Indian Journal of Public Health Research & Development
An International Journal

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

Website:
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Print ISSN: 0976-0245, Electronic ISSN: 0976-5506, Frequency: Quarterly (Four issue per volume)

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The journal has been assigned International Standards Serial Number (ISSN)Print ISSN: 0976-0245, Online ISSN: 0976-5506 and is indexed with Index Copernicus (Poland). It is also brought to notice that the journal is being covered by many international databases. The journal is covered by EBSCO (USA), Embase, EMCare & Scopus database. The journal is now part of DST, CSIR, and UGC consortia.

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Estimation of C-Reactive Protein Levels in Chronic Periodontitis

Prashaanthi N₁, Anitha Roy², Savitha G³

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ABSTRACT

Aim: The aim of the study was to assess the level of C-reactive protein in patients with chronic periodontitis.

Introduction: Periodontal disease is marked by chronic infection and inflammation in periodontal tissues resulting in the destruction of alveolar bone with subsequent tooth loss. C-reactive protein (CRP) elevation is a part of the acute phase response to acute and chronic inflammation. Periodontal sub-gingival pathogens affect native and general immune and inflammatory response and causes the liberation of cytokines, this result in periodontal destruction and initiation of acute phase systemic inflammatory response marked by the release of C-reactive proteins.

Materials and Method: Patients were selected from those attending the outpatient department of a private hospital and divided into two groups (n=30) Group I – Normal healthy individuals and Group II – Chronic periodontitis individuals. Informed consent was obtained from the patient before sample collection. 3ml of venous blood was collected in plain collection tubes and centrifuged at 3000rpm for 10 minutes. Then serum was separated and analysed to estimate the CRP by Turbilatex Method using ERBA CHEM 5 plus analyzer. Student t test was used for statistical analysis of the data.

Results: The study group showed a significant increase in mean CRP level 7.7 ± 1.25 compared to control 3.12 ± 1.25 (p = 0.001)

Conclusion: The increase in CRP level associated with patients with chronic periodontitis compared to individuals with healthy periodontium may be indicative of the inflammation and hence, CRP may be used as a inflammatory marker for diagnosing periodontitis.

Keywords: biomarker, CRP, inflammatory response, periodontal disease, saliva.

Introduction

Periodontal disease is marked by chronic infection and inflammation in periodontal tissues leading to destruction of alveolar bone with subsequent tooth loss. Periodontal infections are the result of an interaction between tooth associated microbial biofilms and the host defences. Periodontal pathogens can affect local and systemic immune and inflammatory responses.¹,²

C - reactive protein (CRP), plasminogen-activator inhibitor 1 (PAI-1) and fibrinogens are the most important factors in the acute phase of inflammation. CRP is a protein synthesized in the liver and the major protein of plasma. Its half-life is approximately 4-6 hours. The serum levels of this protein increase rapidly within 24 to 72 hours in conditions of inflammation or tissue damage and will subside after the removal of inflammation or infection.³,⁴ It is a pattern recognition molecule, that is extremely sensitive and non-specific acute-phase marker for inflammation, produced in response to many forms of injury other than binding to specific molecular configurations that are typically exposed during cell death or found on the surfaces of pathogens. It is regulated by cytokines like interleukin-6 (IL- 6), interleukin-1β (IL-1β) and tumour necrosis factor-α (TNF-α).⁵,⁶

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A biomarker is an objective measure that has been evaluated and confirmed either as an indicator of physiologic health, a pathogenic process or a pharmacologic response to a therapeutic intervention. Biomarkers can be studied in various body fluids like serum, GCF, saliva, CSF, urine etc. There have been innumerable attempts over the years to establish methods of diagnosis or prognosis for oral disease by the analysis of saliva. Oral fluid/saliva, called the ‘mirror of the body’, is a perfect medium to be explored for health and disease surveillance. Positive correlation between CRP and periodontal disease severity was proved by many studies and levels of CRP decrease after nonsurgical periodontal therapy, but most studies have focused on CRP levels in chronic periodontitis, and very few are conducted on patients with aggressive periodontitis. Epidemiological associations between periodontitis and CVD have been reported.

The findings conducted by Rangbulla et al .,2017, suggest that salivary IgA, Interleukin-1 and MMP-8 might be potentially useful in distinguishing health from disease with early diagnosis, monitoring periodontal disease activity, and response to therapy. The systematic review by Fintoni et al,2017, showed higher IL8 gene expression and IL-8 protein levels in gingival tissues from individuals with chronic periodontitis compared with periodontally healthy patients. There are conflicting evidences regarding IL-8 levels in saliva. Moreover, although the results of the studies were highly heterogeneous, many studies reported higher IL-8 levels in the gingival crevicular fluid of patients with chronic periodontitis as compared to healthy controls.

The Periodontal disease may lead to atherogenesis by two different pathways: A direct invasion of the arterial wall as evidenced for chlamydial organisms and P.gingivalis and some other periodontal pathogens. The release of some systemic inflammatory mediators and acute phase reactants with atherogenic effects. E.g.: TNFα, IL-1, IL-6, CRP, and serum amyloid-A. The total volume of inflamed periodontal tissue may also play a role and there is tendency for higher CRP levels in generalized periodontitis compared to localized periodontitis. It has been established that the extent of bacteremia is directly related to the severity of the periodontal inflammation. Subsequently, the systemically dispersed bacteria and lipopolysaccharide (LPS), as well as cytokines from the periodontal lesion, may stimulate hepatocytes and circulating leukocytes to produce CRP and IL-6, respectively. The presence of periodontal pathogens Porphyromonas gingivalis, Prevotella intermedia, Campylobacter rectus and Bacteroides forsythus in subgingival samples was positively associated with elevated CRP levels.

Present studies have demonstrated that the extent of increase in CRP levels in periodontitis patient depends on the severity of disease and that the elevation of CRP is associated with the presence of periodontopathic bacteria. It should be noted that CRP levels of patients tended to be higher at baseline and declined at reassessment, suggesting that destructive periodontal diseases are treatable and that it may be possible to lower the CRP value through effective management of destructive periodontal disease. This study was done to assess the levels of C-reactive protein in patients with and without periodontitis.

Materials and Method

Patients were selected from those attending the outpatient department of a private hospital and divided into two groups (n = 30). Group I – Normal healthy individuals and Group II – Chronic periodontitis. The criteria included were individuals with the age group of thirty five to sixty five years and patients with Chronic periodontitis. The exclusion criteria includes individuals with other systemic illness like obesity, Cardiovascular disease, Renal failure, Stroke, endocrine illness, Individuals with acute illness like fever and immuno-compromised individuals.

Sample collection: Informed consent was obtained from the patient before sample collection. 3ml of venous blood was collected in plain collection tubes and centrifuged at 3000 rpm for 10 minutes. Then serum was separated and analysed to estimate the CRP by Turbilatex Method using ERBA CHEM 5 plus analyser. All the data were analysed by using SPSS package. Student t-test analysis was done to find out significant differences between the two groups.

Results

The study group showed a significant increase in mean CRP level 7.7 ± 1.25 compared to control 3.12 ± 1.25 ( p = 0.001) ( Table 1)
Table 1: CRP levels of control and study group

<table>
<thead>
<tr>
<th>CRP Level</th>
<th>Mean</th>
<th>SD</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>3.12</td>
<td>1.11</td>
<td>0.001</td>
</tr>
<tr>
<td>Periodontitis</td>
<td>7.7</td>
<td>1.25</td>
<td></td>
</tr>
</tbody>
</table>

Discussion

The present study revealed a statistically significant increase in the C-reactive protein in the study group with chronic periodontitis compared to control group. CRP represents a reliable marker of the acute phase response to infectious burdens and/or inflammation. Recent evidence has indicated that patients with severe periodontitis have increased serum levels of CRP compared to unaffected control population.16

Periodontal diseases involve chronic inflammatory processes resulting from interaction of selected gram negative bacterial species with the host defense in disease susceptible individuals. The host responds to microbial challenge, with a high inflammatory response with increased levels of cytokines like IL-1, IL-6, TNF-α. These mediators promote activation of the acute phase reactants resulting in elevated serum levels of CRP, α1-acid glycoprotein, ceruloplasmin, serum amyloid A.17-21

In 2015, Podzimek et al compared and evaluated the systemic levels of CRP in the peripheral blood samples of patients with chronic and aggressive periodontitis, gingivitis, and gingival recessions. Their study results show that CRP levels increase subsequently with the severity of the periodontal disease. There was a positive correlation of CRP levels increasing in patients with gingivitis and patients with chronic periodontitis.15 In 2017, the study conducted by Chandy et.al, showed that there is an increased level of serum CRP and plasma fibrinogen in study groups when compared to healthy controls. An increase in level of mean serum CRP and plasma fibrinogen were observed in chronic and aggressive periodontitis group when compared to control group and this was found to be statistically significant.2

In this study, CRP level of patients with periodontitis was significantly high compared to healthy patients. They are in accordance with the study of Podzimek et al. There is positive co-relation between high CRP levels with periodontitis. Hence, the present concept is that periodontitis affected subjects have association between periodontal conditions and systemic CRP and periodontal infections may be one of the factors contributing to systemic inflammation. Podzimek et al, have also demonstrated that periodontitis affected subjects have association between periodontal conditions and systemic CRP levels.15

According to study conducted by Salzberg et.al, patients with aggressive periodontitis have statistically significant elevations in serum CRP levels compared to subjects with healthy periodontium. Elevated CRP in these subjects might represent a contribution of periodontal infection to systemic inflammation in relatively young individuals.18 Factors that place individuals at high risk for periodontitis may also place them at high risk for systemic diseases such as cardiovascular disease. Among the environmental risk factors and indicators shared by periodontitis and systemic diseases, such as cardiovascular disease, are tobacco smoking, stress, aging, race/ethnicity, male gender, and history of Periodontitis. It seems likely that the polymorphisms in the IL-1ß and TNF-α gene family are likely to be associated with cardiovascular disease as well as with periodontitis.19 The result of this study showed that the patients with high CRP levels are affected with periodontitis and on the other hand they are prone to other systemic diseases. Healthy patients with normal CRP levels or decrease in the CRP levels have healthier periodontium.

Conclusion

This study highlights the association between the CRP levels and chronic periodontitis. CRP can be used as a serum biomarker for the diagnosis of chronic periodontitis. Studies can be conducted on a larger sample size which may confirm the association of CRP levels in chronic periodontitis.

Conflict of Interest: Authors report that there is no conflict of interest of any kind.

Statement of Informed consent: Informed consent was obtained from the concerned authorities and from the subjects before the study.

Statement of Human and Animal Rights: No harm was inflicted on any humans on conduction of this study.

Source of Funding: Self
REFERENCES


Does Accreditation Improves Quality of Care Perceived by Healthcare Providers?

Arif Raza
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ABSTRACT

The study is aimed at understanding whether the accreditation of hospital in India (NABH) has any effect on its quality, as perceived by the healthcare providers. Primary data was collected from healthcare providers working in accredited and non-accredited hospitals, on their rating of Infrastructure, process and outcome of care at their hospital. The data was statistically analysed to determine if there is any significant difference in the rating given by accredited hospital’s healthcare providers from non-accredited hospital’s healthcare providers.

The study found that except infrastructure component, the mean rating and percentage of high rating were significantly higher for process and outcome component. The overall rating was also significantly higher by accredited hospitals healthcare providers.

Keywords: Hospital Accreditation, Quality, Patient Safety, NABH

Introduction

Accreditation of hospitals is considered as one of the most successful mechanism to achieve improvement in quality and safety of healthcare. In healthcare, accreditation recognize and certifies the capability of a healthcare organization in delivering an acceptable standard of healthcare services, which is based upon good and safe practices.

Accreditation is gaining prominence amongst healthcare organizations in India. Accreditation by National Accreditation Board for Hospitals and Healthcare Providers (NABH) is the most sought after accreditation by Indian hospitals. After the advent of NABH accreditation in India in 2006, the number of hospital achieving NABH accreditation has been consistently increasing. The process of getting accreditation by NABH involves application, pre-assessment, final assessment and grant of accreditation. In between these stages the HCO is required to prepare itself as per the requirements of accreditation standards.

Since its inception the NABH board has promoted accreditation of hospital as an effective mean to improve quality and patient safety. Several benefits of accreditation for different stakeholders of the hospital have been mentioned. Several other organizations specifically who are in business of providing consultancy support to hospitals also promotes accreditation on similar lines.

However, the recognition of accreditation as a means to healthcare quality have not been sufficiently verified scientifically. Although there have been various researches and systematic literature reviews conducted in other parts of the world, in India no such study has been done till date.

Existing studies on healthcare accreditation shows differential result with different accreditation system. Also, as different accreditation system has its own set of standards, assessment and accreditation method, generalizing result of study of on one accreditation system
on other may be limited. Several studies have also found contradicting findings even with same accreditation system. This explains that while accreditation may have sufficient association on some parameters it may not be associated with other parameters.

While most studies observed and compared accreditation’s impact on clinical care components8,9,10,11,12,13,14, very few shows an overall impact on hospital as an organization15,16,17. Clinical care although is a vital component of healthcare the non-clinical aspects also play an important role in overall healthcare quality. Things like infrastructure, human resource capability, patient care processes, client satisfaction etc. constitutes an important part of overall quality and whether or not accreditation has any effect on them, is not reflecting from literatures reviewed.

There are very few literature on NABH. In one intra-institutional experience study that was conducted to evaluate the change of attitude toward acceptance of NABH guidelines by medical practitioner, it was reported that medical staff had a positive attitude and improved knowledge about accreditation after 6 months working in a hospital on the way to NABH22. However, no link with healthcare performance, quality, safety or outcome were made. Accreditation requires significant amount of financial resources and efforts on part of the hospitals. Financial implications for accreditation are both direct and indirect4. Since these expenditure and efforts are being done primarily to improve patient care quality6, it is imperative to have an evidence to ascertain the same.

Methodology

Framework of the study: Modelling the healthcare is a considered as a highly complex task25. After reviewing the popular models, Donabedian’s conceptual model of quality of care has been chosen for this study. The model is arguably the most popular to understand the dimensions of healthcare quality19,20,21. It proposes that healthcare quality consists of three categories: “structure,” “process,” and “outcomes.”. This study utilizes Donabedian’s quality of care model to describe and assess quality in healthcare organization.

Study design: The study uses cross sectional exploratory study design. The data from sample belonging to accredited and non-accredited hospitals were compared. Statistical analysis done to determine significant differences.

Samples: The samples were sourced from 2 NABH accredited and 2 not accredited hospitals. Refer table 1 for hospitals details.

<table>
<thead>
<tr>
<th>Hospital A</th>
<th>Hospital B</th>
<th>Hospital C</th>
<th>Hospital D</th>
</tr>
</thead>
<tbody>
<tr>
<td>Accreditation status</td>
<td>Accredited by NABH</td>
<td>Not accredited</td>
<td>Not Accredited</td>
</tr>
<tr>
<td>Date of accreditation</td>
<td>23 June, 2013</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>Ownership</td>
<td>Private – Corporate</td>
<td>Private – Corporate</td>
<td>Private – Corporate</td>
</tr>
<tr>
<td>Bed strength</td>
<td>150</td>
<td>175</td>
<td>150</td>
</tr>
<tr>
<td>Average annual outpatient attendance</td>
<td>40,000 – 45,000</td>
<td>65,000 – 75,000</td>
<td>55,000 – 60,000</td>
</tr>
<tr>
<td>Average annual inpatient admissions</td>
<td>3,800 – 4,100</td>
<td>6,800 – 7,000</td>
<td>5,000 – 5,200</td>
</tr>
<tr>
<td>Average Bed occupancy rate</td>
<td>45-50%</td>
<td>55-60%</td>
<td>50-55%</td>
</tr>
</tbody>
</table>

Inclusion and Exclusion Criteria: The healthcare providers working in the above hospitals were randomly sampled using the following inclusion and exclusion criteria

● Inclusion: Staff employed in any of the above hospitals and are directly providing healthcare to patient (such as doctors, nurses, therapists)

● Exclusion: Staff that are employed for less than 1 year or are under resignation and serving notice period

Data collection: Data was collected using the structured instrument created on the basis of Donabedian’s model. The instrument was validated and pilot testing
was carried out. The instrument was prepared in two languages, English and Hindi.

**Hypothesis:** The hypothesis which were used for statistical analysis are

**H01:** There is no significant difference in the rating given to *infrastructure* component of the hospital, by healthcare providers from accredited hospital (HCP-Ac) and healthcare providers from non-accredited hospitals (HCP-NAc)

**H02:** There is no significant difference in the distribution of ‘high’ and ‘not high’ rating given to *infrastructure* component, by HCP-Ac and HCP-NAc

**H03:** There is no significant difference in the rating given to *process* component of the hospital, by HCP-Ac and HCP-NAc

**H04:** There is no significant difference in the distribution of ‘high’ and ‘not high’ rating given to *process* component, by HCP-Ac and HCP-NAc

**H05:** There is no significant difference in the rating given to *outcome* component of the hospital, by HCP-Ac and HCP-NAc

**H06:** There is no significant difference in the distribution of ‘high’ and ‘not high’ rating given to *outcome* component, by HCP-Ac and HCP-NAc

**H07:** There is no significant difference in the rating given to *overall* hospital, by HCP-Ac and HCP-NAc

**H08:** There is no significant difference in the distribution of ‘high’ and ‘not high’ rating given to *overall* hospital, by HCP-Ac and HCP-NAc

**Findings**

**Healthcare Providers’ Sample Description:** The profile mix of respondents under both the group is described in table 2.

**Table 2: Healthcare Providers sample mix**

<table>
<thead>
<tr>
<th></th>
<th>From accredited hospitals</th>
<th>From non-accredited hospitals</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sample size (n)</strong></td>
<td>135</td>
<td>148</td>
<td>283</td>
</tr>
<tr>
<td><strong>Age</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18-30</td>
<td>49 (36.3%)</td>
<td>44 (32.59%)</td>
<td>93 (32.86%)</td>
</tr>
<tr>
<td>31-45</td>
<td>62 (45.93%)</td>
<td>70 (51.85%)</td>
<td>132 (46.64%)</td>
</tr>
<tr>
<td>&gt; 45</td>
<td>24 (17.78%)</td>
<td>34 (25.19%)</td>
<td>58 (20.49%)</td>
</tr>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Males</td>
<td>47 (34.81%)</td>
<td>61 (41.22%)</td>
<td>108 (38.16%)</td>
</tr>
<tr>
<td>Females</td>
<td>88 (65.19%)</td>
<td>87 (58.78%)</td>
<td>175 (61.84%)</td>
</tr>
<tr>
<td><strong>Category</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Doctor</td>
<td>14 (10.37%)</td>
<td>20 (13.51%)</td>
<td>34 (12.01%)</td>
</tr>
<tr>
<td>Nursing</td>
<td>90 (66.67%)</td>
<td>96 (64.86%)</td>
<td>186 (65.72%)</td>
</tr>
<tr>
<td>Paramedical</td>
<td>31 (22.96%)</td>
<td>32 (21.62%)</td>
<td>63 (22.26%)</td>
</tr>
<tr>
<td><strong>Years of work</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-3 years</td>
<td>59 (43.70%)</td>
<td>61 (41.22%)</td>
<td>120 (42.40%)</td>
</tr>
<tr>
<td>4-7 years</td>
<td>54 (40.00%)</td>
<td>51 (34.46%)</td>
<td>105 (37.10%)</td>
</tr>
<tr>
<td>&gt; 7 years</td>
<td>22 (16.30%)</td>
<td>36 (24.32%)</td>
<td>58 (20.49%)</td>
</tr>
</tbody>
</table>
Findings on Infrastructure Component: Table 3 describes the data on Infrastructure component

### Table 3: Descriptive statistics on Infrastructure component

<table>
<thead>
<tr>
<th></th>
<th>HCP-Ac</th>
<th>HCP-NAc</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sample size (n)</td>
<td>135</td>
<td>148</td>
</tr>
<tr>
<td>Mean rating</td>
<td>4.64</td>
<td>4.63</td>
</tr>
<tr>
<td>Standard Deviation</td>
<td>0.35</td>
<td>0.43</td>
</tr>
<tr>
<td>No. of rating as</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>94 (69.63%)</td>
<td>107 (72.30%)</td>
</tr>
<tr>
<td>4</td>
<td>33 (24.24%)</td>
<td>27 (18.24%)</td>
</tr>
<tr>
<td>3</td>
<td>8 (5.93%)</td>
<td>14 (9.46%)</td>
</tr>
<tr>
<td>2</td>
<td>0 (0.00%)</td>
<td>0 (0.00%)</td>
</tr>
<tr>
<td>1</td>
<td>0 (0.00%)</td>
<td>0 (0.00%)</td>
</tr>
</tbody>
</table>

Testing of null Hypothesis H01: Null hypothesis ‘There is no significant difference in the rating given to infrastructure component of the hospital, by HCP-Ac and HCP-NAc’ was tested using two tailed t-test. The P value (P(T<=t) two-tail = 0.907017) was found to be greater than alpha (α = 0.05), hence the result is **not significant**.

Testing of Hypothesis H02: Null hypothesis ‘There is no significant difference in the distribution of ‘high’ and ‘not high’ rating given to infrastructure component, by HCP-Ac and HCP-NAc’, was tested using Chi square test. The Chi-square value was found to be 1.230 at corresponding P value of 0.267, hence the result is **not significant** at p < 0.05.

(Note: rating of 4 and 5 is taken as ‘high’ rating and rating below 4 as ‘not high’ rating.)

Findings on Process Component: Table 4 describes the data on Process component

### Table 4: Descriptive statistics on Process component

<table>
<thead>
<tr>
<th></th>
<th>HCP-Ac</th>
<th>HCP-NAc</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sample size (n)</td>
<td>135</td>
<td>148</td>
</tr>
<tr>
<td>Mean rating</td>
<td>4.22</td>
<td>3.71</td>
</tr>
<tr>
<td>Standard Deviation</td>
<td>0.76</td>
<td>0.99</td>
</tr>
<tr>
<td>No. of rating as</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>68 (50.37%)</td>
<td>46 (31.08%)</td>
</tr>
<tr>
<td>4</td>
<td>30 (22.22%)</td>
<td>25 (16.89%)</td>
</tr>
<tr>
<td>3</td>
<td>36 (26.67%)</td>
<td>71 (43.92%)</td>
</tr>
<tr>
<td>2</td>
<td>1 (0.74%)</td>
<td>12 (8.11%)</td>
</tr>
<tr>
<td>1</td>
<td>0 (0.00%)</td>
<td>0 (0.00%)</td>
</tr>
</tbody>
</table>

Testing of null Hypothesis H03: Null hypothesis ‘There is no significant difference in the rating given to process component of the hospital, by HCP-Ac and HCP-NAc’ was tested using t-test two tailed. The P value (P(T<=t) two-tail = 5.946E-06) was found to be less than alpha (α = 0.05), hence result is **significant**.

Testing of Hypothesis H04: The null hypothesis ‘There is no significant difference in the distribution of ‘high’ and ‘not high’ rating given to process component, by HCP-Ac and HCP-NAc’ was tested using Chi square test. The Chi-square value was found to be 17.789 and corresponding P value is 0.000, the result is **significant** at p < 0.05.

Findings on Outcome Component: Table 5 describes the data on Outcome component

### Table 5: Descriptive statistics on Outcome component

<table>
<thead>
<tr>
<th></th>
<th>HCP-Ac</th>
<th>HCP-NAc</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sample size (n)</td>
<td>135</td>
<td>148</td>
</tr>
<tr>
<td>Mean rating</td>
<td>4.35</td>
<td>4.03</td>
</tr>
<tr>
<td>Standard Deviation</td>
<td>0.62</td>
<td>1.11</td>
</tr>
<tr>
<td>No. of rating as</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>71 (52.59%)</td>
<td>72 (48.65%)</td>
</tr>
<tr>
<td>4</td>
<td>42 (31.11%)</td>
<td>21 (14.19%)</td>
</tr>
<tr>
<td>3</td>
<td>20 (14.81%)</td>
<td>43 (29.05%)</td>
</tr>
<tr>
<td>2</td>
<td>2 (1.48%)</td>
<td>12 (8.11%)</td>
</tr>
<tr>
<td>1</td>
<td>0 (0.00%)</td>
<td>0 (0.00%)</td>
</tr>
</tbody>
</table>

Testing of null Hypothesis H0-2e: Null hypothesis ‘There is no significant difference in the rating given to outcome component of the hospital, by HCP-Ac and HCP-NAc’ was tested using t-test – two tailed. The P value (P(T<=t) two-tail = 5.946E-06) was found to be less than alpha (α = 0.05), hence result is **significant**.

Testing of Hypothesis H0-2f: Null hypothesis ‘There is a significant difference in the rating given to outcome component of the hospital, by HCP-Ac and HCP-NAc’ was tested using Chi square test. Chi-square value was found to be 15.520 and corresponding P value is 0.000, the result is **significant** at p < 0.05.

Findings on Overall Hospital Rating: Table 6 describes the data on overall rating
Table 6: Descriptive statistics on Overall rating

<table>
<thead>
<tr>
<th></th>
<th>HCP-Ac</th>
<th>HCP-NAc</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sample size (n)</td>
<td>135</td>
<td>148</td>
</tr>
<tr>
<td>Mean rating</td>
<td>4.32</td>
<td>3.99</td>
</tr>
<tr>
<td>Standard Deviation</td>
<td>0.53</td>
<td>0.73</td>
</tr>
<tr>
<td>No. of rating as</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>63 (46.67%)</td>
<td>47 (31.76%)</td>
</tr>
<tr>
<td>4</td>
<td>53 (39.26%)</td>
<td>59 (39.86%)</td>
</tr>
<tr>
<td>3</td>
<td>18 (13.33%)</td>
<td>36 (24.32%)</td>
</tr>
<tr>
<td>2</td>
<td>1 (0.74%)</td>
<td>6 (4.05%)</td>
</tr>
<tr>
<td>1</td>
<td>0 (0.00%)</td>
<td>0 (0.00%)</td>
</tr>
</tbody>
</table>

Testing of null Hypothesis H0-2g: Null hypothesis ‘There is no significant difference in the rating given to overall hospital, by HCP-Ac and HCP-NAc’ was tested using t-test two tailed. The P value (P(T<=t) two-tail = 0.000634) was found to be less than alpha (α = 0.05), result is significant.

Testing of Hypothesis H0-2h: Null hypothesis ‘There is no significant difference in the distribution of ‘high’ and ‘not high’ rating given to overall hospital’ was tested using Chi square test. The Chi-square value was found to be 15.520 and corresponding P value is 0.003, hence the result is significant at p < 0.05.

Conclusion

The data and its analysis shows following result

- The mean rating given to infrastructure component by healthcare providers of accredited hospital do not significantly differ from healthcare providers of non-accredited hospital. The distribution of high and not high rating also do not differ between healthcare providers of accredited and non-accredited hospital
- There is a significant difference in ratings given by healthcare providers of accredited and non-accredited hospital on process component
- Differences in mean rating of outcome by respondents from accredited and by respondents from non-accredited hospitals was also found to be statistically significant, with rating by respondents from accredited group being significantly higher
- The analysis of overall rating has shown significant difference in ratings by respondents from accredited and non-accredited hospital in both the categories. The distribution of ‘high’ rating was also found to be higher in accredited group respondents

Thus, it could be concluded that except for infrastructure, the other components of quality, i.e. process and outcome, has been perceived better by healthcare providers from accredited hospital in comparison to non-accredited hospitals. The overall response on hospital was also better for accredited hospitals.

Recommendation: While the accreditation system do seem to improve process and outcomes in view of healthcare providers, the infrastructure component is not effected. As infrastructure is also a basic component of quality of care, the accreditation system must focus more on improving this component of the hospital.

Limitation: The study has some limitations which should be taken into consideration while interpreting the results

- The effect on quality has been measured by the rating given by healthcare providers. This may differ from the technical data on infrastructure, process and outcome.
- The study is based on a cross sectional data and do not features in time series data. Hence study cannot comment upon whether the data collected at the time of collection holds true across the time.

Ethical Clearance: Taken from Institutional review Board under Federal Assurance for the protection of Human subjects, IIHMR university, Jaipur

Source of Funding: Self

Conflict of Interest: Nil

REFERENCES


Managing Technology and Innovation among Entrepreneurs in Tamil Nadu

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¹Assistant Professor; ²Associate Professor, Dept. of Commerce, Vistas, Chennai

ABSTRACT

This study highlights the importance of technology-based entrepreneurship as a strategy for industrialization and technological development. Exploratory in nature, the study describes the general context for entrepreneurship in the evolving economies of State of Tamil Nadu in India. Specifically it probes the positive engagement of the private sector in sustaining the drive toward technological entrepreneurship in the region. Using the scheme developed by the Organization for Economic Cooperation and Development (OECD) of classifying industries according to their degree complexity and knowledge intensity, the study suggests another way of looking at the issue of technological development. The study revealed that entrepreneurship and technological developments are attracting increasing attention in the region, but that the necessary supportive educational measures are either absent or weak. The evidence is that the private sector is as active as the public sector in the processes of industrialization and technological development Decision-makers are called upon to boost public and private innovation initiatives, and to place an appropriate emphasis on entrepreneurship learning for all. This study heads some light on the efforts of the private sector in Tamil Nadu to close the technological gap with other states in the Country.

Keywords: Technological entrepreneurship, technological innovation, development.

Introduction

“An entrepreneur searches for change, responds to it and exploits opportunities. Innovation is a specific tool of an entrepreneur hence an effective entrepreneur converts a source into a resource.” –Peter Drucker, Entrepreneurship is the lifeblood of any economy.

Entrepreneurship is the ability to bring these innovative ideas into new real successful products, by means of deeply assessing multidisciplinary aspects surrounding the new idea, well before becoming a real product. Furthermore, it is an inevitable step for any successful product in the market. This competence helps innovating and having great ideas while teaches keeping the feet on the ground and be realistic. Innovation is a key element in any successful company. Although the skills to foresee improving opportunities can rest on any employee’s abilities, usually this task lies on the shoulders of its R&D engineers. By having deep knowledge in the company product technologies, engineers create and engender new ideas which increase business opportunities. Indian entrepreneurs are more about overcoming barriers, obstacles, inspiring & surmount in their fields. Entrepreneurship is one of the important segments of economic growth. Innovation is a key factor that an entrepreneur brings in an overall change through innovation for the maximum social good. The growth of entrepreneurship particularly in the small scale sector can be traced to the Second World War boom which brought many enterprising people from various walks of life. As someone said failures are the stepping Stones for Success. If we observe the way any entrepreneur, their life is not a bed of roses. They faced many obstacles in the way of entrepreneurial achievement. Furthermore, women can tell the condition of a nation, she acts as a central cohesive source of support and stability, not only to her family but also to whole nation. There is saying where women are respected, dwells God. Similarly where women are there in the industry dwells progress and prosperity. The bottom line for all the entrepreneurial life taught the first lesson for success; and that is failure.
Review of Literature and Theoretical Framework

The Knowledge Spillover Theory of Entrepreneurship:
Resolution to the Innovation Paradox came after rethinking not the validity of the model of the knowledge production function, but rather the implicit assumptions of independence and reparability underlying the decision-making analytical units of observation—the established incumbent firm and the new entrepreneurial firm. Just as the prevailing theories of entrepreneurship have generally focused on the cognitive process of individuals in making the decision to start a new firm, so that the decision-making criterion are essentially internal to the decision-making unit in this case the individual, the model of the knowledge production function generally limited the impact of the firm’s investments in creating new knowledge to that decision-making unit in this case the firm.

That these decision-making units the firm and the individual might actually not be totally separable and independent, particularly with respect to assessing the outcome of knowledge investments, was first considered by Audretsch (1995), who introduced The Knowledge Spillover Theory of Entrepreneurship 1.

The expected value of any new idea is highly uncertain, and as Arrow pointed out, has a much greater variance than would be associated with the deployment of traditional factors of production. After all, there is relative certainty about what a standard piece of capital equipment can do, or what an unskilled worker can contribute to a mass-production assembly line. By contrast, Arrow emphasized that when it comes to innovation, there is uncertainty about whether the new product can be produced, how it can be produced, and whether sufficient demand for that visualized new product might actually materialize.

But what is the appropriate unit of observation to be used to frame the context and observe the entrepreneurial response to knowledge investments made by incumbent organizations In his 1995(Audretsch) proposed using the industry as the context in which knowledge is created, developed, organized, and commercialized. The context of an industry was used to resolve the paradox concerning the high innovative output of small enterprises given their low level of knowledge inputs that seemingly contradicted the Griliches model of the firm knowledge production. After reviewing the literature on location, innovation is analyzed in a modified production function approach following Griliches (1979), in which innovative output depends upon inputs. U.S. Small Business Administration (SBA) data from 1982 is used, consisting of innovation citations containing information on 4,200 product innovations. Small firms (those with fewer than 500 employees) were found to make better use of university research, despite fewer formal relationships, though this may be due to less developed internal R&D departments2.

The reason for challenging the assumptions of independence and reparability between (potential) entrepreneurs and firms emanates from a fundamental characteristic of knowledge that differentiates it from the more traditional firm resources of physical capital and (unskilled) labor. Arrow (1962) pointed out that knowledge differs from these traditional firm resources due to the greater degree of uncertainty, higher extent of asymmetries, and greater cost of transacting new ideas3.

The empirical evidence supporting the knowledge spillover theory of entrepreneurship was provided from analyzing variations in startup rates across different industries reflecting different underlying knowledge contexts (Audretsch, 1995). In particular, those industries with a greater investment in new knowledge also exhibited higher startup rates while those industries with less investment in new knowledge exhibited lower start up rates, which was interpreted as the mechanism by which knowledge spillovers are transmitted.

In applying the model of the knowledge production function to spatial units of observation, theories of why knowledge externalities are spatially bounded were needed. Thus, it took the development of localization theories explaining not only that knowledge spills over but also why those spillovers decay as they move across geographic space.

Feldman (1992) confirmed that the knowledge production function represented equation held at a spatial unit of observation using a direct measure of innovative activity: new product introductions in the market. Feldman (1994) extended the model to consider other knowledge inputs to the commercialization of new products. The results confirmed that the knowledge production function was robust at the geographic level of analysis: the output of innovation is a function of the innovative inputs in that location4.
Studies identifying the extent of knowledge spillovers are based on the model of the knowledge production function applied at spatial units of observation. In what is generally to be considered to be the first important study re-focusing the knowledge production function, Jaffe (1989) modified the traditional approach to estimate a model specified for both spatial and product dimensions. Empirical estimation of Equation (1) essentially shifted the knowledge production function from the unit of observation of a firm to that of a geographic unit. Implicitly contained within the knowledge production function model is the assumption that innovative activity should take place in those regions where the direct knowledge-generating inputs are the greatest, and where knowledge spillovers are the most prevalent. Jaffe (1989) dealt with the measurement problem raised by Krugman (1991a) by linking the patent activity within technologies located within states to knowledge inputs located within the same spatial jurisdiction.

**Methodology of the Study**

The data and information has been collected from secondary sources magazines, business newspapers, journals, periodicals, reports, text books and websites. Further, interviews, lecturers on related area were also taken into consideration for the study.

**Objectives of the Study:**

- To analyze the future of entrepreneurship in India.
- To elucidate the role of technology and Innovation on Entrepreneurship in India

### Importance of Innovation in Entrepreneurship:

The rules and principles are similar for every entrepreneur who owns large or small enterprise. Only the difference is, The starter face toothache and hick ups at the early stage, where as existing business face different problems, limitations, management problems and constraints in the market etc. Both the cases it needs to learn many things and should be innovative for the survival in the business market. The daily crisis cannot be postponed; it has to be dealt with right away. And the existing operation demands high priority and deserves it. It thus takes special effort for the existing business to become entrepreneurial and innovative. As Drucker says, The enterprise that does not innovate inevitably ages and declines. And in a period of rapid change such as the present, an entrepreneurial period, the decline will be fast. Innovation requires major effort. It requires hard work on the part of performing, capable people the scarcest resource in any organization.

### Innovation and Entrepreneurship:

The conceptual relationship between entrepreneurship and innovation has been discussed in the literature for many years. According to Nelson (1993, p.4), innovation encompasses “the processes by which firms master and get into practice product designs and manufacturing processes that are new to them.”

Such a broad understanding of innovation is particularly meaningful within the context of innovative entrepreneurship insofar as upgrading technology or improving skills may lead to more efficient uses of resources or higher-quality outputs, but not necessarily to new products or patents. That is why Lundvall (2007) emphasized that it is important to avoid a high-tech bias when thinking about innovation.

### Top ten Entrepreneurs in Tamil Nadu

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Entrepreneurs</th>
<th>Company</th>
<th>Business</th>
<th>Net worth</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Mr. P. Rajagopal</td>
<td>Hotel Saravana Bhavan</td>
<td>Hotel Industry</td>
<td>US$ 700 million</td>
</tr>
<tr>
<td>2.</td>
<td>MR. A. D. Padmasingh</td>
<td>Aachi Group</td>
<td>Masala King</td>
<td>Rs.1200 Crores</td>
</tr>
<tr>
<td>3.</td>
<td>R. G. Chandramogan</td>
<td>Hatsun Agro Products</td>
<td>ice cream</td>
<td>347.11 Crores</td>
</tr>
<tr>
<td>4.</td>
<td>Nalli Kuppusami Chetti</td>
<td>Nalli Silks</td>
<td>Silks</td>
<td>Rs 450 crore</td>
</tr>
<tr>
<td>5.</td>
<td>Mr. Sridhar Vembu</td>
<td>Zoho Corporation</td>
<td>technology compan</td>
<td>$200 million</td>
</tr>
<tr>
<td>6.</td>
<td>Mr. K. M. Mammen Mappillai</td>
<td>MRF</td>
<td>manufacturer of tyres</td>
<td>4517.64 Crores</td>
</tr>
<tr>
<td>7.</td>
<td>Mr. T. V. Sundram Iyengar</td>
<td>TVS</td>
<td>automobile production</td>
<td>49.22 billion</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(US$750 million)</td>
</tr>
<tr>
<td>8.</td>
<td>Mr. C. K. Ranganathan</td>
<td>CavinKare</td>
<td>personal care and food categories</td>
<td>1,100 crore</td>
</tr>
<tr>
<td>9.</td>
<td>Mr. Murugappa chettiyar</td>
<td>Murgappa Group</td>
<td>diversified fields</td>
<td>$805 million</td>
</tr>
<tr>
<td>10.</td>
<td>Mr. K. R. Nagarajan</td>
<td>Ramraj Cotton</td>
<td>ethnic men’s wear</td>
<td>Rs 5,000 crore</td>
</tr>
</tbody>
</table>
Findings and Discussion

- Innovation always an important component of entrepreneurship but it is not essentially part of it. Innovation term is developed from innovation. So if something is new is innovative, whereas the entrepreneurship always does not require innovation.
- It is necessary to be the typical characteristics that define the leading cross-business incubators are very busy and the ability and aspiration to success. And we can define these properties as follows
  - Autonomous capacity to take decisions has the ability to control the work and results
  - Higher energy level working diligently and found the extraordinary efforts in order to succeed.
  - Big need for achievement: stimulates to accomplish, and looking up to achieve the goals that are challenging.
  - Self-confidence have the ability, and very self-reliance and confidence.
  - Leadership comes in a lot of cases, new innovation, which changes in the area where he works in full, and this type of entrepreneurs is relying on them in the development of the entire country’s economy, and the source of the change engine the structures of the industry.

Conclusion

Entrepreneurial and innovative organizations studied in this research are facing problems with the implementation of entrepreneurship and innovation. Because entrepreneurship and innovation are systematic behaviours, systematic efforts are required to incorporate them into the operations of organizations.

Innovation in Entrepreneurship must be regarded as continues, everyday practice in all organizations, and this study has contributed to enlightening the innovation attitude of some entrepreneurs in the state. It is also apparent that cultural issues should be addressed when examining the level of entrepreneurship and innovation in Tamil Nadu. Moreover, more systematic and comprehensive studies are required in the future to study how innovation culture might influence firm’s performance

Ethical Clearance: Completed

Source of Funding: Self

Conflict of Interest: Nil

REFERENCES

Prevalence of Dental Caries among 9 to 13 Years School Children of Tiruvallur District-Chennai Tamil Nadu

Indhulekha Vimalakshan1, Deepa Gurunathan2, Pradeep Kumar3
1Graduate Student, 2Professor, Department of Pedodontics, 3Professor, Department of Community Dentistry, Saveetha Dental College, Saveetha Institute of Medical Technical Sciences (SIMATS), Saveetha University, Chennai

ABSTRACT
Oral health plays an important role in general health of body. Poor oral hygiene can also lead to many systemic diseases. Dental caries is a disease with multifactorial causes. The prevalence and occurrence of dental caries in a population is influenced by many factors such as sex, age, socioeconomic status, dietary patterns and oral hygiene habits. Hence, the present study was designed to assess the prevalence of dental caries in Tiruvallur district Chennai, Tamil Nadu.

Material and methods: The survey was carried out among school going children of age 6 years and 13 years. 399 healthy subjects including 219 boys and 129 girls from 7 different schools were examined in day light with the help of basic diagnostic instruments like mouth mirror and probe.

Result: In this study it was observed that the 9 and 10 age group of children had high percentage of caries when compared to 11 to 13 years age group of children. The mean dmft score was also high in was also high in 9 and 10 age group of children. In total dental caries was observed in 253(72.21%) study population. Restoration is the most required treatment in both the group.

Conclusion: The result of this study reveals that there are still large amounts of population that lack awareness on the effect of poor oral hygiene and oral health status and also are ignorant on the advantages of having a good health.

Keywords: oral hygiene, dental caries, school children, prevalence, mouth mirror, probe

Introduction
Health is a basic human right and oral health is a significant component of general health. Although oral diseases are mostly not life-threatening, they are important public health problems. Dental caries is a multifactorial disease where many risk factors are involved, and it occurs because of an imbalance between the environment and external factors. Accumulation of bacteria especially cariogenic streptococcus mutants, diet, oral hygiene and time play an important role in carious lesion. However, dental caries is not a typical classical infectious disease.

Dental caries is specifically increasing in children. 80 to 85% children suffer from this disease and the average number of decayed, missing and filled teeth per child at the age of 12 years is about 4 in rural areas and 5 in urban areas of India with almost no dental restorative help available particularly in the rural areas. Carlos and Gittelsohn (1965) were among the first to group the teeth from most susceptible to least susceptible. According to them the mandibular molars were the most susceptible and the lower incisors were least susceptible. The most frequently affected site is the occlusal surface of first and second molars. Molars are susceptible to dental caries, not only because of their location but also because of their anatomy.

DOI Number: 10.5958/0976-5506.2019.01231.2
The prevalence of dental caries was of great interest for long and is a principal subject of many epidemiological researches being carried out worldwide. This significant but a preventable public health problem interferes with normal food intake, speech, self-esteem, and routine activities affecting overall health status of the children. [1] The prevention of dental caries has long been considered as an important labor for health profession. The world health organization (WHO) recognizes dental caries as a pandemic and reports that the prevalence of dental caries among school going children is about 60 to 90%. The risk factors for dental caries are many and they can be classified into oral and non-oral risk factors. Oral risk factors include anatomy of the tooth, composition of dental plaque, restoration and oral hygiene status. Non-oral risk factors include age, irregular tooth brushing, dietary habits and medication history. [6] School years cover a period that runs from childhood to adolescence. These are influential stages in people’s lives where lifelong substantial oral health-related behaviors, as well as beliefs and attitudes, are being developed. Children are particularly receptive during this period, and the earlier habits are established, the long-lasting, and the impact. [7] Children who suffer from poor oral health are 12 times more likely to have more restricted activity days including missing schools than those who do not. [8]

Studies have reported missed school hours, toothache, and several impairments of daily life activities associated with a high decayed component in both primary and permanent dentition. [9] Similar findings have been reported in Brazilian preschool children and in a school survey of American native children. [10]

Voluminous literature exists on the status of the dental caries in the Indian population. In 1997, 22.7% of Indian population was estimated to be 5 to 14 years. This being such a high proportion of the population, the prevalence of dental caries among this age group needs to be assessed. It has been observed that during 1940 the prevalence of dental caries in India was 55.5%, during 1960 it was reported to be 68%. Overall the general impression is that dental caries has increased in the prevalence severity in urban and cosmopolitan population over the last couple of decades. However there is no definite picture as yet regarding the disease status in rural and backwards areas of the country in the comparison where 80% of the population inhabits. [11]

The “Prevalence” of dental caries in an individual is obtained by calculating DMFT, which is the most common index used and for deciduous dentition dft index is used. An epidemiological study was planned as very few studies have been conducted in Chennai city. Hence, this present study was conducted as a part of the screening, to assess the prevalence among school going children of Tiruvallur district using DMFT index

**Materials and Method**

The study received the approval from university review board (STP/SD 12 BDS 103).

A study of prevalence of dental caries among school going children of Tiruvallur district Chennai was undertaken by the Department of Public Health Dentistry, Saveetha Dental College and Hospitals, Chennai to evaluate prevalence of dental caries in relation to various risk factors.

The survey was conducted in 348 school children residing in Tiruvallur district, Chennai. Out 139 government schools in Tiruvallur district 7 schools were selected for the survey. The sample consisted of 348 individuals of both gender (219 were male and 129 are females); their ages ranged from 9 to 13 years. Age of 12 years has been universally accepted as a global monitoring age for caries since all permanent teeth except third molars would have been erupted by this age. Consent for examining of the children was obtained from the respective head master. The criteria for selection of the study subjects were that the children should be permanent residents of Tiruvallur.

Depending on the physical condition of the school, the exact arrangement for conducting the examination was determined. The school children were examined under daylight with the help of plain mirror and standardized dental probes. Examination of the child was done by only one examiner to avoid interexaminer variability. Recording of data was done by a trained person who assisted throughout the study. Dental caries was evaluated and the DMFT indices were recorded respectively. [12]

**Results**

This study aims to measure the distribution of dental caries among school going children from 9 to 13 years old in Tiruvallur district. The sample size was 348 school children of different age groups.
Table 1 shows the distribution of sample according to source of population, age and gender. The sample is divided into four groups according to age and also was divided into groups according to gender in which each group has both the gender.

Table 2 shows the prevalence of dental caries in which the highest is seen in the age group of 9 with a percentage value of 88.24%. Comparatively the other age group had a percentage value of 85.28%, 74.24%, 52.78%, 60.32%, and 72.21% respectively. Table 2 also shows the mean DMFT for the study subject which was 3.24 while the mean DMFT for different age groups (9-13 years) was 5.03, 4.76, 2.20, 2.18, 2.06, and 3.24 respectively.

Table 3 shows the prevalence of dental caries in different age groups (9-13 years old) for females. The highest percentage of dental caries prevalence was found in the age 10 and the lowest percentage of was found in the age 12.

Table 4 shows the prevalence of dental caries in different age groups (9-13 years old) for males. The highest percentage of dental caries prevalence was found in the age 9 and the lowest percentage of was found in the age 12.

Table 1: Shows the source population according to age and gender

<table>
<thead>
<tr>
<th>Age</th>
<th>Female</th>
<th>Male</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>9 years</td>
<td>51</td>
<td>34</td>
<td>85</td>
</tr>
<tr>
<td>10 years</td>
<td>32</td>
<td>29</td>
<td>62</td>
</tr>
<tr>
<td>11 years</td>
<td>35</td>
<td>33</td>
<td>66</td>
</tr>
<tr>
<td>12 years</td>
<td>32</td>
<td>39</td>
<td>72</td>
</tr>
<tr>
<td>13 years</td>
<td>34</td>
<td>29</td>
<td>63</td>
</tr>
</tbody>
</table>

Table 2: Shows the prevalence and severity of dental caries mean DMFT in different age groups (9-13 years) old.

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Total number</th>
<th>Affected number</th>
<th>Caries prevalence %</th>
<th>DMFT (mean)</th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td>85</td>
<td>75</td>
<td>88.24</td>
<td>5.03</td>
</tr>
<tr>
<td>10</td>
<td>62</td>
<td>53</td>
<td>85.28</td>
<td>4.76</td>
</tr>
<tr>
<td>11</td>
<td>66</td>
<td>49</td>
<td>74.24</td>
<td>2.20</td>
</tr>
<tr>
<td>12</td>
<td>72</td>
<td>38</td>
<td>52.78</td>
<td>2.18</td>
</tr>
<tr>
<td>13</td>
<td>63</td>
<td>38</td>
<td>60.32</td>
<td>2.06</td>
</tr>
<tr>
<td>Total</td>
<td>348</td>
<td>253</td>
<td>72.21</td>
<td>3.24</td>
</tr>
</tbody>
</table>

Table 3: The prevalence and severity of dental caries mean dmft in different age groups (9-13 years) old females

<table>
<thead>
<tr>
<th>Age</th>
<th>Total number</th>
<th>Affected number</th>
<th>Caries prevalence %</th>
<th>Dmft (mean)</th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td>51</td>
<td>42</td>
<td>82.35</td>
<td>1.53</td>
</tr>
<tr>
<td>10</td>
<td>32</td>
<td>30</td>
<td>93.75</td>
<td>2.80</td>
</tr>
<tr>
<td>11</td>
<td>35</td>
<td>27</td>
<td>77.14</td>
<td>0.50</td>
</tr>
<tr>
<td>12</td>
<td>32</td>
<td>16</td>
<td>50.00</td>
<td>0.91</td>
</tr>
<tr>
<td>13</td>
<td>34</td>
<td>22</td>
<td>64.70</td>
<td>0.52</td>
</tr>
</tbody>
</table>

Table 4: The prevalence and severity of dental caries mean DMFT in different age groups (9-13 years) old males

<table>
<thead>
<tr>
<th>Age</th>
<th>Total number</th>
<th>Affected number</th>
<th>Caries prevalence %</th>
<th>Dmft (mean)</th>
</tr>
</thead>
<tbody>
<tr>
<td>9</td>
<td>34</td>
<td>33</td>
<td>97.05</td>
<td>3.5</td>
</tr>
<tr>
<td>10</td>
<td>29</td>
<td>23</td>
<td>79.31</td>
<td>1.96</td>
</tr>
<tr>
<td>11</td>
<td>33</td>
<td>22</td>
<td>66.67</td>
<td>1.78</td>
</tr>
<tr>
<td>12</td>
<td>39</td>
<td>22</td>
<td>56.41</td>
<td>1.27</td>
</tr>
<tr>
<td>13</td>
<td>29</td>
<td>16</td>
<td>76.19</td>
<td>1.54</td>
</tr>
</tbody>
</table>

Discussion

Untreated oral diseases in children frequently lead to serious general health, significant pain, and interference with eating and loss of school time.[13] Despite incredible scientific advances and the fact that caries is preventable the disease continues to be a major health problem. The World Health Organization (WHO) has ranked dental caries, as number three among all chronic noncommunicable diseases that require worldwide attention for prevention and treatment and the fact that caries One of the factors to be considered when planning for the required growth in dental in dental facilities is the prevalence of dental diseases and their treatment need in the population. A Who Health Organization of global DMFT for 12-year-old children reported that in the 188 countries included in their database, that on global basis, 200,335,380 teeth were decayed, filled or missing among just that age group. This was based on the data available in 2004 from the WHO Oral Health Database, Country/Area Profile program (CAPP) [13]. Therefore, WHO continues to advocate that efforts to improve the overall situation are still highly indicated[9][14]
The use of DMFT and dft indices has been accepted practice for assessing the prevalence and severity of caries in a population. Hence an attempt has been made in the present study which was conducted as a part of the outreach screening to assess the prevalence of dental caries among primary school going children of Chennai using dft/DMFT index.

In this study, the prevalence of dental caries has increased with age from group 9-13 years. Oral health is an integral part of our health. Lack of awareness and limited access to dental specialist has made the children in Tiruvallur district to be more prone to disease. The 9-13-year age group was chosen for the study as it is the global monitoring age for dental caries, for international comparisons and monitoring of disease trends. [15] In this study it was observed that the caries prevalence of 11 to 13 years old children was lower as compared to 9 and 10 years old age group. This shows that as age advances prevalence of dental caries decreases. This finding corresponds with the study conducted by Misra F.M (1979) [16] among 6-16 year old children in urban area of South Orissa. He observed an increase in caries level between 5 to 12 year (56% to 81%) and a decrease in caries level in 13-15year (41.4%). Similarly in the study conducted by Peterson P.E, et al (1991)[17], Retna Kumari N (1999)[18], Dash J.K (2002)[19], Saravanan S, et al (2003)[20] The increased prevalence of caries in boys compared to girls confirms the view that there is a marked preference for sons regardless of the socio-economic class, which manifests itself in the longer feeding of sons compared to daughters.[11]

With the limitation of this study, further studies are required to correlate dental caries prevalence in the target population with parent’s literacy level and other socio behavioral factors. Although severity of dental caries is not assessed separately in the present study; the data regarding treatment need gives a glimpse of the severity of dental caries in the study subjects.

Hence oral hygiene education and motivation are the pertaining goal to achieve proper oral hygiene health among school going children. Oral health consciousness programs should be administered by dental college and association to increase consciousness of oral and dental health. The government should provide oral health through primary health-care system and appoint dental surgeons up to primary health center level in this region.

A preventive program including pit and fissure sealant application and topical fluoride application which would be an ideal measure in the prevention of dental caries in the permanent dentition of schoolchildren would aid in protecting the permanent dentition which has to remain lifelong[1]

Conclusion

1. The prevalence of dental caries was high in 9-11 years of age group with highest prevalence seen in 9 years.

2. Caries prevalence showed variation in relation to sex in which male population had high prevalence of dental caries compared to female population

Conflict of Interest: Nil

Source of Funding: Self

REFERENCE


Planning & Designing Reproductive Health Intervention Framework for Young Married Couples in India: Using Systematic Review

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ABSTRACT

Background: A community intervention framework was developed based on systematic reviews of existing evidence showing what is working in the low and middle income countries for improving reproductive and sexual health of young married couples. The systematic review helped us to design intervention framework for young married women in India in a comprehensive manner targeting early and repeated pregnancies and utilization of antenatal, delivery, post-partum, contraception and abortion services.

Methods: The focus was on research studies and evaluation reports of different community level initiatives in improving access to contraception, pregnancy care and safe abortion services by young married couples, where women were in the age-group of 15–24 years in low and middle income countries.

Results: The findings from the systematic reviews shows engaging husband, mother-in-law, sister-in-law, community leaders and community health workers are effective in enhancing young women’s reproductive health outcomes. This finding helped to plan and design the intervention framework according to Indian setting. Further, the newly designed intervention framework was implemented in the rural areas of India to improve sexual and reproductive health of the young married women.

Conclusion: The systematic review helped to design intervention framework targeting empowering individuals, mobilizing families and communities, and sensitizing community health workers to improve access to reproductive health services among young married couples in LMICs in a comprehensive manner.

Keywords: young married couple, intervention framework, systematic reviews, reproductive health

Introduction

Our world is home to 1.8 billion young people and their share is growing fastest in the developing countries¹. India is home of more than 211 million young people (15-24 years) accounting for nearly half of the country’s fertility. Despite consistent efforts to improve age at marriage, a large number of women are married at an early age and continued to face adverse effects of early and repeated pregnancies². National family health survey (2005-06) reports indicate that one in four attain motherhood before the legal age of marriage; because young mothers with less knowledge about reproductive health and contraceptive use in comparison to elder women⁵-⁷. Adolescents age 15 through 19 are twice as likely to die during pregnancy or child birth as those over age 20; girls under age 15 are five times more likely to die³,⁴,¹². Proportion of contribution of Young married women mortality to total maternal mortality is quite significant⁸. Lack of proper knowledge about reproductive issues among young married women results in early and low interval pregnancies¹⁵.

Henceforth, it is important to know highs and lows at the community level before deciding the intervention framework to be carried out. For this purpose, a Systematic Review (SR)⁶ of effectiveness of interventions delivering
The current paper discusses the development process of an intervention framework for an effective community-based intervention for improving the reproductive health outcomes of young married couples (aged 15–24 years) that can be delivered in a resource-constrained setting.

Methodology

An intervention framework was developed through the following steps. First, a systematic review of effective programmes was carried out on this subject. After systematic review, a theory of change model was developed for our proposed project intervention. Further, based on the theory of change, intervention logic model and programme implementation plan was developed for an effective intervention design.

The intervention framework was applied in the rural setting through a multi-stakeholder approach. Three sets of strategies were adopted to help young married couples improve their reproductive health choices and outcomes. The intervention worked directly with (i) young married couples (wife aged 15-24 years and her husband) and (ii) key family members (mother-in-laws) at the community and (iii) supporting system strengthening through advocacy and training to frontline functionaries and doctors to address the reproductive health needs of young married women.

Results

Development of Implementation Framework: We developed an intervention protocol based on systematic review that was used to guide the implementation of the project activities. The intervention protocol was guided by the evidences from the SR and grounded in the Theory of Change. The implementation framework was developed through the following phases.

Phase 1: Searching appropriate literature through systematic review: An extensive search strategy was developed to identify peer-reviewed publications and reports of research studies and project evaluations in which interventions were delivered by community workers to improve maternal health outcomes among young married couples in resource-poor settings. The systematic review was done by using PRISMA checklist. The relevant articles were identified through databases of PubMed, Popline, MEDLINE, JSTOR, Cochrane databases, LILACS, IMSEAR, as well as the regional databases of country-specific websites of Ministry/Department of Health, and World Health Organization. Additionally, search engines such as Google and Google Scholar and relevant papers and reports of national and state/province governments were also used. In some cases, authors were contacted whose studies were included for the review. Finally, 8 studies were selected and findings/evidences of these studies were used for the design of intervention model, out of 20,333 abstracts/papers reviewed.

Phase 2: Intervention model includes theory of change, logic model and intervention design of the programme.

Development of theory of change: Following systematic review, we developed a new theory of change model for the project to empower women and mobilize families and communities for better utilization of health services (figure 1). Theory of change suggests that educating newlyweds and young mothers about self-care and danger signs in pregnancy will create awareness and they further intend to seek help from the health facility at the time of their need. Similarly, mobilizing husbands and their families on this issue will lead to accompany young married women to the health facility by the husband/ or mother-in-laws.

Figure 1: Empowering individuals & mobilizing families and communities to seek reproductive health care in time among young married women
Development of intervention logic model: The intervention logic model was built upon the rationale of inputs and its effect on output through different processes. Intervention includes mobilizing husbands and other family members of the women so that they can accompany pregnant young married women to the health care facility. Bringing change in health care seeking behavior among young married women will lead to reducing maternal mortality. The following intervention logic model (Figure 2) clearly presents the problems and the needs in the community, and further presenting influential factors and strategies to address this problem, which will achieve the desired results.

**Figure 2: Intervention Logic Approach**

**Development of intervention design:** The intervention design was developed based on the systematic review result as well as advocacy with different system level for understanding their perception and opinion regarding the need of young married couples. Mention below is the advocacy efforts at different level to develop intervention framework and support sought from different stakeholders at local and national level.

**A. At the state and national level:** The project was carried out with strategic advocacy to engage
stakeholders working in the field of young people and maternal and child health at National and state level. Consultation meetings were organized with the district/state officials from the department of women and child development and Health for getting support and guidance during program implementation.

B. At district level: Advocacy and Trainings were carried out at the district level with important stakeholders to focusing and reaching to young married couples. Further, the trained district and block level functionaries trained to the frontline functionaries to reach young married couples and sub population through regular systematic intervention, IPC and BCC.

C. At the community level: The project target to reaching to the young married women, their husband, mother/sister-in-laws, local and influential community leaders and frontline workers.

Intervention Design

Phase 3: Programme implementation: The main strategies of the project were advocacy, Information Education and Communication (IEC), capacity building of frontline functionaries, interventions around young married women, their spouses and other family members and community stakeholders.

Programme Description: The project ‘Strengthening district health care facilities for improving the sexual reproductive health choices of young married couples’ was implemented by MAMTA with funding support from MacArthur Foundation for a period of 3 years (2011-2014) to improve the sexual and reproductive health and choices of young married women (15-24 years) in selected districts of Saharanpur(Uttar-Pradesh) and Sri-Ganganagar (Rajasthan). The study area comprised 27 villages in Saharanpur and 47 villages in Sri Ganganagar. In total, 4000 young married women were targeted to reach directly through the intervention.

The overall goal of the project was to improve the reproductive health choices of young married women
by engaging family and community members and strengthening the district health care facilities.

**Process outcome:** The project was successful in reached out 3396 young married women in both the districts through various community based interventions. In total, 750 group meetings were conducted among the young married women. Total numbers of group meetings held with husbands of young married women were 277 along with 138 meetings organized for mother in law and sister in law of young married women. Various cluster level meetings (121) were held with the members of community institutions (Panchayat Raj Institution) and service providers for institutionalization of their needs and sustainability.

**Key Achievements:** During three years of time the project achieved positive changes in its major indicators. An increase in uptake of three ANC check-ups increased from 70% to 82% in Sri Ganganagar and 62 % to 74% in Saharanpur during project period. Institutional delivery increased from 59% to 97% in Sri Ganaganagar and from 56% to 79 % in Saharanpur from baseline to end-line.

### Table 1: The result of binary logistic regression on use of contraception, ANC, institutional delivery and PNC

<table>
<thead>
<tr>
<th>Area</th>
<th>Contraception</th>
<th>ANC</th>
<th>Institutional delivery</th>
<th>PNC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control®</td>
<td>2.125***</td>
<td>3.158***</td>
<td>1.816**</td>
<td>1.356</td>
</tr>
<tr>
<td>Intervention</td>
<td>2.125***</td>
<td>3.158***</td>
<td>1.816**</td>
<td>1.356</td>
</tr>
</tbody>
</table>

Source: Calculated from unit level data

Note: ® indicates reference category

The given odds ratios are controlled for socio-economic and demographic factors

***P<0.01); **P<0.05

**Conclusion**

The systematic review helped to design the implementation framework for young married women in an effective manner. The key achievement of the programme showed that, intervention design was successful in bringing desired health outcomes among young married couples in the rural settings of India. Given the positive findings of the intervention among young married women, an integrated approach for improving sexual and reproductive health choices among young married couples (15-24 years) could lead to significant gains for improving overall reproductive health in a larger segment. At the same time, taking the learning to policy positioning has been a significant aspect of this project. The reproductive health issues of young married women have been incorporated into the state and district PIPs for designing new implementation plan.

Based on our project implementation experience and result findings, further we scaled-up the program for strengthening and capacitating health and ICDS service providers to reach out young married women. In addition, we incorporated pre-conception care in line with RMNCH'A guidelines within continuum of care approach in context to young married women which would improve pregnancy and reproductive health outcomes in an inclusive manner.
Competing Interests: No authors have any competing interests.

Source of Funding: There is no funding support for this publication.

Ethical Clearance: An ethical clearance was not required for this work.

Statement of Informed Consent: There is no requirement of informed consent as this is based on systematic review.

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Usage of CBCT in Detection of Vertical Root Fractures

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ABSTRACT

Aim: A review to evaluate the use of cbct in recognising vertical root fractures.

Background: The usage of cbct in dentistry is vast. Determining the bone density, width, height and its surrounding structure is of at most importance while doing any procedure. Cbct aids in providing such information and helps in delivering better treatment. Vertical root fracture involves either partial or complete rupture of the tooth root structure that extends along the vertical root axis. They can be internal or external origin and also enter through the periodontal space. It also involves the whole length of the root or only a section of it involving only one or both sides of the root. Early detection of vertical root fracture is important to prevent extensive and Additional damage to the periodontal tissues and also unnecessary treatment costs. Radiographic examination is limited to 2 dimensions leading to overlap of adjacent structures that commonly masks the fracture and also aids in false negative diagnosis. Cbct is a 3-dimensional imaging modality that is very accurate in detecting vertical root fractures. It solely focuses on the presence or absence of the fracture and also I. Determine the fracture line pathway. It helps in better Visualization of the landmarks and improves treatment regime. But it lacks the ability to detect in the presence of radio opaque materials like root canal materials. Hence a systematic review of usage of cbct in detection of vertical root fracture is to be done by using articles from PubMed and Scopus database.

Keywords: CBCT, vertical root fracture, endodontically treated tooth, detection, longitudinal

Introduction

Vertical root fracture (VRF) is defined as the incomplete or complete fracture or a longitudinal crack extending along the tooth root which is the most common cause of Endodontic failures and third most common cause of tooth extraction. Diagnosis of a vertical root fracture is a challenging task as they may not manifest pathognomic radiographic or clinical signs and symptoms.¹ The conventional techniques for detection of vertical root fracture includes bite test, observation and examination using a surgical microscope and further the use of radiographs can be used to examine the tooth as there is a fine radiolucent line showing the fracture of the tooth, but the disadvantage is that superimposition and presence of periapical lesion will make the fracture undetectable. Hence these methods have there limitations as they are radiographical detected only when fracture line is parallel to the path of beams.² The advent of Cone Beam Computed Tomography (CBCT) imaging has opened a new diagnostic paradigm in the detection of vertical root fractures.

CBCT when compared to (Computed Tomography) CT carries the unique advantage of being less harmful to the patient as it requires lesser radiation to produce superior quality images. But the technique has a limitation wherein the post and core or the obturating material produces streak artefacts on the image mimicking root fracture.³,⁴ There are various ways to reduced the metal artifacts, primarily by confining the imaging to the FOV which significantly reduces patient radiation dosage and metal artifacts despite several studies it is still debate able about the the use of CBCT to detect VRF comparing the dosage and cost effiency of the imaging technology.

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The aim of this review is to assess the reliability of CBCT in detection of vertical root fractures.

**Materials and Method**

A systematic search of the literature was made in the popular databases mentioned below and studies with below mentioned criteria were chosen.

**Types of Studies:** A systematic search of the literature was initiated which included case reports, case series, clinical studies, in vitro and in vivo studies, comparative studies and systemic reviews.

**Literature search strategy:** The electronic databases searched included PubMed and Google Scholar. Keywords used in search were “CBCT and VERTICAL ROOT FRACTURE” or “DIAGNOSIS”. An assessment of the methodological quality was performed using a modified version of the quality assessment of diagnostic accuracy studies tool to remove duplicate and unrelated studies.

**Selection criteria**

**Inclusion criteria**

- Studies that mentioned CBCT as a diagnostic tool in detection of vertical root fracture’s both in in-vitro and in-vivo models
- Clinical studies that showed the verification of vertical root fracture by conventional radiographs and CBCT
- Studies in which accuracy parameters such as sensitivity or specificity were used.

**Exclusion criteria**

- Studies were the CBCT exposure parameters were not clearly stated
- Studies on tooth fractures other than vertical root fractures.

The search yielded a total of 35 articles from which 27 were chosen as they were matching the aforementioned criteria.

**Target condition:** The target condition was to detect vertical root fracture in any permanent, endodontically treated tooth. From the 27 selected articles 3 favoured using CBCT for detecting vertical root fracture as compared to periapical radiographs (PR), whereas 2 reported no differences between the two methods.

**Vertical Root Fracture:** VRF offer several diagnostic challenges. The lack of consistent signs and symptoms as well as the low sensitivity of conventional radiographs make the detection of VRF difficult. Mild pain may be the only symptom in most of the cases of vertical root fracture. Periodontal type of abscesses maybe one of the clinical findings in certain cases of vertical root fracture, which may result from chronic inflammation at the fracture line. They may also be detected during obturation of root canal by a sharp cracking or popping sound, a sharp sting of pain, bleeding within the canal or enlarged canal paving way for large number of accessory cones - any one of these could be the signs/symptoms or a combination maybe present that could be suspected for vertical root fracture. It is rare to find all the findings present in a single case of vertical root fracture. Therefore, each of these clinical findings should be carefully observed and correlated with the radiographic findings and interpretations, to get conclusive evidence of vertical root fracture. Staining with dyes, trans-illumination using fibreoptic light and surgical exposure are some of the other methods to delineate fracture lines. The prognosis of VRF is poor. In a 5-year follow-up study of non-surgically endodontically treated teeth, root fracture was the untoward event in 32.1%, and the elected treatment was extraction.

The various parameters of CBCT were taken into considerations when assessing the usefulness of CBCT in vertical root fractures. Parameters noted are

- Volume and size
- Resolution
- Tube current
- Voxel size
- Influence of root canal filling material

**Volume and Size:** The size of field of view describes about the FOV and its volume depends on the various attributing factors like the shape and size of the detector, beam projection geometry and the ability to collimate the beam. Beam collimation limits the radiation exposure to a certain region so that optimal FOV can be achieved. Hence smaller scans provide an image that is relatively having lesser artefacts. Providing a holistic treatment in endodontics completely relies on detecting
disruption in tooth, periodontal ligament spaces, alveolar bone, the optical resolution measuring approximately 200 micrometer is optimum.\(^7\). So CBCT is preferred over CT in Endodontics because

1. Increased spatial arrangement due to improve the accuracy of detected minute things such as vertical root fracture.

2. Decreased radiation exposure to patient

3. Time saving due to small volume

Tooth without root filling material requires lesser milli amperes when compared to those filled with gutta percha and metal post. The tube current does not significantly play a major role in detection or vertical root fracture.\(^8\)

**Dosage consideration:** There has to be maximum effort taken to reduce the radiation dose to the patient while performing Endodontic specific task. The measures by which the dosage can be reduced are by using a small FOV there will be an increase in the resolution and increase in the clarity of the image, less exposure and pulsed exposure mode of acquisition is recommended.\(^9\) CBCT has an advantage over CT as radiation doses that are commonly used to diagnose these vertical root fractures is very minimal compared to that of medical CT and the accuracy of CBCT is also increased because of the isotropic voxels.\(^10\)

**Influence of exposure:** There are numerous studies highlighting the impact of exposure parameters on CBCT. According to Pinto et al, exposure parameters does not influence the detection of vertical root fracture and it is independent of the root canal restorative status. If there is a decrease in kVp/\(m\)A then the probability of biological effect to radiations might be reduced without losing the diagnostic accuracy.\(^11\) When the voxel size is 0.125mm the best resolution is achieved without increasing the radiation levels for the patient. 0.300 and 0.400mm voxel size should be avoided as they produced a high range of radiations.\(^12\) The size of the voxel of the CBCT plays a major role in determining and demarcating the fracture line CBCT has 93% sensitivity, 75% specificity and 88% accuracy when it comes to the detection of vertical root fracture as reported by a study by Safi et al\(^{13}\). The periapical radiograph has shown poor results in detecting the vertical root fracture due to their lower sensitivity and they also failed to detect the alveolar fractures which were more promptly detected by cbct.\(^{14,15}\) Despite all this both the imaging modalities have their own limitations when it comes to detecting the vertical root fracture. The detection accuracy was influenced by the width of the vertical root fracture as found in simulated studies.\(^16\) If the width was around 50-300 um the accuracy of detection in vivo was significantly lower to that in in vitro.\(^17\)

**Influence of root canal filling material:** When different endodontically treated tooth were subjected to CBCT for the detection of vertical root fracture there were studies showing that there was no influence of the root canal filled material in aiding to the detection as well as being the causative for the vertical root fracture to happen.\(^18\) Metal post interfered with the diagnosis of vertical root fracture and influence of filters did not prove to improve the diagnosis of vertical root fracture while using CBCT. Hence early detection of the vertical root fracture was difficult in such cases.\(^19\) It should be noted that approximately 90% of teeth with Vertical root fracture have root canal filling materials and approximately 61.7% of them have posts like metal post, gold post. These materials tend to cause line-like artefact’s in the CBCT images and significantly decrease the diagnostic accuracy of vertical root fracture, since the dark or radiolucent lines could be mistaken for fractures and the light lines may be masking the actual fracture lines and that account for the cases of false positive and false negative results. In a study by Costa et al., in the presence of a metallic post the specificity and sensitivity of diagnosing vertical root fracture was significantly reduced.\(^20\)

**Discussion**

The results of the present review shows significant proof that CBCT proves to better in the diagnosis of VRF compared to PR. However the diagnostic accuracy of CBCT was found to be affected by the Voxel size, exposure parameters, FOV, slice thickness. his may be mainly due to the differences in applied inclusion and exclusion criteria of various authors’ and also their opinions on the statistical tests used. However, there is, adequate support to the use of CBCT for the detection and diagnosis of VRF. However there is no available standardised exposure parameters which could be used as a standard for the diagnosis of VRF using CBCT. There are several researches which interestingly reveal a
potentially new issue in detecting vertical root fracture’s. That is, the detection of the vertical root fracture may not only be better for one type of imaging modality over another; rather, the detection may also depend upon the specific characteristics of the tooth. The clinician has to choose the type of imaging depending upon whether the tooth has been previously treated or not. The need to cautiously use CBCT because of its expense and higher radiation when compared to PR seems to be a sensible counter to the notion that CBCT has to be preferred in all instances.

**Conclusion**

Thus CBCT proves to be worthy in diagnosis of VRF, but has to be used judiciously in diagnosis in combination with the other clinical tests. It is preferable to weigh the pros and cons before recommending the use of CBCT in diagnosis of VRF. The need of the hour by the researchers would be to develop standard set of exposure parameters and resolution which will aid in better diagnosis of vertical root fractures. The potential of this imaging has to be explored fully as it eliminates needless surgical exploration to confirm the diagnosis.

**Ethical Clearance:** Not required as it is a review article

**Source of Funding:** Self funding

**Conflict of Interest:** Nil

**REFERENCES**


Internet Addiction Prevalence and Quality of Life-A Cross-Sectional Study among Adolescents

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Department of Community Medicine, Subharti Medical College, Meerut

ABSTRACT

Background: Internet has made our lives extremely easy, as well as on the other hand there are also many problems associated with it, its excessive usage and misuse can produce pathological behavioural problems in its users. This uncontrolled usage of internet has been defined as internet addiction disorder

Objectives: to assess the level of internet addiction among adolescent and to assess the impact of internet use on quality of life of adolescent.

Methods: A cross-sectional study was conducted in 525 school going adolescent of Meerut district with the help of semi structured questionnaire consisting of questions related to demographic information and Young’s Internet Addiction Test Scale, consisting of 20-item, based upon five-point Likert scale was used and subjects were classified into normal users (score <20), mild (score 20-49), moderate (score 50-79) and severe (score 80-100) internet addiction.

Results: The mean age of adolescents was seen to be 14.8 (±1.3) years. Prevalence of Internet Addiction was found to be 63.1%. Of which; 48.8% were mild, 13.7 % were moderate and 0.6% were severe addicts of Internet, Male students were found to be more addicted than females. Total IAT mean was 1.44 with ± SD of 0.87.

Conclusion: Internet addiction is growing menace in adolescent and its prevalence is increasing drastically, a special attention has to given on adolescent mental health which can be deteriorate by excessive use of internet.

Keywords: internet addiction, adolescent health, internet addiction test, quality of life

Introduction

Internet is a young technology but it had a profound impact on the world in the few decades that it has been around. It has converted the whole world into a global information society. Internet has made our lives extremely easy, as well as on the other hand there are also many problems associated with it, its excessive usage and misuse can produce pathological behavioral problems in its users.¹

Studies show that children especially of adolescent age group and students are more liable to get affected by internet menace because of their friable social structure, peer pressure and non-stagnant psychological demand of their mind.²,³ Also, in today’s time there is free and unlimited access to high speed internet at almost all public places besides the place where they study. Studies today are also demanding and hence require frequent internet use. Peer pressure, alluring applications and advertisements of smart phones, tablets and other gadgets have increased the love for internet among adolescents.⁴

In India internet has become one of the most widely accessible media and is a significant part of everyday life,
especially among adolescents. However, excessive use of the internet may instigate potential adverse psychosocial effects and there is a risk for developing internet addictive behavior, which is now considered a serious public health issue globally. There is, however, no consistent definition and there is a limited understanding of the psychopathology cause by internet addiction in adolescent. Therefore, our study try to find out how various domains of quality of life is affected by use of Internet among adolescents. Objective of our study is to assess the level of internet addiction among adolescent and to assess the impact of internet use on quality of life of adolescent.

Material and Method

The present cross-sectional study was conducted on 525 school going adolescents of urban Meerut, Uttar Pradesh, India. The methodology adopted for the study was Multistage sampling technique. Wherein one government and one private school were purposively selected from the registered schools of urban Meerut. Study population was adolescents of 12-18 years of age group. Selection of class sections of 9th and 11th classes was done by simple random method and 3 sections of each classes from both the schools were selected and all the students of these sections were interviewed.

For data collection following tools were used: A pre-tested, pre-validated, semi-structured interview based questionnaire consists of question like age, sex, class of study, type of family and socio-economic status and The Internet Addiction Test scale (IAT; Young’s scale 1998). Internet Addiction Test (IAT) is a reliable and valid measure of addictive use of Internet, developed by Dr. Kimberly Young. It consists of 20 items that measures mild, moderate and severe level of Internet Addiction. IAT is a 20-item and 5-point likert scale i.e;( 0 points Does Not Apply, 1 points Rarely, 2 points Occasionally, 3 points Frequently, 4 points Often, 5 points Always)

Total internet addiction scores are calculated, with possible scores for the sum of 20 . items ranging from 20 to 100.

According to Young’s criteria, total IAT scores 20-49 represent average users with complete control of their internet use, scores 50-79 represent over-users with frequent problems caused by their internet use, and scores 80-100 represent internet addicts with significant problems caused by their internet use.

IAT Subscales

Internet addiction test scale consists of 20 items which was divided into six sub scales i.e.to assess quality of life.

1. Compromised social quality of life
2. Compromised individual quality of life
3. Compensatory usage of the Internet
4. Compromised academic/working careers
5. Compromised time control
6. Excitatory usage of the Internet

Mean scores was obtained by subjects (n = 525) in the total internet addiction test (IAT) scale and in the six IAT subscales, and was calculated by averaging the scores obtained by subjects in each of the considered items.

Data entry and data analysis was done in Statistical Package for Social Sciences (SPSS) version 19.0 by using proportion, chi-square test and other appropriate tests.

Findings

Table 1: Demographic characteristics

<table>
<thead>
<tr>
<th>VARIABLE</th>
<th>GOVERNMENT</th>
<th>PRIVATE</th>
<th>TOTAL</th>
<th>χ2</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>NO.</td>
<td>%</td>
<td>NO.</td>
<td>%</td>
<td>NO.</td>
</tr>
<tr>
<td>AGE (IN YEARS)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12 years</td>
<td>4</td>
<td>1.5</td>
<td>4</td>
<td>1.5</td>
<td>8</td>
</tr>
<tr>
<td>13 years</td>
<td>50</td>
<td>18.9</td>
<td>48</td>
<td>18.4</td>
<td>98</td>
</tr>
<tr>
<td>14 years</td>
<td>53</td>
<td>20.1</td>
<td>58</td>
<td>22.2</td>
<td>111</td>
</tr>
<tr>
<td>15 years</td>
<td>58</td>
<td>22.0</td>
<td>51</td>
<td>19.5</td>
<td>109</td>
</tr>
<tr>
<td>16 years</td>
<td>80</td>
<td>30.3</td>
<td>82</td>
<td>31.4</td>
<td>162</td>
</tr>
<tr>
<td>17 years</td>
<td>19</td>
<td>7.2</td>
<td>17</td>
<td>6.5</td>
<td>36</td>
</tr>
<tr>
<td>18 years</td>
<td>0</td>
<td>0.0</td>
<td>1</td>
<td>0.4</td>
<td>1</td>
</tr>
</tbody>
</table>
In our study three fourths (72.8%) of the study participants were of 14-16 years of age, The mean age of adolescents was seen to be 14.8 (±1.3) years. There were more male students in both government as well as private school. Majority of participants were in class 11th (70.7%) and rest were in class 9th. The distribution of participants were equal in both government and private school.

P value was not significant for age, sex and class of students in government and private school.

57.9% students belonged to nuclear families and 42.1% to joint families. Most of students were from nuclear family in both government and private school. i.e. 60.6% in government school and 55.2% in private school.

Majority of the participants belongs to either upper class (39.4%) and upper middle (57.7%) class of socio economic status in both government and private school respectively. 61.7% of students belongs to upper middle class and 35.2% to upper class in government school, while 53.6% of students were seen to be in upper middle class and 43.7% in upper class in private school. Statistically the variation in socio economic status among government and private school adolescents was not significant.

### Internet addiction test

#### Table 2: Prevalence of internet addiction

<table>
<thead>
<tr>
<th>IAT Scores</th>
<th>Govt.</th>
<th>Private</th>
<th>Total</th>
<th>X²</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No.</td>
<td>%</td>
<td>No.</td>
<td>%</td>
<td></td>
</tr>
<tr>
<td>None (0-19)</td>
<td>106</td>
<td>40.2</td>
<td>88</td>
<td>33.7</td>
<td>194</td>
</tr>
<tr>
<td>Mild (20-49)</td>
<td>122</td>
<td>46.2</td>
<td>134</td>
<td>51.3</td>
<td>256</td>
</tr>
<tr>
<td>Moderate (50-79)</td>
<td>35</td>
<td>13.3</td>
<td>37</td>
<td>14.2</td>
<td>72</td>
</tr>
<tr>
<td>Severe (80-100)</td>
<td>1</td>
<td>0.4</td>
<td>2</td>
<td>0.8</td>
<td>3</td>
</tr>
</tbody>
</table>

On analysis data using young’s internet addiction test (IAT), Internet addiction scoring revealed that out of 525 adolescents, 37% (194) students were not having internet addiction and the prevalence of internet addiction was found to be 63.1% for any degree, of which 48.8% (256) were mild addicts, 13.7% (72) were moderate and 0.6% (3) were severe addicts of Internet.
Quality of life by internet addiction

Table 3: Distribution of study subjects according to mean obtained by subscales (n = 525)

<table>
<thead>
<tr>
<th>SUB SCALES OF INTERNET ADDICTION TEST</th>
<th>MEAN</th>
<th>SD</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>TOTAL IAT</td>
<td>1.44</td>
<td>0.87</td>
<td></td>
</tr>
<tr>
<td>1. Compromised social quality of life</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(a) How often do you form new relationships with fellow on-line users?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(b) How often do others in your life complain to you about the amount of time you spend on-line?</td>
<td>1.41</td>
<td>1.06</td>
<td>0.460</td>
</tr>
<tr>
<td>(c) How often do you become defensive or secretive when anyone asks you what you do on-line?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(d) How often do you snap, yell, or act annoyed if someone bothers you while you are on-line?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(e) How often do you find yourself saying just a few more minutes when on-line?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(f) How often do you try to hide how long you’ve been on-line?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Compromised individual quality of life</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(a) How often do you neglect household chores to spend more time on-line?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(b) How often do you fear that life without the Internet would be boring, empty, and joyless?</td>
<td>1.38</td>
<td>1.04</td>
<td>0.223</td>
</tr>
<tr>
<td>(c) How often do you lose sleep due to late-night logins?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(d) How often do you choose to spend more time on-line over going out with others?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(e) How often do you feel depressed, moody, or nervous when you are off-line, which goes away once you are back on-line?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Compensatory usage of the Internet</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(a) How often do you check your e-mail before something else that you need to do?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(b) How often do you find yourself anticipating when you will go on-line again?</td>
<td>1.37</td>
<td>1.04</td>
<td>0.107</td>
</tr>
<tr>
<td>(c) How often do you feel preoccupied with the Internet when off-line, or fantasize about being online?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Compromised academic/working careers</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(a) How often do your grades or schoolwork suffer because of the amount of time you spend on-line?</td>
<td>1.18</td>
<td>1.15</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>(b) How often does your job performance or productivity suffer because of the Internet?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. Compromised time control</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(a) How often do you find that you stay on-line longer than you intended?</td>
<td>1.52</td>
<td>1.18</td>
<td>0.130</td>
</tr>
<tr>
<td>(b) How often do you try to cut down the amount of time you spend on-line and fail?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6. Excitatory usage of the Internet</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(a) How often do you prefer the excitement of the Internet to intimacy with your close friends?</td>
<td>1.79</td>
<td>1.29</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>(b) How often do you block out disturbing thoughts about your life with soothing thoughts of the Internet?</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Total mean of IAT was seen to be 1.44 with ± SD of 0.87
Compared with the total mean of IAT, the mean of Compromised academic/working careers and Excitatory usage of the Internet was found to be statistically significant (P<.05).

Discussion

In present study the adolescent were in the age group of 12-18 years and the mean age of adolescents was seen to be 14.8 (±1.3) years in both the schools which was similar to finding of Jang et al.(2008) in Korea study in which the mean age found to be 13.9. and a study of Norway by Johansson A, et al.(2004) the mean age of the study participants was seen to be 14.9 years of age. In present study there were more male students in both government as well as private school, Similar distribution was seen in a Indian study conducted by Malviya A et al.(2014) where 164 (67.8%) were males and 78 (32.2%) were females.

In our study level of internet addiction was assessed using young internet addiction test and prevalence of internet addiction was found to be 63% of which; 48.8% students were mild addicts, 13.7 % were moderate and 0.6% were severe addicts of Internet. Similar kind of high prevalence was reported by some researchers in studies done in India, prevalence of 58.87% was reported by Chaudhari B L et. al. (2015) in Maharashtra, in their study out of 282 students - 116 (41.13%) students were not having any internet addiction while 166 (58.87%) students were having internet addiction, out of which 145 (51.42%) were mild addicts while 21(7.45%) were moderate addicts, there was no severely addict student. Duraimurugan, et al.(2015) in their study among college students from South India reported 56.6% prevalence of internet addiction, they found that 41.3% to be mild addicts while 15.2% to be moderate addicts. it shows that Internet addiction prevalence is showing rising trend and adolescents are the higher risk to get addicted due to their social and friable behavior.

In our study Total mean of IAT was seen to be 1.44 with ± SD of 0.87 wherein study done in Italy by Giovanni Ferraro et al. found total IAT mean of 2.7 with ± SD of 0.8.

In present study the IAT subscales calculated revealed Compromised social quality of life had mean of 1.41 with ± SD 1.06, Compromised individual quality of life was 1.38 with ± SD 1.04, Compensatory usage of the Internet had mean of 1.37 with ± SD 1.04, Compromised academic/working careers was seen to be 1.18 with ± SD 1.15, Compromised time control was 1.52 with ± SD 1.18, and Excitatory usage of the Internet was 1.79 with ± SD 1.29.

Compared with the total mean of IAT, the mean of Compromised academic/working careers and Excitatory usage of the Internet was found to be statistically significant (P<.05) which was similar to findings of Giovanni Ferraro et al. in Italy where Compromised social quality of life had mean of 2.73 with ± SD 0.8 , Compromised individual quality of life was 1.93 with ± SD 0.7 , Compensatory usage of the Internet had mean of 2.24 with ± SD 0.8 , Compromised academic/working careers was seen to be 1.77 with ± SD 0.9, Compromised time control was 2.26 with ± SD 0.7, and Excitatory usage of the Internet was 1.8 with ± SD 0.8.

Hence it shows that internet addiction influence the quality of life in different domains, the quality of (real) life hypothesis predicts that IA prevalence is related to a poor quality of real life. In the present cyber age, people may immerse themselves into the virtual world of the Internet to escape from stress they experience in the real world. As the boundaries of the virtual and the real worlds become blurred, individuals who encounter more frequent real life problems have a greater motivation to use the Internet as a coping mechanism. It is thus reasonable to infer an inverse link between IA and the quality of (real) life.

Conclusion

Internet addiction is a threat which is penetrating into various domains of life of adolescents. The major domain affected in our study was academic performance and their excitatory or impulsive use of Internet. Impulsive use has increased their frequency to be on Internet surfing and live in the virtual social networking; which might have affected their academic performance. Though, it is an initial warning signal but cannot be ignored. So further exploration for its association and causation need to explore for timely intervention.

Conflict of Interest: None

Source of funding: Self

Ethical Clearance: Ethical clearance was obtained from institutional ethical committee of Subharti Medical College.
REFERENCES


Customer Perception towards Adoption of Mobile Payments
–A Study

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ABSTRACT

Mobile payments revolution has made it possible to provide ease and flexibility in banking operations for the benefit of customers. Technological innovations in mobile payments have also helped in bringing the customer online. Indeed mobile payments have become one of the most significant factors that support people lifestyle. Many services are now being offered through mobile devices which offer more channels for the businesses to interact with their customers. The banking sector has also foreseen the essential usage of mobile banking. It has been considered as a salient system because of the beneficial attributes of mobile technologies such as ubiquity, convenience, and interactivity. Mobile banking today offers a variety of services which can be accessed in real time, and these indeed balance inquiries, fund transfer, payment etc. In this study, an attempt has been made to explore the role of demographics in the adoption of mobile payments and to identify the factors influencing the mobile payments adoption. It is made at from this research that certain factors are significant in determining the adoption of mobile payments and these includes perceived usefulness, self-efficacy, and compatibility, perceived ease of use, perceived risk, credibility, security, demonstrability, and relative advantage etc. The study reveals that increased use of technological products in a mobile payment industry its helps to work in efficient and better way.

Keywords: Mobile payments; Mobile banking; Mobile technologies; Convenience.

Introduction

Mobile payments have changed the way the business is conducted in everyday life. Business transactions of all types are payments a service provides in mobile payment. Mobile payments involve transactions between consumers and merchants that facilitate direct purchase of goods and services both under the account-based and mobile payment. Mobile devices in particular, mobile payments are in wide use and consumers are becoming increasingly familiar with using mobile payments for various purposes such as “secure” financial transactions via a web banking site. A newer opportunity is emerging for service providers and merchants, the use of mobile payments as a mobile wallet. Considering the success of mobile content services such as ringtones, games and other applications, it is becoming apparent that consumers are willing to utilize mobile phones for payment purposes. Mobile phones are also providing an unprecedented opportunity for expansion of financial activity in developing countries where the number of phone users can exceed the number of those having bank accounts.

Mobile payment indeed has become an inevitable business trend in the recent part. Customers are becoming early adopter and are using mobile payment services with more and more comfort and expediency. Digital push with technological innovation is all set to transform the banking and financial services sector in India. Structural growth drivers such as smart phone penetration, increasing awareness about mobile payments preference for hassle-free transaction and secured payment solution are driving growth for mobile payments. Mobile payment system which is a store house for financial value as well as personal identify such
mobile payment systems empower a customer to pay online for the good and services, including transferring an incorporated hardware and software systems.

Types of Mobile Payments

Mobile payments can be categorized based on the technology used as either one of two types those are proximity or remote. These types drive the nature of the payment service model, the value proposition for both the consumer and merchant, and the relevant technologies and infrastructure considerations required to realize the type of mobile payment.

Proximity Payment: Proximity payment generally refers to contactless payments in which the payment credential is stored in the mobile phone is used by the consumer at the storefront to pay for goods or services via a contactless reader or via text-based or personal identification number-based (PIN-based) methods using Near Field Communication (NFC) technology involving communication between the consumer’s device, the payment scheme operator, and the retail merchant at the storefront. All NFC-compatible mobile devices can send as well as receive data so NFC phones can also act as card readers. It is a technology highly aligned with the use of trusted computing media such as subscriber identity module (SIM) cards and Trusted Platform Modules (TPM).

Remote Payment: Remote payment solutions also can be used for transactions such as face-to-face and vending machine transactions. The mobile phone is used by the consumer in combination with the network messaging service such as Short Message Service (SMS) or Unstructured Supplementary Service Data (USSD) to pay for services or digital content. Credit/debit cards-based payment by entering user information via a secure Wireless Application Protocol (WAP) interface eWallet/stored-value account-based payment via a secure WAP interface.

Review of Literature

Abhiseshek and Hemchand (2016)[1] in their research on adoption of sensor based communication for mobile marketing in India explored the applications of sensor-based found the different ways used to build and sustain customer engagement in mobile payments. Madan and Yadav (2016)[6] investigated the behavioural intention to adopt mobile wallet. The study aimed to understand the factors that affected consumers’ adoption of mobile wallet as alternative methods of making payments to purchase goods and services. Upadhyaya and Chattopadhyay (2015)[7] in their research examined the mobile based payment services adoption issues. It highlighted the influencers of usage intention of mobile-based payment by incorporating the technical characteristics and technology specified characteristics. The GHSOM model has influenced by factors like innovativeness, discomfort and system quality and structural assurance. Tan and Lau (2016)[2] the examiner examined the intention of adopting mobile banking services among the millennial generation. Unified theory of acceptance and Use of technology (UTAUT) model was used to adopt mobile banking Upadhyay and Jahanyan (2016)[9] examined the factors affecting the usage of mobile-based payments services that found that the factors like perceived usefulness, perceived ease of use, system quality, connectivity and discomfort which have significant impact on the usage intention of mobile money services.

Objective of the Study

- To explore the role of demographics in the adoption of Mobile Payments
- To identify the factors for Mobile Payments adoption
- To identify the users risk on using mobile payments

Research Methodology

The current study has used a well-defined and a structured questionnaire to collect the primary data to find the reason for the adoption of mobile payments. Convenience sampling technique has been used for the collection of data in Chennai, Tamil Nadu. Sample size of the study is 200, which included respondents of both the genders varying in age from around 18 years to above 50 years. The respondents were taken from varied occupation sectors with a wide range of salary to give an appropriate sample. Both primary and secondary data were collected and used for this study. The primary data were collected by means of personal interviews with the help of a structured questionnaire which was first pretested and then finalized for the actual study after a few modifications. The secondary data were collected
from various journals, magazines, newspapers, books and reports. The questionnaire consisted of 3 main parts. The first part comprised questions about the demographic profile of the respondent along with a few practices the followed while mobile payments. In the second and third part, the respondents were given 5 options for each statement. The five options were: Strongly Disagree (SD) - 1, Disagree (D) - 2, Neither Agree nor Disagree (NAND) - 3, Agree (A) - 4 and Strongly Agree (SA) - 5. The second part of the questionnaire included questions related to the reasons for adoption of mobile payments while the third part included the questions related to the risks the respondents felt while mobile payments. Statistical tools like Frequency Distribution, factor analyses and t test analysis were used to get conclusive results with the help of SPSS V21 and MSExcel software. To check the validity of a model is reliability. The reliability is measured by using Cronbach’s α which is widely used in social science studies. The current study’s Cronbach’s α is 0.78 which exceeds 0.6 and implies the reliability of the data (Hair et al., 2016)[4]. Also, KMO value is 0.66, from which the sample size can be inferred to be adequate and the research can be considered to be as a valid study on the topic of customer perception towards adoption of mobile payment, providing appropriate results.

**Limitation of the Study**

- The study is confined only to the sample size of 200.
- The study has been conducted in Chennai city.
- It was observed that some of the respondents were reluctant to give correct information, so as a result there may be bias in the information provided by them.

**Table 1: Demographic Profile Of The Respondents**

<table>
<thead>
<tr>
<th>Demographic Profile</th>
<th>Frequency</th>
<th>Percentage</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>102</td>
<td>51.0</td>
<td>200 [100.0]</td>
</tr>
<tr>
<td>Female</td>
<td>98</td>
<td>49.0</td>
<td></td>
</tr>
<tr>
<td><strong>Age</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Below 25 Years</td>
<td>93</td>
<td>46.5</td>
<td>200 [100.0]</td>
</tr>
<tr>
<td>26 To 35 Years</td>
<td>64</td>
<td>32.0</td>
<td></td>
</tr>
<tr>
<td>36 To 45 Years</td>
<td>31</td>
<td>15.5</td>
<td></td>
</tr>
<tr>
<td>Above 46 Years</td>
<td>12</td>
<td>6.0</td>
<td></td>
</tr>
<tr>
<td><strong>Educational Qualifications</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>HSCL</td>
<td>24</td>
<td>12.0</td>
<td>200 [100.0]</td>
</tr>
<tr>
<td>UG</td>
<td>76</td>
<td>38.0</td>
<td></td>
</tr>
<tr>
<td>PG</td>
<td>76</td>
<td>38.0</td>
<td></td>
</tr>
<tr>
<td>Other ( Diploma)</td>
<td>21</td>
<td>10.5</td>
<td></td>
</tr>
<tr>
<td>No Formal Education</td>
<td>3</td>
<td>1.5</td>
<td></td>
</tr>
<tr>
<td><strong>Family Type</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Joint Family</td>
<td>85</td>
<td>42.5</td>
<td>200 [100.0]</td>
</tr>
<tr>
<td>Nuclear Family</td>
<td>115</td>
<td>57.5</td>
<td></td>
</tr>
<tr>
<td><strong>Monthly Family Income</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less Than Rs.10,000</td>
<td>56</td>
<td>28.0</td>
<td>200 [100.0]</td>
</tr>
<tr>
<td>Rs.10,000 – Rs.30,000</td>
<td>75</td>
<td>37.5</td>
<td></td>
</tr>
<tr>
<td>Rs.30,000 – Rs.60,000</td>
<td>55</td>
<td>27.5</td>
<td></td>
</tr>
<tr>
<td>Above Rs. 60,000</td>
<td>14</td>
<td>7.0</td>
<td></td>
</tr>
<tr>
<td><strong>Marital Status</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Married</td>
<td>98</td>
<td>49.0</td>
<td>200 [100.0]</td>
</tr>
<tr>
<td>Unmarried</td>
<td>102</td>
<td>51.0</td>
<td></td>
</tr>
<tr>
<td><strong>Occupations</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Government</td>
<td>28</td>
<td>14.0</td>
<td>200 [100.0]</td>
</tr>
<tr>
<td>Private</td>
<td>75</td>
<td>37.5</td>
<td></td>
</tr>
<tr>
<td>Business</td>
<td>33</td>
<td>16.5</td>
<td></td>
</tr>
<tr>
<td>Professional</td>
<td>24</td>
<td>12.0</td>
<td></td>
</tr>
<tr>
<td>Others</td>
<td>40</td>
<td>20.0</td>
<td></td>
</tr>
</tbody>
</table>
The table 1 show that the majority of the respondents are male (51.0%), age group of 25 years (46.0%) undergraduates and postgraduates, (51%) of the respondents are unmarried, (57.5%) are from Nuclear family, (75%) of the respondents’ monthly income ranges between Rs. 10000 to 30000, Most (37.5%) of the respondents are employed in private sector.

<table>
<thead>
<tr>
<th>Usages of Mobile Payments</th>
<th>Frequency</th>
<th>Percentage</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Frequency of using mobile for payments</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Everyday</td>
<td>44</td>
<td>22.0</td>
<td>200 [100.0]</td>
</tr>
<tr>
<td>Once In A Week</td>
<td>77</td>
<td>38.5</td>
<td></td>
</tr>
<tr>
<td>Once In A Month</td>
<td>40</td>
<td>20.0</td>
<td></td>
</tr>
<tr>
<td>Occasionally</td>
<td>39</td>
<td>19.5</td>
<td></td>
</tr>
<tr>
<td><strong>Source of information about mobile payments</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Friends</td>
<td>102</td>
<td>51.0</td>
<td>200 [100.0]</td>
</tr>
<tr>
<td>Family</td>
<td>48</td>
<td>24.0</td>
<td></td>
</tr>
<tr>
<td>Advertisement</td>
<td>29</td>
<td>14.5</td>
<td></td>
</tr>
<tr>
<td>News</td>
<td>20</td>
<td>10.0</td>
<td></td>
</tr>
<tr>
<td>Others</td>
<td>1</td>
<td>.5</td>
<td></td>
</tr>
<tr>
<td><strong>Frequency of using mobile for payments</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less Than A Month</td>
<td>40</td>
<td>20.0</td>
<td>200 [100.0]</td>
</tr>
<tr>
<td>1 – 6 Month</td>
<td>73</td>
<td>36.5</td>
<td></td>
</tr>
<tr>
<td>6 - 12 Month</td>
<td>23</td>
<td>11.5</td>
<td></td>
</tr>
<tr>
<td>1 – 2 Years</td>
<td>48</td>
<td>24.0</td>
<td></td>
</tr>
<tr>
<td>2 – 3 Years</td>
<td>16</td>
<td>8.0</td>
<td></td>
</tr>
<tr>
<td><strong>Information disclosed while signing in mobile payments</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Email</td>
<td>61</td>
<td>30.5</td>
<td>200 [100.0]</td>
</tr>
<tr>
<td>Mobile Phone</td>
<td>103</td>
<td>51.5</td>
<td></td>
</tr>
<tr>
<td>Photos</td>
<td>13</td>
<td>6.5</td>
<td></td>
</tr>
<tr>
<td>Real Name</td>
<td>9</td>
<td>4.5</td>
<td></td>
</tr>
<tr>
<td>Address</td>
<td>5</td>
<td>2.5</td>
<td></td>
</tr>
<tr>
<td><strong>Period of downloads of mobile payments applications</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Monthly</td>
<td>53</td>
<td>26.5</td>
<td>200 [100.0]</td>
</tr>
<tr>
<td>Quarterly</td>
<td>53</td>
<td>26.5</td>
<td></td>
</tr>
<tr>
<td>Half Yearly</td>
<td>32</td>
<td>16.0</td>
<td></td>
</tr>
<tr>
<td>Yearly</td>
<td>62</td>
<td>31.0</td>
<td></td>
</tr>
</tbody>
</table>

The table 2 show that the majority (51.5%) of the respondents use their mobile numbers for signing for payments through mobile phone, (51%) of the respondents get the information regarding the mobile payments through friends, Most (38.5%) of the respondents use the mobile payments once in a week, (36.5%) of the respondents are using mobile for payments for the period of 1-6 months, (31%) of the respondents download the mobile payment apps on a yearly basis.

**Factor Analysis**

Thirty five mobile payments usage purpose variables have been reduced into 9 aspects and the factor analysis has been applied on those nine reasons adoption of mobile payments aspects to understand the dominant dimensions in them. The extraction method of principal component analysis and rotation of varimax with Kaiser Normalization have been applied and the result are shown table 3 and 4.

**Table 3**

<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>.743</td>
</tr>
<tr>
<td>Bartlett’s Test of Sphericity Approx. Chi-Square</td>
<td>2.337E3</td>
</tr>
<tr>
<td>Df</td>
<td>.595</td>
</tr>
<tr>
<td>Sig.</td>
<td>.000</td>
</tr>
<tr>
<td>Total % of Variance Explained</td>
<td>62.766%</td>
</tr>
</tbody>
</table>
The table 3 show that the value of KMO measure of sampling adequacy is 0.743(74.3%) which is adequate to proceed with factor analysis. In the study 62.766% variance were explained by the 10 extracted components.

### Table 4: Factors of Influence on Adoption of Mobile Payments

<table>
<thead>
<tr>
<th>Factors</th>
<th>Variables</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Factor 1 Perceived Usefulness</td>
<td>Betterment of life</td>
<td>.559</td>
</tr>
<tr>
<td></td>
<td>Mobile payments improves performance in online purchase</td>
<td>.606</td>
</tr>
<tr>
<td></td>
<td>Mobile payment services beneficial</td>
<td>.758</td>
</tr>
<tr>
<td></td>
<td>People influence me to use mobile payment</td>
<td>.752</td>
</tr>
<tr>
<td></td>
<td>Important to use mobile payment</td>
<td>.559</td>
</tr>
<tr>
<td></td>
<td>Willing to use mobile payments</td>
<td>.504</td>
</tr>
<tr>
<td>Factor 2 Self-Efficacy</td>
<td>General opinion is favourable</td>
<td>.739</td>
</tr>
<tr>
<td></td>
<td>Satisfied in service</td>
<td>.786</td>
</tr>
<tr>
<td></td>
<td>Try new services</td>
<td>.803</td>
</tr>
<tr>
<td></td>
<td>Recommend service to others</td>
<td>.464</td>
</tr>
<tr>
<td>Factor 3 Compatibility</td>
<td>Compatible with existing technology</td>
<td>.430</td>
</tr>
<tr>
<td></td>
<td>Satisfies purchase</td>
<td>.607</td>
</tr>
<tr>
<td></td>
<td>Equipment cost is expensive</td>
<td>.836</td>
</tr>
<tr>
<td></td>
<td>Compatible with online transaction</td>
<td>.578</td>
</tr>
<tr>
<td>Factor 4 Perceived Ease of Use</td>
<td>Easy to learning</td>
<td>.480</td>
</tr>
<tr>
<td></td>
<td>Easy to get mobile payments</td>
<td>.557</td>
</tr>
<tr>
<td></td>
<td>Interaction is made easier</td>
<td>.737</td>
</tr>
<tr>
<td></td>
<td>Difficult to become skill full</td>
<td>.579</td>
</tr>
<tr>
<td></td>
<td>Easy to use mobile payments</td>
<td>.738</td>
</tr>
<tr>
<td>Factor 5 Perceived Risk</td>
<td>Risk of abuse in billing information</td>
<td>.488</td>
</tr>
<tr>
<td></td>
<td>Monetary transaction has potential risk</td>
<td>.580</td>
</tr>
<tr>
<td></td>
<td>Privacy</td>
<td>.716</td>
</tr>
<tr>
<td></td>
<td>Merchandise services has risk</td>
<td>.773</td>
</tr>
<tr>
<td></td>
<td>Risk of abuse in billing information</td>
<td>.488</td>
</tr>
<tr>
<td>Factor 6 Credibility</td>
<td>Experiment new ways</td>
<td>.570</td>
</tr>
<tr>
<td></td>
<td>Fashionable and trendy</td>
<td>.800</td>
</tr>
<tr>
<td></td>
<td>Enhance effectiveness</td>
<td>.716</td>
</tr>
<tr>
<td>Factor 7 Security</td>
<td>Fits with online transaction</td>
<td>.416</td>
</tr>
<tr>
<td></td>
<td>Risk of abuse</td>
<td>.612</td>
</tr>
<tr>
<td></td>
<td>Secure for conducting transactions</td>
<td>.716</td>
</tr>
<tr>
<td>Factor 8 Relative Advantage</td>
<td>Makes payment quickly</td>
<td>.768</td>
</tr>
<tr>
<td></td>
<td>Easier to conduct transaction</td>
<td>.835</td>
</tr>
<tr>
<td></td>
<td>More time and effort</td>
<td>.509</td>
</tr>
<tr>
<td>Factor 9 Demonstrability</td>
<td>Appreciate mobile payments</td>
<td>.813</td>
</tr>
<tr>
<td></td>
<td>Adoptable with life style</td>
<td>.802</td>
</tr>
<tr>
<td></td>
<td>Willingness to use new services</td>
<td>.646</td>
</tr>
</tbody>
</table>
From table 4 it is found that value of the respondents view on the adoption of mobile payments ranges of .836 to .416 that factors are significant in determining the adoption of mobile payments those includes perceived usefulness, self-efficacy, and compatibility, perceived ease of use, perceived risk, credibility, security, demonstrability, relative advantagewere found to be significant in the adoption of mobile payments. The respondents’ are adoptions of mobile payments were analyzed using factor analysis by principal component method. The findings reveal that factors are significant in determining the adoption of mobile payments. These reasons are behind the influenced the customers’ adoption of mobile payments.

**T-TEST ANALYSIS**

To identify the respondents risk on using mobile payments t test was used to analyze the data and the result are presented below.

**Table 5: t-Test Analysis on Risk of Using Mobile Payments**

<table>
<thead>
<tr>
<th>Risk of using mobile payments</th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Std. Error Mean</th>
<th>T</th>
<th>Sig. (2-tailed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fits with online transaction</td>
<td>200</td>
<td>3.60</td>
<td>.129</td>
<td>.080</td>
<td>45.145</td>
<td>.000</td>
</tr>
<tr>
<td>Risk of abuse</td>
<td>200</td>
<td>3.73</td>
<td>.955</td>
<td>.068</td>
<td>55.247</td>
<td>.000</td>
</tr>
<tr>
<td>Secure for conducting transactions</td>
<td>200</td>
<td>3.57</td>
<td>.025</td>
<td>.072</td>
<td>49.262</td>
<td>.000</td>
</tr>
<tr>
<td>Monetary transaction has potential risk</td>
<td>200</td>
<td>3.60</td>
<td>.008</td>
<td>.071</td>
<td>50.438</td>
<td>.000</td>
</tr>
<tr>
<td>Privacy risk</td>
<td>200</td>
<td>3.44</td>
<td>.030</td>
<td>.073</td>
<td>47.214</td>
<td>.000</td>
</tr>
<tr>
<td>Enhance effectiveness</td>
<td>200</td>
<td>3.74</td>
<td>.012</td>
<td>.072</td>
<td>52.310</td>
<td>.000</td>
</tr>
</tbody>
</table>

From table 5 it is found that the mean values of the respondents’ views on the risk of using mobile payments ranges from 3.74 to 3.44. The standard deviation of most of the variables less than 1 (0.955 to 0.008) and the standard error mean (0.68 to 0.80). The significant value reveals that the respondents are aware of the risk of using the mobile payments while making online transaction of purchasing a product or services.

**Suggestions of the Study**

With the country marching towards cashless economy, it has become inevitable for digitization. There is a need to bring awareness among the people in India about mobile payments and its advantages. The mobile applications should be designed in such a way that it is more users-friendly. The security and privacy of the information provided must be protected to ensure confidence of the people using Mobile Payments applicationsand the same should be designed developed according to the existing requirements and constraints.

**Conclusion of the Study**

Mobile payments are an evolving area of digitization, where customers can utilizes the service providers through a mobile and wireless network, using mobile devices for information retrieval and transaction processing. Mobile payments services and applications can be adopted through different wireless and mobile networks, with the aid of several mobile devices. Mobile payments services and applications need proper identification of mobile users’ requirements, as well as mobile devices and technologies constraints. Mobile payments work in a paperless environment, thus saving time and are convenient for use by the customer through their mobile phone at any point of time as form of mobile application.

**Conflict of Interest:** Nil

**Source of Funding:** Self

**Ethical Clearance:** This is my own research work. I have not published this article in any other publications.

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Establishment of Reference Tables for Fetal Abdominal Circumference by Ultrasonographic Measurements in Local Population, Karnataka, India

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ABSTRACT

Background: Fetal Abdominal circumference (AC) is an important and most reliable individual parameter, which can be used not only for determining fetal age, fetal growth and the type of growth restriction.

Objectives: 1) To establish a reference table for fetal AC in normal pregnant women from 20 to 38 weeks of gestation from local population 2) To find out the predictive accuracy of GA (Gestational Age) determined by fetal AC with that determined by last menstrual period (LMP) method.

Materials and Methods: The data was collected by using predesigned pretested questionnaire from September 2016 to January 2018. Total 768 singleton pregnant women with minimum 30 cases for each gestational week from 20 to 38 weeks of gestation, fulfilling inclusion and exclusion criteria were studied.

Statistical Analysis: The data was analyzed using Statistical Package for Social Sciences (SPSS) version 20. Percentages, mean, standard deviation and range, standard error, percentiles and regression equation etc. were performed for AC for each gestational week.

Results: The regression equation derived was GA = 4.677 + (1.007 X AC in cm) with correlation coefficient (r) of 0.979 and proportion of variation in dependent variable (R²) of 0.959. By this regression equation, the accuracy in prediction of GA by AC measurements was ranging from 99.75% at 32 weeks to 94.61% at 38 weeks of gestation. The mean AC values of Hadlock’s study were greater than that of the present study except at 20 weeks.

Conclusion: The present study findings confirmed that generation of population specific reference tables and regression equations for various fetal biometric parameters by a large scale study at national level is required for more precise reporting of GA and expected date of delivery (EDD) by ultrasonography.

Keywords: Abdominal circumference, Gestational age, Ultrasound

Introduction

Ultrasound measurement of fetal biometry is an important and commonly used tool in antenatal care. It measures biometric parameters such as biparietal diameter (BPD), head circumference (HC), abdominal circumference (AC) and femur length (FL).¹ Measurements of fetal AC were first used to estimate fetal weight by Campbell and Wilkin in 1975.² Since then AC has become the main fetal parameter used to estimate fetal weight before birth. It is widely used to detect and monitor fetal intrauterine growth restriction (IUGR) or fetal macrosomia in diabetic pregnancies.³ Various studies have also demonstrated that AC and estimated fetal weight (EFW) are preferred parameters to diagnose fetal growth restriction.⁴ The ethnic factor shows to interfere in the fetal growth pattern, impossible that reference ranges of fetal biometric parameters from

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homogeneous population could be applied in other populations. There are a lot of reference charts for fetal biometric parameters established for different populations, i.e. European, African, Asian and Latin American. All these reference charts were unconditional (cross-sectional) studies, because they are more appropriate for the quantification of fetal size. There is a unique unconditional study with 31,476 singleton Brazilian pregnant women which established reference charts for fetal biometric parameters. However, because of a lot of miscegenation of Brazilian population with great ethnic differences among its regions, it is not possible to establish reference charts for fetal biometric parameters to the whole Brazilian population. Hence, each particular population or ethnic group should have their own reference tables for the different fetal anthropometrical variables in order to provide the most accurate fetal assessment.

Therefore, the present study was designed to establishment of a reference table for AC and to find out the predictive accuracy of GA determined by AC with that determined by LMP method in normal pregnant women from 20 weeks to 38 weeks of gestation from Belagavi District, Karnataka, India.

**Aims and Objectives**

1. To establish a reference table for fetal Abdominal circumference in normal pregnant women from 20 to 38 weeks of gestation from local population
2. To find out the predictive accuracy of gestational age determined by fetal Abdominal circumference with that determined by LMP method.

**Materials and Method**

A random case series study was done from September 2016 to January 2018 among the antenatal cases referred to the Department of Radiology, Belagavi Institute of Medical Sciences (BIMS), Belagavi by Department of Obstetrics and Gynaecology (OBG) for routine antenatal scanning after clearance from Institutional Ethics Committee. Antenatal cases with knowledge about exact date of LMP with regular menstrual cycles of 26-33 days for at least 3 cycles before conception, with delivery of a live baby with birth weight more than or equal to 2500 grams, fundal height corresponding to duration of pregnancy as per obstetricians finding, who delivered within one week of the expected date of delivery (EDD) and who delivered a newborn baby without any congenital abnormality were included in the study for analysis. Exclusion criteria were - pregnant women with age below 18 and above 35 years, with height below 140 cm, history of drug abuse, tobacco / gutkha use, smoking before and during pregnancy, oral contraceptive pills for 3 months prior to conception, and previous baby with low birth weight. women with Diabetes mellitus, hypertension detected during examination or developing later during pregnancy, women with multiple gestations, oligohydromnios, polyhydromnios, intrauterine growth retardation, or intrauterine death, women with uterine abnormalities like fibroids, bi-cornuate uterus, etc.

Of the total 1037 cases initially included for the study, 269 cases were excluded after their follow up at delivery for various reasons as mentioned above in inclusion and exclusion criteria. Thus, finally present study included 768 cases for data analysis with minimum 30 cases for each gestational week from 20 to 38 weeks.

**Method of collection of data:** A predesigned, pretested, structured proforma was used for each subject separately. The ultrasonographic examination of each pregnant woman fulfilling inclusion criteria, was done after submission of completely filled ‘Form F’ in compliance to Pre-Conceptional and Pre-Natal diagnostic Techniques (PCPNDT) Act, duly signed by the women undergoing ultrasonography and the radiologist conducting ultrasonography. The ultrasound examination was done by a single radiologist on one ultrasound machine - iU22 Philips make real-time machine with 3.5 MHz electronic curvilinear transducer. AC was measured in the correct cephalocaudal plane where the right and left portal veins were continuous with one another with symmetric appearance of the lower ribs with depiction of the shortest length of umbilical segment of the left portal vein with ellipse fitting to the skin edge.

The patients or close relatives were contacted for information about delivery like date of delivery, onset of labor (spontaneous or induced), mode of delivery (vaginal or caesarean section or assisted one), place of delivery, birth weight of the baby, any congenital anomaly detected in newborn baby, etc. The data was analyzed by using Microsoft Excel and Statistical Package for Social Sciences (SPSS) version 20.
Table 1: Average GA for AC measurements from 14.5 to 33.9 cm

<table>
<thead>
<tr>
<th>AC in Cm</th>
<th>No. of Cases</th>
<th>Average GA ± SD</th>
<th>AC in Cm</th>
<th>No. of Cases</th>
<th>Average GA ± SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>14.5 – 14.9</td>
<td>15</td>
<td>20.49 ± 0.46</td>
<td>24.5 – 24.9</td>
<td>19</td>
<td>29.38 ± 0.80</td>
</tr>
<tr>
<td>15.0 – 15.4</td>
<td>25</td>
<td>20.73 ± 0.55</td>
<td>25.0 – 25.4</td>
<td>26</td>
<td>29.80 ± 0.82</td>
</tr>
<tr>
<td>15.5 – 15.9</td>
<td>24</td>
<td>20.98 ± 0.57</td>
<td>25.5 – 25.9</td>
<td>20</td>
<td>30.32 ± 0.52</td>
</tr>
<tr>
<td>16.0 – 16.4</td>
<td>16</td>
<td>21.51 ± 0.49</td>
<td>26.0 – 26.4</td>
<td>21</td>
<td>30.84 ± 0.56</td>
</tr>
<tr>
<td>16.5 – 16.9</td>
<td>05</td>
<td>22.14 ± 0.43</td>
<td>26.5 – 26.9</td>
<td>22</td>
<td>31.36 ± 0.86</td>
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<tr>
<td>17.0 – 17.4</td>
<td>21</td>
<td>22.38 ± 0.46</td>
<td>27.0 – 27.4</td>
<td>28</td>
<td>32.33 ± 1.09</td>
</tr>
<tr>
<td>17.5 – 17.9</td>
<td>19</td>
<td>23.08 ± 0.43</td>
<td>27.5 – 27.9</td>
<td>37</td>
<td>32.61 ± 1.09</td>
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<tr>
<td>18.0 – 18.4</td>
<td>15</td>
<td>23.28 ± 0.71</td>
<td>28.0 – 28.4</td>
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<td>28.5 – 28.9</td>
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<td>34.70 ± 1.68</td>
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<td>24.79 ± 1.06</td>
<td>29.0 – 29.4</td>
<td>23</td>
<td>34.81 ± 1.24</td>
</tr>
<tr>
<td>19.5 – 19.9</td>
<td>20</td>
<td>25.29 ± 1.02</td>
<td>29.5 – 29.9</td>
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<tr>
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<td>33.5 – 33.9</td>
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<tr>
<td>24.0 – 24.4</td>
<td>18</td>
<td>28.53 ± 0.60</td>
<td>Total Cases</td>
<td>768</td>
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Table 2: Descriptive Statistics of AC measurements

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<tr>
<th>GA (weeks)</th>
<th>Mean ± SD (cm)</th>
<th>Min.</th>
<th>Max.</th>
<th>Standard Error</th>
<th>95% Confidence Interval</th>
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<td>16.4</td>
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<td>15.04 15.33</td>
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<tr>
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<td>18.15 18.73</td>
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<td>19.07 19.57</td>
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<td>0.14</td>
<td>20.44 21.02</td>
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<tr>
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<td>22.21 22.80</td>
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<td>23.23 23.76</td>
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<tr>
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<tr>
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<td>33.4</td>
<td>0.18</td>
<td>30.48 31.23</td>
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<tr>
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<td>33.9</td>
<td>0.18</td>
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Table 3: Comparison of mean AC values with different studies

<table>
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<tr>
<th>GA in weeks</th>
<th>Present study</th>
<th>Hadlock FP et al\textsuperscript{14}</th>
<th>Shahida Zaidi et al\textsuperscript{16}</th>
<th>Australian Society\textsuperscript{12}</th>
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Graph 1: 5th, 50th and 95th percentile values of AC measurements
Results

The present study included total 768 cases between 20 to 38 weeks of gestation for analysis ranging from 34 to 51 cases per gestational week. The average age of the study subjects was 23.59 ± 3.28 years ranging from 18 to 35 years. The mean height observed was 151.13 ± 3.43 cm. Majority of the subjects (53.65%) were educated up to secondary school, followed by higher secondary school (20.05%) with average education status of 9.14 ± 3.14 standard. 42 subjects (5.47%) were illiterates. Almost all (99.61%) were housewives/home makers and around 2/3rd cases were from rural area. 42.97% cases were primigravidae and 427 (55.60%) were from below poverty line family. Majority (79.30%) of the cases delivered in a government health institutes and 89.19% cases delivered normally. 47.79% newborns were females and 62.89% newborns were weighing between 2500 to 2700 gms with average birth weight of 2712.22 ± 181.66 gms.

The average GA for AC measurements from 14.5 to 33.9 cm is as shown in Table 1. Average GA went on increasing with increase in AC measurements. For an AC of 14.5 to 14.9 cm, the average GA found was 20.49 ± 0.46 weeks, whereas it was 38.57 ± 0.20 weeks for AC value of 33.5 to 33.9 cm.

Table 2 shows descriptive statistics for AC measurements like mean ± SD, Minimum and maximum value, standard deviation (SD) and lower and upper limits at 95% confidence intervals. The difference in minimum and maximum AC values went on increasing with increasing GA. However, the difference in lower and upper limits at 95% confidence interval ranged from 0.29 cm at 20 weeks of GA to 0.84 cm at 36 weeks of GA. The regression equation for GA estimation derived was $GA = 4.677 + (1.007 \times AC \text{ in cm})$ with correlation coefficient (r) of 0.979 and proportion of variation in dependent variable ($R^2$) of 0.959. By this regression
equation, the accuracy in prediction of gestational age by AC measurements was ranging from 99.75% at 32 weeks to 94.61% at 38 weeks of GA.

Graph 1 shows the graph of 5th, 50th and 95th percentile values of fetal AC values according to gestational week which shows increasing AC values with advancing gestational age. Graph 2 shows box plot of the mean, first quartile, third quartile and extreme measurements of AC for each gestational week from 20 to 38 weeks of gestation by LMP in study subjects. Graph 3 shows the Scatter plot of predicted GA in weeks with reference to AC in cm.

**Discussion**

Accurate gestational age estimation is one of the most important functions of antenatal ultrasonography. AC measurements are more appropriately used in the assessment of fetal growth, especially in the second half of pregnancy than in the assessment of GA. However, it is an appropriate parameter to demonstrate normal fetal proportions in the mid trimester\(^1\). Similar to other studies, the present study also found progressively increased AC variability with increasing menstrual age and was shown to be related to the predicted AC value\(^2\). AC has generally largest reported variability than other fetal biometry parameters like head circumference, femur length and bi-parietal diameter as it is more acutely affected by growth disturbances than the other parameters \(^11,14,15\). In early pregnancy and in normally growing fetuses, the AC is only slightly accurate on average than other parameters. However, the variability in predicting GA based on AC increases as pregnancy advances\(^11\). A study by Hadlock FP et al\(^15\) demonstrated prospectively that the use of multiple parameters in estimating fetal age offers a significant advantage over any single parameter used alone and that the regression equations developed from a middle-class white population appear to be applicable to fetuses from a population with different socioeconomic and racial characteristics.

As seen in Table 3, the mean AC values of Hadlock’s study\(^14\) were higher than that of the present study except at 20 weeks. The observed difference in mean AC values in present study and that of Hadlock’s were 0.37 cm, 1.76 cm and 1.68 cm at 28, 37 and 38 weeks of gestation respectively. The mean AC measurements of the present study were also found to be different from the observations of other similar studies\(^12,16\).

The reference charts developed by Hadlock et al\(^14\) are used for assessment of GA and fetal well-being in the local area, but there are more chances of over-diagnosis of intra-uterine growth retardation and wrong prediction of expected date of delivery especially at advancing gestational age. This mandates for use of reference tables prepared from local population for more accurate and reliable estimation of gestational age and determination of fetal growth and development and also for deciding expected date of delivery.

**Conclusion**

There is strong possibility of overestimation or underestimation of GA and EDD when the fetal biometry parametric measurements of one population is used for other racial or ethnic groups. So generation of population specific reference tables and regression equations for various fetal biometric parameters by a large scale study at national level is required for more precise reporting of GA and EDD by ultrasonography.

**Conflict of Interest:** Nil

**Source of Funding:** Self

**Ethical Clearance:** Taken from Institutional Ethics Committee of KLE Academy of Higher Education and BIMS, Belagavi.

**REFERENCES**


Prevalence of Pre-Hypertension, Blood Pressure Variables and Cardiovascular Risk among College Students

D. Ezhil Bhavani\(^1\), R. Monisha\(^1\)

\(^1\)Assistant Professor, SRM College of Physiotherapy, SRM Institute of Science and Technology, Kattankulathur, Chennai, India

ABSTRACT

Introduction: Pre-hypertension is defined as a systolic blood pressure (SBP) of 120-139 mmHg or a diastolic blood pressure (DBP) of 80-89 mmHg in adults. Pre-hypertension has become a major public health concern due to its strong association with increased risk of hypertension and cardiovascular or cerebrovascular events. It affects 25-50\% of adults worldwide, and increases the risk of incident hypertension.

Objective: Aimed to investigate the prevalence of pre-hypertension and cardiovascular risk factors among college students and to evaluate the blood pressure variables.

Methods: 500 students were evaluated with sphygmomanometer, initial measurements include height, weight and the evaluation has been repeated in students with persistent elevated BP. Blood pressure variables include Systolic blood pressure, Diastolic blood pressure, Mean arterial pressure, Pulse pressure were recorded.

Results and Conclusion: Result will be revealed after completion of this study

Keywords: Systolic blood pressure, Diastolic blood pressure, Body mass Index, Heart rate

Introduction

The major predictor of cardio vascular and cerebrovascular events lies in the analysis of pre-hypertensive subjects. However, there is a conflicting evidence that a single measure of systolic and diastolic blood pressure recordings is not sufficient to predict the cardiovascular risk, hence there is a need to analyze the blood pressure variables on determining the prognosis on cardiovascular events, there has been a continuous uncertainty persisting on the relative importance in predicting risk. Lot of research evidence highlights on the fact that SBP and DBP recordings can rule out the risk factor for cardiovascular events. RCTs shows greater evidence on SBP can alone sufficient to document the risk of cardiovascular events. Subsequently, pulse pressure (PP) was conjointly shown to be a crucial predictor of the danger of CVD, significantly in old and older people, a lot of analyses conducted in a very younger population have steered that a mix of BP indices may well be superior to single parts for predicting the danger of CVD. Age-related changes in BP indices are represented across populations, with SBP rising unendingly throughout life, whereas DBP tends to stay constant, or maybe decline, once the fifth and sixth decades.16 As a result, PP additionally rises unendingly, with some acceleration in later life. Information from a pair of massive meta-analyses of cohort studies have shown a homogenous attenuation of the association between BP indices and vas risk with increasing age, they need additionally incontestible that SBP alone was slightly a lot of informative compared with the opposite BP indices, that PP was less informative than SBP, which this was notably true in those aged <50 years. But studies are lagged in the age group of 19-25 years.

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Email: monishaphysio186@gmail.com
Objective of the Study

Blood pressure recording is frequently used for identifying patients with cardiovascular risk. However, there is contradictory evidence to support this. The study objective was not to examine the single measure of systolic or diastolic Blood pressure recording, there is a need to analyze the blood pressure variables and its correlation in predicting the cardiovascular risk.

Methodology

A. Sample Design: Non probability randomized sampling.

B. Sample Size: Totally 500 students with are included in the study and 200 students were excluded out of the study because of their engagement in regular practice of Surya namaskar.

C. Study Duration: 4 weeks

D. Study Setting: SRM College of Physiotherapy, SRM Institute of Science and Technology, Chennai

Selection criteria:

A. Inclusion Criteria:

- Students with age group 17 to 23 years.
- Students who are not under any medication
- Both male and female students

B. Exclusion Criteria:

- Students who were not willing to participate

Assessment Parameters:

- Systolic blood pressure
- Diastolic blood pressure
- Mean arterial pressure
- Pulse pressure
- CVD risk factors

Method

The study was designed to relate BP and blood pressure variables, this is not have been detailed elsewhere. In brief, BP and PP, Mean arterial pressure on the incidence of cardio vascular events among individuals with the age group 19-25 has been studied. Participants had to be ≥19 years of age at entry and to have ≥1 other risk factor for CVD. A total of 300 students participated in the study, recruited from SRM Institute of science and technology was analyzed for the cardiovascular risk.

Baseline Assessment

The baseline systolic and diastolic readings and blood pressure variables were recorded initially. 5 minutes of rest has been provided in between the test, three consecutive recordings of BP were recorded with the participant in a seated position. PP was measured as the difference between systolic and diastolic BP and mean arterial BP as the sum of diastolic BP and one third of PP. In the baseline data the details on medical history, current medical treatment family history of cardiovascular risk factor were identified, and any major risk factors were noted. cardiovascular disease (CVD) exists primarily because of the increased risk of the presence of hypertension. According to the Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure (JNC-7), pre-hypertension is marked as a systolic blood pressure (SBP) of 120-139 mmHg or a diastolic blood pressure (DBP) of 80-89 mmHg in adults. hypertension and its risk has been strongly associated in patients who are pre- hypertensive. Thus pre-hypertension is one of the public health concern nowadays because of its interrelationship with cardiovascular complications. However, JNC-8 guidelines on hypertension do not focus on the concept of pre-hypertension. Investigation the prevalence of pre-hypertension and connected risk factors may facilitate to forestall cardiovascular disease and CVD and end-organ damage. But none of the study has done in Chennai so far estimating the prevalence rate of pre-hypertensive. Differences in the prevalence of pre-hypertension is because of various factors and geographical constraints Higher waist circumference and body mass index have been considered to be potential risk factors of pre-hypertension. The objective of the current study was to investigate the prevalence of pre-hypertension and potential risk factors associated with the progression of pre-hypertension among a represented student population in chennai.
Blood Pressure Measurement: Blood Pressure was measured in the right arms, with the subjects in sitting position at 10.00am to 11.00am each day with a minimum of five minutes of rest. Measurement was done using standard mercury sphygmomanometer with appropriate cuff sizes. Three BP readings were recorded consecutively with at least 15 minutes interval and the average of three readings was documented. This procedure was repeated, to measure the BP, for another four days. Finally, the minimum value among the three day readings was taken to be the blood pressure of that student.

Statistical Analysis: Statistical analysis was performed by SPSS 12.0 software.

Table 1: Spearman Correlation- Age and Systolic Blood Pressure Recording

<table>
<thead>
<tr>
<th></th>
<th>Value</th>
<th>Asymp. Std. Error</th>
<th>Approx. T</th>
<th>Approx. Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interval by Interval</td>
<td>Pearson’s R</td>
<td>.236</td>
<td>.060</td>
<td>4.201</td>
</tr>
<tr>
<td>Ordinal by Ordinal</td>
<td>Spearman Correlation</td>
<td>.207</td>
<td>.059</td>
<td>3.645</td>
</tr>
<tr>
<td>N of Valid Cases</td>
<td>300</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

When age and systolic blood pressure recordings have been compared. Students in the age group of 17 - 21 years have increased chances of getting hypertension as the age progresses. There is a statistically significant value obtained in Chi-Square Tests (.000) students age and its association with elevated systolic blood pressure recordings shows there is a chance of developing Hypertension as most of the college students are pre-hypertensive.

Table 2: Spearman Correlation - Age and Diastolic Blood Pressure Recording

<table>
<thead>
<tr>
<th></th>
<th>Value</th>
<th>Asymp. Std. Error</th>
<th>Approx. T</th>
<th>Approx. Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interval by Interval</td>
<td>Pearson’s R</td>
<td>-.087</td>
<td>.057</td>
<td>-1.512</td>
</tr>
<tr>
<td>Ordinal by Ordinal</td>
<td>Spearman Correlation</td>
<td>-.076</td>
<td>.058</td>
<td>-1.321</td>
</tr>
<tr>
<td>N of Valid Cases</td>
<td>300</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

However the students with the age group of 19 to 21 have elevated diastolic blood pressure. There is no statistically significant value obtained in Chi-Square test and there is no correlation exist between age and diastolic blood pressure recording. So it is proved that age is not a factor influencing diastolic blood pressure recording.

Table 3: Spearman Correlation- Gender and Systolic Blood Pressure

<table>
<thead>
<tr>
<th></th>
<th>Value</th>
<th>Asymp. Std. Error</th>
<th>Approx. T</th>
<th>Approx. Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interval by Interval</td>
<td>Pearson’s R</td>
<td>-.254</td>
<td>.052</td>
<td>-4.532</td>
</tr>
<tr>
<td>Ordinal by Ordinal</td>
<td>Spearman Correlation</td>
<td>-.251</td>
<td>.054</td>
<td>-4.474</td>
</tr>
<tr>
<td>N of Valid Cases</td>
<td>300</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Female students were prone to develop hypertension in the age group of 17-21 years and there is a statistically significant results obtained in data analysis which shows gender is having a correlation with systolic blood pressure recording.

Table 4: Spearman Correlation-Gender and Diastolic Blood Pressure

<table>
<thead>
<tr>
<th></th>
<th>Value</th>
<th>Asymp. Std. Error</th>
<th>Approx. T</th>
<th>Approx. Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interval by Interval</td>
<td>Pearson’s R</td>
<td>-.029</td>
<td>.057</td>
<td>-.497</td>
</tr>
<tr>
<td>Ordinal by Ordinal</td>
<td>Spearman Correlation</td>
<td>-.025</td>
<td>.057</td>
<td>-.430</td>
</tr>
<tr>
<td>N of Valid Cases</td>
<td>300</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

When gender and diastolic blood pressure has been compared there is no correlation exist between gender and diastolic blood pressure recordings.
Table 5: Spearman Correlation—Family History and Systolic BP

<table>
<thead>
<tr>
<th></th>
<th>Value</th>
<th>Asymp. Std. Error</th>
<th>Approx. T</th>
<th>Approx. Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interval by Interval</td>
<td>Pearson’s R</td>
<td>.037</td>
<td>.034</td>
<td>.639</td>
</tr>
<tr>
<td>Ordinal by Ordinal</td>
<td>Spearman Correlation</td>
<td>.015</td>
<td>.055</td>
<td>.260</td>
</tr>
</tbody>
</table>

When family history and systolic blood pressure recording of college students has been compared there is no correlation exist between these two variables.

**Discussion**

The current study revealed that the overall prevalence of pre-hypertension was 89.7% in Chennai among college students. The prevalence of hypertension was already elevated of the population already in the age group of 55-60 years. Higher prevalence of pre-hypertension was reported in male -87 out of 132 have elevated systolic blood pressure when comparing female students -73 out of 168 have elevated systolic blood pressure.

Moreover, age, gender, BMI, Family history were important risk factors for pre-hypertension in the population under investigation. Previous studies have proved that For every 10 years increment in age, the risk of pre-hypertension increased 50 times. The risk of pre-hypertension was about 5 times higher among subjects in the age group of 21 years compared to those aged below in the recent prevalence study done among college students.

Higher prevalence of pre-hypertension in the northern population might be due to higher salt intake. Further studies should be carried out in order to rule out the etiology behind the higher incidence of hypertensive and pre-hypertensive recordings documented in male population. The prevalence of pre-hypertension has been noted to be significantly higher in male individuals in this current study too. Significant difference in the prevalence of prehypertension was observed among different age groups in our study 19 to 21 years of age are in greater risk of developing CVD as they documented under pre-hypertensive systolic and diastolic blood pressure recordings and with the positive risk factor and family history. In contrast with our study, Zhao et al. suggested that the prevalence has decreased along with the age increment. These findings might be explained by cross researches.

Individuals with pre-hypertension have an increased risk of hypertension, college students in the age group of 21 are documented as pre-hypertensive. Pathophysiology and etiology behind this must be investigated in future by proper follow up of these subjects and measures have been taken out to reduce the impact of these elevated systolic and diastolic blood pressure recordings among students.

High BMI was the predictor of pre-hypertension. This finding suggests that being overweight or obese has a statistically significant association with the development of pre-hypertension. Therefore, to prevent pre-hypertension, weight loss may be necessary for all individuals with high BMI. However, the mechanisms underlying increased risk of pre-hypertension in individuals with age group of 21 years need to be investigated further.

The study aims to identify the of pre-hypertension among college students of age 17-23 years and management remains an important method of preventing the development of hypertension and other CVD risk. Multiple risk factors are responsible for the onset of pre-hypertension, including age, gender and higher BMI and heredity. Most of these risk factors of pre-hypertension are closely associated with lifestyle factors. At most attention should be paid to the identification of pre-hypertension even in the healthy population. Active management of blood pressure, timely and effective treatment of lifestyle modifications, and increasing physical activity, yoga, stress reduction may help to slow down the progression of pre-hypertension. However, evidences for the treatment of pre-hypertension are still lacking, life style modification and basic exercises to avoid sedentary living must be included in regular practice.

**Conclusion**

The study conclude that non-modifiable CVD risk factors are associated with PHT. Among them Age, BMI and blood pressure variables are the predictors of
PHT in our study population. This study declare that recording of more than one blood pressure variables is needed to analyze the prevalence of pre-hypertensive individual. Follow up of this student population is planned to execute physiotherapy treatment protocol in risk reduction among pre-hypertensive subjects.

**Conflict of Interest:** Nil

**Source of Funding:** Nil

**Ethical Clearance:** Obtained by paper presented in research day–2018, in srm college of physiotherapy

**REFERENCES**


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8. Mente, Andrew; O'Donnell (July 2016). “Associations of urinary sodium excretion with cardiovascular events in individuals with and without hypertension: a pooled analysis of data from four studies”. The Lancet
Assessment of Health Literacy Rates and Implementation of Teach Back Method in a Tertiary Care Teaching Hospital in South India

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ABSTRACT

Improving health literacy levels would empower people to improve their capacity in using health related information effectively. The study period was six months: this included the collection of data, the analysis of the collected data, and the reporting of the results. The sample size was calculated to be 104. Each research subject was scheduled 4 appointments which included the pretest and posttest of the subject as well as the teaching part of the teach back program. The scores were graded accordingly into three grades. On the first visit the patient was administered a tool, newest vital sign, which has a nutrition label and a questionnaire. The subject would be explained about the label. After the explanation, the subject would be administered the questionnaire which has 6 questions. For every correct answer, an award of one point is made. A score between 0 and 1 points to a high probability of the patient having a literacy level that could be labelled as limited literacy. A score between 2 and 3 points to a medium probability of the patient having a literacy level that could be labelled as limited literacy. A score between 4 and 6 points to a level of literacy that could be labelled as sufficient to competently traverse the healthcare system. After the collection of pretest results, the teach back method of educating patients about health literacy will be implemented for two sessions and follow up will be done for the next two consecutive visit. The assessment of health literacy will be done on the fourth visit and analysis of results will be done to see the improvement if any. Out of 104 patients who attended the pre and the post-tests, the health literacy status was found to be higher among females compared to males in the pretest scores. With relation to age it was found that the people in the age group of 18-25 lacked knowledge on health literacy. The age group above 35 had higher literacy levels.

Keywords: Health Literacy, Teach back method

Introduction

Health literacy (HL) is the capacity to acquire, assimilate and comprehend knowledge of healthcare services at a basic level. This capacity is required to make accurate and relevant decisions in health seeking behavior. Health literacy has been proven to be as important a determinant of health seeking behavior and health as general literacy. By improving health literacy we can empower people to improve their capacity in using health related information effectively.¹²
It is clear that very significant proportions of populations do not have levels of health literacy that could be characterized as sufficient to successfully traverse a healthcare environment that is becoming increasingly difficult to comprehend.\textsuperscript{4,5,6}

**Low levels of health literacy are linked to:** Lower scores on health status,\textsuperscript{7} increased frequency of hospitalization and mortality, increased length of inpatient stay, increased rates of repeat inpatient admissions within one month of being discharged, a reduction in capacity to manage chronic disease, a decrease in the ability to recall information after doctor appointments, a higher likelihood of medication errors, increased intensity of illness when seeking medical care, poor levels of knowledge of illness management, inadequate use of preventive services, heightened cost of care, and a significantly higher probability of missing appointments. A significant proportion of the population with poor health literacy skills remains unvaccinated. People with poor levels of health literacy are at greater risk of being unvaccinated when compared to people with levels of health literacy that could be termed as adequate.\textsuperscript{10}

In teach-back, the healthcare provider takes full accountability for the level of understanding of the patient. The patient is encouraged to discuss and question openly.\textsuperscript{11,12} In the beginning, the health professional attempts to teach the patient (or the patient caregiver) the new skill. After this, the health professional asks questions like “I want to be certain that I have got this across to you correctly. Can you please tell me how you would go about administering this medication once you are back home?” Next, the patient/caregiver do one of two things: repeat the instructions in their own words or do a practical demonstration of the skill. Thus, the health professional can make a clear assessment of whether the patient (or the patient caregiver) has understood what the health professional was trying to teach or get across. The teach back is complete when it is clear that the information has been conveyed and assimilated as intended. Repeated iterations might be needed for the teach back method to be completed satisfactorily.\textsuperscript{13}

**Aim of the Study**

To improve the health literacy of patients so as to enable access to health information.

**Objectives of the Study**

1. To assess the health literacy rates of patients visiting the general medicine OPD in a tertiary care teaching hospital.

2. To measure the improvement in the health literacy rate post the teach back method implementation.

**Methodology**

The study was conducted in the general medicine outpatient department in a tertiary teaching hospital in a coastal city of Karnataka state. The study duration was six months. This study duration included the collection and analysis of the data.

Then the sample size for the study was determined using the following formula:

\[
\begin{align*}
  n &= \frac{p(1-p) \left( z_{1-\alpha/\beta} + z_{1-\beta} \right)^2}{(p_1 - p_2)^2} \\
  \text{Where } p_1 &= 0.45 \text{ and } p_2 = 0.3 \text{ and the values from the standard normal table was taken as } 2.32 \text{ for } z_{1-\alpha/\beta} \text{ and } 0.84 \text{ for } z_{1-\beta}.
\end{align*}
\]

After applying the required values the sample size was determined to be 104. The sample size was assessed by the principal investigator for a period of 4 months at the outpatient department of the general medicine unit. And the participants who understand English or kannada as language were selected as research subjects. Each research subject was scheduled 4 appointments which included the pretest and posttest of the subject as well as the teaching part of the teach back program. Scheduled appointments were given for the subjects taking into consideration the availability of the research subject. A log book was also maintained to keep a note of the scheduled appointments. After the collection of the pre and post test results, the scores were statistically analyzed in SPSS version 20. The scores were graded according into three grades. Wilcoxon signed ranked test was used to assess if the scores were statistically significant.

On the first visit the patient was administered a tool, newest vital sign, which has a nutrition label and a questionnaire. The subject would be explained about the label. After the explanation, the subject would be administered the questionnaire which has 6 questions. For every correct answer, an award of one point is made.
A score between 0 and 1 points to a high probability of the patient having a literacy level that could be labelled as limited literacy. A score between 2 and 3 points to a medium probability of the patient having a literacy level that could be labelled as limited literacy. A score between 4 and 6 points to a level of literacy that could be labelled as sufficient to competently traverse the healthcare system. After the collection of pretest results, the teach back method of educating patients about health literacy will be implemented for two sessions and follow up will be done for the next two consecutive visits.

**Results**

The total number of subjects for which the results were analyzed were 104. The frequencies of the subjects based on the demographic variables like age and gender is given below.

**Cross tabulation between the age of the patient and the pretest and post test scores**

<table>
<thead>
<tr>
<th>Age of patient</th>
<th>0-1 high probability of limited literacy</th>
<th>2-3 some probability of limited literacy</th>
<th>Total score of patient _ pre</th>
<th>Total score of patient _ post</th>
<th>Total % within Total score of patient pretest</th>
</tr>
</thead>
<tbody>
<tr>
<td>18-25</td>
<td>Count</td>
<td>1</td>
<td>6</td>
<td>15</td>
<td>22</td>
</tr>
<tr>
<td></td>
<td>% within Total score of patient pretest</td>
<td>11.1%</td>
<td>17.1%</td>
<td>25.0%</td>
<td>21.2%</td>
</tr>
<tr>
<td>25-30</td>
<td>Count</td>
<td>0</td>
<td>3</td>
<td>8</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>% within Total score of patient pretest</td>
<td>0.0%</td>
<td>8.6%</td>
<td>13.3%</td>
<td>10.6%</td>
</tr>
<tr>
<td>30-35</td>
<td>Count</td>
<td>1</td>
<td>4</td>
<td>7</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>% within Total score of patient pretest</td>
<td>11.1%</td>
<td>11.4%</td>
<td>11.7%</td>
<td>11.5%</td>
</tr>
<tr>
<td>above 35</td>
<td>Count</td>
<td>7</td>
<td>22</td>
<td>30</td>
<td>59</td>
</tr>
<tr>
<td></td>
<td>% within Total score of patient pretest</td>
<td>77.8%</td>
<td>62.9%</td>
<td>50.0%</td>
<td>56.7%</td>
</tr>
<tr>
<td>Total</td>
<td>Count</td>
<td>9</td>
<td>35</td>
<td>60</td>
<td>104</td>
</tr>
</tbody>
</table>

From the above table, we understand that out of the total percent of people who scored in likelihood of limited literacy, 11.1% were from age group 18-25, 11.1% were from age group 30-35 and 77.8% were from above 35 age group. Out of the total percent of people who scored in possibility of limited literacy, 17.1% were from age group 18-25, 8.6% were from age group 25-30, 11.4% were from age group 30-35 and 62.9% were from above 35 age group. Out of the total percent of people who scored in adequate literacy, 25% were from age group 18-25, 13.3% were from age group 25-30, 11.7% were from age group 30-35 and 50% were from above 35 age group.

**Based on gender of patient:** Out of the 104 subjects’ 54.8 percent were males and 45.2 were females.

**Based on age:** Out of the total 104 research subjects, 21.2% were in the age group of 18 – 25, 10.6% were in the age group of 25 – 30, 11.5% were in the age group of 30 – 35 and 56.7% were in the age group of above 35. A trend was noticed that as the age increased the people scored more on health literacy. Both in the pretest and the posttest it was found that the people who had adequate literacy skills were more in the age above 35.

Cross tabulations were performed to find out the relationships between the pretest and posttest scores and the demographic variables like the age and the gender. The details are given below.
Table 2: Age of patient * Total score of patient posttest Crosstabulation

<table>
<thead>
<tr>
<th>Age of patient</th>
<th>2-3 probability of limited literacy</th>
<th>4-6 adequate literacy</th>
<th>Total score of patient posttest</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Count</td>
<td></td>
<td>100.0%</td>
<td>100.0%</td>
</tr>
<tr>
<td></td>
<td>% within Total score of patient posttest</td>
<td></td>
<td>20.8%</td>
<td>21.2%</td>
</tr>
<tr>
<td>18-25</td>
<td>Count</td>
<td></td>
<td>0.0%</td>
<td>13.8%</td>
</tr>
<tr>
<td></td>
<td>% within Total score of patient posttest</td>
<td></td>
<td>12.5%</td>
<td>11.2%</td>
</tr>
<tr>
<td>25-30</td>
<td>Count</td>
<td></td>
<td>66.7%</td>
<td>53.8%</td>
</tr>
<tr>
<td>30-35</td>
<td>Count</td>
<td></td>
<td>100.0%</td>
<td>100.0%</td>
</tr>
<tr>
<td>above 35</td>
<td>Count</td>
<td></td>
<td>100.0%</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

From the above table, we understand that out of the total percent of people who scored in possibility of limited literacy, 20.8% were from age group 18-25, 12.5% were from age group 30-35 and 66.7% were from above 35 age group.

Out of the total percent of people who scored in adequate literacy, 21.2% were from age group 18-25, 13.8% were from age group 25-30, 11.2% were from age group 30-35 and 53.8% were from above 35 age group.

Table 3: gender of patient * Total score of patient pretest Crosstabulation

<table>
<thead>
<tr>
<th>gender of patient</th>
<th>0-1 high probability of limited literacy</th>
<th>2-3 some probability of limited literacy</th>
<th>Total score of patient pretest</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Count</td>
<td>% within Total score of patient pretest</td>
<td>4-6 adequate literacy</td>
<td></td>
</tr>
<tr>
<td>male</td>
<td>Count</td>
<td>% within Total score of patient pretest</td>
<td>44.4%</td>
<td>54.3%</td>
</tr>
<tr>
<td></td>
<td>% within Total score of patient pretest</td>
<td>55.6%</td>
<td>45.7%</td>
<td>43.3%</td>
</tr>
<tr>
<td>female</td>
<td>Count</td>
<td>% within Total score of patient pretest</td>
<td>55.6%</td>
<td>45.7%</td>
</tr>
<tr>
<td></td>
<td>% within Total score of patient pretest</td>
<td>100.0%</td>
<td>100.0%</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

Cross tabulation between the gender of the patient and the pretest and posttest scores: From the above table, we understand that out of the total percent of people who scored in likelihood of limited literacy, 44.4% were males and 55.6% were females. Out of the total percent of people who scored in possibility of limited literacy, 54.6% were males and 45.7% were females. Out of the total percent of people who scored in adequate literacy, 56.7% were males and 43.3% were females.
From the above table, we understand that out of the total percent of people who scored in possibility of limited literacy, 50% were males and 50% were females. Out of the total percent of people who scored in adequate literacy, 56.2% were males and 43.8% were females.

Next, Wilcoxon signed ranked test was applied, the p value was obtained to be <0.001 which shows that it is statistically significant as mentioned in table 5. The median along with the quartiles were obtained. The minimum and the maximum scores along with the means were obtained for both the pretest and posttest.

### Table 5

<table>
<thead>
<tr>
<th>Test Statistics</th>
<th>Post score pre score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Z</td>
<td>-7.979</td>
</tr>
<tr>
<td>Asymp. Sig. (2-tailed)</td>
<td>.000</td>
</tr>
<tr>
<td>a. Wilcoxon Signed Ranks Test</td>
<td></td>
</tr>
<tr>
<td>b. Based on negative ranks.</td>
<td></td>
</tr>
</tbody>
</table>

### Table 6: Descriptive Statistics

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Percentiles</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>25th</td>
</tr>
<tr>
<td>Pretest score</td>
<td>104</td>
<td>3.63</td>
<td>1.422</td>
<td>0</td>
<td>6</td>
<td>3.00</td>
</tr>
<tr>
<td>Posttest score</td>
<td>104</td>
<td>4.84</td>
<td>1.308</td>
<td>2</td>
<td>6</td>
<td>4.00</td>
</tr>
</tbody>
</table>

### Discussion

Torwane et al enumerate the ill effects of low levels of oral health literacy. Kim et al report regarding the beneficial effects of the Chronic Disease Self Management Program (CDSMP) that proved that health literacy is important in self-management of chronic diseases.

Cunha et al report that for the relationship between Health Literacy (HL) and Body Mass Index (BMI), it was found that Health Literacy had a positive association with the BMI, suggesting a significant relationship between both. Given that the increase in literacy for health represents a decrease in BMI values, we may infer that better literacy for health also corresponds to a better nutritional status. Aydin et al report that individuals have an active role in personal health decision making. Information technologies and the internet have become potent sources of health information. In this scenario, health literacy is one of the most important factors that affect individuals.

The questionnaire has a nutrition label and a set of six questions. Depending upon the scoring, respondents were divided into three categories which portrayed the health literacy knowledge they had. After the pre-test, the teach-back method was implemented. The participants were briefed about different good dietary habits which would benefit them in terms of health and wellbeing. After the teaching part was completed, the respondents were reassessed again with a post-test.

Out of 104 patients who attended the pre and the post-tests, the health literacy status was found to be higher among females compared to males in the pretest scores. The reason for this difference could not be identified. A similar gender difference was observed in a study carried out in the rural population in another tertiary teaching hospital in southern India. With relation to age it was...
found that the people in the age group of 18-25 lacked knowledge on health literacy. The age group above 35 had higher literacy levels.

More interventions must be planned by the hospital to improve the health literacy status of the patients; which would in turn reduce health care costs as it will reduce readmissions in hospitals.

**Ethical Clearance:** Taken from Institutional ethics committee

**Source of Funding:** Self

**Conflict of Interest:** None

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Economic Impact of FDI on Indian Biotechnology Sector

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ABSTRACT

Number one Sector of producing Hepatitis b Vaccine recombinant in the world is Indian Biotechnology Sector. India has the potential to become a major producer of transgenic and various Generic Modified (GM) or Engineered Vegetables for the global food requirement. The modus operandi of this study is exposes the strength, Weakness, Opportunities and Challenges of Biotech sector in connection with Foreign Direct Investment. Chapter one provides a basic idea about the Indian Biotechnology sector. Chapter two enlists the review of literature. Chapter three envisages the role of FDI on Indian Biotechnology sector. Chapter four portrays the current status of Indian Biotechnology sector. Chapter five depicts the SWOT analysis of Economic Impact of FDI on Indian Biotechnology sector and last chapter concludes the scope of Indian Biotechnology sector and Discussion on future prospects of Indian Biotechnology sector.

Keywords: FDI, Economic Impact, Biotechnology, BIRAC, Generic Modified Technology

Introduction

Indian Biotechnology sector has the twelfth position at world level and got the third rank in Asian Pacific region. After espousing Product Patent Regime (PPR) in 2005, India has became the second largest number of approved plants of U.S. Food and Drug Administration (USFDA). In order to Fund, mentor, handhold and facilitate in the Biotechnology sector, including infrastructure for the enhancement of biotechnology sector, “Biotechnology Industry Research Assistance Council (BIRAC) was incorporated. It is proud to propagate that India is the world’s leading supplier of affordable vaccines, especially, largest producer of recombinant Hepatitis B vaccine. The twin advantages of this sector is the availability of intellectual, highly skilled and trained manpower in Biotechnology field and massive domestic market with huge consumer base for the development and growth medical and Bio-organic field. Indian Biotechnology sector consist of five Bio-components such as Bio-pharmaceutical sector, Bio-Service sector, Bio-agricultural sector, Bio-Industrial Sector and Bio-Informatics sector.

Review of Literature

There are several studies relating investment on Biotechnology sector. Few of them, are

Alexius A. Pereira¹ suggests that the “collaboration” or “adaptive partnership” between governments and TNCs can be understood as follows. Governments need to be pro-active (via policy interventions) to create opportunities for TNCs to enhance their own business competitiveness. However, governments should expect policy competition for FDI and they should also expect TNCs to be selective. Hence, there will be a great deal of interaction and transaction - not just between the two sides but also within each side (e.g. states in policy competition) - that will ultimately determine FDI flows.

Pedro I. Bustamante ² concluded that The “High-TECH SMES” of the biotechnology industry should be identified as a key industry sector responsible for developing high-wage research and development jobs, and thus an important target in the tax incentive legislative proposals.

R. Himachalapathy³ The government is establishing a biotech park in Chennai to tap the abundant availability of highly skilled manpower in biotechnology & biochemistry from eminent institutions. Furthermore, the state is very rich in herbs and a major exporter of herbal products to Europe, East Asia, and the United States.

Deepak Ranjan and Shuchi Jaiswal⁴ According to them, the fast growth rate and increasing number of licensing and collaboration deals in the biotech industry is attracting growing levels of investment, not only from
pharmaceutical companies but also from stock market investors due to the future prospects within the industry.

Ramamohan Rao T V S 5 This book deals with the organizational mechanisms to accelerate developments in biotechnology, the patents and IPRs necessary to obtain the requisite R&D and compensate the entrepreneurs and the emerging markets for products of biotechnology and their pricing.

Giovanni Lagioia, Annarita Paiano, Teodorolo Gallucci6 they concluded that This study shows that in Apulia few biotech innovations could be applied. Without any doubt, the possible development of biotechnology in the territory of Apulia depends on the successful transfer of technological know-how from research centres or universities to local businesses, especially because of their small size.

Role of FDI on Indian Biotechnology sector: The Foreign Direct Investment in India, has been enhance after the liberalization policy and the structural changes made in foreign trade policy. As far as FDI inflow in India with respect to biotechnology are, 100% Foreign Direct Investment (FDI) is allowed under the automatic route for greenfield pharma, 100% Foreign Direct Investment (FDI) is allowed under the automatic route for brownfield pharma in up to 74% FDI is under automatic route and beyond 74% is under government approval route and FDI up to 100% is allowed under the automatic route for the manufacturing of medical devices. India was the first Asian country, has recognized the importance of biotechnology as a tool of upgrading the economic system. In continuation with this, India initiated the first Export Processing Zone in Kantla. Integration of agricultural sector and pharmacy sector, for the purpose of accelerating the economic growth in the field of Information technology resulted in incorporation of “Biotechnology Sector”. The Indian biotechnology sector has inheriting power of low operational costs for running the unit, low cost for the technology, availability of skilled human resource, IT enhanced network of life science research laboratories along with abundance of raw material inputs such as plant, animal and human genetic diversity. Due to the enormous flow of Foreign Direct Investment, the transformation of Indian Biotechnology sector from share of 2 percent global requirement in 1999 to position of top 12 largest destination of Biotechnology product supply. The current study is witnessing the significance of FDI on Indian Biotechnology sector.

Current Status of Indian Biotechnology Sector: The post liberalization era has witnessed that Indian Biotechnology sector has grown in leaps and bounds. The current study throws light on the current position of Indian biotechnology sector. According to government report under Make in India statistics that the Indian biotech industry is expected to grow at 30.46 percent CAGR to reach US $100 billion by 2025. It has grown from US $ 1.1 billion in 2005 to US $ 7 billion and is expected to reach US $ 11.6 billion in 2017. The emerging trend of biotechnology sector in Indian scenario, a positive hold in the macro economic variables especially, the employment opportunities, as it the sector supported with 104 new startups, 346 biotechnology based companies, more the 500 projects, out of which 115 collaborative projects through BIRAC, a Public sector unit of Government of India. Further, more than 100 Intellectual properties are facilitated through TRIPS and TRIMS. In addition to that bio-incubation space has been created to enhance the performance bio-incubators. As on now, 1,75,000 square feet of bio-incubation space has been provided and the sector is planning to incorporate 50 world class bio-incubators by 2020. The Indian biotechnology sector gains its importance as it encourages all three sectors simultaneously. Raw material from the plants (Bio-agriculture), production of drugs and other healthcare products (bio-industry) and using information technology and enhance the medical field (bio-service). The Special Economic Zones are the catalyst of Indian Biotechnology growth, as the SEZ act, 2006, in its amendments encouraged that the minimum land requirement for starting a SEZ unit from 100 acres to only 10 acres and 100% deduction of profits for 3 out of 5 years for startups setup during April, 2016 to March, 2019. MAT will apply in such cases 10% rate of tax on income from worldwide exploitation of patents developed and registered in India by a resident. Custom single window project have been announced and would be implemented at major ports and airports from the beginning of next financial year

SWOT Analysis for Economic Impact of FDI on Indian Biotechnology Sector: The leading sector of Indian industry, the Biotechnology sector needs a critical analysis, as its scope on economic development is comparatively high. The current discussion enriches the knowledge of possible further improvement in biological economic field. The strength of Indian Biotechnology sector includes 12th largest biotech destination, 2nd highest approved plants (USFDA), leading supplier
of Hepatitis B vaccine recombinant, availability of skilled man power, Connectivity of all economic sectors (agriculture, Industry and Service sector, Larger demand for biotech products, Enhanced academic resources to create a strong pool of scientists, well developed base industries (Pharmaceuticals), Extensive clinical trials and rich biodiversity. However, this sector has certain hurdles, such as, Commercializing the biotech products, creation of economic inequalities, Problems of economies of scale, Foreign competitors and High import duty for asset acquisition, unfavorable balance of payments. As far as the opportunities are concerned, huge domestic market, Biotechnology Industry Partnership Programme (BIPP), Small Business Innovation Research Initiatives (SBIRI), Biotechnology Industry Research Assistance Council (BIRAC), Special Economic Zones and IPR policies. The Indian Biotechnology sector is facing number of challenges, especially the problem of anti-biotech propaganda, increasing brain drain, Unfair Trade Practice, loss of natural resources, initiation of new type of diseases, Cost competitiveness and political, social, economic and cultural value deterioration.

**Strength**
1. 12th largest biotech destination,
2. 2nd highest approved plants (USFDA),
3. Leading supplier of Hepatitis B vaccine recombinant,
4. Availability of skilled man power,
5. Connectivity of all economic sectors (agriculture, Industry and Service sector,
6. Larger demand for biotech products,
7. Enhanced academic resources to create a strong pool of scientists
8. Well-developed base industries
9. Extensive clinical trials and rich biodiversity.

**Weakness**
1. Commercializing the biotech products,
2. Creation of economic inequalities,
3. Problems of economies of scale,
4. Foreign competition
5. High import duty for asset acquisition,
6. Unfavorable balance of payments
7. Problem of IPR

**Opportunities**
1. Huge domestic market,
2. Biotechnology Industry Partnership Programme (BIPP),
3. Small Business Innovation Research Initiatives (SBIRI),
4. Biotechnology Industry Research Assistance Council (BIRAC),
5. Special Economic Zones and
6. IPR policies
7. Low operational costs for running the unit,
8. Low cost for the technology

**Threats**
1. The problem of anti-biotech propaganda,
2. Increasing brain drain, Unfair Trade Practice,
3. Loss of natural resources,
4. Initiation of new type of diseases,
5. Cost competitiveness and political, social, economic and cultural value deterioration,
6. Clinical strikes

Source: Prepared by Author

**Fig. 1: SWOT Analysis–Economic Impact of FDI on Indian Biotechnology Sector**

**Conclusion**

The Economic Impact of FDI on Indian Biotechnology results in initiation of Current Good Manufacturing Practices (CGMP) Plant was started with world class infrastructure for the manufacture of phyto-pharmaceuticals in 2016. This industry influences all three economic sectors and its macroeconomic variable, including national income elements, GDP, Investment, Employment, Health sector and so on. The success of biological economics relies on the development of Biotechnology sector.
Discussion

The initiation of Bio-economic models may provide lead to growth and development in the manufacturing sector. The right choice of model, can be induced from the biotechnology sector. This sector is the right destination for MSME (Micro, Small and Medium Enterprises) as it generates more employment opportunities. The Government of India has already announced number of schemes and project to improve the growth and export promotion of Biotechnology sector. The Indian economy expects many more developments in Biotechnology industry in the days to come.

Ethical Clearance: Completed. (Dept. level committee at VELS)

Source of Funding: Self

Conflict of Interest: NIL

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Integrated Ancient Medicine Practice and Treatment For Obesity-A Holistic Approach

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ABSTRACT

In the current intellectual world, the power of Human capital of the respective country decides its strength of the country in the future. Hence it is extremely important for progressive Governments to foster and sustain human development which is the part and parcel of its social fabric and civic society. Human development does not rain down from heaven but it is by the people and for the people. This is also applicable to development of human health. The Human health influences the both economic development and economic growth. The human ailments like non communicable disease especially obesity leads to weaken the man power which in turn slow down the productivity of manpower and progress of the economy. Balancing the demand for and supply of health care products and services lead to optimal human development. Therefore the health care providers and destinations should understand the demand pattern of patient-centered plans and clinical decision-making under the existing health care system

Keywords: BMI, Lifestyle disorder, Indian Health Care Economy, Obesity, Indian Medicine

Introduction

Nowadays Obesity is common health issue among the people irrespective of their ages and economic status. Majority of the people are not giving importance for this ailment. Actually it looks as simple as a life style disorder but it leads to serious and complicated health issues and impair human development. Most of the developed countries are providing a huge investment or medical facilities to protect and maintain the human health, as it is an economic indicator of the standard of living. This indicates that there is a strong association between the health and economic development.

Objectives

To examine and analyze the causes and consequences of lifestyle disorders ailments – Obesity, obesity related issues, its economic impacts and measures to overcome obesity.

Review of Literature

M laxy, C teuner, R Holle and C Kurz¹ stated that the BMI- HRQL (Health Related Quality of Life) is the highest in white people and it is linear negative slope in black women among the Hispanics.

Cilia mejia-Lancheros, John Mehegan, Celine M. Murrin, Cecily C. Kelleher² Concluded in their studies that “The smoking habit from the paternal line is associated with grand-children’s adiposity measures during their early childhood, which might be epigenetically transmitted through male-germ line cells”.

Ahmad Jayedi, Sakineh Shab-Bidar³ found in their research work that “There is strong evidence which confirms existence of obesity paradox in patients with hypertension. However, owing to the observational nature of included studies, these findings should be interpreted with caution”.

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S. N. Sugumar pointed out that the health education and its awareness on alternative medicine are useful to overcome the lifestyle disorder human ailments, such as cardiovascular disease, Blood Pressure, Cancer etc.,

F Ofei According to author, there is the need now, more than ever, to set up a multi-sectoral taskforce to assess the national prevalence, trends, determinants and impact of obesity and its related NCDs on the society as a whole and on health care provision in the country. The recommendations from such a consultation could show the way in which our environment can be made more enabling for adults and children to eat more healthily and be more physically active on a regular basis.

Kevin M. Fitzpatrick et.al. The study concludes that one of the element for the cause of obesity is the “Place”. The multivariate analysis also confirms that the ploace-chronic health has a positive connection with the longitude and latitude position of the globe. The continuing burden of zip code in the western side for the marginalized population leads to place-focused medical care.

J Nurse Pract Naturopathy is medical treatment which involves diet, correcting imbalance, making changes in lifestyle in order to achieve the long-term sustainable health optimization.

Obesity

Obesity means an increase in body weight caused by excessive accumulation of fat, a person is Obese when his/her Body Mass Index (BMI) is higher than 26 and is considered overweight when their Body Mass Index is between 25 and 30. Obesity is a serious and chronic human syndrome which affects multiple organs of our body.

Obesity in Global context: According to Obesity Rates by Country–2017, Renew Bariatrics, there are nearly 650 million adults and more than 125 million children and adolescents are suffering from obesity in the world, based on Body Mass Index (BMI) estimation. This indicates nearly 10.5 percent of world population (7.5 Billion) are suffering with obesity.

Obesity in Indian Context: India is positioned 3rd globally in terms of number of Obese people and nearly 44.3 million people are obese and as a percentage 5% of its population. Obesity in Indian adults appears to be disproportionate with 22 percent of women found to be obese compared to 16 percent of men. This may be accounted for by traditional Indian values, in which men work and the women remain at home. In addition, the technology improvement in home-aids leads to lesser physical work for the house maker which results in obesity. In modern times, the increasing percentage of women employment also leads to many life style disorders that causes obesity

Obesity related health issues: The human ailments such cardiovascular disease, cancer, diabetes, joint pains, and chronic kidney disease and Blood pressure etc., may be caused by Obesity. Many empirical studies have revealed that the obesity is the main reason for fall in life expectancy when it is unchecked in time. The rise in obesity among children is symptom of health deterioration, since it has the potential to sap human development and thereby future economic growth.

Johns Hopkins University and Global Nutrition Report CoChair. “A well-nourished child will learn better in school, be healthier and grow into productive contributors to their economies. Good nutrition provides the brainpower, the ‘grey matter infrastructure’ to build the economies of the future” and “A well-nourished child is one-third more likely to escape poverty”, says Jessica Fanzo,

Economic Impact of Obesity: The Human capital is the integral part of Gross Domestic product, as it directly influences the total productivity of the nation. However the human capital depends on public health which is highly affected by the health disorders particularly the Obesity. Therefore, there is a direct proportional linkage between the obesity and GDP. Obesity and human productivity are inversely related which also results in negative economic growth and more medical expense.

Reasons for Obesity in India: There are many reasons for the rise in obesity at global level. Some of the reasons are enlisted as

Urban Area Clusters: Expansion of urban areas to accommodate growing population has muted human physical movement to a very large extent since the required living amenities are available close by.

Increased Affluence: Increase in purchasing power of households across Urban and Rural areas has led to consumption of aspirational foods more regularly leading to Obesity.
Mechanization: The shift from manual labor to mechanized labor and continuous invention of modern household and industrial gadgets also has reduced the necessity for strenuous physical activity which is needed to burn fat.

Digitalization: With the three screens to one human syndrome the entire entertainment to adults and to large extent of children are being delivered through Television, Mobile Phones and Laptops. This is one of the primary reasons for restrictions and lack of interests in outdoor activities instead focuses on vicarious pleasures thereby leading to sedentary and inactive lifestyle.

Fast Food culture: This could be labelled as the number one culprit for increase in obesity across the spectrum since calories are available over the counter readily, easily and it’s much easier to buy delicious foods without looking at the health quotient this coupled with western food cultural influence which India is rapidly adapting in recent past.

Smoking: India has 11.2% of the world’s total smokers. Deaths attributable to smoking increased by 4.7% in 2015 compared with 2005 and smoking was rated as a bigger burden on health, moving from third to second highest cause of disability.

Reduction in DALY: Disability Adjusted Life Years measure the number of years that are lost or rendered economically unproductive due to disease including obesity. Of the DALYs lost to obesity across the world, around 71 percent are due to premature mortality and 29 percent to disability that has prevented individuals from making their full economic contribution.

Medical and Health Impact of Obesity: Obesity has a far-ranging negative effect on health.

Diabetes: Obesity is the major cause of type II diabetes. Obesity can cause resistance to insulin, the hormone that regulates blood sugar. When obesity causes insulin resistance, the blood sugar increases. Even moderate obesity can shoot up the risk of diabetes.

Respiratory and Lung Disorders: Sleep apnea, which causes people to stop breathing for brief periods, interrupts sleep throughout the night and causes drowsiness during daytime. It also leads to heavy snoring. Respiratory problems associated with obesity occur when added weight of the chest wall squeezes the lungs and causes restrictive breathing. Sleep apnea can also be associated with high blood pressure.

High Blood Pressure: Extra fat tissue and cells in the body needs oxygen and required nutrients to survive, which requires the blood vessels to circulate more blood to the fat tissue and cells. This increases the workload of the heart because it must pump more blood constantly. More circulating blood also means more pressure on the artery walls. Higher pressure on the artery walls increases the blood pressure. Apart from that extra weight can raise the heart rate and reduce the body’s ability to transport blood through the vessels.

Cardiovascular Disease: Atherosclerosis (hardening of the arteries) is present 10 times more often in obese people compared to those who are not obese. Coronary artery disease is also more prevalent because fatty deposits build up in arteries that supply to the heart. Narrowed arteries and reduced blood flow to the heart can cause chest pain (angina) or an imminent heart attack. Blood clots can also form in narrowed arteries and cause a stroke.

Joint Problems: Obesity can affect the knees and hips because of the stress placed on the joints by increased weight. Joint replacement surgery, while commonly performed on damaged joints, may not be an advisable option for an obese person because the artificial joint has a higher risk of loosening and causing further damage to already existing problem.

Cancer: Overweight Women contribute to an increased risk for a variety of cancers including breast cancer, colon, gallbladder, and uterus. Men who are overweight also have a higher risk of colon cancer and prostate cancers.

Metabolic Syndrome: Metabolic syndrome is a complex risk factor for cardiovascular disease. Metabolic syndrome consists of six major components: abdominal obesity, elevated blood cholesterol, and elevated blood pressure, insulin resistance with or without glucose intolerance, elevation of certain blood components that indicate inflammation, and elevation of certain clotting factors in the blood.

Societal and Psychological Effects: With the advent of Facebook, Instagram culture there is a constant peer pressure to be physically good looking almost leading to anorexia. Overweight and obese persons are often branded for their condition as lazy or weak -willed.
Teasing of overweight persons expressed by some individuals may progress to bias, discrimination, and even torment and no romantic relationships.

**Health Economics to Healthy Economics:** Health Economics is an applied field of study that allows for the systematic and rigorous examination of the problems faced in promoting health for all. By applying economic theories of consumer, producer and social choice, health economics aims to understand the behavior of citizens, health care providers, public and private organizations, and governments in decision-making.

Health economics is used to promote healthy lifestyles and positive health outcomes through the study of health care providers, hospitals and clinics, managed care and public health promotion activities. Efficiency is not the only objective in choosing how health care resources should be allocated we also need to think about equity, or the fair distribution of resources and benefits especially in a country like India and which is also an objective in health care decision-making. Economics provides an information framework in which the objectives of both efficiency and equity may be pursued accordingly. It’s important to take into consideration the welfare state model while delivering health care using the principle of Health economics.

**Obesity-Control and Reduction through Integrated Ancient Medicine Treatment:** To control obesity effectively body needs to do two of its primary functions really well first it has to flush toxins and effortlessly remove waste second it has to increase digestion to improve metabolism. Both these are very effectively achieved by the below ten Ancient Medicine treatment and practices which has given marked and improved weight reduction for more than 20 obese patients over a period of 6 months. The programme was titled fight obesity which was designed as a holistic and integrated offering which could work with majority of Obese patients to produce optimum results enabling them to lead healthier life’s. It was observed that on an average there was a reduction of 7 to 9 kgs. The minimum course duration of 21 days amongst the patients for both the sexes. Purgation or Viresanam is provided through Siddha Medicine with one day guided fasting and diet restrictions.

**Varmam Sarvaanga Thadaval Massage:** Delivered by an experienced Varmam Asan to activate internal metabolism by stimulating the key energy points situated across the body vigorously and in an orchestrated manner applying medicated herbal powder mix to induce fat burn. It’s a 60-minute procedure recommended for fourteen days.

Nasal and Ear Drops or Nasiyam Process is administered with Siddha Medicine. It is a package of 15 minutes procedure recommended once in 15 days as two sittings during the course.

**Herbal Steam Bath:** Herbal decoction steam bath to stimulate opening of pores in the skin, this is done after the Varmam Sarvaanga Thadaval Massage to enable elimination of toxins. This is suggested as a fifteen minutes procedure recommended for 14 days.

**Internal Medicines:** Siddha medicine formulations in the form of tablets and powder are provided to aid in waste elimination and to increase absorption and digestion. This is recommended for 21 days.

**Yoga:** Pranayama including Anulom - Vilom (Alternative Nostril Breathing) and Kapal Bhatti (Fore head shiner) along with Sarvangasan (Plough Pose), Vajrasan (Bolt Pose), and Shavasan (Corpse pose or Yoga Nidra) poses and techniques are taught and advised to be practiced every day for 30 minutes in the morning as an ongoing life style change.

**Acupuncture:** Stomach, Spleen, Kidney and Liver Meridians XI cleft and Jing well points are stimulated for toxin removals, digestion, absorption and excretion. This Acupuncture practice of 30 minutes is recommended weekly for 21 days.

**Sujok:** Pituitary, Thyroid glands, Stomach, Kidney, Sigmoid colon and Liver are stimulated using seeds and color therapy through standard correspondence systems. This is recommended for 30 Minutes over a period of 21 days.

**EFT (Emotional Freedom Technique):** The tapping method works at the mind level to provide the patients the needed mental support by helping them to clear their fear, uncertainties and doubts about the fight against obesity and for their overall wellbeing. This is administered 30 minutes every week for 21 days.

**Naturopathy:** Detailed individualized diet chart based on the body dosha (constitution) is prepared and given in consultation with the patient to accommodate their food preferences and allergies. This is recommended for 21 days and a repetition of another course and as an ongoing life style change.
Discussion

The current study has paved way for many future research studies, like whether obesity is based on hereditary, bio magnetism, life style disorder or Food habit.

Conclusion

To combat Obesity globally there are systemic changes which need to be brought in including higher taxes on smoking and strict and tighter regulations around non-healthy food products focused on the ready to eat segment. The state should more actively embark upon prevention activities such as weight management programs and public health campaigns to promote active life style leading to better health. Government and private healthcare providers, social-sector organizations and other stakeholders should fight against the obesity problems with integrated and holistic approach. Given the seriousness of the obesity issue, the need of the hour is to educate the public that the obesity is not only preventable but also curable.

Ethical Clearance: VELS Research Committee

Source of Funding: Self

Conflict of Interest: NIL

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Impact of Farm Technology on Agricultural Production– A Study with Special Reference to Madurai District of Tamilnadu

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ABSTRACT

Agriculture in India is undergoing transformation. Traditional technology is slowly giving way to modern technology. The ‘New Strategy’ for agricultural development, which was initiated in 1966, in essence called for the implementation of High Yielding Varieties Programme (HYVP) in all districts selected under Intensive Agricultural District Programme (IADP) and allied schemes. The strategy was concerned with higher productivity of crops but with multiple cropping, the HYVP had assumed ‘crucial importance’ in the Planning Commission’s agricultural development strategy. A three dimensional approach towards agricultural development was chemical technology that guaranteed minimum paddy as an incentive to agricultural production. Technological change or the new strategy proposes to make a new technological breakthrough in India which comprises the introduction of new and HYV of improved seeds, increased application of the recommended dose of fertilizers and extension of the use of pesticides that can save crop from destruction by insects. The increase in production of food grains recorded after 1966-67 is described as Green Revolution. The rapid introduction of HYV of paddy and wheat and their multiplied effects on other crops justify the name Green Revolution. To study the characteristics of sample farmers, labour utilization, input and output structure, cost and returns for small and large farmers cultivating High Yielding Variety and Traditional Variety of rice.

Keywords: Agriculture Production, Farm Technology, High Yielding Varieties.

Introduction

Agriculture in India is undergoing transformation. Traditional technology is slowly giving way to modern technology. This transformation to new technology and techniques brings to the fore new problems and thus offers new opportunities and new avenues of research to agricultural economists. The ‘New Strategy’ for agricultural development, which was initiated in 1966, in essence called for the implementation of High Yielding Varieties Programme (HYVP) in all districts selected under Intensive Agricultural District Programme (IADP) and allied schemes. The strategy was concerned with higher productivity of crops but with multiple cropping, the HYVP had assumed ‘crucial importance’ in the Planning Commission’s agricultural development strategy. The most interesting feature of the new agricultural strategy was that the movement for scientific agriculture and programmes for research and extension received fresh stimulus.2 a three dimensional approach towards agricultural development was chemical technology that guaranteed minimum paddy as an incentive to agricultural production. Technological change or the new strategy proposes to make a new
technological breakthrough in India which comprises the introduction of new and HYV of improved seeds, increased application of the recommended dose of fertilizers and extension of the use of pesticides that can save crop from destruction by insects. This technological change brought spectacular changes in the agriculture production of our country. The increase in production of food grains recorded after 1966-67 is described as Green Revolution. The rapid introduction of HYV of paddy and wheat and their multiplied effects on other crops justify the name Green Revolution. To study the characteristics of sample farmers, labour utilization, input and output structure, cost and returns for small and large farmers cultivating High Yielding Variety and Traditional Variety of rice. Indian Government has been emphasizing the importance of agricultural development. The New Agricultural Strategy (NAS) was initiated in 1966. Accordingly, policies were formulated to utilize and promote high yielding varieties of food grains in all districts selected under the IADF and IAAP schemes. Madurai district in Tamil Nadu State is one of the most important districts where there has been a significant progress for adopting high-yielding varieties of rice. Rice is mainly cultivated in almost all the seven taluks in this district and the 68 per cent of ayacut is double cropped land. For the purpose of analysis, High Yielding Variety is expressed as HYV and Traditional Variety is expressed as TV.

(i) Characteristics of sample farmers
(ii) Cost and returns structure

Objectives of the Study

1. To analyse the cost and return structure of Traditional and High Yielding Variety technology of and of small and large farmers producing Traditional and High Yielding Variety of rice.
2. To identify and analyse the determinants of yield and factors causing yield gap with regard to farmers cultivating two varieties of rice and of small and large farmers group.

Statement of the Problem

The new farm technology adopted since the mid sixties has helped in revolutionizing Indian agriculture. Technological change in agriculture is characterized by the use of pesticides, irrigation, machinery, improved implements, soil conservation and the like. The successful adoption of these components of new strategy has resulted in the increase of agricultural production. The introduction of above mentioned components of new agriculture strategy depends upon factors like irrigation, size of farm, capital, institutional credit, and extension services. There are many regions with better factor endowments. The new agricultural strategy was the first to adopt modern inputs and derive the benefits as a sequel. The production performance of the rice production is of critical importance in improving the efficient use of resources. The cost of production and net returns obtained per unit would determine the profitability of the Agriculture production.

### Table 1: Agricultural Perspective in India

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<td>(i) Net Sown Area</td>
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<td>(ii) Gross Cropped Area</td>
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<td>197.2</td>
<td>203.4</td>
</tr>
<tr>
<td>(iii) Cropping Intensity</td>
<td>125.0</td>
<td>130.0</td>
<td>135.0</td>
<td>140.0</td>
<td>144.0</td>
</tr>
<tr>
<td>(iv) Gross Cropped area under food grains</td>
<td>126.7</td>
<td>1270</td>
<td>130.0</td>
<td>132.6</td>
<td>135.8</td>
</tr>
<tr>
<td>2. Irrigation (m.ha.)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(i) Foodgrains</td>
<td>44.2</td>
<td>53.8</td>
<td>62.3</td>
<td>70.2</td>
<td>77.7</td>
</tr>
<tr>
<td>(ii) Other than foodgrains</td>
<td>16.3</td>
<td>21.9</td>
<td>27.0</td>
<td>31.8</td>
<td>36.3</td>
</tr>
<tr>
<td>(iii) Total</td>
<td>60.5</td>
<td>75.7</td>
<td>89.3</td>
<td>102.0</td>
<td>114.0</td>
</tr>
<tr>
<td>3. Fertilizer (m. t.)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(i) Foodgrains</td>
<td>6.2</td>
<td>9.4</td>
<td>12.8</td>
<td>16.6</td>
<td>21.0</td>
</tr>
<tr>
<td>(ii) Other than foodgrains</td>
<td>2.1</td>
<td>4.1</td>
<td>5.5</td>
<td>7.1</td>
<td>9.0</td>
</tr>
<tr>
<td>(iii) Total</td>
<td>8.3</td>
<td>13.5</td>
<td>18.3</td>
<td>23.7</td>
<td>30.0</td>
</tr>
</tbody>
</table>
4. Product-mix

<table>
<thead>
<tr>
<th>Product</th>
<th>Price Range (Cost)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(i) Cotton (m. bales)</td>
<td>8.5, 10.5, 14.0, 18.0, 23.0</td>
</tr>
<tr>
<td>(ii) Sugarcane (mt)</td>
<td>170.3, 235.0, 275.0, 335.0, 408.0</td>
</tr>
<tr>
<td>(iii) Foodgrains (mt)</td>
<td>145.5, 172.5, 210.0, 245.0, 285.0</td>
</tr>
<tr>
<td>(iv) Oilseeds (mt)</td>
<td>13.0, 17.5, 23.0, 29.0, 37.0</td>
</tr>
</tbody>
</table>

5. Population (million)

<table>
<thead>
<tr>
<th>Year</th>
<th>Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>1992-97</td>
<td>762.0</td>
</tr>
<tr>
<td>2006</td>
<td>844.0</td>
</tr>
<tr>
<td>2006</td>
<td>925.0</td>
</tr>
<tr>
<td>2006</td>
<td>1006.0</td>
</tr>
<tr>
<td>2006</td>
<td>1102.0</td>
</tr>
</tbody>
</table>


Table 2: Size of Operational Holdings of the Sample Farmers

<table>
<thead>
<tr>
<th>Size of Holdings (in acres)</th>
<th>High Yielding Variety (HYV)</th>
<th>Traditional Variety (TV)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Small</td>
<td>Large</td>
</tr>
<tr>
<td>Less than 1</td>
<td>15 (10.00)</td>
<td>-</td>
</tr>
<tr>
<td>1-2</td>
<td>25 (16.67)</td>
<td>-</td>
</tr>
<tr>
<td>2-5</td>
<td>58 (38.66)</td>
<td>-</td>
</tr>
<tr>
<td>5-8</td>
<td>-</td>
<td>42 (28.00)</td>
</tr>
<tr>
<td>Above 8</td>
<td>-</td>
<td>10 (6.67)</td>
</tr>
<tr>
<td>Total</td>
<td>98 (65.33)</td>
<td>57 (34.67)</td>
</tr>
</tbody>
</table>

Source: Survey data. Figures in bracket represent percentages to total.

Table 3: Experience of Sample Farmers in Paddy Cultivation

<table>
<thead>
<tr>
<th>Experience in Years</th>
<th>High Yielding Variety (HYV)</th>
<th>Traditional Variety (TV)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Small</td>
<td>Large</td>
</tr>
<tr>
<td>Less than 5</td>
<td>8 (6.67)</td>
<td>4 (2.67)</td>
</tr>
<tr>
<td>5-10</td>
<td>26 (17.33)</td>
<td>10 (6.67)</td>
</tr>
<tr>
<td>10-15</td>
<td>57 (38.00)</td>
<td>36 (24.00)</td>
</tr>
<tr>
<td>15-20</td>
<td>5 (3.33)</td>
<td>2 (1.33)</td>
</tr>
<tr>
<td>Total</td>
<td>98 (65.33)</td>
<td>52 (34.67)</td>
</tr>
</tbody>
</table>

Source: Survey Data. Figures in bracket represent percentages to total.

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</tr>
<tr>
<td>Total</td>
<td>98 (65.33)</td>
<td>52 (34.67)</td>
</tr>
</tbody>
</table>

Source: Survey Data. Figures in bracket represent percentages to total.

Table 2 reveals that in high yielding variety, nearly 65.34 per cent of the operational holding was below 5 acres and remaining 34.66 per cent were above 5 acres. Among small farmers, the dominant operational holding was between 2-5 acres (38.67 per cent) while in the large farm, it was 5-8 acres (28.00 per cent) to the total. In the case of traditional variety, nearly 68.66 per cent of the operational holding was below 5 acres. The remaining 31.34 per cent belong were above 5 acres. Among small farmers, the dominant operational holdings were between 2-5 acres (45.33 per cent) while in the large farms, it was 5-8 acres (27.34 per cent) to the total. Comparing their two varieties, high yielding variety is low in operational holding below 5 acres (65.34 per cent) while traditional variety is high in operational holding below 5 acres (68.66 per cent) respectively.

Table 3: Experience of Sample Farmers in Paddy Cultivation

<table>
<thead>
<tr>
<th>Experience in Years</th>
<th>High Yielding Variety (HYV)</th>
<th>Traditional Variety (TV)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<tr>
<td>Total</td>
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<td>52 (34.67)</td>
</tr>
</tbody>
</table>

Source: Survey Data. Figures in bracket represent percentages to total.

It is observed from Table 3 that in high yielding variety 24.00 and 62.00 per cent of the farmers have had the experiences of 5-10 years and 10-15 years respectively. While 9.33 per cent of farmers had the experience of less than 5 years and only 4.67 per cent of farmers have experience of 15-20 years. In traditional variety 28.00 and 58.00 per cent of the farmers had experience of 5-10 years and 10-15 years. While 8.00
per cent of the farmers had experience between 15-20 years and only 6.00 per cent had experience less than 5 years. Comparatively, traditional variety has 58.00 per cent of farmers with experience of 10-15 years, whereas in High Yielding variety only 62.00 per cent of farmers had experience between 10 to 15 years.

Table 4: Labour Utilisation in the Cultivation of HYV and TV Varity of Rice

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Particulars</th>
<th>High Yielding Variety</th>
<th>Traditional Variety</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Small Farmers</td>
<td>Large Farmers</td>
</tr>
<tr>
<td>1.</td>
<td>Human labour</td>
<td>4691.65 (79.15)</td>
<td>4665.10 (78.98)</td>
</tr>
<tr>
<td>2.</td>
<td>Bullock labour</td>
<td>1236.14 (20.85)</td>
<td>1241.31 (21.02)</td>
</tr>
<tr>
<td>3.</td>
<td>Total labour cost</td>
<td>5927.79 (100)</td>
<td>5906.41 (100)</td>
</tr>
</tbody>
</table>

Source: Survey data

Table 4. reveals that there was a direct proportion between the size of the farm and the human labour and total labour cost in the case of High Yielding variety. The total labour cost increased with the increase in size of the farm. The total labour cost per acre was Rs. 5927.79 for small farmers and Rs.5906.41 for large farmers. In the total labour cost, the cost of human labour constituted 79.15 per cent for small farmer, 78.98 per cent for large farmers and 78.33 per cent for overall farmers. Bullock labour constituted for 20.85 per cent on small farmers, 21.02 per cent on large farmers and 21.67 per cent on overall farmers. In the case of traditional variety, the total labour cost per acre was from Rs.4716.45 for small farmers and Rs.4932.41 for large farmers. In the total labour cost, the cost of human labour constituted 85.13 per cent, 84.37 per cent and 85.00 per cent for small, large and overall farmers respectively. Bullock labour accounted for 14.87 per cent for small farmers, 15.63 per cent for large farmers and 15.00 per cent for overall farmers.

Table 5: The Per Acre Average Cost and Returns Structure of Small and Large Farmers Cultivating HYV of Rice

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Cost Component</th>
<th>Small Farmers</th>
<th>Large Farmers</th>
<th>Overall Farmers</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Human labour (including family labour)</td>
<td>4,465.16</td>
<td>4,516.21</td>
<td>4,516.21</td>
</tr>
<tr>
<td>2.</td>
<td>Bullock labour</td>
<td>1,421.36</td>
<td>1,316.15</td>
<td>1,321.15</td>
</tr>
<tr>
<td>3.</td>
<td>Chemical fertilizer</td>
<td>1,626.13</td>
<td>1,621.36</td>
<td>1,641.13</td>
</tr>
<tr>
<td>4.</td>
<td>Pesticide cost</td>
<td>621.22</td>
<td>639.14</td>
<td>610.66</td>
</tr>
<tr>
<td>5.</td>
<td>Seed cost</td>
<td>672.16</td>
<td>611.21</td>
<td>531.12</td>
</tr>
<tr>
<td>6.</td>
<td>Farm manure</td>
<td>693.14</td>
<td>699.14</td>
<td>766.10</td>
</tr>
<tr>
<td>7.</td>
<td>Cost of irrigation</td>
<td>399.65</td>
<td>391.25</td>
<td>361.11</td>
</tr>
<tr>
<td>8.</td>
<td>Interest on working capital</td>
<td>691.22</td>
<td>641.14</td>
<td>609.13</td>
</tr>
<tr>
<td>.</td>
<td>Cost A</td>
<td>10,590.04</td>
<td>10,435.81</td>
<td>10,356.61</td>
</tr>
<tr>
<td>9.</td>
<td>Rent</td>
<td>991.24</td>
<td>956.21</td>
<td>1,008.15</td>
</tr>
<tr>
<td>10.</td>
<td>Interest as fixed capital (excluding land cost) land revenue, less and taxes, depreciation of implements and machinery</td>
<td>619.13</td>
<td>661.26</td>
<td>609.15</td>
</tr>
</tbody>
</table>

Total – Cost C (total) 12,200.41 12,053.28 11,973.91

Yield per acre in kg 2,466.36 2,241.41 2,316.41

Gross Returns (Rs.) 16,961.22 16,999.26 16,361.15

Net Returns (Rs.) 4,760.81 4,945.98 4,387.24

Source: Survey data.
It is understood from Table 5 that the small farmers produced 2,466.36 kgs of rice and earned Rs.16,961.22 per acre while their net returns per acre were Rs.4,760.81. In the case of large farmers, the yield per acre was 2,241.41 kgs and they realized Rs.16,999.26 per acre as gross returns while their net return per acre was Rs.4,945.98. In overall yield per acre, gross returns and net returns earned were 2,316.41 kgs, Rs.16,361.15 and Rs.4,387.24 per acre respectively. It indicates that the small farmers were getting higher yield and thereby higher net income than large farmers in the case of HYV. The cost analysis reveals that the per acre total cost, that is operational cost of cultivation for small farmers, worked out to Rs.10,590.04, whereas it was Rs.10,435.81 for large farmers. It in observed that total cost incurred was found higher in the case of large farmer compared to small farmers. The cost of human labour forms the major component of the total cost of production for both small and large farmers. Next to human labour, the amount spent on the use of chemical fertilizers occupied the major portion in the total cost of production. It came behind the cost of farm manure, cost of irrigation, pesticides, seed cost and bullock labour. the costs of all the inputs except bullock labour were found to be higher for large farmer than for small farmers. Thus, it is inferred from the analysis that the small farmers were found more efficient than the large farmers, both cost-wise and return wise.

**Conclusion**

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

**Ethical Clearance:** Completed

**Source of Funding:** Self

**Conflict of Interest:** Nil

**REFERENCES**


Assessing WHO’s IYCF Indicators in Mangalore Taluk- A Cross sectional Study

Sandhya Rani Javalkar
Assistant Professor, Department of Community Medicine, JJM Medical College, Davangere, Karnataka

ABSTRACT

Introduction: Infant and Young Child Feeding Practices are a set of well-known and common recommendations that includes guidelines on breastfeeding practices and timely introduction of complementary foods.

Objectives: To assess the WHO’s IYCF indicators among the urban and rural population in Mangaluru Taluk, Karnataka.

Methods: A community based cross-sectional study was conducted among mothers of children in Mangalore Taluk, Karnataka. Data collected by personal interview among 408 mothers using a predesigned pretested questionnaire.

Results: Indicators like Exclusive breast feeding under 6 months (47.8% in urban and 45.6% in rural), Introduction of solid and semi solid foods (90.0% in rural and 92.0% in urban) and minimum meal frequency (83.3% rural and 81.9% urban) were almost same in both urban and rural areas. Early initiation of breast feeding (50% in rural and 42.8% in urban), Continued breast feeding (60.4% in rural and 50.7% in urban) was better in rural compared to urban area. Indicators- minimum dietary diversity (21.3% in rural and 37% in urban), and minimum acceptable diet (20% and 31.9%) were poor in both the areas.

Conclusion: Few indicators performed better in urban areas and few indicators performance was better in rural area. The poor performance of indicators can be reduced by providing right knowledge to the mothers and family members at right time and counseling them about the common low cost nutritious foods that are locally available.

Keywords: Infant and young child feeding, breastfeeding, Minimum acceptable diet.

Introduction

Infant and Young Child Feeding Practices is a set of well-known and common recommendations that includes guidelines on breastfeeding practices and timely introduction of complementary foods at 6-8 months. Optimal IYCF practices are essential for child’s growth and development. A child’s first two years of life are considered a “critical window of opportunity” for prevention of growth faltering. Of all proven preventive health and nutrition interventions, IYCF has the single greatest potential impact on child survival.

Global statistics of IYCF Indicators show that 43% have initiated Breastfeeding within one hour after birth, 37% of children received exclusive breastfeeding, were as 60% of children were initiated with complementary feeding by 6-8 months of age and breastfeeding was continued for 2 years by 55% of the individuals. In India, NFHS 4 reveals that exclusive breastfeeding to be only 54.9% up to 6 months and the initiation of breastfeeding within one hour of birth was 41.6%. Introduction of complementary feeding along with continued breastfeeding in 42.6% children 6-9 months of age.

Infant and young child feeding practices in children 0-23 months of age are critical to improve nutrition, health and development of children. Hence WHO and
UNICEF’s global recommendations for optimal infant feeding as set out in the Global Strategy are: Exclusive breastfeeding for 6 months (180 days), nutritionally adequate and safe complementary feeding starting from the age of 6 months with continued breastfeeding up to 2 years of age or beyond 3 years.6

The difference in feeding practices is still prevalent in urban and rural areas even today, which are influenced by various factors.7 Though there are many studies related to this subject, there are very few studies assessing the WHO’s Core indicators in rural and urban areas. Hence this study is designed with the objectives to assess the WHO’s IYCF indicators among the population in urban and rural areas of Mangaluru Taluk, Karnataka.

Method

A Community based cross-sectional study was conducted among mothers of the children aged 12 months – 36 months. The study areas were a part of field practice area of Department of Community Medicine, Yenepoya Medical Colleges in Mangalore Taluk.

Sample size calculation: Using WHO methodology of Lot Quality Assurance Technique6, considering desired level of confidence interval as 95% and desired level of accuracy as 5%, the initial sample size is 384. The starting point of the study was anganwadi centre (ICDS Block). There are 227 Anganwadi centre in urban Mangalore area and 447 anganwadis in rural Mangalore area.6 10% of the anganwadi centres were selected randomly in the defined study area. Thus total number of lots were 68 (23+45). Initial sample size is 384, and there are 68 lots. Hence each lot sample size is 384/68 = 5.64 that is 6 mothers from each lot were selected by simple random method. Thus total number of mothers (study participants) would be 68 X 6 = 408. Thus the revised sample size became 408.

Data collection: A predesigned pretested questionnaire was designed based on IYCF module on feeding practices for Infant and Young Child.7 The data was collected by personal interview sessions. The Questionnaire consisted of questions regarding demographic profile, socio-economic status, breastfeeding practices, complementary feeding practices, choices of foods etc. Information regarding per capita income in (rupees/month) was collected and socio economic status was assessed using Modified B G Prasad classification.10

Inclusion criteria of the study consisted of the mothers of the children aged 12-36 months, who were willing to participate in the study, this age group was considered as the information of both breastfeeding and complementary feeding along with continued breastfeeding can be collected.

Ethical considerations: The study was initiated after obtaining approval from the Institutional Ethics Committee, Yenepoya University. Written informed consent was obtained from the study participants after explaining them the nature of information that will be collected from them and explaining the objectives of the study in the local language.

Data analysis: Data was collected and entered in Microsoft (MS) Excel work sheet and analyzed using SPSS (Statistical Package for Social Sciences) software version 16.0. Descriptive statistics were reported as mean (standard deviation) for continuous variables and frequencies (percentage) for categorical variables.

Operational definitions of Indicators for assessing infant and young child feeding practices9

- Early initiation of breastfeeding: Proportion of children who were put to the breast within one hour of birth;
- Exclusive breastfeeding under 6 months: Proportion of infants who are fed exclusively with breast milk till 6 months of age;
- Continued breastfeeding at 1 year: Proportion of children aged 12 months who are fed breast milk;
- Introduction of solid, semi-solid or soft foods: Proportion of infants who receive solid, semisolid or soft foods between 6 to 8 months of age;
- Minimum Dietary Diversity (MDD): Proportion of children who receive foods from 4 or more food groups between 6 to 12 months of age;
- Minimum Meal Frequency (MMF): Proportion of children who receive foods from 4 or more food groups between 6 to 12 months of age;

The seven food groups included grains; roots and tubers; legumes and nuts; dairy products (milk, yogurt, cheese); flesh foods (meat, fish, poultry and liver/organ meats); eggs; vitamin-A rich fruits and vegetables; other fruits and vegetables.

- Minimum Meal Frequency (MMF): Proportion of breastfed and non-breastfed children aged 6 to 12 months, who receive solid, semi-solid, or soft foods the minimum number of times or more.
times for breastfed children 6–23 months, 4 times for non-breastfed children 6–23 months);

- **Minimum Acceptable Diet (MAD):** Proportion of children 6 to 23 months of age who had at least the minimum dietary diversity and the minimum meal frequency.

**Results**

In this study, 270 (66.2%) belonged to the rural area and 138 (33.8%) belonged to the urban area as described in the methodology. The mean age of mothers was 25.9 ± 3.67 years, range of 18 to 35 years. Majority of the mothers were literate i.e., 387 (94.9%), and among them 48 (11.8%) were graduates; only 21 (5.1%) were illiterate. Majority of the women 319 (78.2%) were homemakers. Based on the mean per capita income of these families (per month INR) according to Modified B G Prasads Socio Economic Classification nearly half of participants belonged to socioeconomic class II i.e., 207 (50.7%). The average Family size was 3.87 +/- 1.03 members, with a range of 3-8 members. The mean age at marriage of the mothers was 20.54 +/- 2.15 years, with a range of 17 to 29 years. Mean age the child was 21.37 +/- 7.01 months; among them 229 (56.1%) were male and 179 (43.9%) were female. The birth order of the child varied from 1st - 5th, Majority of them being 2nd order 222 (54.4%) individuals. Table 1 Shows the status of Infant and Young Child Feeding Practices indicators.

<table>
<thead>
<tr>
<th>Table 1: Indicators for Assessing Infant and Young Child Feeding Practices</th>
</tr>
</thead>
<tbody>
<tr>
<td>Indicators</td>
</tr>
<tr>
<td>-------------</td>
</tr>
<tr>
<td>Early initiation of breastfeeding</td>
</tr>
<tr>
<td>Exclusive breastfeeding</td>
</tr>
<tr>
<td>Continued breastfeeding</td>
</tr>
<tr>
<td>Solid, semi-solid or soft foods at 6-8 months</td>
</tr>
<tr>
<td>Minimum Dietary Diversity</td>
</tr>
<tr>
<td>Minimum meal frequency</td>
</tr>
<tr>
<td>Minimum acceptable diet</td>
</tr>
</tbody>
</table>

Indicators like Exclusive breast feeding under 6 months (47.8% in urban and 45.6% in rural), Introduction of solid and semi solid foods (90.0% in rural and 92.0% in urban) and minimum meal frequency (83.3% rural and 81.9% urban) were almost same in both urban and rural areas. Early initiation of breast feeding (50% in rural and 42.8% in urban), Continued breast feeding (60.4% in rural and 50.7% in urban) was better in rural compared to urban area.

Indicators- minimum dietary diversity (21.3% in rural and 37% in urban), and minimum acceptable diet (20% and 31.9%) were poor in both the areas but however better in urban when compared to rural area.

**Discussion**

In this study, the age of the mothers ranged from 18 to 35 years. Similarly, Indian studies conducted by Sujatha P et al11 and Mondal T et al12 the range was 16-37 & 17-35 years respectively. In the present study, 5.1% of mothers were illiterate. Other similar studies conducted by Madhu K et al13 and Mondal T et al12 reported 52% and 44% illiterate mothers. Majority of the women i.e., 78.2% in this study were housewives. Similarly a study conducted by Das N et al14 in West Bengal showed that 82.5% mothers were housewives and a Kashmir study by Fazilli15 showed that 61.53% mothers were housewives.

In this study 50.7% of mothers belonged to socio-economic class II, according to Modified B G Prasads Socio Economic Classification. An Indian Study, having same classification reported 46.5% belonged to class II socio-economic status respectively16. In another study done in Karnataka by Garg M et al17 64.2% belonged to Lower middle class of socio economic status of Modified Kuppuswamy Classification.

In this study there were 408 children studied among them 229 (56.1%) were male and 179 (43.9%) were female. A similar study reported, 54% were boys and 46% were girls.17

In this study, the Proportion of children who were initiated with breastfeeding within one hour of birth was
194(47.5%), which was 50% in rural area and 42.8% in urban area. In a similar study 40.0% mothers had initiated breastfeeding within one hour,\textsuperscript{17} the delay in the initiation of the breastfeeding can be attributed to the recovery of the mother post delivery or C section.

Another study conducted by Ashwini et al.\textsuperscript{18} reported Initiation of breast feeding was delayed beyond 4 h by 24.5% urban and 33.6% rural mothers; the most common reason quoted by urban mothers for delayed initiation of breast feeding after delivery was their physical inability like pain or tiredness. Whereas, in rural area it was because of elders who advised not to initiate breast feeding early.

The Proportion of infants who were exclusively breastfed upto 6 months of age were 45.5%, i.e., 47.8% in rural and 45.6% in urban area. According to the NFHS IV data\textsuperscript{4}, the exclusive breastfeeding practice was found to be 52% in urban and 56% in rural areas, the better performance of this indicator in the rural area compared to urban can be attributed to the working status of the mother, if the mother has to join to job (working women more in urban area), depending on the working condition, she will have to start formula feeds or complimentary feeds.

Continued breastfeeding upto 12 months is the indicator that refers to Proportion of children aged 12 months who are fed breast milk along with complimentary feeds. This study reported 57.1%, which was 60.4% in rural and 50.7% in urban areas. However a study conducted by Ashwini et al.,\textsuperscript{18} reported Continued breast feeding rate at 1 year was 100% in urban and 99.21% in rural area.

Proportion of infants who receiving solid, semisolid or soft foods between 6 to 8 months of age was 90.6%; 90% in rural and 92% in urban area, A similar study reported that 62.5\%\textsuperscript{19} of the children were taking solid, semi-solid, or soft foods. This was found to be higher than that reported by NFHS-4 fact sheet national level data 42.7\%.\textsuperscript{4}

Minimum dietary diversity (MDD) indicator is the proportion of children 6–23 months of age who receive foods from 4 or more food groups from a total of 7 food groups. In this study we observed MDD to be 26.9%; 21.3% in rural and 37% in urban area. A similar study reported MDD to be 32.6% between 6 and 23 months.\textsuperscript{19} This indicator shows us if the child is receiving nutritious and balanced diet.

Minimum meal frequency (MMF) indicator Proportion of breastfed and non-breastfed children aged 6 to 12 months, who receive solid, semi-solid, or soft foods the minimum number of times or more. (3 times for breastfed children 6–23 months, 4 times for non-breastfed children 6–23 months). This study reported MMF to be 82.8%; 83.3% in Rural, 81.9% in urban area. A M Khan et al.,\textsuperscript{19} reported MMF was observed to be 48.6%.

Minimum Acceptable Diet (MAD) indicator is the proportion of children aged 6–23 months who receive at least the MDD as well as at least the MMF according to the definitions mentioned above. Our study observed MAD to be adequate among 24%; i.e., 20% in rural and 31.9% in urban area. A M Khan et al.,\textsuperscript{19} MAD indicator to be adequate only in 19.7% of children. However it was observed to be better than the NFHS IV data reported which showed 9.6%.

Conclusion

The WHO indicators on IYCF practices as Early initiation of breast feeding, Continued breast feeding and Minimum meal Frequency were better in rural area. Though the indicators as Minimum dietary diversity and minimum acceptable diet were poor in both urban and rural area, they were comparatively better in urban area. Over all the poor performance of indicators can be reduced by providing right knowledge to the mothers and family members at right time and counseling them about the common low cost nutritious foods that are locally available.

Source of Funding: Self

Conflict of Interest: Nil

REFERENCES


Reaching the Unreached–A Retrospection of the Nine Year long Oral Rehabilitative Program in the Tribal Hamlets of Kerala

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ABSTRACT

Following is a description of an oral rehabilitative program–Amrithasmitham which has aimed at improving the poor quality of life experienced as a result of edentulousness among the indigenous populations of Kerala. It has been running for nine years in the tribal belts of Wayanad, Kerala since 2008. It thrives on the sense of social responsibility and accountability of the medical profession. This paper highlights the lessons learnt and aims to provide a model which may be replicated in unreachable locations or in geographically reachable yet physically challenged geriatric populations.

Keywords: oral rehabilitative program, tribal populations, community health

Introduction

Indigenous populations across the globe continue to remain one of the poorest and marginalised groups¹. Studies have shown that the health indicators of this population are poor and warrant attention²,³. Compounding this problem is the severe dearth of doctors serving the tribal belts. With a wide poverty gap existing, it may be stated that the tribals face the brunt of the 3As – availability, accessibility and affordability of healthcare as compared to the mainland population.

The tribal populations of Kerala are a group of geographically isolated, extremely deprived and marginalised community⁴. Respiratory infection, diarrheal disorders, skin infections, malnutrition, anaemia and degenerative disorders like diabetes are some of the conditions common among them⁵. Oral diseases are widely prevalent particularly with poor oral hygiene practices and rampant tobacco abuse common to them⁶. Coping with the burden of more life-threatening diseases, oftentimes leads to poor priority of oral health. Hence the need to seek care for basic dental problems is negligible. As a result of plethora of problems faced and the lack of awareness, the end point of most of these dental problems is the extraction of teeth and thereafter a compromised life resulting from edentulism.

Among the tribes, edentulism has long been accepted as a way of life and a part of the natural process of ageing. Difficulties associated with mastication of food, clarity of speech or the aesthetics are often buried under the load of such beliefs⁷. Access to dental care does not exist and many may have not approached a dentist in their lifetime⁸. It is also known that the disability caused by severe tooth loss is larger than moderate heart failure⁹.

Following is a description of an oral rehabilitative program that has aimed at improving the poor quality of life experienced as a result of edentulousness among the tribal populations. Amritasmitham a tribal outreach program is an initiative of the Amrita School of Dentistry. It has been running for nine years in the tribal belts of Kerala.
since 2008. It thrives on the sense of social responsibility and accountability of the medical profession and thereby offers a replicable model to make available rehabilitative services to the unreachable populations.

Mission and vision of the program: The mission of this program is to reach the unreached populations of Kerala, who often are geographically isolated and economically poorly equipped to seek treatment for dental ailments.

The program also aims to provide dentist as well as the student dentist with an opportunity to have a lived-in experience of the health disparity faced by those belonging to the other end of the spectrum. A first-hand experience, working conditions are often suboptimal and participation purely voluntary. This way the program paves for many more such programs to be conducted by doctors experiencing this. The program envisions to be able to provide basic level of oral care to all tribals.

Need of the program: The prevalence of edentulism among the indigenous populations of Wayanad is 40.2% in females and 59.8% in males. Most of the elderly among the tribes refrain from seeking care for numerous reasons. As part of its philanthropic contributions, the School of Dentistry runs a yearly oral rehabilitative program in the tribal belts of Kerala. The proportion of edentulous patients seeking complete denture prosthesis was observed to increase and one of the patient’s is quoted here:

“I wanted to replace my missing teeth since three years. I never thought I would be able to do that. I don’t have the money for it. This (program) is my luck.” Said a patient who had arrived at the camp site.

Method

Project Planning

- A location is identified based on the treatment needs of the population and the practicality of conducting a denture camp. The camp site is assessed for its nearness to the tribal colonies and presence of basic facilities for the conduct of the program.

- A meeting is held with the local bodies in the area which includes representatives and officials from the government [forest officers, panchayat members and local leaders]. These meetings were held to enable collaboration with the government bodies and receive support from them, in terms of facilities like transport of the tribals to camp site, accommodation of the dental team, advertisement of the program etc.

  - A screening is carried out at a minimum of four locations and possible cases are identified and registered to the program.

  - Initial diagnostic procedures are carried out.

  - Following this, treatment plans for individual patients are charted out and initial lab works are completed in the institution (Amrita School of Dentistry).

  - An exhaustive list of all supplies (in terms of manpower, equipment and materials) is created.

  - A call for interested doctors within the institution is put out. It is clearly informed that the camp is a service with no remuneration and sub optimal working conditions. Only volunteers are involved.

  - The participating doctors are oriented towards the camp.

  - The entire workforce is divided into Individual units composed of dentists and technicians and patients are assigned to each of these units.

  - The entire team travels to the camp site. Necessary supplies and equipment are carried alongside.

  - Following this, the units work round the clock for three continuous days at the camp site. These sites most often have limitations of poor lighting and inadequate space. Working conditions are suboptimal.

  - All the lab work is carried out at the field with the help of skilled technicians.

  - On the third day of the camp dentures are delivered to patients free of cost.

  - Reviews are carried out for the delivered dentures at the interval of 15 days and then again at one-month interval.

Project Funding: An estimate of possible expenditure towards the camp is presented and funds are provided by the Amrita Institute of Medical Sciences (AIMS). AIMS has taken initiative for this program which is in line with their basic charitable mission of providing health care to all. Consistently, over last 8 years, 3000 USD have
been allocated to this program. Besides this, support has been extended by Attapady Hill Area Development Society (AHADS), Forest Department, Government of Kerala, Amrita Seva Sangam, a Non-Governmental Organisation and various dental material suppliers.

**Personnel:** On an average 30 to 40 members comprise the dental team. This team is constituted by interns, post graduates and faculty of the dental school. A team of technicians is also involved. The entire dental team is then divided into units. One faculty member guides around two to three units. Each unit is assigned patients, who are followed till delivery of the denture by the same team.

### Results

**Achievements:** The sustainability of this program for nine years reflects its perceived need among this population. Over nine years the program has been able to attract volunteer doctors to work in such settings. While there are constant efforts from the government to deploy doctors to work in these areas, camps of this nature definitely do contribute in alleviating a fraction of the health issues faced by the people in this region. We also believe that the voluntariness to participate in the program has ensured that the quality of the program is not compromised. An overview of the camps held has been provided in table 1.

**Table 1: Dentures delivered in each camp**

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Year</th>
<th>Location</th>
<th>Number of dentures delivered</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>2008</td>
<td>Attapady</td>
<td>28</td>
</tr>
<tr>
<td>2.</td>
<td>2009</td>
<td>Thattekadu</td>
<td>126</td>
</tr>
<tr>
<td>3.</td>
<td>2010</td>
<td>Idamalayar</td>
<td>52</td>
</tr>
<tr>
<td>4.</td>
<td>2011</td>
<td>Puthukode</td>
<td>23</td>
</tr>
<tr>
<td>5.</td>
<td>2012</td>
<td>Athirapally</td>
<td>Cancelled</td>
</tr>
<tr>
<td>6.</td>
<td>2013</td>
<td>Kalpetta</td>
<td>43</td>
</tr>
<tr>
<td>7.</td>
<td>2014</td>
<td>Kalpetta</td>
<td>50</td>
</tr>
<tr>
<td>8.</td>
<td>2015</td>
<td>Kalpetta</td>
<td>64</td>
</tr>
<tr>
<td>9.</td>
<td>2016</td>
<td>Kalpetta</td>
<td>65</td>
</tr>
<tr>
<td>10.</td>
<td>2017</td>
<td>Kalpetta</td>
<td>78</td>
</tr>
</tbody>
</table>

**DISCUSSION**

**Lessons Learnt:** In order to scale the challenging landscape of tribal health, a public health program needs to focus on the following:

**Building relations:** The tribes are generally a closed community. Initiating and sustaining a program needs efforts to build a rapport. This has to be done by finding an anchor (a person belonging to the community or one who is trusted by the community) at the site of work and building the program with their inputs.

**Working together:** Establishing open communication and identifying common ground and common goals is the first step toward working together effectively. The social environment within a tribal community may vary largely from the general population. There is a need to work alongside them to ensure community participation which is critical to sustain the program.

**Building skills:** This step equips the members of these tribal communities to learn practical skills. For eg: the initial discomforts of a denture are transient, and the patient needs to be motivated to persevere until he gets accustomed. Identifying and educating individuals from the community who may act as facilitators of the much-needed reinforcement among patients even in the absence of the doctor is critical.

**Employing the Horizontal approach:** The program may be used as a platform for dissemination of knowledge. While this program was rehabilitative in nature, it was utilised to create awareness about prevention and early treatment of disease. A common risk factor approach was employed.

**Domino effect:** Every positive interaction between the patient and doctor serves to bridge the barrier between the healthcare provider and the community.

**Conclusions**

This program aims to create a model which may be replicated in unreachable locations or in geographically reachable yet physically challenged geriatric population. Similar programs may be planned for institutionalised elderly or elderly at day care centres and contribute to one of the emerging public health challenges of provision of geriatric care. Such models offer improved accessibility and cater to geriatric needs sensitively, ensure life with greater dignity for the elderly population. To ensure its self-sustainability, we propose for public private partnership and ensuring autonomy to the program.

As dentistry takes strides forward in technological advancement there is a need to extend a helping hand to
those who are deprived of basic dental care. Healthcare providers and trainees must be sensitive to the needs of the underprivileged and be able to offer services with care and compassion.

**Source of Funding:** This program was supported by the Amrita Institute of Medical Science, Kochi, Kerala.

**Conflict of Interest:** The authors are a part of the Amrithasmitham tribal outreach program.

**Ethical Clearance:** The program is approved by the Management of the Amrita Institute of Medical sciences. Individual patient consents have been sought prior to treatment.

**REFERENCES**


Periodontal Disease and Its Influence on Systemic Disease—
A Survey among Non-Medical Professionals

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ABSTRACT

Aim: To determine the knowledge of periodontal disease, the influence of periodontal disease on systemic disease and the attitude towards treatment for periodontal disease among non-medical professionals.

Objectives: The objective of the above study is to determine the knowledge of periodontal disease, its influence on systemic health and disease and to evaluate the knowledge and attitude towards the treatment for periodontal disease.

Materials and Method: A cross-sectional survey using self-administered questionnaire was conducted among the non-medical professionals during 2016 – 2017. Participants visiting the outpatient of the department were selected by simple random sampling. A total of 282 subjects participated in the study. Amongst these 267 were selected. The included subjects were 39 medical professionals’, 228 non-medical professionals. The subjects were introduced to the questionnaire and requested to fill their socio-demographic details and also to answer the questionnaire related to the effect of periodontal disease on the systemic health and disease. The scores that were obtained was considered adequate if the participants answered at least 50% of the questions correctly.

Results: Out of the 282 questionnaires distributed a total of 267 were selected. 15 questionnaires were improperly filled and so were excluded. The 267 questionnaires included were filled by 39 medical professionals’ and 228 non-medical professionals. The medical professionals have better knowledge about periodontal disease compared to other groups. The non-medical professionals’ knowledge was inadequate compared to all the other parameters.

Conclusion: The overall results of the study showed the knowledge of the influence of the systemic disease on periodontitis and also about the treatments available for this disease was inadequate among the non-medical professionals compared to that of the medical professionals.

Keywords: attitude, non-medical professionals, periodontitis, systemic health, treatment, questionnaire.

Introduction

The rise in the prevalence of periodontal disease and its association with the complex etiology of this has raised the concern for oral health care. Hence it is necessary to control this infection at the population level and the individual level. It is essential to scientifically reason the requirement for the improvement in the oral condition which in turn helps in the growth of the oral health behavior. There is a necessity to increase the awareness among the general public to understand the influence of systemic health and disease on periodontitis and also to understand the treatment of periodontal...
disease. There is also growing evidence of the association of increased systemic illness such as cardiovascular diseases, stroke, peripheral vascular diseases, diabetes and pregnancy outcomes.3, 4

Patients suffering from Atherosclerotic, cardiovascular disease should receive a periodontal evaluation, and patients with moderate to severe periodontitis should be informed about their potential increased risk of atherosclerosis.5

The access to the oral health and care is instrumental in the prevention and the control of the disease. The availability of the resources in high income countries has made health care system to be available for this group and absence in low-income, middle income countries. The approach to prevent periodontal disease is provided mostly for the financially well to do subjects6. Hence in such situations the knowledge and proper attitude towards these diseases are crucial, and it is necessary for the promotion of health and prevention of disease. It is essential to gain information on views and values related to periodontal health and illness.7 Thus, the purpose of the present study was to explore perceptions of periodontal health and disease and to examine attitudes and beliefs regarding prevention of periodontal diseases among Indian non-medical professionals.

Aim: To determine the knowledge and attitude of non-medical professional towards periodontal disease and its influence on systemic health.

Objective:

1. To determine the knowledge of non-medical professionals about periodontal disease
2. To assess the knowledge about the influence of periodontal disease on systemic health and disease
3. To evaluate the knowledge and attitude about the treatment of periodontal disease

Material and Method

This cross-sectional survey was conducted among the nonmedical professionals visiting the dental outpatient of the department of Periodontology. The patients were randomly selected to complete the questionnaire. A self-administered questionnaire was distributed to the subjects interested to participate in the study. The website, http://writingtester.com was used to determine the reading level to ensure that the language used in the questionnaire is understandable at or below the tenth-grade reading level.

The questionnaire was divided into four sections. The first section gathered information about the subject’s sociodemographic data. The second section included ten questions about the knowledge of the periodontal disease. The knowledge of the bidirectional relationships between periodontal disease and different systemic conditions was also assessed. This subsection assessed the respondents’ knowledge of the effects of variation in glucose level and diabetes status and the influence of diabetes on periodontal disease as well as the knowledge of periodontal disease as a risk factor for preterm low birth weight. The final section included four questions that explored the knowledge and attitude about treatment of the periodontal disease.

The scoring criteria for the four questions assessing the knowledge of periodontal disease was based on score 1 for each correct response, and score 0 for wrong answers. Experts in a related field established the face validity of the questionnaire. The procedure was by first giving a draft of different questions assessing the knowledge of periodontal disease/systemic illnesses to experts in the field of periodontology. They determined the appropriateness of the questions and some were modified subsequently based on their recommendations. The study was approved by the Institutional Ethical Committee of the Kasturba hospital bearing the ethical clearance number 371/2016. The procedures followed were in accordance with the ethical standards of the responsible committee on human experimentation (institutional and national) and with the Helsinki Declaration of 1975, as revised in 2000.

Results

Out of the 282 subjects attempting the questionnaire a total of 267 were selected. This was due to the improperly filled 15 questionnaire. The 267 questionnaire included were filled by 39 medical professionals’ and by 228 non-medical professionals.

Demographic characteristics: Of the 267 questionnaires that were completely filled females represented 57.3% and males represented 42.7% of the sample, the overall mean age was 35.4 years. There were 106 Males and 122 females in the non-medical professional subjects. Male
non-medical professionals had an average age of 36.6 years (Age range of 15 to 72 years) and were older than female counter part with an average age of 34.3 years (Age range of 15 – 68 Years). The subjects included 6 volunteers with a PhD (2.2 %), 52 postgraduates (19.5 %), 120 graduates (40.4 %) and rest of the subjects were Pre-university or high school educated students and adults (36.6%). There were 31 females and 8 males in the medical professional subjects. The medical professionals subjects had an average age of 21.9 years (Age range of 19 to 48 years). The subjects included 28 graduates (71.8%), 10 Pre-university or high school educated adults (25.6%) and 1 subject with post graduate education (2.56%).

Knowledge about the periodontal disease: The subjects included had adequate knowledge of periodontal disease that progresses as the painless gum disease and causing the tooth mobility. The scoring criteria for the ten questions assessing the knowledge of periodontal disease were based on the score 1 for correct response and 0 for the wrong response. This gave a score of 1-10. This was then dichotomized to 0-5 (inadequate) and 6-10 (adequate).

All the subjects had adequate knowledge about the cause of periodontal disease and its effect. More than 90% of the nonmedical professionals convincingly answered the questionnaire regarding the knowledge of the periodontal disease (Figure 1). But amongst these subjects, only 17% of them responded correctly that there is no relationship between periodontal disease and skin rash this was almost similar to the medical professionals (23%). But the overall knowledge of periodontal disease was greater than 90% (Table 1).

![Figure 1: Percentage of subjects answering the questions on knowledge of periodontal disease correctly](image)

Table 1: Knowledge about periodontal disease among medical and non-medical professionals

<table>
<thead>
<tr>
<th>Variable</th>
<th>Inadequate (n)</th>
<th>Adequate (n)</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nonmedical professionals</td>
<td>21</td>
<td>207</td>
<td>90.7</td>
</tr>
<tr>
<td>Medical professionals</td>
<td>0</td>
<td>39</td>
<td>100</td>
</tr>
</tbody>
</table>

Knowledge about the influence of periodontal disease on systemic disease: Periodontal disease is a risk factor for systemic diseases like diabetes mellitus, arthritis, heart disease and blood pressure. The scoring criteria for the eight questions assessing the knowledge of the association between periodontal disease and systemic disease were based on the score 1 for correct response and 0 for the wrong response. This gave a score of 1-8. This was then dichotomized to 0-4 (inadequate) and 5-8 (adequate).

The knowledge of each parameters on the influence of periodontal disease on systemic disease was less than adequate among the non-medical professionals (Figure 2).

The knowledge of the influence of periodontal disease on systemic health and disease shows a large variation of greater than 38% between the non-medical professionals and the medical professionals (Table 2).
Knowledge and attitude towards the treatment for the periodontal disease: Greater than 63% of the subjects showed adequate knowledge and a positive attitude towards treatment for periodontal disease (Table 3). But the knowledge of the treatment for periodontal disease was inadequate in terms of no of appointments for the complete treatment (Figure 3).

Table 3: Knowledge and Attitude towards the treatment for the periodontal disease (nonmedical professionals)

<table>
<thead>
<tr>
<th>Variables</th>
<th>n</th>
<th>Positive attitude (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adequate</td>
<td>145</td>
<td>63.6</td>
</tr>
<tr>
<td>Inadequate</td>
<td>83</td>
<td>36.4</td>
</tr>
</tbody>
</table>
Educational level was defined according to years of education as 6 – 10 years, 11–15, and ≥16 years. The results show that the education on the knowledge of periodontal disease, its systemic influence and the treatment for the disease were similar for all the three categories of education level. The overall results showed that there was a lack of understanding of the influence of periodontal disease towards systemic health and disease. Further there was a lack of understanding of appointments that is necessary for treating periodontal disease amongst the non-medical professionals.

Discussion

The attitudes towards the periodontal health improves overall health. The motives to seek prompt preventive periodontal treatment could be the belief and the acceptance that periodontal treatment is beneficial to overall health. It has also been seen that the compliance with oral health care regimens is better among well-informed patients.8

Periodontal disease can be a risk factor for systemic disease. There are certain misconceptions or incorrect knowledge about oral health/ disease or periodontal health/disease and may lead to harmful behavior. The socioeconomic status, attitude, periodontal awareness, habits, and oral health behavior are the factors that determine the level of periodontal health and oral health in an individual.9 Further the health behavior models are complex involving different aspects such as self-efficacy expectations, decisional balance, perceived susceptibility and normative beliefs.10

Knowledge is one of the factors affecting these issues. However, it can be considered as one of the preconditions for additional measures to improve oral health behavior. Hence, most interventions aimed to improve oral health include measures to improve oral health-related knowledge.11 The signs and symptoms of the periodontal disease are rather mild, and the progression of the disease is often slow in chronic but can be rapid in cases of aggressive periodontitis.

The overall limited knowledge displayed by the nonmedical professionals in this study determines that there is a need for the periodontal specialist to undertake the regular screening of the disease. At a minimum, our findings suggest that dental schools should provide more knowledge and comprehensive training in oral/periodontal health. Further it is also necessary to explain about the consequences of the periodontal disease and its influence on systemic health and disease. It is also necessary to explain the duration and various types of modalities of treatment that are available for subjects suffering from periodontal disease. Our study had a limitation that the study was a self-reported and anonymous but was done in single center, and findings may not be generalizable.

Conclusion

The knowledge regarding the cause of periodontitis among the non-medical professionals was adequate, but the knowledge of its influence on systemic disease and the treatment for the disease was inadequate. Hence there should be an emphasis on providing knowledge to the non-medical professionals on the systemic influence of periodontal disease conversely its systemic influence and also various treatments to curb this disease.

Conflict of Interest: Authors have no conflict of interest

Source of Funding: Self

REFERENCES


Role of Residential Indoor Dampness and Mold as Determinants of Respiratory Symptoms among Adults

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ABSTRACT

Adverse Respiratory health was found to be one among leading risks factors of the deaths globally and in India. As conditions are favorable for dampness, and indoor mold in low and middle income countries, studies associating them with respiratory health are much needed. Dampness, demographic profile, housing characteristics, and respiratory symptoms were assessed as cross-sectional measurements using validated questionnaires. Mold in indoor air were assessed using Standard Settle Plate technique using Malt Extract Agar as nutritional medium. Association of indoor mold and indoor dampness with respiratory symptoms was found using Multiple Logistic regression analysis. After adjusting for potential risk factors, Indoor mold, Cladosporium was found to be significantly associated with any one of the respiratory symptoms (AOR 5.0; 95% CI 2.7, 9.3), breathlessness (AOR 9.7; 95% CI 1.31, 71.3) and rhinitis (AOR 2.5; CI 1.2, 5.1). Self-reported indicators of dampness were found to have significant association with respiratory symptoms with reported ‘visible mold’ being associated with most of the respiratory symptoms. The findings identify the potential risk of dampness and indoor mold in provoking respiratory symptoms among the residents in a tropical developing country.

Keywords: Indoor Dampness, Indoor mold, Respiratory symptoms, India

Introduction

Respiratory illnesses are the well-recognized risks ranking third and fifth position respectively causing global DALYs (Disability Adjusted Life Years). These risks are projected to be one among the leading causes of death globally in 2030. In India, COPD and Lower Respiratory disease were two among the five leading causes of change in DALY in 2016 with Air pollution being the second leading risk factor contributing to above diseases. Among the Four million premature deaths occurring annually as a result of indoor air pollution in the world, around 1.04 million occurs in India alone. Indoor air quality is a significant health risk factor, as people spend most of their time inside buildings. A series of WHO guidelines on indoor air quality has been prepared to identify physical, chemical and biological contaminants that pollute indoor air but estimating the causative agent for the adverse respiratory health is highly complex.

Recent studies in India, reported higher prevalence of respiratory symptoms among the adults. But, the association between all possible causative agents and the adverse respiratory symptoms among the residents were not explored. Previous studies worldwide identified several household and demographic characteristics to influence adverse respiratory health and indicated a strong association between Dampness and respiratory symptoms among all age group.

Dampness in buildings is influenced by various factors such as inadequate ventilation, insulation, climatic change, indoor temperature, relative humidity, and poor building materials. Existing literature identified that home dampness initiates colonization of fungi
Dampness remains to be an important problem among low-income countries, due to economic constraints in the remediation and improvement of housing standards. In a developing tropical country like India, climatic conditions; diversified housing characteristics such as high relative humidity, housing type, cooking fuel; lack of awareness on housing conditions such as leaky water pipelines, improper drainage, poor building construction, poor ventilation; and unhygienic practices are favorable for dampness and mold proliferation but research on this field is limited and much needed in India.14

This study reports the association between the indoor mold/indoor dampness and respiratory symptoms from a subset of rural and urban households that were enrolled in a cohort study in Tamil nadu, The Tamil Nadu Health Effects of Air Pollution (TAPHE) cohort study that examined the exposure-response relationships between particulate matter and maternal-child and adult respiratory outcomes.15 Participants enrolled in this TAPHE study were from around 110 villages (in Tiruvallur) and 10 urban zones (in Chennai) providing a wide range of household configuration to maintain unbiased representation for the present study.

Method

Study area: The present study was conducted in Tamil nadu between the years 2011-2013 with Sri Ramachandra medical college and research institute (SRMC) as the study centre. Tamil nadu, with approximately 79.8 million population belonging to varied Socio-economic status, equally distributed between urban and rural locations, making the state suitable for this study. SRMC is situated in the borderline of the Tiruvallur district and Chennai city provided practically feasible conditions to conduct the study in rural villages and urban zones respectively.

Study design and Participants: This is a Cross-sectional study, approved by Institutional Ethics committee. The participant was screened for eligibility, explained about the study and informed consent was obtained before the interview. Pregnant mothers, people in dusty occupation, people with dreadful disease conditions were eliminated during screening. All men and women between the age group 18-60, living in the same building for atleast two years were recruited in the study. In some of the houses, two participants were recruited as per the recruitment criteria of the TAPHE study. Assessment of dampness and mold exposures were made in 710 households at the same time and 916 participants were interviewed for their demographic, housing characteristics, and respiratory symptoms.

Dampness Assessment: Dampness in the house has been assessed as participant’s self-reported information using a set of questions derived from previous studies16,7 as retrospective information for the preceding twelve months. Dampness indicators were positive response to questions on “Moisture stains on wall and other surfaces”, “Water leakage”, “Slow drying of cloths”, “Floor oozes”, “Flooding”, “Dampness in sleeping area”, “Mold Odour”, “Visible Mold”.

Mold Assessment: Duplicate plates of Malt Extract Agar17 were exposed at a height of 1.5 meters (normal breathing zone) and 1 meter away from walls in the living room of the household for 20 minutes. After sampling, they were sealed with parafilm and shipped back to the microbiology laboratory under aseptic conditions in a cold pack for further cultivation and analysis. The plates were incubated at a temperature of 20-25 °C for about 5 days and observed the growth of the fungal colonies. The fungi were then isolated and characterized both macroscopically and microscopically. The four important mold genera that were consistently associated with adverse respiratory health such as Aspergillus, Penicillium, Cladosporium and Alternaria18-20 were identified.

Respiratory Symptoms: Respiratory Symptoms were assessed using INSEARCH (Indian Study on Epidemiology of Asthma, Respiratory Symptoms and Chronic Bronchitis in adults) questionnaire developed and validated for assessing prevalence of asthma, chronic bronchitis and respiratory symptoms for the preceding twelve months period of the interview. As the study has been already established in Tamil nadu (as one among its twelve centers) with SRMC being its regional centre, the reliability tested regional version (Tamil) was readily available.
Statistical Analysis

Adjusted odds ratio for Respiratory symptoms was calculated for indoor dampness and indoor mold after adjusting for potential risk factors such as demographic and housing characteristics by Multiple Logistic regression analysis using SPSS software version 23.0.

Results

The demographic profile of the study participants were given in Table 1. The overall rural and urban ratio was 0.73. The participants were almost equal in gender. Majority of the population comes under lower and middle in Socio-economic status. Even though there are fewer smokers in this group, around 16% of people are passive smokers. Around 5% and 10% of people have family history of asthma and atopic symptoms respectively.

Table 1: Demographic profile of study population

<table>
<thead>
<tr>
<th>Personal characteristics</th>
<th>Rural n = 530 (%)</th>
<th>Urban n = 386 (%)</th>
<th>Total n = 916 (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age of the participant (in years)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15-24</td>
<td>109 (20.6)</td>
<td>58 (15)</td>
<td>167 (18.2)</td>
</tr>
<tr>
<td>25-34</td>
<td>207 (39.1)</td>
<td>166 (43)</td>
<td>373 (40.7)</td>
</tr>
<tr>
<td>35-44</td>
<td>84 (15.8)</td>
<td>62 (16.1)</td>
<td>146 (15.9)</td>
</tr>
<tr>
<td>45-54</td>
<td>75 (14.2)</td>
<td>56 (14.8)</td>
<td>131 (14.3)</td>
</tr>
<tr>
<td>55-64</td>
<td>55 (10.4)</td>
<td>44 (11.4)</td>
<td>99 (10.8)</td>
</tr>
</tbody>
</table>

Conted…

<table>
<thead>
<tr>
<th>Gender</th>
<th>Male 237 (44.7)</th>
<th>219 (56.7)</th>
<th>456 (49.8)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female</td>
<td>293 (55.3)</td>
<td>167 (43.3)</td>
<td>460 (50.2)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Socio-Economic status</th>
<th>Total n = 916 (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lower</td>
<td>381 (71.9)</td>
</tr>
<tr>
<td>Middle</td>
<td>147 (27.7)</td>
</tr>
<tr>
<td>Upper</td>
<td>2 (0.4)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Smoking status</th>
<th>Total n = 916 (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smokers</td>
<td>8 (1.5)</td>
</tr>
<tr>
<td>Non-smokers</td>
<td>522 (98.5)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Environmental tobacco smoke</th>
<th>Total n = 916 (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exposed</td>
<td>104 (19.6)</td>
</tr>
<tr>
<td>Unexposed</td>
<td>426 (80.4)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Family history of Atopy</th>
<th>Total n = 916 (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>49 (9.2)</td>
</tr>
<tr>
<td>No</td>
<td>481 (90.8)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Family history of Asthma</th>
<th>Total n = 916 (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>22 (4.2)</td>
</tr>
<tr>
<td>No</td>
<td>508 (95.8)</td>
</tr>
</tbody>
</table>

Prevalence of seventeen Respiratory symptoms of the study population classified based on location and gender of the population is represented in Figure 1. Differences were found between the prevalence of various respiratory symptoms among the study population, but could not recognize difference based on age or gender for each symptom.

Figure 1: Population prevalence of various Respiratory Symptoms in Rural (right panel) and Urban (left panel) locations among Total population (dark coloured bars), Men (light coloured bars) and Women (empty bars).
Similarly, the frequencies of the indicators of dampness were given in **Figure 2**. Around half of the study Participants reported moisture stain on their wall surfaces and all other indicators were less reported comparatively.

**Figure 2**: Frequencies of the indicators of dampness (self-reported) in percentage for the study house.

General household characteristics were broadly similar across rural and urban households were given in **Table 2**. Use of biomass as primary cook-fuel was reported in a higher proportion of rural households. Around 50% of buildings belong to the age group of 11-30 years. Majority of the houses were in ground floor. Use of Air-conditioner in the study houses was very less.

**Table 2**: General housing characteristics of the study population

<table>
<thead>
<tr>
<th>Household characteristics</th>
<th>Rural (N = 408) n(%)</th>
<th>Urban (N = 302) n(%)</th>
<th>Total (N = 710) n(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary cooking Fuel</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Biomass</td>
<td>147(36)</td>
<td>13(4.3)</td>
<td>160(22.5)</td>
</tr>
<tr>
<td>Kerosene</td>
<td>12(2.9)</td>
<td>35(11.6)</td>
<td>47(6.6)</td>
</tr>
<tr>
<td>LPG</td>
<td>249(61)</td>
<td>254(84.1)</td>
<td>503(70.8)</td>
</tr>
<tr>
<td>Age of the house</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;10 yrs</td>
<td>130(36)</td>
<td>85(28.3)</td>
<td>215(34.3)</td>
</tr>
<tr>
<td>11-30 yrs</td>
<td>176(48.8)</td>
<td>139(52.3)</td>
<td>315(50.2)</td>
</tr>
<tr>
<td>&gt;30 yrs</td>
<td>55(15.2)</td>
<td>42(15.8)</td>
<td>97(15.5)</td>
</tr>
<tr>
<td>Not available</td>
<td>47(11.5)</td>
<td>36(11.9)</td>
<td>83(11.7)</td>
</tr>
<tr>
<td>Type of house construction</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kutcha</td>
<td>77(18.9)</td>
<td>20(6.6)</td>
<td>97(13.7)</td>
</tr>
<tr>
<td>Semipucca</td>
<td>135(33.1)</td>
<td>89(29.5)</td>
<td>224(31.5)</td>
</tr>
<tr>
<td>Pucca</td>
<td>196(48)</td>
<td>193(63.9)</td>
<td>389(54.8)</td>
</tr>
</tbody>
</table>

Conted…

<table>
<thead>
<tr>
<th><strong>House surrounded by trees</strong></th>
<th>Present</th>
<th>Absent</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Present</td>
<td>262(64.2)</td>
<td>46(15.2)</td>
<td>308(43.4)</td>
</tr>
<tr>
<td>Absent</td>
<td>146(35.8)</td>
<td>256(84.8)</td>
<td>402(56.6)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Elevation</strong></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Ground floor</td>
<td>383(93.9)</td>
<td>223(73.8)</td>
<td>606(85.4)</td>
</tr>
<tr>
<td>First floor</td>
<td>23(5.6)</td>
<td>61(20.2)</td>
<td>84(11.8)</td>
</tr>
<tr>
<td>Second floor and above</td>
<td>2(0.5)</td>
<td>18(6.0)</td>
<td>20(2.8)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Air conditioner in the house</strong></th>
<th>Present</th>
<th>Absent</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Present</td>
<td>7(1.7)</td>
<td>30(9.9)</td>
<td>37(5.2)</td>
</tr>
<tr>
<td>Absent</td>
<td>401(98.3)</td>
<td>272(90.1)</td>
<td>673(94.8)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Wall plastering</strong></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Not plastered</td>
<td>52(12.7)</td>
<td>20(6.6)</td>
<td>72(10.1)</td>
</tr>
<tr>
<td>Not Painted</td>
<td>36(8.8)</td>
<td>37(12.3)</td>
<td>73(10.3)</td>
</tr>
<tr>
<td>Painted</td>
<td>320(78.4)</td>
<td>245(81.1)</td>
<td>565(79.6)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Ventilation in the house</strong>a</th>
<th>Present</th>
<th>Absent</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Present</td>
<td>309(75.7)</td>
<td>217(71.9)</td>
<td>526(74.1)</td>
</tr>
<tr>
<td>Absent</td>
<td>99(24.3)</td>
<td>85(28.1)</td>
<td>184(25.9)</td>
</tr>
</tbody>
</table>

*aAtleast one window kept open*

As represented in **Table 3**, selected self-reported moisture indicators and indoor mold, *Cladosporium*, showed significant association with atleast one of the respiratory symptoms after adjusting for the demographic and housing characteristics.
Table 3: Association between Dampness, Indoor mold and Respiratory Symptoms

<table>
<thead>
<tr>
<th>Dampness indicators (Self-reported)</th>
<th>Respiratory symptoms</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Any of the respiratory symptom</td>
<td>Wheeze</td>
<td>Breathlessness without Exertion</td>
<td>Cough at night</td>
<td>Phlegm</td>
</tr>
<tr>
<td>Moisture stains on wall</td>
<td>0.2(0.1, 0.4)</td>
<td>0.17 (0.1, 0.5)</td>
<td>0.5(0.08, 2.9)</td>
<td>0.5(0.19, 1.5)</td>
<td>0.41(0.13, 1.4)</td>
</tr>
<tr>
<td>Visible mold</td>
<td>42.5(13.0, 38.4)</td>
<td>19.5 (4.1, 92.3)</td>
<td>7.9(0.5,118.8)</td>
<td>6.5(1.6, 26.5)</td>
<td>9.97(3.0, 33.9)</td>
</tr>
<tr>
<td>Mold odour</td>
<td>0.3(0.1, 0.9)</td>
<td>1.2( 0.2, 7.1)</td>
<td>0.20(0.01, 5.7)</td>
<td>0.3(0.05, 1.6)</td>
<td>0.25(0.04, 1.6)</td>
</tr>
<tr>
<td>Indoor Mold</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cladosporium</td>
<td>5.0(2.7, 9.3)</td>
<td>2.6(0.75, 9.0)</td>
<td>9.7(1.31, 71.3)</td>
<td>1.6(0.6, 4.6)</td>
<td>2.9(0.9, 10.0)</td>
</tr>
<tr>
<td>Any of the above mold</td>
<td>0.6(0.18, 1.8)</td>
<td>0.05 (0.003, 0.7)</td>
<td>0.96(0.03, 37.1)</td>
<td>0.99(0.2,6.6)</td>
<td>0.2(0.02,3.2)</td>
</tr>
</tbody>
</table>

aadjusted for demographic and household characteristics

Significant p-values are highlighted in bold font

Discussion

We provide a comparison of results obtained with other studies examining the association between indoor mold/dampness and respiratory symptoms and discuss potential implications of the findings for future studies. After adjusting for the demographic and household variables, in the current study, Self-reported dampness showed highly significant association with respiratory symptoms similar to previous studies21-23 and indoor mold, Cladosporium were found to be significantly associated with any one of the respiratory symptoms. This may be due to resistance of the spores of Cladosporium in indoor air to varied climatic and housing conditions in a tropical country, making it fit for survival to provoke respiratory illnesses. Many previous aeromycological studies reported Cladosporium to be the most abundant mold all over the world24, 25 with its spore having structural configuration (small size, smooth wall) facilitating easier transportation26 and resistance to hot climate.27

Conclusion

As there are very less research undergoing in tropical countries related to dampness and indoor mold, the assessment of the association between indoor mold/dampness and respiratory symptoms in the present study will provide baseline information for further research in India. As recommended by WHO guidelines, Proper Ventilation, renovation, and hygienic conditions in the houses would arrest the growth of indoor mold and dampness.

Financial support for this study: Author, Saraswathy Manivannan was financially supported through funds provided by Indian Council of Medical Research (ICMR) for the SRU- ICMR Center for Advanced Research on Air Quality, Climate and Health (SRU-CAR).

Conflicts of Interest: There are no conflicts of interest

REFERENCES


Study of Postpartum Depression and its Associated Factors in Women Attending Tertiary Care Hospital, Raichur

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¹Assistant Professor, Community Medicine Department, Navodaya Medical College, Raichur

ABSTRACT

Introduction: Depression is very common, yet a neglected problem in new mothers, that can affect their own health as well as that of their children. The present study was carried out to evaluate the association of different socio-demographic and risk factors with postpartum depression, so that these women can be screened in their early puerperium while in the hospital and can be provided with special care.

Objectives: 1. To assess the prevalence and risk factors associated with postpartum depression. 2. To evaluate the association of antenatal and postnatal risk factors with postpartum depression.

Materials and Method: A descriptive cross-sectional study conducted in the postnatal ward of Tertiary Care Centre, Raichur. A pre-designed and pretested questionnaire was used to interview the patient, after taking verbal consent. It was one-to-one type of interaction. Depression was assessed using Edinburgh Postnatal Depression Scale (EPDS). The duration of the study was 6 months (1st March – 31st August, 2017) with 264 sample size.

Results: Out of 264 patients 60(23%) had postpartum depression, among them 31(51.67%) had mild depression, 22(36.67%) had moderate depression and 07(11.67%) had severe depression. Depression was significantly associated with antenatal and postnatal risk factors (p < 0.05), however complaints during antenatal period and mode of delivery had no association.

Conclusion: Routine screening for postpartum depression to be done in high risk cases.

Keywords: Postpartum depression, Risk factors, Prevalence, Postpartum women.

Introduction

Depression is very common, yet a neglected problem in new mothers, that can affect their own health as well as that of their children. (1) Postpartum depression is a non-psychotic depressive episode of mild to moderate severity, beginning in or extending into the first postnatal year. (2) The incidence of postnatal depression is observed in 10-20% of mothers. (3) A Meta analysis of studies mainly based in the developed world found the incidence of postpartum depression to be 12-13%; (4) with higher incidence in developing countries. (5,6) The present study was carried out to evaluate the association of different socio-demographic and risk factors with postpartum depression, so that these women can be screened in their early puerperium while in the hospital and can be provided with special care.

Objectives

1. To assess the prevalence and risk factors associated with postpartum depression.

2. To evaluate the association of antenatal and postnatal risk factors with postpartum depression.

Materials and Method

A descriptive cross-sectional study was conducted in the postnatal ward of Tertiary Care Centre, Raichur. A pre-designed and pretested questionnaire was used...
to interview the postpartum women, after taking verbal consent. It was one-to-one type of interaction. Depression was assessed using Edinburgh Postnatal Depression Scale (EPDS). This is a questionnaire comprising of ten questions. Mothers who score above 13 were taken to be suffering from depression. The women were also classified according to their age, marital status, parity, literacy, mode of delivery and obstetric outcome. Mothers in the 1st month of puerperium were included; mothers and babies with serious postnatal complications and mothers with diagnosed history of depression were excluded from the study. 264 postpartum women were enrolled in the study who visited the hospital during the study period of 6 months (1st March – 31st August, 2017). Results were analyzed using Chi-square test to evaluate the significance of association of antenatal and postnatal risk factors with postpartum depression. The study was conducted after obtaining the ethical clearance from the institutional ethical committee.

Results

Table 1: Socio-demographic profile of the study participants (n = 264)

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Socio-demographic variable</th>
<th>Frequency (n)</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Age:</td>
<td>&lt; 20 years</td>
<td>18</td>
<td>6.8</td>
</tr>
<tr>
<td></td>
<td>21 – 25 years</td>
<td>96</td>
<td>36.4</td>
</tr>
<tr>
<td></td>
<td>26 – 30 years</td>
<td>138</td>
<td>52.3</td>
</tr>
<tr>
<td></td>
<td>&gt;30 years</td>
<td>12</td>
<td>4.5</td>
</tr>
<tr>
<td>2. Domicile:</td>
<td>Urban area</td>
<td>132</td>
<td>50.0</td>
</tr>
<tr>
<td></td>
<td>Rural area</td>
<td>132</td>
<td>50.0</td>
</tr>
<tr>
<td>3. Religion:</td>
<td>Hindu</td>
<td>142</td>
<td>53.8</td>
</tr>
<tr>
<td></td>
<td>Muslim</td>
<td>84</td>
<td>31.8</td>
</tr>
<tr>
<td></td>
<td>Christian</td>
<td>38</td>
<td>14.4</td>
</tr>
<tr>
<td>4. Education:</td>
<td>Illiterate</td>
<td>102</td>
<td>38.6</td>
</tr>
<tr>
<td></td>
<td>Primary &amp; Secondary</td>
<td>38</td>
<td>14.4</td>
</tr>
<tr>
<td></td>
<td>SSLC</td>
<td>66</td>
<td>25.0</td>
</tr>
<tr>
<td></td>
<td>PUC</td>
<td>34</td>
<td>12.9</td>
</tr>
<tr>
<td></td>
<td>Graduate</td>
<td>24</td>
<td>9.1</td>
</tr>
</tbody>
</table>

The prevalence of postpartum depression was 60 (23%) out of 264 postpartum women, among them 31(51.67%) had mild depression, 22(36.67%) had moderate depression and 07(11.67%) had severe depression.

Table 2: Depression among postpartum women (n = 60)

<table>
<thead>
<tr>
<th>Grade</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mild</td>
<td>31</td>
<td>51.67</td>
</tr>
<tr>
<td>Moderate</td>
<td>22</td>
<td>36.67</td>
</tr>
<tr>
<td>Severe</td>
<td>07</td>
<td>11.67</td>
</tr>
</tbody>
</table>

The postpartum depression was found to be associated with the antenatal risk factors like unplanned pregnancy, difficulty for the mothers in carrying out their daily activities and mothers having more number of girl children. There is no association found between postpartum depression and complaints during pregnancy.
There is highly significant association of postpartum depression with these antenatal risk factors at p < 0.05, except with complaints during pregnancy.

Table 4: Association of postpartum depression with postnatal risk factors

<table>
<thead>
<tr>
<th>Postnatal risk factors</th>
<th>Chi-square value</th>
<th>p–value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mode of delivery</td>
<td>0.161</td>
<td>.688</td>
</tr>
<tr>
<td>Any complaints for newborn</td>
<td>11.524</td>
<td>.001</td>
</tr>
<tr>
<td>Trouble during breastfeeding</td>
<td>20.874</td>
<td>.000</td>
</tr>
</tbody>
</table>

The postpartum depression is associated with postnatal risk factors like complications to the newborn and trouble during breastfeeding. No association was found between postpartum depression and mode of delivery. There is highly significant association of postpartum depression with postnatal risk factors at p < 0.05, except with mode of delivery.

Discussion

Postpartum depression is a widespread disorder which engulfs numerous women into its darkness and despair. The prevalence of postpartum depression varies from region to region but its occurrence is a known fact and also its debilitating effects. It is very important to know its prevalence in our society so that appropriate measures can be taken to avoid its occurrence and treat the affected.(8)

In our study, the majority of the postpartum women (52.3%) were in the age group of 26-30 years which is consistent in the studies conducted by Maria Ahmad et al(8) and Sumitra Melinamani.(13) Majority of the postpartum women (52.3%) were employed in the present study whereas in the study conducted by Desai Nimisha(2) and Giri et al(10), majority of the postpartum women were unemployed. Majority of the postpartum women (38.6%) belonged to upper middle class of socio-economic status, while in the studies conducted by G Maria Ahmad et al(8) and Giri et al(10), majority of the postpartum women belonged to middle class of socio-economic status.

The prevalence of postpartum depression in the present study is 23% which is consistent with the studies conducted by Patel V et al(5) and Budhathoki N et al.(11) In the studies conducted by Desai Nimisha et al(2) and Gupta et al(9) showed low prevalence that is 12.5% and 15.8% respectively. The prevalence was higher in the studies conducted by Giri et al(10) and Nepal M et al(12) that is 30.3% and 11-40% respectively. The high prevalence of depressive symptoms reported in this study might be because of lower cut-off point of EPDS score (≥10).

In the present study, the postpartum depression is assessed in the scale of mild, moderate and severe depression. Out of 264 postpartum women, majority 31(51.67%) had mild depression, followed by moderate depression (36.67%) and severe depression (11.67%) whereas in the study conducted by Sumitra Melinamani et al(13), majority of the mothers had severe depression (35%) followed by moderate and mild depression.

The present study noted that postpartum depression was associated with low education and similar results were noted from the studies conducted by Ghosh A et al(1), Gupta et al(9) and Sumitra Melinamani et al.(13)

In our study, the postpartum depression is significantly associated with the risk factors like unplanned pregnancy, difficulty for the mothers in carrying out their daily activities and mothers having more number of girl children, complications to the newborn and trouble during breastfeeding. Similar findings were noted in the previous studies for factors such as mothers having difficulty in carrying out their daily activities,(14) mothers having more number of girl children,(2,5,6,9,14) complications to the newborn(2,14) and trouble during breastfeeding.(14)

There was no association found for complaints during pregnancy and mode of delivery in our study. Similar findings for association with mode of delivery was noted in the study conducted by Ghosh et al(1) whereas in the study conducted by Musleh et al(14) suggests that those women who underwent delivery by caesarean section were at higher risk of suffering from postpartum depression.

Conclusion

The present study provides useful information about the prevalence of postpartum depression and risk factors associated with its occurrence. Since the prevalence is high, efforts should be made to improve the condition of postpartum women by identifying the risk factors at the
earliest during the antenatal period. Measures to be taken to improve their education and socio-economic status. Effective measures like appointment of counsellors at the level of primary health care to provide routine screening and counselling for postpartum depressive women and their family members should also be motivated in identifying and helping the postpartum women. This will help to improve the quality of care to the women to reduce maternal morbidity due to depression which is required under National Rural Health Mission.

Ethical Clearance: The study was conducted after obtaining ethical clearance from Institutional research ethical committee, Navodaya Medical College, Raichur.

Source of Funding: Self

Conflict of Interest: Nil

REFERENCES


Linking EHR and ERP Adoption with Flexibility in Care-Delivery and Operational Performance: A Conceptual Review in Hospital Supply Chain

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ABSTRACT

Healthcare-sector has gained prominence over decades and managing healthcare-records, healthcare-verticals and hospital-supplier linkages have emerged as focal-points of discussion. Electronic-health-records(EHR) and Enterprise-resource-planning(ERP) platforms are being adopted by hospitals frequently for reducing paper-based approach and better hospital-supplier sync; aiming at extending flexible and responsive patient-care-delivery; thereby boosting operational-performance. EHR and ERP adoption literatures have been evolving ever since. Well-grounded in literature and drawing logical support from two theories (Cybernetic-control-theory and Resource-based-view), this study puts forward rationally linked antecedent-consequence relationships, aimed at eliciting a nuanced view of how EHR and ERP adoption in the hospitals, adds to patient-care-flexibility. Contribution of this study lies in proposing the conceptual framework with overarching goal of achieving better operational-performance by technology-adoption(EHR and ERP), through facilitating care-delivery-flexibility as gains of EHR and ERP-implementation in hospital-network.

Keywords: EHR-adoption; ERP-implementation; Healthcare; care-delivery-flexibility; operational performance.

Introduction

Healthcare involves goods-services aspects. Goods aspect involve medical-supplies, pharmaceutical-supplies, medical-devices, etc., while services aspects include patient-care-processes, treatment-delivery and care-service-operations. The input materials in a healthcare supply chain are diseased patients, treatment care processes, pharmaceutical formulations/medications and care-delivery-schedules. With the evolving healthcare scenario, a major differentiating factor for hospitals is having an edge on services rendered towards their patients. Any processes and/ or techniques helping in synchronous process flows are vital intermediary inputs as the process of services flow downstream. Outcomes of a hospital-supply-chain are cured-patients, flexible-care-delivery propositions and efficiently managed operational performance; building competitive advantage over other hospitals. Technology has a pivotal role in development, modernization and automation of various sectors like telecom, retail, etc. and even healthcare is shifting towards technology-digitalization. However technology-adoption as antecedents to superior care-flexibility and hospital operational-performance remains unexplored.

Technology-enabled healthcare remains nascent and needs to bridge the lack of understanding of technology-adoptions towards achieving flexible patient-care and performance related aspects in hospitals. In hospital-supply-chain, major obstacles exist in communication, integration, patient-records-management, patient-data-processing, etc. This creates functional barriers among
the stakeholders\textsuperscript{13}. Feeble health-integration systems, improper patient-records management, poor connectivity, expectation-mismatch of performance-outcomes, lack of confidence on providers towards technology-adoptions, inadequate preparedness for technology-enablement have been quoted as major obstacles in achieving better care-delivery-efficiency, care-effectiveness and flexible-patient-care for hospitals\textsuperscript{9,14,15}. Shifting focus towards digitalized healthcare has triggered technology-enabled care-delivery and trending research findings indicate high potential of academic research\textsuperscript{16}.

Digitalization of health-records and enterprise-wide digitally-integrated platforms have become standardized-practice and more common in the current digitally synchronized healthcare-networks; thereby enhancing integration among various healthcare stakeholders\textsuperscript{11,17}. Technology resources like ERP (Enterprise-Resource-Planning) and EHR (Electronic-Health-Records) are making more leeway into healthcare domain\textsuperscript{4,17}. The technology resource EHR are referred to as digitalized systems functionally providing patient-history, patient-demographics, registration-details, patient-problem lists, physician clinical-notes, diagnostic-reports, comprehensive patients’ lists, medications/allergies, computerized prescriptions, laboratory and imaging results electronically\textsuperscript{18,4}. The other technology resource-Enterprise resource planning (ERP) systems are platforms/programs forming tools for providing integrated software for multiple business-facets and various stakeholders\textsuperscript{11,5,19}.

This paper aims at linking EHR-adoption and ERP-implementation with care-delivery-flexibility and operational-performance outcomes in hospital-supply-chain. Current industry-practices lack the understanding of the impacts of EHR and ERP adoption on patient-care flexibility and how they can improve the ultimate operational performance outcomes\textsuperscript{14}. This detailed conceptual review aims at providing linkages between EHRs & ERPs with care-delivery-flexibility and operational-performance outcomes of hospital-supply-chain; adding substantial clarity and justification to hospital-managers.

\textbf{Material and Method}

\textbf{Theoretical-Underpinning:} This study draws logical support from two theories- Cybernetic control theory and Resource-based-view. Linkages from cybernetic control theory and resource-based-view; contributes towards highlighting the impacts technology-resources like EHR and ERP and links their adoption-effects on care-delivery-flexibility and operational performance of hospital supply chain. First, ‘\textit{Cybernetic control theory (CCT)}’ justifies adoption/usage of cyber-technology-resources (EHR and ERP) in providing effectiveness and efficiency in hospital-process-operation; effectively developing hospital care-service-delivery capabilities\textsuperscript{20}.

Thus CCT support ERP-implementation and EHR-adoption, aimed at capturing, processing and delivering flexible and effective patient-care-delivery. Second, ‘\textit{Resource-Based-View(RBV) theory}’ asserts that firms’ compete based on bundle of resources that are valuable, rare, difficult-to-imitate and non-substitutable(VRIN) by competitors; facilitating firms to achieve competitive-advantage and superior long-term performance\textsuperscript{21}.

\textbf{Literature-Review:} This section reviews extant literature of the constructs of research interest in this paper aiming at establishing the detailed view on
application of EHR and ERP on healthcare-supply-chain context and aspects of care-delivery flexibility and operational performance in hospital-context.

**EHR-Adoption:** EHR is the process of electronically storing patients’ medical records, involving continuous collection, storage and utilization of digitalized patient health-information including demographics, progress-notes, problems, medications, vital-signs, medical-history, immunizations, laboratory-pathology-data, etc. in the form of easily retrievable files/records aiming at superior patient-care-services. Contrary to paper-based record-keeping, EHRs reduce human-errors and repetitions of diagnosis and treatment delays; fostering continuity and care-quality. EHR helps in information-standardization; thereby improving coordination among healthcare-providers. EHRs harness flow of health-related information, providing healthcare-organizations with competitive-advantage by significantly improving care-quality, efficiency, cost-containment and productivity. EHRs have capabilities of intra and inter organizational information-sharing fostering clinical-operations forming a potent tool for achieving coordinated care by overcoming long-waiting-times in hospitals; improving safety, quality and operational efficiencies. EHRs connect hospitals and patients by synchronizing patients’ clinical-record online; providing faster data-access, easier retrieval, greater collaboration, high-quality workflow and electronic-reporting mechanism through process-automation.

**ERP-Implementation:** ERP forms an enterprise-wide-package, functionally integrating the individuals, departments and multiple-stakeholders of firms by integrating various operational facets including product-planning, development, manufacturing, sales and marketing into single platform-based application-user-interface. ERP is reported as key digital-resource enabling the firms to adapt, configure, and integrate information-flows and business-processes; acting as integrated umbrella system facilitating real-time information-sharing along varied verticals like procurement-supplies, shop-floor control, etc. besides amalgamating management functions and complex heterogeneous networks across geographies, providing seamless network-wide connectivity across business silos.

ERP in healthcare has aided synchronized connectivity and real-time information-interchange among healthcare-stakeholders, improving patient-care-quality and service-flexibility; reflecting a significant impact on information-sharing, real-time tracking and supplier-hospitals integrated interaction. Major ERP benefits in healthcare are highlighted as: faster, reliable and agile medical information distribution reaching doctors, suppliers and key stakeholders on real-time basis enabling monitoring of warehouse-stocks, medical-supplies’ status and managing order lead-times; thereby minimizing stock-out situations. Further extant studies highlight healthcare-ERP benefits attributing to patients’ satisfaction, stakeholders’ satisfaction, operations-efficiency, strategic performance management of healthcare organisations.

**Care-delivery-flexibility:** Care-flexibility is referred as the extent to which healthcare-systems can adapt to dynamic process environment and be flexible in addressing variable customer (patient/hospital) complaints/requirements, concerning delivery of care/order. Care-flexibility in daily task-scheduling process promotes autonomy among staffs; allowing higher staffing-levels, lower staff-turnover and more life experiences for residents. Delivery-flexibility is essential in healthcare to continuously adapt to dynamic environment fostering patient-centric care-delivery, adapting to patient-demands, providing dependable and reliable care; besides aiding hospitals to offer customized, innovative, adaptive value-based patient-care services. Integrated, sharable and reusable technology resources effectively provide foundation fostering healthcare flexibility in dynamic environment. Network-wide IT-platform-resources have been shown effective on intangibles like enhanced flexibility and care-quality besides tangible outcomes like productivity, efficiency and cost-savings.

**Operational-Performance:** Operational performance is referred as firms’ ability to manage operational goals or services. Challenges in healthcare-network come from criticality, operational challenges and high level of operational dependencies. Operational characteristics like cycle-time, on-time-delivery, reduced lead-time, etc. form key contributors to enhanced cost-saving and resource-utilization; being even more important in healthcare due to battling between cost and quality-care along with achieving greater patient-satisfaction and loyalty. The principle attributes of operational performance are: reduction in service cycle-times; improving service processing accuracy; improved on-time-delivery of service; and improving service forecasting accuracy which is of primary focus in hospital supply chain along with focusing on patient-care-services and hospital-supplier coordination management to achieve operational success.
Table 1: Conceptual Construct Definitions

<table>
<thead>
<tr>
<th>Construct Name</th>
<th>Construct Definition</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>EHR-Adoption</td>
<td>EHR Adoption is the extent to which the firms (hospital) has adopted electronic technologies to save access and handle patient related data to facilitate diagnosis and clinical decision making.</td>
<td>13, 18</td>
</tr>
<tr>
<td>ERP-Adoption</td>
<td>ERP Adoption is the extent to which firm (hospitals/suppliers) has implemented the relevant ERP system modules, properly aligned to its business processes.</td>
<td>5, 9</td>
</tr>
<tr>
<td>Care-delivery-flexibility</td>
<td>Care Delivery Flexibility is the extent to which a firm (hospital) can deliver care to patients by adapting to the dynamic process environment, recognize process loopholes and address variable customer (patient/hospital) complaints/requirements, concerning delivery of care/order.</td>
<td>6, 7</td>
</tr>
<tr>
<td>Operational Performance</td>
<td>Operational performance is defined as the extent to which the firm (hospital/supplier) fulfils its operational goals/targets compared to its operational outcome levels prior to technology implementation.</td>
<td>34</td>
</tr>
</tbody>
</table>

Methodology

This paper is a systematic review of the impact of EHR and ERP technologies adoption in healthcare-sector focusing its implications on care-delivery flexibility and operational performance. This study details the literature review conducted to provide the antecedent-consequence linkages between EHR & ERP adoption in the hospital supply chain. Based on detailed literature-review and theoretical-supportings, the proposed research-model is structured and research propositions are derived. While reviewing literature, it was found that EHR & ERP applications in healthcare are at a very nascent stage with limited findings towards patient-care-flexibility and also limited research on innovative technology adoptions in healthcare and implications on operational-performance. This gap in body-of-knowledge offers ample scope of research. Literatures for review and analysis are taken from Google Scholar, Elsevier, Jstor, Proquest, IEEE, Emerald-Insight, Research-Gate, EBSCO, etc. Search was refined based on keyword search priority to obtain the research articles and information about EHR; ERP; Healthcare; Flexibility; Care-delivery; Operational Performance and Patient care. In this study, various caveats of healthcare systems have been identified and analyzed and a logical framework proposed.

Findings: Proposition-development

Linking EHR & ERP with Care-delivery-flexibility:
EHR is a platform for electronic storage of patient-health-data accomplishing information standardization, proper storage and access of all records by the healthcare stakeholders; thereby improving coordination among healthcare providers\(^3\). Care-flexibility based on care-design-time, care-deployment-time and actual care-run-time are primary focus areas in flexible healthcare delivery context and can be helped by technology involvement and electronic data exchange\(^3\). EHRs provide personalized system to track, manage, and interpret the patients’ health-history and help in advising both patients and providers having a potential of offering improved functionalities, robustness, reliability and care-flexibility in the system\(^1\). So we propose: Proposition-1: EHR-Adoption has a positive relationship with Care-delivery-flexibility in hospital-supply-chain.

ERP is an integration platform help in real-time information-flow across hospital-departments and hospital-suppliers, reducing gaps among disconnected hospital-silos; fostering flexibility in patient-care-delivery system\(^1\). ERP has been considered as a driving technology for business-process-management, bringing in flexibility and standardization by integrating the care functionalities in minimum possible time; thereby fostering better care-delivery coordination, care-delivery process-redesign, care-process risk-reduction and providing efficient and effective care-delivery in hospital care-delivery supply-chain\(^29,5\). Synchronization between external and internal flexibilities through ERP-systems implementation is needed for bolstering flexibility in patient-care-delivery\(^2\). Mobile-devices and technology-integrated platforms like ERP improve sensor-based-integration and user-navigation thus positively impacting flexibility\(^3\). So we propose:
Proposition-2: ERP-Adoption has positive relationship with Care-delivery-flexibility in hospital-supply-chain.

Linking Care-delivery-flexibility with Operational Performance: Collaboration and coordination across silos of healthcare supply chain facilitates flexible value-delivery driving towards patient-centered care. Flexible service is the fundamental requirement for capability-driven service and flexible availability of staffs to serve patients and provide care can largely generate better operational performance. Healthcare processes being complex, require lots of information-exchange, interaction and coordination among the physicians and hospital-staffs; necessitating a flexible system for boosting the operational performance; therefore vertical integration among the hospital supply chain stakeholders are essential for enhancing the delivery-flexibility and operational performance of the hospitals and their suppliers. Studies highlight that IT applications predominantly fosters patient-care flexibility and tangible outcomes like productivity, efficiency, cost-savings and organizational-performance. So we propose:

Proposition-3: Care-delivery-flexibility has positive relationship with Operational-Performance in hospital-supply-chain.

Conclusion and Implications: Based on extant literature and practitioner-studies, this paper proposed a conceptual framework linking EHR and ERP adoptions with care-delivery-flexibility and operational performance; leading to the development of three key propositions in healthcare context. These conceptual linkage and review-based propositions will significantly contribute to healthcare-research; providing clear understanding of implications and outcomes linked to EHR & ERP adoption, besides prompting hospitals about avenues to improve flexibility and operational performance; aimed at providing value-based care. The proposed framework, specific for healthcare-sector context, emphasizes the advantages of technology adoption/implementation; aimed at helping the hospital managers to get enhanced clarity regarding EHR and ERP adoption/implementation, besides enlightening them about proposed impact of such adoptions. From the managerial perspective this framework can be adapted in other sector-contexts; however care must be taken before indiscriminate generalization of the framework. Further scope of empirical validation through formulation of testable hypotheses remains.

Conflict of Interest: Nil
Source of Funding: Self
Ethical Clearance: No unethical details are revealed.

REFERENCES


Self Assessment of Oral Health and Risk Factors among Elderly in Tamilnadu, India

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¹Reader and Head of the Department, ²Former Student, Sathyabama Dental College and Hospital, Chennai

ABSTRACT

Background: The aim of the study was to self-assess the oral health and risk of the elderly population living in affordable and non-affordable old age homes in South India.

Methodology: A cross-sectional study was carried out among elderly people of 65 years and above and 600 samples (330 from affordable homes, 270 from non-affordable homes) were selected using cluster random sampling. Self assessment was done using WHO oral health questionnaire form for adults, 2013. The data were compiled in Microsoft excel sheet based on the coding of WHO oral health questionnaire for adults and transferred to version 20 SPSS software.

Statistical Analysis: Descriptive analysis and Chi-square test was done. Level of significance was set as 0.05.

Result: 35% had more than 20 teeth in their mouth. 37.3% had experienced pain or discomfort in their teeth or mouth during past 12 months. Majority (78%) of them graded themselves having good and very good gums and teeth respectively. 418 clean their teeth once a day. 82.3% use toothbrush. 87% use toothpaste for brushing their teeth. Less than 25% visited dentist in past years. Of those majority of them visited for pain/trouble with teeth gums or mouth. Less than 26% of elderly had experienced difficulty in biting, chewing foods and speech. Almost 90% reports that they have not experienced any daily activities affected because of their state of teeth or mouth. Majority (>90%) doesn’t use tobacco or alcohol.

Conclusion: The present study clearly shows that amidst all the oral health condition, the oral health related quality of life among elderly is found to be satisfactory.

Keywords: Self-assessment; Oral health; Risk factors; Ageing population; Quality of life; Questionnaire survey.

Introduction

Human beings whose age near or surpasses the average life span constitute elderly or old age. By 2050 India may have 20 percent of elderly among the total population, which is around 323 million. About 65 percent of the aged had to depend on others for their day-to-day maintenance. The possibility of being isolated from the society, employment related stress and depression might influence the health and oral health of elderly. Health can be measured by two methods, clinical examination by the medical professionals and self-assessment by the individuals. Self-assessment data are useful in determining the health needs of the population and identifying the target groups. With the self-assessment of the health status, it has become easier to control the risk factors in elderly population. Self-assessment of oral health has been shown to be of possible value for adult communities, providing reasonably valid estimates for the numbers of remaining teeth, for fillings and for root canal therapy experiences and for the presence of fixed and removable prostheses and for screening of urgent dental care. With the self-assessment of oral health status, it has become easier to control the risk factors in elderly population. By self-assessing the oral health status of the elderly population the characteristic discrepancy among elderly residing in affordable and non-affordable old age homes can be determined and programs can be planned to create awareness in eradicating the risk factors causing oral health discrepancies. Literature.
shows an increase in the number of studies related to self-assessment of general health and there is scarcity in literature based on the oral health assessment of adults. Thus, this study was undertaken with the aim to self-assess the oral health and risk factors among elderly population in Tamil Nadu, India.

Methodology

The present cross-sectional study was carried out among elderly aged above 65 years living in affordable and non-affordable old age homes in Tamil Nadu, South India. As per the old age home directory of India, there were 246 registered old age homes in Tamil Nadu. Sample size determination was done using the formula

\[ n = \frac{Z^2pq}{d^2} = \frac{(1.96)^2 \times 37.6 \times 62.4}{(4)^2} = 563 \]

(approximately 600)

Where, \( Z \) (confidence interval 95%) = 1.96; \( p \) (prevalence) = 37.6% (prevalence was taken from previous studies conducted among elderly in Chennai); \( q = 1-p = 62.4; d \) (allowable error) = 4%

The study sample was selected using a cluster random sampling method. 150 elderly residing in affordable and non-affordable old age homes from Chennai, Kanyakumari, Hosur, Coimbatore who were willing to participate was selected. Subjects who are diseased were excluded. The Study was conducted between October 2017 – December 2017. The study was conducted after obtaining ethical clearance (Ref.No: Sathyabama University/IHEC/Study No 18) from the Institutional Human Ethical Committee of Sathyabama Dental College and Hospital, Chennai. Prior permission to conduct the study was obtained from the authorities of the respective old age homes in Tamil Nadu. Informed written consent was obtained from the participants of all the old age homes.

Self assessment was done using a WHO oral health assessment form for adults. WHO oral health assessment for adults is used for the collection of information on self-assessment of oral health status, oral health habits, risk behavior, quality of life and social position and modifiable factors of oral health such as diet/nutrition, tobacco use and excessive alcohol consumption. This provides a conceptual and practical basis for linking oral health to relevant chronic assessment. The Questionnaire was described and explained in local language of the participants for their enhanced understanding of the study and to get accurate justification for the Questionnaire. The data were compiled in Microsoft excel sheet based on the coding of WHO oral health questionnaire for adults and transferred to version 20 SPSS software. Descriptive analysis and Chi-square test was done to know the significant difference between the affordable group and Non-affordable group. Level of significance was set as 0.05.

Table 1: Demographic Data

<table>
<thead>
<tr>
<th>Gender/Questions</th>
<th>Affordable n (%)</th>
<th>Non-Affordable n (%)</th>
<th>N (n = 600)</th>
<th>Chi-square value</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>174 (52.72%)</td>
<td>138 (51.11%)</td>
<td>312</td>
<td>0.801</td>
<td>0.67</td>
</tr>
<tr>
<td>Female</td>
<td>156 (47.27%)</td>
<td>132(48.88%)</td>
<td>288</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1. What level of education have you completed?

<table>
<thead>
<tr>
<th>Education Level</th>
<th>Affordable n (%)</th>
<th>Non-Affordable n (%)</th>
<th>N (n = 600)</th>
<th>Chi-square value</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>a) No formal schooling</td>
<td>44 (13.33%)</td>
<td>44 (16.29%)</td>
<td>88</td>
<td>14.98</td>
<td>0.059</td>
</tr>
<tr>
<td>b) Less than primary school</td>
<td>28 (8.48%)</td>
<td>24 (8.88%)</td>
<td>52</td>
<td></td>
<td></td>
</tr>
<tr>
<td>c) Primary school completed</td>
<td>48 (14.54%)</td>
<td>60 (22.22%)</td>
<td>108</td>
<td></td>
<td></td>
</tr>
<tr>
<td>d) Secondary school completed</td>
<td>74 (22.42%)</td>
<td>48 (17.77%)</td>
<td>122</td>
<td></td>
<td></td>
</tr>
<tr>
<td>e) High school completed</td>
<td>52 (15.75%)</td>
<td>56 (20.74%)</td>
<td>108</td>
<td></td>
<td></td>
</tr>
<tr>
<td>f) College/University completed</td>
<td>66 (20%)</td>
<td>34 (12.59%)</td>
<td>100</td>
<td></td>
<td></td>
</tr>
<tr>
<td>g) Postgraduate degree</td>
<td>18 (5.45%)</td>
<td>4 (1.48%)</td>
<td>22</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 2: Self Assessment of General Oral Health

<table>
<thead>
<tr>
<th>Questions</th>
<th>Affordable n (%)</th>
<th>Non-Affordable n (%)</th>
<th>N (n = 600)</th>
<th>Chi-square value</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. How many natural teeth do you have?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a) No natural teeth</td>
<td>50 (15.15%)</td>
<td>44 (16.29%)</td>
<td>94</td>
<td>4.005</td>
<td>0.261</td>
</tr>
<tr>
<td>b) 1-9 teeth</td>
<td>40 (12.12%)</td>
<td>38 (14.07%)</td>
<td>78</td>
<td></td>
<td></td>
</tr>
<tr>
<td>c) 10-19 teeth</td>
<td>108 (32.73%)</td>
<td>110 (40.74%)</td>
<td>218</td>
<td></td>
<td></td>
</tr>
<tr>
<td>d) 20 teeth or more</td>
<td>132 (40%)</td>
<td>78 (28.88%)</td>
<td>210</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. During the past 12 months, did your teeth or mouth cause any pain or discomfort?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a) Yes</td>
<td>156 (47.27%)</td>
<td>68 (25.18%)</td>
<td>224</td>
<td>21.36</td>
<td>0.0001*</td>
</tr>
<tr>
<td>b) No</td>
<td>154 (46.66%)</td>
<td>150 (55.55%)</td>
<td>304</td>
<td></td>
<td></td>
</tr>
<tr>
<td>c) Don’t Know</td>
<td>16 (4.85%)</td>
<td>46 (17.04%)</td>
<td>62</td>
<td></td>
<td></td>
</tr>
<tr>
<td>d) No answer</td>
<td>4 (1.21%)</td>
<td>6 (2.22%)</td>
<td>10</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 3: Prosthetic Status of the elderly

<table>
<thead>
<tr>
<th>Questions</th>
<th>Affordable n (%)</th>
<th>Non-Affordable n (%)</th>
<th>N (n = 600)</th>
<th>Chi-square value</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Do you have removable dentures?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a) A partial denture</td>
<td>36 (10.90%)</td>
<td>294 (89.09%)</td>
<td>330</td>
<td>1.755</td>
<td>0.416</td>
</tr>
<tr>
<td>b) A full upper denture</td>
<td>74 (22.42%)</td>
<td>256 (77.57%)</td>
<td>330</td>
<td>11.96</td>
<td>0.001*</td>
</tr>
<tr>
<td>c) A full lower denture</td>
<td>70 (21.21%)</td>
<td>260 (78.8%)</td>
<td>330</td>
<td>13.83</td>
<td>0.008*</td>
</tr>
</tbody>
</table>

Table 4 (a) : Self Assessment of Oral Hygiene Condition

<table>
<thead>
<tr>
<th>Questions</th>
<th>Affordable n (%)</th>
<th>Non-Affordable n (%)</th>
<th>N (n = 600)</th>
<th>Chi-square value</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. How will you describe your state of your teeth and gums?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a) Excellent</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>0</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>b) Very good</td>
<td>34 (10.30%)</td>
<td>4 (0.4%)</td>
<td>38</td>
<td>33.18</td>
<td>0.001*</td>
</tr>
<tr>
<td>c) Good</td>
<td>58 (17.57%)</td>
<td>74 (22.42%)</td>
<td>132</td>
<td>176</td>
<td></td>
</tr>
<tr>
<td>d) Average</td>
<td>120 (36.36%)</td>
<td>102 (30.90%)</td>
<td>222</td>
<td>194</td>
<td></td>
</tr>
<tr>
<td>e) Poor</td>
<td>62 (18.78%)</td>
<td>76 (23.03%)</td>
<td>138</td>
<td>88</td>
<td></td>
</tr>
<tr>
<td>f) Very poor</td>
<td>22 (6.66%)</td>
<td>36 (10.90%)</td>
<td>58</td>
<td>22</td>
<td></td>
</tr>
<tr>
<td>g) Don’t know</td>
<td>34 (10.30%)</td>
<td>28 (8.48%)</td>
<td>62</td>
<td>56</td>
<td></td>
</tr>
</tbody>
</table>
Table 4 (b) : Self Assessment of Oral Hygiene Maintenance

<table>
<thead>
<tr>
<th>Questions</th>
<th>Affordable n (%)</th>
<th>Non-Affordable n (%)</th>
<th>N (n = 600)</th>
<th>Chi-square value</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. How often do you clean your teeth?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a) Never</td>
<td>10 (3.03%)</td>
<td>4 (1.48%)</td>
<td>14</td>
<td>9.95</td>
<td>0.077</td>
</tr>
<tr>
<td>b) Once a month</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>c) 2-3 times a month</td>
<td>4 (1.21%)</td>
<td>0 (0%)</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>d) Once a week</td>
<td>2 (0.6%)</td>
<td>0 (0%)</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>e) 2-6 times a week</td>
<td>6 (1.81%)</td>
<td>2 (0.74%)</td>
<td>8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>f) Once a day</td>
<td>222 (67.27%)</td>
<td>216 (80%)</td>
<td>438</td>
<td></td>
<td></td>
</tr>
<tr>
<td>g) Twice or more a day</td>
<td>86 (26.06%)</td>
<td>48 (17.77%)</td>
<td>134</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 4 (b) : Self Assessment of Oral Hygiene Maintenance (Contd…)

<table>
<thead>
<tr>
<th>Questions</th>
<th>Affordable n (%)</th>
<th>Non-Affordable n (%)</th>
<th>N (n = 600)</th>
<th>Chi-square value</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Do you use any of the following to clean your teeth?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a) Tooth brush</td>
<td>Yes</td>
<td>296 (89.69%)</td>
<td>34 (10.30%)</td>
<td>198 (73.33%)</td>
<td>72 (26.66%)</td>
</tr>
<tr>
<td>b) Wooden tooth picks</td>
<td>Yes</td>
<td>50 (15.15%)</td>
<td>280 (84.84%)</td>
<td>16 (5.92%)</td>
<td>254 (94.07%)</td>
</tr>
<tr>
<td>c) Plastic tooth picks</td>
<td>Yes</td>
<td>8 (2.42%)</td>
<td>322 (97.57%)</td>
<td>2 (0.74%)</td>
<td>268 (99.25%)</td>
</tr>
<tr>
<td>d) Thread (dental floss)</td>
<td>Yes</td>
<td>6 (1.81%)</td>
<td>324 (98.18%)</td>
<td>2 (0.74%)</td>
<td>268 (99.25%)</td>
</tr>
<tr>
<td>e) Charcoal</td>
<td>Yes</td>
<td>2 (0.60%)</td>
<td>328 (99.39%)</td>
<td>2 (0.74%)</td>
<td>268 (99.25%)</td>
</tr>
<tr>
<td>f) Chewstick</td>
<td>Yes</td>
<td>16 (4.84%)</td>
<td>314 (95.15%)</td>
<td>0 (0%)</td>
<td>270 (100%)</td>
</tr>
<tr>
<td>g) Other</td>
<td>Yes</td>
<td>36 (10.90%)</td>
<td>294 (89.09%)</td>
<td>56 (20.74%)</td>
<td>214 (79.25%)</td>
</tr>
</tbody>
</table>

2. Do you use tooth paste to clean your teeth?

<table>
<thead>
<tr>
<th>Questions</th>
<th>Affordable n (%)</th>
<th>Non-Affordable n (%)</th>
<th>N (n = 600)</th>
<th>Chi-square value</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>i) Yes</td>
<td>294 (89.09%)</td>
<td>226 (83.70%)</td>
<td>520</td>
<td>9.171</td>
<td>0.057</td>
</tr>
<tr>
<td>ii) No</td>
<td>36 (10.90%)</td>
<td>44 (16.29%)</td>
<td>80</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

3. Do you use a toothpaste containing fluoride?

<table>
<thead>
<tr>
<th>Questions</th>
<th>Affordable n (%)</th>
<th>Non-Affordable n (%)</th>
<th>N (n = 600)</th>
<th>Chi-square value</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>i) Yes</td>
<td>84 (25.45%)</td>
<td>38 (14.07%)</td>
<td>122</td>
<td>13.697</td>
<td>0.008*</td>
</tr>
<tr>
<td>ii) No</td>
<td>76 (23.03%)</td>
<td>56 (20.74%)</td>
<td>132</td>
<td></td>
<td></td>
</tr>
<tr>
<td>iii) Don’t know</td>
<td>170 (51.51%)</td>
<td>176 (65.18%)</td>
<td>346</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Table 5: Utilization of Dental Services

<table>
<thead>
<tr>
<th>Questions</th>
<th>Affordable n (%)</th>
<th>Non-Affordable n (%)</th>
<th>N (n = 600)</th>
<th>Chi-square value</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. How long is it since you last saw dentist?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a) Less than 6 months</td>
<td>30 (9.09%)</td>
<td>18 (6.66%)</td>
<td>48</td>
<td>35.45</td>
<td>0.0001*</td>
</tr>
<tr>
<td>b) 6-12 months</td>
<td>60 (18.18%)</td>
<td>24 (8.88%)</td>
<td>84</td>
<td></td>
<td></td>
</tr>
<tr>
<td>c) 1-2 years</td>
<td>60 (18.18%)</td>
<td>18 (6.66%)</td>
<td>78</td>
<td></td>
<td></td>
</tr>
<tr>
<td>d) 2-5 years</td>
<td>68 (20.60%)</td>
<td>46 (17.03%)</td>
<td>114</td>
<td></td>
<td></td>
</tr>
<tr>
<td>e) &gt;5 years</td>
<td>70 (21.21%)</td>
<td>62 (22.96%)</td>
<td>132</td>
<td></td>
<td></td>
</tr>
<tr>
<td>f) never visited</td>
<td>42 (12.72%)</td>
<td>102 (37.77%)</td>
<td>144</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. What was your reason for your last visit to dentist?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a) Consultation/advise</td>
<td>30 (9.09%)</td>
<td>6 (2.22%)</td>
<td>36</td>
<td>53.81</td>
<td>0.0001*</td>
</tr>
<tr>
<td>b) Pain or trouble with teeth, gums or mouth</td>
<td>130 (39.39%)</td>
<td>50 (18.51%)</td>
<td>180</td>
<td></td>
<td></td>
</tr>
<tr>
<td>c) Treatment/follow-up treatment</td>
<td>104 (31.51%)</td>
<td>74 (27.40%)</td>
<td>178</td>
<td></td>
<td></td>
</tr>
<tr>
<td>d) Routine check-up treatment</td>
<td>18 (5.45%)</td>
<td>8 (2.96%)</td>
<td>26</td>
<td></td>
<td></td>
</tr>
<tr>
<td>e) Don’t know/don’t remember.</td>
<td>48 (14.54%)</td>
<td>132 (49.25%)</td>
<td>180</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Table 6: Self-Assessment of Oral Health Related Quality of Life

<table>
<thead>
<tr>
<th>Questions</th>
<th>Affordable n (%)</th>
<th>Non-Affordable n (%)</th>
<th>N (n = 600)</th>
<th>Chi-square value</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Because of the state of your teeth or mouth, how often have you experienced any of the following problems during the past 12 months?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(a) Difficulty in biting foods</td>
<td>42 36 96 148 8</td>
<td>22 50 70 120 8</td>
<td>64 86 166 268 16</td>
<td>2.989</td>
<td>0.56</td>
</tr>
<tr>
<td>(b) Difficulty chewing foods</td>
<td>46 44 76 156 8</td>
<td>28 40 76 120 6</td>
<td>74 84 152 276 14</td>
<td>1.745</td>
<td>0.783</td>
</tr>
<tr>
<td>(c) Difficulty with speech/trouble pronouncing words</td>
<td>12 8 34 256 20</td>
<td>8 16 46 182 18</td>
<td>20 24 80 438 38</td>
<td>6.735</td>
<td>0.151</td>
</tr>
<tr>
<td>(d) Dry mouth</td>
<td>2 2 46 256 24</td>
<td>6 2 40 206 16</td>
<td>8 4 86 462 40</td>
<td>1.881</td>
<td>0.758</td>
</tr>
<tr>
<td>(e) Felt embarrassed due to appearance of teeth</td>
<td>4 0 24 280 22</td>
<td>0 4 12 240 14</td>
<td>4 4 36 520 36</td>
<td>5.303</td>
<td>0.258</td>
</tr>
<tr>
<td>(f) Felt tense because of problems with teeth or mouth</td>
<td>0 0 34 270 26</td>
<td>0 0 8 242 20</td>
<td>0 0 42 512 46</td>
<td>7.587</td>
<td>0.023*</td>
</tr>
</tbody>
</table>

4-Very often 3-Fairly often 2-Sometimes 1-No 0-Don’t Know
Table 6: Self-Assessment of Oral Health Related Quality Of Life (contd...)

<table>
<thead>
<tr>
<th>Questions</th>
<th>Affordable n (%)</th>
<th>Non-Affordable n (%)</th>
<th>N (n = 600)</th>
<th>Chi-square value</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>(g) Have avoided smiling because of teeth</td>
<td>4 0 12 296 18</td>
<td>0 0 6 244 20</td>
<td>4 0 18 540 38</td>
<td>2.228</td>
<td>0.527</td>
</tr>
<tr>
<td>(h) Had sleep that is often interrupted</td>
<td>0 2 12 294 22</td>
<td>0 0 2 250 18</td>
<td>0 2 14 544 40</td>
<td>4.758</td>
<td>0.19</td>
</tr>
<tr>
<td>(i) Have taken days off work</td>
<td>0 0 10 304 16</td>
<td>0 0 2 250 18</td>
<td>0 0 12 554 34</td>
<td>2.113</td>
<td>0.348</td>
</tr>
<tr>
<td>(j) Difficulty doing usual activities</td>
<td>0 0 22 286 22</td>
<td>0 0 0 252 18</td>
<td>0 0 22 538 40</td>
<td>10.56</td>
<td>0.005*</td>
</tr>
<tr>
<td>(k) Felt less tolerant of spouse or people who are close to you</td>
<td>0 0 10 298 22</td>
<td>0 0 0 252 18</td>
<td>0 0 10 550 40</td>
<td>5.339</td>
<td>0.069</td>
</tr>
<tr>
<td>(l) Have reduced participation in social activities</td>
<td>0 0 8 304 18</td>
<td>0 2 2 246 20</td>
<td>0 2 10 550 38</td>
<td>2.587</td>
<td>0.46</td>
</tr>
</tbody>
</table>

Table 7: Self-Assessment of Sugar Intake

<table>
<thead>
<tr>
<th>Questions</th>
<th>Affordable n (%)</th>
<th>Non-Affordable n (%)</th>
<th>N (n = 600)</th>
<th>Chi-square value</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>(A) Fresh fruit</td>
<td>30 86 40 20 50 104</td>
<td>24 46 24 40 130 6</td>
<td>54 132 64 60 180 110</td>
<td>68.2</td>
<td>0.001*</td>
</tr>
<tr>
<td>(B) Biscuits, Cakes, Cream cakes</td>
<td>0 126 44 48 56 56</td>
<td>12 28 20 38 132 40</td>
<td>12 154 64 86 188 96</td>
<td>57.75</td>
<td>0.001*</td>
</tr>
<tr>
<td>(C) Sweet pies, Buns</td>
<td>0 10 12 28 42 238</td>
<td>0 6 2 38 78 146</td>
<td>0 16 14 66 120 384</td>
<td>19.88</td>
<td>0.001*</td>
</tr>
<tr>
<td>(D) Jam or Honey</td>
<td>0 2 2 12 18 296</td>
<td>0 10 2 22 48 188</td>
<td>0 12 4 34 66 484</td>
<td>17.94</td>
<td>0.001*</td>
</tr>
<tr>
<td>(E) Chewing gum containing sugar</td>
<td>0 2 4 6 6 312</td>
<td>0 0 0 6 18 246</td>
<td>0 2 4 12 24 558</td>
<td>3.545</td>
<td>0.471</td>
</tr>
<tr>
<td>(F) Sweets/Candy</td>
<td>0 10 42 52 134 92</td>
<td>2 8 10 20 72 158</td>
<td>2 18 52 72 206 250</td>
<td>35.72</td>
<td>0.001*</td>
</tr>
<tr>
<td>(G) Lemonade, Coca-cola or other soft drinks</td>
<td>4 6 2 12 40 266</td>
<td>0 6 0 6 26 232</td>
<td>4 12 2 18 66 498</td>
<td>5.5</td>
<td>0.358</td>
</tr>
<tr>
<td>(H) Tea with Sugar</td>
<td>46 168 10 4 10 92</td>
<td>32 132 6 0 40 60</td>
<td>78 300 16 4 50 152</td>
<td>16.78</td>
<td>0.005*</td>
</tr>
<tr>
<td>(I) Coffee with Sugar</td>
<td>60 106 8 18 12 126</td>
<td>16 90 4 6 48 106</td>
<td>76 196 12 24 60 232</td>
<td>21.84</td>
<td>0.001*</td>
</tr>
</tbody>
</table>

How often do you eat or drink any of the following foods, even in small quantities?

6-Several times a day 5-Everyday 4-Several times a week 3-Once a week 2-Several times a month 1-Seldom/Never
## Table 8: Self-Assessment of Tobacco Consumption

<table>
<thead>
<tr>
<th>Questions</th>
<th>Affordable n (%)</th>
<th>Non-Affordable n (%)</th>
<th>N (n = 600)</th>
<th>Chi-square value</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>6</td>
<td>5</td>
<td>4</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>1. How often do you use any of the following types of tobacco?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A. Cigarettes</td>
<td>8</td>
<td>2</td>
<td>0</td>
<td>6</td>
<td>18</td>
</tr>
<tr>
<td>B. Cigars</td>
<td>2</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>6</td>
</tr>
<tr>
<td>C. A pipe</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>6</td>
</tr>
<tr>
<td>D. Chewing Tobacco</td>
<td>4</td>
<td>4</td>
<td>4</td>
<td>6</td>
<td>12</td>
</tr>
<tr>
<td>E. Use snuff</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>4</td>
</tr>
</tbody>
</table>

6-Several times a day  5-Everyday  4-Several times a week  3-Once a week  2-Several times a month  1-Seldom/Never

## Table 9: Self-Assessment of Alcohol Consumption

<table>
<thead>
<tr>
<th>Questions</th>
<th>Affordable n (%)</th>
<th>Non-Affordable n (%)</th>
<th>N (n = 600)</th>
<th>Chi-square value</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. During the past 30 days, on the days you drank alcohol, how many drinks did you usually drink per day?</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a) Less than 1 drink</td>
<td>4 (1.21%)</td>
<td>0 (0%)</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>b) 1 drink</td>
<td>6 (1.81%)</td>
<td>8 (2.96%)</td>
<td>14</td>
<td></td>
<td></td>
</tr>
<tr>
<td>c) 2 drinks</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td>d) 3 drinks</td>
<td>4 (1.21%)</td>
<td>0 (0%)</td>
<td>4</td>
<td></td>
<td></td>
</tr>
<tr>
<td>e) 4 drinks</td>
<td>2 (0.60%)</td>
<td>0 (0%)</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>f) 5 or more drinks</td>
<td>2 (0.60%)</td>
<td>10 (3.70%)</td>
<td>12</td>
<td></td>
<td></td>
</tr>
<tr>
<td>g) Did not drink alcohol for the past 30 days</td>
<td>312 (94.54%)</td>
<td>252 (93.33%)</td>
<td>564</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Chi-square value: 6.515, p value: 0.368
Results

The present study was conducted among 600 (Affordable-330, Non-Affordable-270) elderly aged 65 years above living in affordable and non affordable homes in Tamil Nadu. Table 1 shows the demographic details of the study population. Table 2 shows self-assessment of general oral health among elderly. 47.27% of elderly from affordable homes suffered more pain or discomfort for the past 1 year when compared to non-affordable homes (p<0.05). From table 3 it is evident that elderly living in affordable homes have dentures when compared to non-affordable homes. Table 4 indicates that the respondents of non-affordable group had better state of teeth and gums compared to affordable group. Table 5 indicates almost 102(37.77%) elderly living in non-affordable homes have not visited a dentist. Table 6 indicates almost 50% to 80% of the respondents has no difficulty in chewing and biting food or had a speech trouble while affordable group encounter less difficulty than non-Affordable group. Table 7 indicates both Affordable and Non-Affordable group will consume coffee or tea several times a day or everyday while fresh fruits are consumed in highest numbers by the Affordable group. Table 8 shows majority(>98%) does not use Tobacco/Alcohol.

Discussion

Self-Assessment of oral health questionnaire for adults have been pilot tested in different parts of the world and can be done either by self-completion or completion by means of interview of which Self-completion brings forth higher response rates. The aim of the study is to gather data by focusing on socio-economic status, risk factors of oral health and also information about environmental exposure to fluoride, oral hygiene practices and use of available oral health services. Oral Health Related Quality of life is considered as an important outcome10.

Majority (96%) of the elderly have not utilized dental services in our study. This is in concordance with study conducted by Rani et al11 and Talajia et al12. The reason might be lack of transportation and lack of insurance which is a must for expensive dental treatments are the obstacles in utilizing dental services and people visit dentists only when they suffer from pain and they are not concern about the follow up treatment. About 35% have more than 20 teeth in their mouth and majority have the habit of brushing once a day using toothbrush and toothpaste. This highlights that our study population are aware of oral health maintenance. Talajia et al12 in his study states that age, education and income are associated to oral health risk factors. Hardly 50% of the population has completed High school of which Non-Affordable group has a lower level of education than Affordable group.

From the present study it is found that felt need of oral health among elderly with regards to oral condition is less in their perspective resulting in good Oral Health Related Quality Of Life. The present study concludes that the elderly population self assessed their oral hygiene status as good and oral health status does not bother their quality of life and Self assessing affirms good state of oral health in elderly inspite of the difficulty they experience with teeth or mouth. Though the oral hygiene is maintained lack of awareness in utilizing dental care and poor education system may be the major cause of the rundown in Non-Affordable group than Affordable group.

Conflict of Interest: NIL

Source of Funding: Self

Ethical Clearance: The study was conducted after obtaining ethical clearance (Ref.No: Sathyabama University/IHEC/Study No 18) from the Institutional Human Ethical Committee of Sathyabama Dental College and Hospital, Chennai.

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Brand Resonance: Concept and Influence of Relationship Marketing Dimensions with Reference to Online Shopping Portals

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ABSTRACT

Technology has penetrated into every field of operation and most of the businesses today are executed online. In this context, the competition is intense in online shopping portals. With the advent of internet and the ease of accessibility of Internet at anytime and anywhere has increased the number of online shoppers. The online shopping portals are finding it difficult to retain the customers and establish a long term relationship with them. Focusing this issue of online shopping portals, the study elaborates the concept of Brand Resonance, a powerful tool for the portals to have a long sustenance in the market. The correlation between the various factors of Brand Resonance such as Brand Loyalty, Brand Attachment, Brand Engagement and Brand Community is explained and the influence of Relationship marketing dimensions on Brand Resonance is analyzed theoretically. The four Relationship Marketing Dimensions Trust, Satisfaction, Empathy and Conflict handling has been considered for the study.

Keywords: Brand Resonance, Relationship Marketing Dimensions, Brand Loyalty, Brand Engagement, Brand Community, Brand Attachment.

Introduction

The Internet Revolution has created opportunity for Businesses and thus many services are offered online. Among the services, online shopping has taken a predominant position with a huge customer base (Richa.D, 2012). As the cost of doing business online is less compared to conducting a business with physical store formats, it has attracted the interest of many entrepreneurs. The cost of inventory is less and the choices available to the customers is varied compared to physical stores.

Due to this the competition is also intensifying where the businesses struggle to retain its customers. It is because customers switch to other shopping portals when the price of the same product is offered at a slashed rate. To tackle this situation, businesses need to focus on ways to retain their customers. Brand Resonance should be the goal of every marketer. The marketer needs to drive their customers to this state of high psychological connection towards the brand. Once the customers feel emotionally connected with the brand, they do not easily switch over to other brands. Though Brand Resonance is an ideal state to be achieved, businesses find success when they choose this path to travel. They realize huge profits when they get closer to this state.

Relationship Marketing plays a crucial role in influencing Brand Resonance. The impact of these dimensions in creating Brand Resonance is very high and thus are considered as antecedents for this study. The four main relationship marketing dimensions trust, satisfaction, conflict handling and empathy which are paramount for online shopping portals are considered for examination.

Objectives

- To trace the linkage between Relationship Marketing Dimensions and Brand Resonance.
- To determine the levels of correlation between the factors of Brand Resonance.
- To determine the correlation levels between Relationship Marketing Dimensions and Brand Resonance.
- To discern the concept of Brand Resonance with respect to Online Shopping Portals.
**Materials and Method**

The study has employed descriptive type of research using primary and secondary data. The primary data from 515 respondents using online shopping portal have been collected and analyzed in order to determine the correlation between Brand Resonance and between Brand Resonance and RM dimensions. Convenience Sampling has been employed in the study. The Secondary data is collected from various online journals like ebscohost, proquest, newspaper sources and internet sources.

**Brand Resonance: Overview**

Brand Resonance is defined as the type of relationship the consumers share with the brand and the level of sync they establish towards the brand. It is also characterized by depth of psychological bond the consumers share with the brand. The four dimensions of Brand Resonance are exhibited in Fig 1.

![Fig. 1: Sub dimensions of Brand Resonance](image)

The Behavioral loyalty or Brand Loyalty refers to the frequency of purchase and quantity of purchase made by the customers. The repeat purchases are measured in order to determine the behavioural loyalty. The more the purchase is higher is the level of loyalty. Though loyalty forms a crucial component to achieve Brand Resonance, customers should establish a personal attachment towards the brand. They should feel that their brand is very special beyond just possessing a positive image for the brand and love their brand. This is termed as Brand Attachment.

Another important dimension is Brand Community where the customers identify themselves within a community and feel affiliated with other members linked to the brand. A strong assertion towards brand loyalty happens when the customers beyond the purchase time are ready to invest energy, time and money for the brand which is Brand Engagement (Keller, 2001). These four factors constitute the Brand Resonance and every factor is significant and contributes majorly towards the brand resonance.

**Correlation between the Factors of Brand Resonance**

The various levels of Brand Resonance have interactive effects. They are correlated and interrelated to one another. When the levels of Brand Attachment increases it leads to an increase in engagement levels. Ultimately, in order to boost Brand Resonance, the intensity and activity levels of loyalty should be improved (Wasib, 2014). In order to determine the correlation between the various factors of brand resonance, a study was conducted among 515 online shoppers and the result of the correlation is exhibited in the table.

<table>
<thead>
<tr>
<th>Brand Resonance</th>
<th>Brand Attachment</th>
<th>Brand Engagement</th>
<th>Brand Community</th>
<th>Brand Loyalty</th>
</tr>
</thead>
<tbody>
<tr>
<td>Brand Attachment</td>
<td>1.000</td>
<td>0.677***</td>
<td>0.474***</td>
<td>0.625***</td>
</tr>
<tr>
<td>Brand Engagement</td>
<td>-</td>
<td>1.000</td>
<td>0.632***</td>
<td>0.580***</td>
</tr>
<tr>
<td>Brand Community</td>
<td>-</td>
<td>-</td>
<td>1.000</td>
<td>0.562***</td>
</tr>
<tr>
<td>Brand Loyalty</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>1.000</td>
</tr>
</tbody>
</table>

*** indicates the significance of correlation at 1% level

From the above table it can be inferred that the correlation is high between Brand Attachment and Brand Engagement with a value of 0.677. So an increase in one factor leads to an increase on the other factor. The correlation is least between Brand Attachment and Brand Community with a value of 0.474. It is observed from the correlation values that all the values are above 0.5 and thus every factor of Brand resonance is very closely and positively related to one another. Hence it can be concluded that the factors of Brand Resonance are closely related to each other.
Relationship Marketing Dimensions and Brand Resonance-Interdependance

Relationship Marketing and brand Resonance is closely knitted to each other. Every RM (Relationship Marketing) Dimension very strongly influence Brand Resonance.

Brand Community and RM Dimensions: Trust, a paramount factor of Relationship Marketing Dimension is strongly associated with Brand Community (ie) online communities in the case of online shopping portal. When a user of the shopping portal is long associated with the community, he develops greater trust for the shopping portal and enjoys a very comfortable shopping experience. The customer’s feeling of risk in shopping hits the rock bottom (Zhu, 2012)4.

Brand Communities benefit the customers to a large extent. Online shoppers in the recent times depend on the reviews and comments of other shoppers, mainly because it is a virtual shopping and the physical assistance is absent. A report suggests that 84% of US online shoppers trust the perceptions of other shoppers which is a sign of credibility and thus the risk factor is reduced (Anderson, Swaminathan and Mehta, 2013)5. In general, customers have certain shopping characteristics and in online community, they search for shoppers with similar characters. Once the search is successful, the opinion of these persons are very powerful because the customers selection depend on their favorite shopper to decide which particular seller to opt for (Van den bulte and Wuys, 2007)6. At times a new product purchase decision may also depend on this favourite shopper as the customer believes that they share the same wavelength with respect to tastes and preferences. Empathy and Conflict Handling dimensions of RM has a greater impact on Brand Community compared to satisfaction and trust. When the shopping portals express high levels of empathy, the gratitude is expressed by good word of mouth in online communities.

Brand Loyalty and RM Dimensions: As the competition among the online shopping portal gets intensified customer satisfaction acts as a crucial differentiator and thus has gained a pivotal position in business strategy. The psychological factors strongly influence the customer’s loyalty towards the online shopping portal (Pai and Tsai, 2011)7. Hence, Customer Satisfaction plays a critical role in building Brand Loyalty among the customers who later turn as customer evangelists and spread good word of mouth about the brand. Though there are many metrics like market share which measures the performance of the company in the market, customer satisfaction is the most significant indicator which decides on the likeliness of the customer to do repeat purchase which is brand loyalty (Tripathi, 2014)8.

The basic principle to have intensified levels of loyalty is immense degree of trust which minimizes the reliability on various monitoring mechanism and thereby reducing the transaction costs (Gefen,2003)9. Supporting this view, the framework developed by Harris and Goode (2004)10 emphasized that trust is paramount in developing long term relationship with the customer that enables further purchases.

Sere De Lanauzn (2006)11 suggests that the integrity and credibility components of trust form the predictors for brand loyalty. So as the sensibility of trust increases, the loyalty of the customers towards the brand also increases. Thus Brand Loyalty is very closely associated with Relationship Marketing Dimensions.

Brand Engagement and RM Dimensions: Brand Engagement focuses on the level of importance the customers place on their favourite brands and the extent to which consumers strongly bond with their preferred brands (Sprott, 2009)12. The RM dimensions trust and satisfaction are antecedents for Brand Engagement particularly for old customers (Linda, 2011)13. On the road of achieving long term relationship with the customer, customer satisfaction is the first stage and engagement of the customer towards the brand is the pinnacle of long term relationships. Customers who exhibit higher levels of engagement towards the brand or company are invested emotionally with respect to brand since they believe that the organization has invested emotionally on the customers (Tripathi, 2014).

Brand Attachment and RM Dimensions: Brand Attachment is defined as “Inalterable, long lasting, affective reaction for the brand, exhibiting psychological proximity towards the brand” (Lacoeuilhe, 2000)14. Thus Brand Attachment exhibits a customers interest to establish a wistful relationship by means of consumption or usage of a brand. Though RM dimensions does not form a definite pre requisite for Brand Attachment, the
presence of trust enhances the bonding of Brand Attachment. As far as the satisfaction is concerned, the evidence of the relationship with Brand Attachment is not explicit but however affective component of satisfaction is positively related to Brand Attachment (Samy Belaid, 2010)\(^1\)

**CORRELATION BETWEEN BRAND RESONANCE AND RELATIONSHIP MARKETING DIMENSIONS**

The following table illustrates the correlation between the brand resonance and relationship marketing dimensions:

<table>
<thead>
<tr>
<th>Factors</th>
<th>Brand Attachment</th>
<th>Brand Engagement</th>
<th>Brand Community</th>
<th>Brand Loyalty</th>
<th>Overall Brand Resonance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trust</td>
<td>0.484***</td>
<td>0.352***</td>
<td>0.230***</td>
<td>0.384***</td>
<td>0.427***</td>
</tr>
<tr>
<td>Empathy</td>
<td>0.569***</td>
<td>0.543***</td>
<td>0.420***</td>
<td>0.484***</td>
<td>0.598***</td>
</tr>
<tr>
<td>Satisfaction</td>
<td>0.517***</td>
<td>0.424***</td>
<td>0.299***</td>
<td>0.413***</td>
<td>0.488***</td>
</tr>
<tr>
<td>Conflict Handling</td>
<td>0.553***</td>
<td>0.393***</td>
<td>0.424***</td>
<td>0.379***</td>
<td>0.527***</td>
</tr>
<tr>
<td>Overall Relationship Marketing</td>
<td>0.644***</td>
<td>0.516***</td>
<td>0.4217***</td>
<td>0.501***</td>
<td>0.617***</td>
</tr>
</tbody>
</table>

*** indicates the significance of correlation at 1% level

From the above table it can be inferred that for Brand Attachment, the correlation is strong with Empathy with a value of 0.569, Brand Engagement has high correlation with Empathy (0.543), Brand Community has high correlation with Conflict Handling (0.424) and Brand Loyalty has highest correlation with Empathy (0.484). Among all the factors of brand resonance Brand Attachment has got the strong correlation with the overall RM dimension (0.644) and among all the RM dimensions, Empathy has the strongest correlation with the overall Brand Resonance (0.598). The least level of correlation exists between Brand Community and Trust (0.230). Focusing on the bigger picture the correlation levels are generally high except a few intercepts with low levels of correlation.

**Findings**

It is evident from the literature that Brand Resonance is one of the strong levels to be reached by the marketers to have a prominent position in the market. Though Brand Resonance is an ideal state to be reached, the closer the businesses travel higher are the benefits to be enjoyed. From the correlation values of Brand resonance, it is apparent that the 4 factors are closely related to each other and a rise in one component leads to the rise in other components. Tracing the relationship between RM Dimensions and Brand Resonance, the RM Dimensions have a strong influence of Brand Resonance and the earlier studies support the view that RM dimensions are antecedents for Brand Resonance. With the correlation values between both, overall a strong level of correlation exists between RM dimensions and Brand Resonance with a coefficient value 0.617.

**Conclusion**

The Marketers can use Brand Resonance as one of their Business Strategies to stand apart from the competitors. Relationship Marketing has always been a term of strategic importance from time to time. But however the dimensions have got different ranking and priority through different marketing ages. As the customer’s mind set changes and also with the advent of new ways of doing business, marketers need to place more emphasis on the changes and formulate their strategies which is concomitant with the needs of the customers. Though RM Dimensions have got a direct influence on Brand Resonance, it is imperative to focus on the dimensions that contribute the maximum towards Brand Resonance and place higher importance for these factors which will directly have a strong impact on sales and profits.
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Community Health Diagnosis in a Tribal Hamlet–A Case Study from India

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ABSTRACT

This is an account of a Community Health Diagnosis program conducted in a tribal hamlet in Kerala, India. The goal of the program was to identify factors affecting health of this population and determine the availability of resources within the community to address these factors. The program identified the felt needs of this marginalized population and developed a causal loop diagram to identify the social and cultural factors affecting their health. Actionable recommendations were proposed to the local political leader. It was concluded that addressing social determinants is key to delivering health care in low resource settings.

Keywords: Community health diagnosis; Social determinants; Tribal

Introduction

India is the land of many diversities, home to more than 1.2 billion of the world’s population, a colossal assortment of various cultures and diversities. The indigenous groups (tribals or adivasis as they are locally addressed) constitute about 8.2% of the total population[1]. Being a marginalised and disadvantaged community, the tribals in India face a plethora of health issues calling for urgent attention. A burgeoning volume of research identifies social factors at the root of health problems especially among the disadvantaged groups. The Commission on Social Determinants of Health proposed that social determinants are relevant to communicable and non-communicable diseases alike[2]. Hence identifying of social determinants is key to addressing most health issues.

The Community Health Diagnosis (community health assessment) is the foundation for improving and promoting the health of the people of a community. The goal of community assessment is to identify factors that affect the health of a population and determine the availability of resources within the community to adequately address these factors[3]. According to the WHO definition, it is “a quantitative and qualitative description of the health of citizens and the factors which influence their health. It identifies problems, proposes areas for improvement and stimulates action”[4].

It starts with collecting basic data about community beginning from geographical characteristics of the community, to analysing the health condition of its inhabitants thereby presenting an overall profile of the community. The World Health Organization endorses this concept by defining health as a state of complete physical, mental and social well-being and not merely the absence of any disease or infirmity[5].

Purpose of community diagnosis

- To act as a tool to bring out the hidden issues that are not tangible to the community or policy makers but are directly or indirectly affecting their health.
To reach out to underprivileged people who are unable to utilize the available facilities due to poverty, prevailing discriminations or other social causes.

To determine genuine problems of the community, that the community itself may not have perceived as problems.

To suggest priority areas for intervention and solutions for the same.

To identify and communicate these problems from the local level to the state and national level.

To serve as baseline data for assessing the effectiveness of any intervention or program implemented.

Appraising the findings to policy makers who in turn can implement the suggested solutions for community betterment. This process is better known ‘as advocacy’; one of the core functions of a public health professional.

It should be understood that community diagnosis is not a one-time affair rather a continuous and dynamic process. It requires constant monitoring and follow-up to enable significant changes in the community.

As mentioned earlier, there is a need to dispel the myth that ill-health is merely caused due to bio-medical reasons. The advancements in medical technologies and advent of super-specialties have cocooned medical professionals to the four walls of a hospital. Community diagnosis program provides an opportunity to sensitize medical professionals to diagnose the exact ‘cause’ of a disease by reflecting on the social, cultural and economic aspects of a disease/illness as well.

Community diagnosis programs has been successfully implemented in many countries as a part of routine medical curriculum[6-8]. This training in early years of medical education could have a wider impact in shaping the thought process of the professional.

**Community health diagnosis program in a tribal hamlet in Wayanad, Kerala**

**Need for the program:** The purpose of this program was to highlight the view health needs and problems cannot be viewed in isolation. It has been observed that in deprived communities, health is often not a priority. An approach to identify their felt needs and addressing them becomes vital in improving their general health. Hence, a community health diagnosis program was designed and implemented to identify the key social and cultural factors governing health related behaviour of a tribal community in the state of Kerala, India.

**Methodology**

Information was elicited through primary data availed from household surveys in the form of structured interviews, group discussions and analysis of health care providers, community leaders and community representatives’ perspectives and from secondary data (previous studies, newspaper reports and government publications).

A total of 28 houses belonging to Madakunnu tribal colony were surveyed by a nine member team comprising of faculty and postgraduates scholars of Public Health Dentistry, Amrita School of Dentistry. Health care providers of two hospitals frequented by tribals were interviewed.

As an attempt to orient and improve their attitudes towards basic hygiene and sanitation, households were provided with a basic health kit consisting of bathing soap, toothpaste and toothbrush, shampoo, band-aids and nail clippers.

**Findings**

**Community profile:** Madakunnu is a tribal hamlet in the hilly regions of Wayanad district in Kerala. The geography of the hamlet is presented in the form of a social map (Figure 1) developed with the help of a preceptor. Social map is a two-dimensional cartographic representation showing relative households and social institutions.
Community characterization: We found that on an average five persons lived together in a single room kuchha house. Majority of them were manual labourers working for daily wages in nearby agricultural lands drawing a remuneration of Rs 400 (for men) and Rs 250 (for women) per day. They usually worked for a maximum of 10 days per month. Literacy rates were found to be poor with most of the females educated upto 4th grade and males till 8th grade of schooling.

Prioritization: Identifying felt and normative needs required weighing and prioritizing the various community problems. The following observations were made in the process.

Fever and cough were the common health issues expressed by the community for which care was sought from a nearby government primary health center and two charitable hospitals. From the health provider’s perspective, tuberculosis, under-nutrition and anaemia were the most common health issues. This could predominantly be attributed to their living conditions like poor housing, overcrowding, lack of potable water and inhalation of firewood fumes. Consumption of the alcohol and use of tobacco were the other major problems affecting this community.

The foremost barriers in seeking care were difficulty in reaching the health care facility during need due to rough terrain, poorly motorable roads, lack of frequent public transport services and financial issues. Commuting was difficult in the dark and during rainy seasons. Lack of electricity compounded the problem leading to a situation where sick and needy were left to suffer till next twilight to access health care.

The primary concern was housing. Roofs built of hay and plastic sheets gave way during rainy seasons leading to perennial leaks and dampness and associated illnesses like fever and infectious diseases. The problem of overcrowding in a single room house, cooking using firewood in the same room and lack of ventilation were aggravating factors for development and spread of infections. The other concern raised was the lack of potable water. Majority of the households drew water from a man-made pit on the river bank. This pit was not covered and exposed to a variety of litter and debris affecting the quality of water. Boiling of water before
consumption was practiced only during rainy seasons. Community leaders and doctors opined that awareness levels regarding health and disease were generally poor.

**Detailed analysis of the identified problems:** The foremost objective of a community diagnosis program is to view health from a wider perspective. One of the methods to obtain a comprehensive picture is by developing a causal loop model. It is a model to understand the complex systemic nature of health and identify key variables affecting it.

At the end of data collection, a brainstorming session was conducted among the investigators to develop a causal loop diagram from data obtained during household visits, on-field observations and expert opinion from various stakeholders. Key variables were identified, relationship of one variable to others was established and in the event of conflicting views, a consensus was reached based on majority vote. The final diagram was developed using Vensim software (Figure 2).

![Causal loop diagram](image)

**Figure 2: Causal loop diagram**

**Actionable Recommendations:** The following recommendations were proposed:

1. Improving access to health care by converting the present rough terrain paths to motorable roads.

2. Provision of electricity at least in the form of public lighting source (like street lamps and high mast lights).

3. To address the problem of respiratory infections and TB, provision of LPG cylinders as a part of ongoing central government schemes is suggested.

Continued emphasis on education and initiation of sustainable health programs was highly recommended as a long term strategy. Over a period of time, this could translate into the creation of skilled labourers and widening the scope of employment opportunities. These recommendations, if implemented, could have a positive impact on the health and overall development of this marginalised community.

**Advocacy:** The report of the program was handed over to Member of Legislative Assembly (MLA) of the constituency to appraise the actionable changes who assured to look into the findings.
Conclusion

There is a constant tussle between the normative need from a health professional’s perspective and the felt needs of a marginalized community. Though medicine has seen rapid strides in terms technological advancements and treatment modalities, it has not translated into better health outcomes especially in disadvantaged populations. So, it can be argued that it is the non-medical factors like social and economic environment that increase the vulnerability to diseases. There is a poor realization on the part of health professionals to think beyond biomedial reasons to ensure optimum health.

Addressing health disparities requires an upstream approach. It is obvious that addressing poverty and other social determinants will ensure improvement in health outcomes. Unless these determinants are addressed, improving access and providing health care through isolated efforts will only partially alleviate but never substantially reduce the burden of diseases.

Thus, through community health diagnosis, we call for a change in approach to tackle health problems through the lens of social determinants.

Source of Funding: This community diagnosis program was conducted and funded as a part of tribal outreach initiative of Amrita Institute of Medical Sciences, Kochi, Kerala

Ethical Clearance: The program was approved by the management of Amrita Institute of Medical Sciences, Kochi, Kerala.

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A Study on the Horrendous Industrial Mass Disaster at Union Carbide Plant of Bhopal in Light of Ethical Dimension

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ABSTRACT

The Bhopal Gas tragedy, considered as one of the most horrendous industrial mass disaster, is unparalleled in its magnitude and devastation in the history of mankind.1 The incident occurred on the night of 2-3 December 1984 when a highly toxic chemical named Methyl Isocyanate (MIC) leaked into the atmosphere from the plant of Union Carbide (India) Limited(UCIL). Methyl Isocyanate (MIC) usually written as CH3CNO is an extremely toxic, volatile and flammable gas whose density is more than the density of air and has no possible antidote.2 The US Defense Department also tested MIC as a warfare agent in 1944.3 Since the density of the gas is more than that of air, its leakage into the atmosphere led to the formation of toxic gas clouds, very close to the ground level which eventually spread into the entire city of Bhopal. Thousands of people lost their life. As per Times of India Report 16177 death claims were filed and 7000 death case compensation were awarded till November 27, 1994.4 The government of Madhya Pradesh confirmed 3787 deaths.5 In an affidavit filed in the Supreme Court by the Government of India on 26th October, 2006 the government stated that the gas leak led to 5,58,125 injuries.6

Keywords: Bhopal Gas Tragedy, Union Carbide India Ltd.(UCIL), Union Carbide Corporation

Union Carbide India Limited

The Union Carbide India Limited was a majority owned subsidiary of Union Carbide Corporation (UCC), USA. Union Carbide Corporation, USA was established in 1917 and soon rose to become one of the most influential and renowned chemical companies of United States . Union Carbide Corporation (UCC), USA established one of its subsidiary named, Union Carbide (India) Limited in India in 1934, with 50.9% holdings and the remaining 49.1 percent of shares were held by the Government of India through Unit Trust of India (UTI) and Life Insurance Corporation of India (LIC) and many private investors. However in Charanlal Sahu vs. Union of India7 case the Supreme Court of India held that Central Government of India did not hold any shares in UCIL because UTI and LIC are statutorily independent organizations. The shares of UCIL were listed at Calcutta Stock Exchange and the company’s annual sales were nearly $200 million.8 UCIL started its operation in India by making dry cell batteries under the trademark “Eveready.” This trademark “Eveready” was also used by Union Carbide Corporation (UCC) for its dry cell batteries in USA. The state government of Madhya Pradesh allotted land to the company in its capital city Bhopal, for a period of 99 years on a very favorable lease. The UCIL factory of Bhopal started the phase of its operation in 1968-69 and the project took approximately eight years to complete fully in 1980. UCIL made pesticides at its Bhopal since 1969 and obtained the license to produce upto 5,000 tons of “SEVIN”, a carbaryl pesticide produced by reacting Methylamine with Phosgene to form Methyl Isocyanate (MIC). The financials position of the company went down and it paid the compensation of $470 million in 1989 to settle the litigations against it. In 1994, Union Carbide Corporation sold entire stake in UCIL to Mcleod Russel India Limited, Calcutta which decided to rename UCIL as Eveready Industries India Limited (EIIL). In 1999, Dow Chemical announced the purchase of Union Carbide Corporation for $8.89 billion in stock and the deal was finally signed in 2001.9

DOI Number: 10.5958/0976-5506.2019.01251.8
UCIL Plant of Bhopal: Though the UCIL plant at Bhopal was established with great enthusiasm and fervor, but soon both UCC and UCIL realized that the plant is economically unviable because, the main chemical produced by the plant was “SEVIN” which is a carbaryl pesticide and this chemical became obsolete after the discovery and production of new generation “carbofuran pesticides” in US and Europe. The local Indian farmers were more inclined towards using local and organic products. Even though, the plant was in modest profit till 1981, yet it always operated below its capacity and started posting losses from 1982 onwards. By 1984 the plant was operating at only 25 percent of its capacity.

The continuous losses and low production volumes led to the massive reduction in the workforce and also employment of less skilled and low wages employees. For example; in the Methyl Isocyanate unit, the workforce was reduced from the recommended 3 supervisors and 12 workers on each shift to 1 supervisor and 6 workers in each shift.10

Earlier Gas Leaks Incidents Reported at the Plant: The safety and security of the Bhopal Chemical Plant had always been a matter of concern. There had been continuous accidents happening in the plant since its operation. In 1976 some local trade union groups complained about very high level of pollution within the plant premise.11,12 In 1981, a worker died when he removed his gas mask in panic and inhaled phosgene gas while repairing a leakage in the supply pipe. The January 1982 phosgene gas leak caused the hospitalization of 24 workers. None of them were instructed to wear protective mask for safety. The February 1982 MIC leak affected 18 workers. In August 1982 a chemical engineer suffered 30 percent burn when he accidently came into contact with liquid MIC. There were similar reported leaks in October 1982, 1983 and 1984.

The Major Gas Leak Incident and the Day when Tragedy Struck: UCIL Bhopal had three underground MIC storage tanks; E610, E611 and E619 with the storage capacity of 68,000 liters each. However, tank E619 was not in order. The last batch of producing SEVIN was under progress and MIC of 62 tons was produced by mixing Phosgene and Methylamine. 22 tons of MIC was put in tank E611 and remaining 40 tons were put in E610. The UCC safety regulation provided that no storage tank should be filled with more than 50 percent of its capacity and each tank should be pressurized with the inert nitrogen gas. This pressurization kept the impurities out of tank and also helped in pumping out MIC out of the tank.13 The plant operation remained shut for many days due to the curfew clamped down by the state government after the assassination of the then Indian PM Indira Gandhi. At the eve of December 2, 1984 the second shift supervisor ordered the workers to perform the periodic washing of pipes in the MIC storage area. The washing continued till 10:30-10:45 and it was at this time when the third shift started. Due to washing the water is said to have leaked into the dysfunctional E610 tank storing 40 tons of MIC. Around 1 pm the nearby residents felt the gas leak in the atmosphere but due to lack of any information and training in dealing with such type of emergency situation they became panicked and started fleeing. People who inhaled gas started complaining about burning sensation into their respiratory tract, breathlessness, vomiting, stomach pains and suffocation. Thousands humans and animals died and thousands were injured. The soil and air around the region was heavily and defoliation of the trees happened. Union Carbide Corporation (UCC) Chairman Warren Anderson travelled to India along with a team of experts but upon his arrival he was placed under house arrest and was asked to leave India within 24 hours.

Legal Proceedings: After the aftermath, the legal proceedings started both in India and US. The Government of India passed the “Bhopal Gas Leak Disaster Act” that entitled the government to represent all the Bhopal gas victims in cases running in India or abroad. This act was challenged in the Supreme Court, but in the Charanlal Sahu vs. Union of India case, the Supreme Court of India allowed the Government of India to represent the Bhopal Gas victims stating that the Bhopal gas victims could not be considered as any match to the MNCs and therefore they cannot look after their own interest effectively.14 In June 2010, seven former employees of UCIL namely: i. Keshub Mahindra, former non executive chairman of UCIL ii. Keshub Mahindra, former non-executive chairman of Union Carbide India Limited; V. P. Gokhale, managing director; Kishore Kamdar, vice-president; J. Mukund, works manager; S. P. Chowdhury, production manager; K. V. Shetty, plant superintendent; and S. I. Qureshi, production assistant, were awarded 2 year imprisonment and Rs.1,00,000 fine each for death due to negligence. All of them were soon released on bail. Warren M Anderson, the then CEO of UCC died a natural death at the age of 92 in Sept 2014.
In 1987 the U.S. Court of Appeals for the Second Circuit dismissed the Bhopal gas disaster litigation in the U.S.: “In short, the plant has been constructed and managed by Indians in India.” The Court found that “UCC’s participation was limited and its involvement in plant operations terminated long before the [1984] accident.”

With respect to alleged pollution at the Bhopal plant site, the Second Circuit Court concluded in its 2013 decision that individuals “living near the Bhopal plant may well have suffered terrible and lasting injuries from the wholly preventable disaster for which someone is responsible. After nine years of contentious litigation and discovery, however, all that the evidence in this case demonstrates that UCC is not that entity”16

**Ethical Dimensions: There are series of ethical lapses evident in this case, like:**

**(i) No Risk Assessment:** Lack of risk assessment was the root cause of this whole disaster. UCIL plant was located merely 4.8 km from the main city, and the government not only allowed the illegal settlements near the dangerous plant but also regularized those settlements to appease the voters keeping forthcoming assembly elections in mind. Even though, the master plan of the Bhopal city was formed in 1975 and it laid down provisions to establish the hazardous industry 15 km away from the city yet, the UCIL plant was not asked to relocate. The plant was also accorded with the status of general industry rather than hazardous industry in order to avoid its relocation.

**(ii) India’s Economic ambition and Red Tapism:** The mixed economy had provisions for the growth of both public and private sector industries. We see that both centre and state government were very eager to promote rapid industrialisation but with certain curbs and limits. Permit was required to be taken for every small little thing. UCIL was invited to establish a factory at Bhopal at a very favourable lease of 99 years but the company had to face lot of bureaucratic hurdles in running its operation. For example; UCIL plan of producing carbaryl pesticides using alpha-naphthol process was developed by its own local chemists in 1969. This was done because the government of India highly stressed upon local production and discouraged imports. UCILs process of producing carbaryl pesticides soon became an obsolete and costly affair which forced it to import alpha-naphthol from Union Carbide Corporation (UCC), US and after reviewing the production cost in 1981, UCC further suggested that UCIL should also import Methyl Isocynate (MIC) as well from it but, the import application was rejected by the Indian government which wanted the companies to focus on getting local production.

**(iii) Economic condition of the chemical plant:** The economic condition of the UCIL plant in Bhopal was not very sound. The company realized that the change in market conditions have made the plant economically unviable and accepted the recommendation of UCC to sell its plant. The process of producing carbaryl pesticides at UCIL plant Bhopal was very costly and time consuming and many of its units like alpha naphthol producing unit failed to work properly. Though the Bhopal plant was in moderate profit until 1981 yet it never failed to operate in its full capacity and by the fall of 1984 the plant was operating at about 25 percent of its capacity. The company resorted to cost cutting due to its deteriorating economic health and even compromised with safety while doing so. The safety standards of UCC recommended 3 supervisors and 12 workers in each shift for the MIC unit but due to cost cutting the number was reduced to 1 supervisor and 6 workers. The other sections of the plant were also affected by the cost cutting. The repairing and maintenance of the plant was also not done properly due to cost cutting and this is evident from the fact that many of the pipes used in the chemical process were corroded and not repaired.

**(iv) Lack of Skilled workforce:** The first batch of management and supervisory staff of UCIL plant Bhopal, received training at the Union Carbide’s West Virginia plant in US in 1982 but when the economic condition of the UCIL Bhopal plant deteriorated then most of these employees left their job for better prospects. These employees were replaced by less skilled workforce who was not very adept in their job. They even failed to read the safety manuals because they were written in English. Their casualness is also evident from
the fact that the washing of the plant was carried on despite knowing the fact that the pipes are corroded and the washing may lead to leakage. The supervisors didn’t take the initial gas leaking very seriously and even when a major gas leak was discovered around 11:45 pm night, then also, it was decided to fix the leakage only after the 12:15 am tea break. By that time the situation aggravated and went out of control.

(v) Violation of Safety Standards: The safety standards were badly compromised and grossly violated. It really surprises to see a chemical plant producing and storing extremely poisonous and harmful chemicals being run so casually, keeping all the safety measures aside. The safety standards were compromised at all the levels.

(vi) Poor Medical facilities: People were rushed to the city’s Hamidia Hospital but the health care facilities were not very good. There were only around 300 doctors and approximately 2000 beds available in the Bhopal city hospitals and many of the medical practitioners were not well aware about the treatment that is likely to be given in such types of incidents. Inquiries with UCIL medical officers also yielded very little relevant information. Furthermore, no antidotes were available to treat the victims which made the doctors even more helpless.

(vii) Legal Actions: The government and judiciary failed to provide timely justice to the victims of Bhopal Gas Tragedy. UCC proposed a settlement amount of $350 million which was rejected by the Indian government but on the intervention of Supreme Court of India the final settlement amount was fixed to $470 million. Madhya Pradesh Government allocated us $ 14 million for victim relief in July 1985 and started paying US $ 3.2 per month initially as widow pension which was later on increased to US $14 per month. The average sum paid out to the victims was US $ 980 for death and US $ 400 for personal injury. Only seven people, all Indians were convicted and that too only for a period of 2 years. They were soon granted bail and the case is still going on. The then CEO of the company Mr. Warren M Anderson died in US as a free man at the age of 92 in September 2014.

Conclusion and Suggestions: Bhopal Gas tragedy is an explicit example of extreme corporate greed and corruption. The victims feel betrayed by the bureaucratic, political and judicial stands taken in this case. Warren M Anderson was arrested but was allowed to leave India without facing any charges. Later on the effort to extradite him and face trial in India was seen as an eye wash and political drama by the victims. The judiciary failed to deliver timely justice and all the accused are moving free. Cases related to the incident are still pending in many lower courts and some people are still struggling to get relief funds.

Ethical Clearance: Taken from MITS School of Business, Chittoor, A.P.

Source of Funding: Self

Conflict of Interest: NIL

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A Review on Root Canal Irrigants

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ABSTRACT

Three essential steps in root canal therapy are proper instrumentation, irrigation and obturation of the root canal. Elimination or significant reduction of irritants and prevention of recontamination of the root canal after treatment are essential elements for successful outcomes. The common belief that inadequate obturation is the major cause of endodontic failure has been proven to be fallacious as obturation reflects the adequacy of cleaning and shaping. The primary endodontic treatment goal must thus be to optimize root canal disinfection and to prevent reinfection.

Keywords: Root canal irrigants, endodontic irrigants, NaOCl, EDTA, MTAD, CHX

Introduction

Bacteria is been recognized as the primary etiologic factors in the development of pulp and periapical lesions. Chemomechanical debridement of pulpal tissue, dentin debris, and infective microorganisms ensures success of root canal therapy. Irrigants can enhance mechanical debridement through flushing out of debris, dissolving the organic tissue, and disinfecting the root canal system. Complex internal anatomy such as fins or other irregularities that might be missed by instrumentation can be treated by chemical debridement

Classification of commonly used irrigation solutions

I. Chlorine Releasing Agents
   1. Potassium hypochlorite
   2. Sodium hypochlorite

II. Oxidizing Agents
   1. Hydrogen peroxide
   2. Urea peroxide

III. Chelating Agents
   1. EDTA
   2. EDTAC

IV. Organic Acids
   1. Citric acid
   2. Maleic acid

V. Herbal Alternatives–Green tea, Triphala

Sodium hypochlorite–NaOCl

History: Introduced by Henry Drysdale Dakin and Alexis Carrel

Antimicrobial Property–Concentration and Time:
The most effective irrigation regimen is reported to be 5.25% at 40 min; irrigation with 1.3% and 2.5% NaOCl for this same time interval is ineffective in removing E faecalis from infected dentin cylinders. NaOCl when used is moderately effective against bacteria but less effective against endotoxins in root canal infection.

Effect on Biofilm
- Complete dissolution of cells with absence of visual evidence
- Bacterial cells are disrupted from the biofilm and are nonviable.
- Bacterial cells are disrupted from the biofilm but are viable
Effect of NaOCl in Tissue Dissolving Capacity: Its effect depends on concentration, temperature and time of application.

Biofilm: Biofilm interferes with efficacy of NaOCl when they grow on predentin.

Effect on Dentin: The effect of the NaOCl on dentin is limited when used as the first irrigant because of the hydroxyapatite coating on collagen which protects the collagen fibers. When decalcifying solution is used prior, the hydroxyapatite is quickly dissolved exposing the underlying collagen fibers and NaOCl can directly attack the proteins and cause considerable destruction of the collagen of surface dentin.

Ultrasonic: Passive ultrasonic irrigation with a NiTi tip produced superior dissolving ability when compared to sonic irrigant activation.

Influence of NaOCl on Bond Strength: NaOCl causes decreased bond strength between dentin and resin cements and may require a reversal agent such as ascorbic acid or sodium ascorbate, because of its ability to affect the polymerization of the resin sealer.

Final Rinse: Not recommended as it causes dentinal erosion.

Interaction of NaOCl and Chlorhexidine: Kuruvilla et al. suggested that 2.5% NaOCl and 0.2% chlorhexidine (CHX) used in combination had greater antimicrobial effect than used separately. The reaction between NaOCl and CHX produces parachloroanaline (PCA) of molecular formula NaC6H4Cl, which has carcinogenic effect. This PCA occludes the dentinal tubules and affects the seal of the root canal.

EDTA–Ethylene DiamineTetraacetic Acid: EDTA was introduced into endodontics as an aid in preparation of narrow and calcified canals by Nygaard-Ostby in 1957 who recommended use of 15% EDTA at PH 7.3.

Time Duration for Smear Layer Removal: According to Saito et al. the 30-sec or 15-sec groups had lesser smear layer removal than in the 1-min EDTA irrigation group.

Effect on Tooth Surface Strain: When 5% NaOCl is used alone or in combination with 17% EDTA (used in 30-min cycles) it causes increase in tooth surface strain. This alternating use of NaOCl and EDTA causes greater changes in tooth surface strain than when NaOCl used alone.

EDTA with Ultrasonics: A 1-min application of 17% EDTA combined with ultrasonics is efficient for smear layer and debris removal in the apical part than the coronal and middle third of the root canal.

Chlorhexidine: Chlorhexidine has excellent antimicrobial activity but it completely lacks tissue dissolving capability.

Antibacterial Activity: Basson and Tait compared the ex vivo effectiveness of calcium hydroxide, iodine potassium iodide (IKI), and CHX solution in disinfecting root canal systems that were infected with Actinomyces israelii and concluded that only CHX was able to eliminate A. israelii.

Effect of CHX on Dentin: CHX binds the anionic molecules such as phosphate present in the structure of hydroxyapatite, leading to release of small amounts of calcium from the root canal dentin.

Interaction of CHX and EDTA: When CHX and EDTA interact, a white precipitate is formed by electrostatic neutralization of cationic CHX by anionic EDTA.

CHX and Biofilm: Spratt et al. have evaluated the various irrigants in different concentrations of 2.25% NaOCl, 0.2% CHX, 10% povidone iodine against monoculture biofilms of P intermedia, P miro, S intermedius, F nucleatum, and E faecalis. The results indicated that NaOCl was the most effective antimicrobial agent, followed by the iodine solution. Clegg et al. evaluated the ex vivo effectiveness against apical dentine biofilms of three concentrations of NaOCl (6%, 3%, and 1%), 2% CHX, and Mixture of Tetracycline acid and detergents (MTAD). The results concluded that 6% NaOCl and 3% NaOCl were capable of disrupting and removing the biofilm, the 1% NaOCl and the MTAD were capable of disrupting the biofilm. Its efficacy in eliminating bacteria was not known, and the 2% CHX was not capable of disrupting the biofilm.

Substantivity: White et al. reported that CHX has a substantivity of 72 hours. Khademi et al. found that induction of 5-min application of 2% CHX solution prolonged substantivity for up to 4 weeks. Rosenthal et al. reported that when irrigated for 10 min CHX was antimicrobiologically effective for up to 12 weeks.

CHX and Dentine Bonding (Anticollagenolytic Activity): Human dentin contains various collagenases
like (MMP-8), gelatinases MMP-2 and MMP-9, and enamelysin MMP-20. Dentine collagenolytic and gelatinolytic activities can be suppressed by protease inhibitors. It indicates that MMP inhibition could be beneficial in the preservation of hybrid layers. On the whole, because of its broad-spectrum MMP-inhibitory effect, CHX can significantly improve the resin–dentine bonding and enhance stability.[22]

Cytotoxicity of CHX: CHX when tested for cytotoxicity on canine embryonic fibroblast and Staphylococcus aureus showed that it was toxic in bactericidal concentrations whereas non-cytotoxic in concentrations which dint show antimicrobial activity. Ribeiro et al. evaluated the genotoxic effects (potential damage to DNA) of formocresol, paramonochlorophenol, calcium hydroxide, and CHX against Chinese hamster ovary cells. Results showed that none of the abovementioned agents contributed to DNA damage. Thus, in the clinically used concentrations, CHX is biocompatible.[23]

Allergic Reactions to CHX: Contact dermatitis is a common adverse reaction.[24] CHX may have a number of rare side effects, such as desquamative gingivitis, orangish discoloration of the teeth and tongue, or dysgeusia.

MTAD: Torabinejad et al. developed a newer irrigant, a mixture of 3% doxycycline, 4.25% citric acid, and detergent (Tween-80).[25]

Smear Layer Removal and Its Antibacterial Activity: MTAD is composed of three constituents that act synergistically against bacteria. The bacteriostatic effect of MTAD was inferior to 1%-6% NaOCl against E faecalis biofilms. The buffering effect of dentin and the serum albumin present in the root canal inhibits the antibacterial activity of MTAD. MTAD has been reported to be effective in removing smear layer. In the MTAD preparation, the citric acid removes the smear layer thus enabling doxycycline to enter the dentinal tubules and exert an antibacterial effect.

Bond Strength: A final rinse with MTAD might have a negative effect on the bonding ability of both resin-based and calcium hydroxide–based sealers due to the precipitate formation.[26]

Citric Acid and EDTA-T: Citric acid in concentration of 10% when used as final irrigation has shown good results in smear layer removal. In vitro studies have shown their cytotoxicity, and 10% citric acid has proven to be more biocompatible than 17% EDTA-T and 17% EDTA[27].

Scelza et al concluded that 10% citric acid showed less aggressive in inflammatory response. 25% citric acid was ineffective in effectively removing biofilms of E faecalis after 1, 5, and 10 min of exposure[28].

Maleic Acid: Maleic acid is used as an acid conditioner in adhesive dentistry and it is the milder form of organic acid. Ballal et al. reported that 7% maleic acid when used as final irrigant for 60 seconds was effective than 17% EDTA in the removal of smear layer from the apical third of the root canal system.[29]

HEBP: HEBP (1-hydroxyethylidene-1,1-bisphosphonate), also known as etidronic acid or etidronate, has been proposed as a potential alternative to EDTA or citric acid because this agent shows no short-term reactivity with NaOCl. HEBP is not lethal and is used to treat bone diseases. Both 9% HEBP and 18% HEBP promoted demineralization kinetics and were significantly slower than those of 17% EDTA. De-Deus et al. reported that the soft chelating irrigation protocol (18% HEBP) optimized to improve the bonding quality (3.1–6.1 MPa) of Resilon/Epiphany[30]

Chlorine Dioxide: Chlorine dioxide (ClO2) the familiar household bleach is chemically similar to chlorine or hypochlorite. An In-vitro study comparing the organic tissue dissolution capacity of NaOCl and ClO2 concluded that both are equally efficient in dissolving organic tissue[31]. ClO2 produces little or no trihalomethanes[32] which is a potential animal carcinogen and a suspected human carcinogen[33, 34]. Therefore ClO2 can be a better dental irrigant than NaOCl.

Herbal Irrigants

Triphala: Triphala consists of dried and powdered fruits of three medicinal plants Terminaliabellerica, Terminaliachebula, and Emblicaofficinalis. Triphala achieved 100% killing of E faecalis at 6 min. This is due to formulation of three different medicinal plants in equal proportions; in such cases different compounds may help enhance the potency of the active compounds, producing a synergistic effect. Triphala bears fruits rich in citric acid, which may aid in removal of the smear layer. The major advantages of using herbal extracts as irrigants are easy availability, cost-effectiveness, longer shelf life, low toxicity, and lack of microbial resistance.[35]
**Green Tea:** Green tea, the traditional drink of Japan and China is prepared from the young shoots of the tea plant *Camellia sinensis* and is rich in polyphenols and antioxidants. Green tea polyphenols showed statistically significant antibacterial activity against *E. faecalis* biofilm when formed on tooth substrate. To achieve 100% killing of *E. faecalis* it takes approximately 6 mins.\(^{[36]}\)

**Morinda citrifolia:** *Morinda citrifolia* (MCJ) has a wide range of therapeutic effects, including antibacterial, antiviral, antifungal, antitumor, antihelmintic, analgesic, hypotensive, anti-inflammatory, and immune-enhancing effects.\(^{[37]}\) MCJ is rich in the antibacterial compounds L-asperuloside and alizarin. Murray et al. proved that when morinda is used as an intracanal irrigant to remove the smear layer, the efficacy of 6% MJC was similar to that of 6% NaOCl in conjunction with EDTA\(^{[38]}\). Therefore its use as an irrigant might be advantageous being a biocompatible antioxidant and posses no potential risk as might occur through NaOCl accidents.

**Conclusion**

Any endodontic situation warrants a correct combination of irrigants. Choosing the right combination is essential to prevent misuse or overuse of these chemical adjuncts.

Future of irrigants lie in a single irrigant possessing the tissue dissolving capacity, smear layer removal property, along with antibacterial efficacy and also being biocompatible.

**Source of Funding:** Self

**Conflict of Interest:** The authors have no conflict of interest

**Ethical Clearance:** Not applicable

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Correlative Study Prolactin Level and Hypothyroidism in Both Primary and Secondary Infertility in Females of Uttar Pradesh

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ABSTRACT

In the present study, 40 females of primary infertility and 40 females of secondary infertility aged between 18-40 years were studied, primary infertility females grouped as group - A and secondary infertility females grouped as group - B. In group A, the duration of marriage of 21 (52.5%) was 1 to 5 years, 12 (30%) had 6 to 10 years, 7(17.5%) had more than 10 years. In group B, 11(27.5%) had 1-5 years of marriage duration, 16(40%) had 6-10 years and 13(32.5%) had more than 10 years of marriage period. The menses history in group A was: 13(32.5%) had regular menses, 19(47.5%) had oligomenorrhea, 5(12.5%) had amenorrhea and 3(7.5%) had menorrhagia. In group B, 12(30%) had regular menses, 17(45.5%) had oligomenorrhea, 9(22.5%) had amenorrhea and 2(5%) had menorrhagia. In group A, serum prolactin level in 17(42.5%) females was 0-20mg/ml, 23(57.5%) was 21-100mg/ml. In group B, 26(65%) had 21-100mg/ml and 1(2.5%) had >100 mg/ml. In group A, TSH level in 3(7.5%) was <0.4, 27(67.5%) females had 0.4-4.7, 10(25%) females had >4.7 µIU/ml. In group B 2(5%) females had <0.4 µIU/m, 33(82.5%) females had 0.4-4.7 µIU/m, 5(12.5%) females had >4.7 µIU/ml. This correlative study of S. prolactin and TSH hormones will be quite useful to obstetrics and gynecologist, endocrinologist, to rule out proper cause and treat the infertility efficiently, because due to increased rate of infertility majority of couples are finding surrogate mothers which are quite expensive and may lead to legal complications.

Keywords: S. Prolactin = Serum Prolactin, TSH= Thyroid stimulating Hormone

Introduction

Infertility is defined as the failure of a couple to achieve conception (regardless of cause) after one year of unprotected and adequately timed intercourse (1). It could be primary i.e. a couple has never conceived despite cohabitation and exposure to sexual activity over a period of years, secondary infertility is when couples have achieved a pregnancy, previously but regular unprotected sexual intercourse has not resulted in second pregnancy (2). Human infertility is a complex problem, which has numerous consequences depending on the society and cultural background, gender, lifestyle, sexual history of the people it affects. Infertility is a global public health concern. This is partly due to complexity in aetiology as well as difficulty in preventing, diagnosing and treating it.

Hormonal disorder of female’s reproductive system is comprised of a number of problems resulting from aberrant dysfunction of hypothalamic-pituitary-ovarian axis. These relatively common disorders often lead to infertility (3). Measurement of prolactin and thyroid hormones especially TSH has been considered an important component of infertility work up in females.(4)

Hence attempt was made to study these both hormonal assays and correlate their profile in both primary and secondary infertile females.

Material and Method

80 infertility woman aged between 18 to 40 years who were regularly visiting Obstetrics and Gynecology...
department, G.S. Medical College, NH24, near petrol pump, Peepulabandapur, Pilkhuwa-245304(UP) were selected for study. Among 80, 40 were primary infertility and 40 were secondary infertility hence primary infertility females were, grouped as A and secondary infertile were grouped as B group.

Complete haemogram, ESR, USG perineum and abdomen, chest x-ray, thyroid function test, serum prolaction test, Histosalpinography and diagnostic laparoscopy was carried out whenever indicated.

Blood examination was done for hormone probably on 3rd day of menstrual cycle. TSH and prolactin assay levels were measured using Beckman coulter Access-II Immune assay analyzers.

Male factor infertility - congenital anomaly of urogenital tract, diabetes mellitus patients with cardiac and neurological disease were excluded from the study.

The duration of study is about two years (from September 2016 to December 2018)

For the patients of group A and group B, duration of marriage, menses history, hormonal level assay were classified in percentage and studied.

Observation and Results

Table 1: Study of duration of marriage in infertile females in both groups

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Duration of years of marriage</th>
<th>Group -A(40) No</th>
<th>Group - A (40) %</th>
<th>Group - B(40) No</th>
<th>Group - B(40) %</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>1-5 years</td>
<td>21</td>
<td>52.5</td>
<td>11</td>
<td>27.5</td>
</tr>
<tr>
<td>2.</td>
<td>6-10 years</td>
<td>12</td>
<td>30</td>
<td>16</td>
<td>40</td>
</tr>
<tr>
<td>3.</td>
<td>&gt;10 years</td>
<td>07</td>
<td>17.5</td>
<td>13</td>
<td>32.5</td>
</tr>
</tbody>
</table>

Group A- Primary infertile females 21(52.5%) had 1-5 years of marriage duration, 12 (30%) had 6 to 10 years, 7(17.5%) had more than 10 years of marriage period.

Group B- Secondary infertile females 11(27.5%) had marriage duration of 1 to 5 years, 16(40%) had 6 to 10 years, 13(32.5%) had more than 10 years of marriage duration.

Table 2: Study of history of menses in both groups

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Particular of Menses</th>
<th>Group – I (40) No</th>
<th>Group – I (40) %</th>
<th>Group – II (40) No</th>
<th>Group – II (40) %</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Regular menses</td>
<td>13</td>
<td>32.5</td>
<td>12</td>
<td>30</td>
</tr>
<tr>
<td>2.</td>
<td>Oligomenorrhea</td>
<td>19</td>
<td>47.5</td>
<td>17</td>
<td>42.5</td>
</tr>
<tr>
<td>3.</td>
<td>Amenorrhea</td>
<td>05</td>
<td>12.5</td>
<td>09</td>
<td>22.5</td>
</tr>
<tr>
<td>4.</td>
<td>Menorrhagia</td>
<td>03</td>
<td>07.5</td>
<td>02</td>
<td>05</td>
</tr>
</tbody>
</table>

Group-A (Primary infertility)- 13(25.5%) had regular menses, 19(47.5%) had oligomenorrhea, 5(12.5%) had amenorrhea, 3(7.5%) menorrhagia.

Group-B (secondary infertility)- 12(30%) had regular menses, 17(42.5%) had oligomenorrhea, 9(22.5%) had amenorrhea, 2(5%) had menorrhagia.

Table 3: Study of prolactin level in both group of infertility

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Particular</th>
<th>Group – I (40) No</th>
<th>Group – I (40) %</th>
<th>Group – II (40) No</th>
<th>Group – II (40) %</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>0-20 mg/ml</td>
<td>17</td>
<td>42.5</td>
<td>26</td>
<td>65</td>
</tr>
<tr>
<td>2.</td>
<td>21-100 mg/ml</td>
<td>23</td>
<td>57.5</td>
<td>13</td>
<td>32.5</td>
</tr>
<tr>
<td>3.</td>
<td>&gt;100 mg/ml</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>2.5</td>
</tr>
</tbody>
</table>

Group-A (Primary infertility)- 17(42.5%) had 0-20 mg/ml, 23(57.5%) had 21-100, 0% had more than 100.

Group-B (Secondary Infertility)- 26(65%) females had 0-20 mg/ml, 13 (32.5%) had 21-100mg/ml, 1(2.5%) had >100 mg/ml.

Normal Values of S. Prolactin -2-25 mg/ml

Table 4: Study of TSH hormones in infertile females of both groups

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Particular</th>
<th>Group – I (40) No</th>
<th>Group – I (40) %</th>
<th>Group – II (40) No</th>
<th>Group – II (40) %</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>&lt;0.4</td>
<td>03</td>
<td>7.5</td>
<td>02</td>
<td>05</td>
</tr>
<tr>
<td>2.</td>
<td>0.4-4.7</td>
<td>27</td>
<td>67.5</td>
<td>3.3</td>
<td>82.5</td>
</tr>
<tr>
<td>3.</td>
<td>&gt;4.7</td>
<td>10</td>
<td>25</td>
<td>05</td>
<td>12.5</td>
</tr>
</tbody>
</table>

Normal TSH is 0.5-4.7 µIU/m
Group-A (Primary infertility)- 3(7.5%) had < 0.4 μIU/m, 27(67.5%) females had 0.4 to 4.7 μIU/m, 10(25%) had >4.7 μIU/m

Group-B (secondary infertility)- 2(5%) had < 0.4 μIU/m, 33(82.5%) females had 0.4 to 4.7 μIU/m, 5(12.5%) females > 4.7 μIU/m.

Discussion

In the correlative study of prolactin level and hypothyroidism in both primary and secondary infertility females of Uttar Pradesh, in group A, the duration of marriage of 21 (52.5%) was 1 to 5 years, 12 (30%) had 6 to 10 years, 7(17.5%) had more than 10 years. In group B, 11(27.5%) had 1-5 years of marriage duration, 16(40%) had 6-10 years and 13(32.5%) had more than 10 years of marriage period (Table-1). The menses history in group A was: 13(32.5%) had regular menses, 19(47.5%) had oligomenorrhea, 5(12.5%) had amenorrhea and 3(7.5%) had menorrhagia. In group B, 12(30%) had regular menses, 17(45.5%) had oligomenorrhea, 9(21.5%) had oligomenorrhea, 9(22.5%) had amenorrhea and 2(5%) had menorrhagia (Table-2). In group A, serum prolactin level in 17(42.5%) females was 0-20mg/ml, 23(57.5%) was 21-100mg/ml. In group B, 26(65%) had 21-100mg/ml and 1(2.5%) had >100 mg/ml (Table-3). In group A, TSH level in 3(7.5%) was <0.4, 27(67.5%) females had 0.4-4.7, 10(25%) females had >4.7 μIU/ml. In group B 2(5%) females had <0.4 μIU/m, 33(82.5%) females had -0.4-4.7 μIU/m, 5(12.5%) females had >4.7 μIU/ml (Table-4). These findings were more or less in agreement with previous studies (5)(6)(7).

Hyper prolactinemia resulting from long standing primary, hypothyroidism has been implicated in ovulatory dysfunction ranging from inadequate corpus luteal progesterone secretion when mildly elevated to oligomenorrhea or amenorrhea when circulating production levels are high Amenorrhea occurs in hypothyroidism due to hyper prolactinemia resulting from a defect in the positive feedback of estrogen on LH and because of LH and FSH suppression (9).

However many infertile females present with normal or regular menses despite of raised serum prolactin level pituitary hormone such as TSH, prolactin or growth hormone may act synergistically with FSH and LH to enhance the entry of non-growing follicle into the growth phase (9). Even in the absence of hyper prolactinemia, hypothyroidism itself may contribute to infertility since thyroid hormones may be necessary for the maximum production of both estradiol and progesterone (10). In the areas with endemic goiter, the major contributor of thyroid dysfunction is iodine deficiency. Infertility associated with thyroid dysfunction in these areas is not uncommon (11). Treating such thyroid dysfunction with low dosage of thyroxin slightly increased the FT4 levels leading to inhibition of TSH secretion within normal range resulting in subjecting improvement in health status, normalization menses, abnormalities and restoration of normal fertility.

Hyper prolactin adversely affects the fertility potential by impairing pulsative secretion of GnRH and hence interfering with ovulation(12). This disorder has been implicated in menstrual and ovulatory dysfunctions like amenorrhea, oligomenorrhea, anovulation, in adequate corpus luteal phase and galactorrhea.

Summary and Conclusion

The present correlative study of serum prolactin level and hypothyroidism in both primary and secondary infertility of females in Uttar Pradesh will be quite useful for obstetrics and gynecologist endocrinologist physician to treat such infertility. Hence assessment of serum TSH and prolactin levels must be mandatory in the treatment of infertile women especially those presenting with menstrual irregularity. But this study further warrants, genetics nutritional, neurological, endocrinological study because exact quantum of hormonal secretion, mechanism of stimulating factors which exactly increase or decrease the hormonal secretion is still unclear.

Ethical Clearance: This research paper was approved by ethical committee of G.S. Medical College, NH24, Near Petrol Pump, Peelabandapur, Pilkhuwa-245304(UP)

Conflict of Interest: No

Source of Funding: No

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Comparative Evaluation of Efficacy of Electronic Apex Locators in Determining the Working Length of the Canal Which is Used During a Routine Root Canal Treatment-In Vivo Study

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ABSTRACT

Aim: The aim of this study was to evaluate the clinical efficacy of four electronic apex locators i.e Dentaport ZX, Raypex 6, Propex pixi and I-Root in comparison with the standard radiographic technique.

Methodology: A total of 20 patients diagnosed with apical periodontitis with no periapical lesions scheduled for root canal therapy were selected for the study and the working length of palatal canal were determined using the four apex locators and standard radiographic technique.

Results: Statistical analysis was done using PRISM 5.0 Software. Intra-group comparison was done using repeated measures one way ANOVA with post-hoc tukey test and inter group comparision was done using Independent sample t test. No significant differences were detected between the apex locators (P=0.531).

Conclusions: The result in this study showed no significant difference among the groups, indicating they were as good as the radiographic method.

Keywords: Apical constriction, Apex locator, working length, radiograph, radiographic apex.

Introduction

The accuracy and predictablility of working length assessment has been enhanced since the evolution of electronic apex locators. The development of the electronic apex locator has helped make the assessment of working length more accurate and predictable.[1] Although radiographs are a critical and an integral part of endodontic therapy (Vertucci 2005) there is an ongoing need to reduce exposure to ionizing radiation whenever possible.[2] The significance of the apical constriction in the root canal treatment is well recognized. It is generally accepted that the preparation and obturation should be at or short of the apical constriction.[3] A new equipment called Apex locator was introduced by Sunada. The main benefit of apex locators are that these analyse the working length to apical foramen and not the radiographic apex. They are easy and fast to operate, and have a good accuracy. Radiation to the patient can also be reduced.[4] Dentaport ZX (J. Morita Corporation, Tokyo, Japan) is the latest version of the Root ZX (third generation), one of the most evaluated EALs that is often used as the ‘gold standard’ to which other EALs are compared.[5] Propex Pixi™(dentsply) and I-Root (E-Magic finder series) (s–denti seoul korea) are two fifth generation apex locators. The consistency of a device describes the regularity of its function. A measuring device that is able to give a reading each time used is considered to function consistently regardless of the quality of the performance.[6] The purpose of this study is therefore to compare the efficacy of above mentioned electronic apex locators in determining the working length of the root canal during the routine endodontic therapy along with radiographic measurement.

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Methodology

A total of 20 patients diagnosed with apical periodontitis with no periapical lesions scheduled for root canal therapy were selected for the study. Intact maxillary first molars with carious lesions involving pulp and without any metallic restorations were included. The patients were informed about routine endodontic procedures and an informed written consent in compliance with ethical principles was obtained from each patient before the treatment was initiated. Patients with cardiac pacemakers, teeth with no apical patency and with the radiographic signs of resorption were excluded from the study.

Local anesthesia was administered and isolation with rubber dam was done, followed by caries removal. Standard access cavity preparation was done using a high speed diamond round bur (Dentsply Maillefer) and a straight line access was done with Endo Z bur. The palatal canal was explored using a no.10# k file followed by coronal enlargement using Gates Glidden drills (#1, #2, #3). The pulp tissue was then extirpated with #15 - #25 broaches and the canals were thoroughly irrigated with normal saline and 5.25% sodium hypochlorite solution. The working length in palatal canal was estimated using 5 different methods. Which were further divided into following groups,

- Group I (control) – Determination of working length using radiovisuography (rvg)
- Group II- Determination of working length using Dentaport ZX
- Group III- Determination of working length using Raypex 6
- Group IV- Determination of working length using Propex pixi
- Group V- Determination of working length using I-root

Recording of working length using RVG, Dentaport ZX, Raypex 6 , Propex pixi and I-root Apex locators

**Working length using Dentaport ZX:** The working length was recorded using #15, #20 or # 25 file depending on the canal size. The contrary electrode (the lip clip) was placed into the corner of the mouth then the file holder was attached onto the shaft of the hand file and then the Apex locator Dentaport ZX was switched on. The file was then progressed until “00” appears on the screen as per manufacturer’s instructions indicating at the apex. The silicone stop on the file was set to the reference point. The distance from the file tip to the silicone stop was then measured and similar procedure was repeated for Raypex 6, Propex pixi and I-root. The readings were measured as the file progressed to “00” on the screen.

**Working length measurement using Raypex 6:** The similar procedure was done as done for Dentaport except the recording of working length measurement technique in case of raypex was according to the the colour where blue indicated approaching the apex where as green to yellow section showing projection of apical constriction to apical foramen region relevant section to determine the working length and red beyond the apex. Also beeps sound when approaching the apex.

**Working length measurement using Propex pixi:** Here as the file is inserted the display shows a reading of 2.0 with blue colour and also a beep sound indicating the file is 2mm from the apex,so as the file approaches apical position i.e 0.0 the colour changes to yellow and also the beep sound increases indicating the apex. Thus estimating the working length.

**Working length measurement using I-Root:** The measurement was done by turning on the device and placing the lip clip in the oral cavity following placement of the file holder on to the file. The file is slowly inserted in the canal at this point the device starts to beep and as the file reaches around 0.5mm from the apex the intensity of the beep sound increases and also “APEX” is displayed on the device.

**RESULTS**

Statistical Analysis was done using PRISM 5.0 Software. Intra-group comparison was done using repeated measures one way ANOVA with post -hockey test and inter group comparision was done using Independent sample t test. When compared with Group I, Group V showed higher mean difference followed by Group III ,Group IV and Group II. The result in this
study showed no significant difference among the groups, indicating they were as good as the radiographic method.

**Discussion**

The present in vivo study was done to evaluate the efficacy of four electronic apex locators when compared with the radiographic working length measurement.

Nguyen et al in one of his study concluded that the Root ZX located the apical constriction even when the anatomic constriction was eliminated stating, the file size did not influence the accuracy of EALS.\(^7\) Whereas Herrera et al pointed out that the file size should be as close as possible to the apical diameter for the accuracy of the results.\(^8\) Thus Standardization of working length measurement was done by using the same file type and size, irrigant concentration and reference point to have comparable conditions.

Sodium hypochlorite was used as an irrigant for efficient cleaning of the canal before estimating the working length. A study reported that the presence of sodium hypochlorite did not influence the accuracy of EALS.\(^9\)

Intraoral Digital Radiography was incorporated in the study. It has been reported that there is 60% reduction of ionizing radiation in comparison with conventional radiography\(^10\) However, the working length measurement performed radiographically presents several limitations, namely radiation exposure, it is also time consuming and the image formed will be a two dimensional which is often overlapped with anatomic structures\(^11\) prompting a dentist to embrace electronic apex locator over radiography.

The EALS used in the present study had no significant difference when compared with the radiographic measurements. Dentaport ZX is a third generation EAL which is a frequency based EAL Which measures the impedance values in 2 frequencies 8 and 0.4 kHz, and hence calculates the quotient by ratio method. The latest version of root zx is Dentaport ZX, \(^12\) considering the total number of measurements obtained, Root ZX revealed more precise measurements as confirmed by a lower mean difference when compared with the value obtained through radiographic evaluation.

Raypex 6 is a fourth generation EAL which uses two separate frequencies. A significant disadvantage of the fourth generation apex locators is that they need to perform in relatively dry or partially dried canals. \(^13\)

In this study there was a mean difference of 0.55 when compared with radiographic method and also the reason may have been the presence of irrigants during the measurement which hindered the results.

The study also included, two Fifth generation apex locators which worked on dual frequency type and it is considered best in any root canal condition. In addition to calculating the root mean square (RMS) values of the electric signals. The RMS represents the energy of the electric signals, and therefore it is claimed to be less affected by electrical noises affecting other physical parameters.\(^14\) The Propex Pixi is a new EAL, and not many literatures are available to compare its working length accuracy with the present study. The results of the present study did demonstrate that it has a similar accuracy to Dentaport ZX. Where as I – root showed the highest difference when compared to all the methods.

There is no study in literature comparing the reproducibility of all the 4 groups of EALs used in this study, whilst Wrbas et al. 2007 compared two apex locators root zx and raypex 5 and concluded there was no significant difference.\(^15\) Similarly somma et al 2012 compared three EAL.\(^16\)

**Conclusion**

Under clinical conditions the tested Electronic apex locators had no significant differences statistically.

Within the limitations of this study, it is suggested that EALS were found to be depicting similar results as did the radiographic methods. However role of radiographs cannot be completely eliminated and has been advised to use this devices in conjunction with radiographs.

**Conflict of Interest:** No Conflict of Interest

**Ethical Clearance:** Taken

**Source of Funding:** Self

**REFERENCES**


A Cross Sectional Study to Assess Sociodemographic Profile and Sanitation Practices in a Rural Village in Western Maharashtra

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ABSTRACT

Introduction: Access to water supply and sanitation is a fundamental need and a human right. The effects of poor sanitation seep into every aspect of life including health, nutrition, development, economy, dignity and empowerment. So, the present study was carried out to assess sociodemographic profile and sanitation practices in rural area of Maharashtra.

Objectives: 1) To study sociodemographic profile of families in the village population 2) To assess sanitation practices among the families in the village population.

Material and Method: A Cross-sectional study was conducted in a village in western Maharashtra including household as Unit of study. Total 201 households were included in the study. Pre- tested semi-structured questionnaire was used for collection of data. The questionnaire consists of socio-demographic profile, water and sanitation practices in households. The data collection was done by interview and observation method.

Results: Data of 192 households was analysed with Microsoft Excel and Epi-Info Version 7 Software. Average family size was 5.4, total population was 1044 out of which 567 (54.31%) were males and 477 (45.68%) were females. There were 52.60% nuclear families and 47.4% joint families. Overcrowding was present in 32.29% of households. There were 146 (76%) households had tap water from Grampanchayat, 22 (11.45%) had dual water supply i.e. from tap water and well. 48 (25%) of households were carrying refuse disposal by collection van of Grampanchayat while 144 (75%) of households were doing refuse disposal by throwing indiscriminately. There were 184 (95.83%) of households had latrine facility among them, 146 (79.34%) were private while 38 (20.65%) were public latrines.

Conclusion: As the village is located near industrial area, better socio-economic development is seen in the area. There were 95 % households with either private or public toilets but still practices of open – air defecation is persistent in the village.

Keywords: Open–air Defecation, Sanitation, Household

Introduction

Environment is a basic need for all living beings. Protection of environment is vital for existence of life on the earth1. Access to water supply and sanitation is a fundamental need and a human right. It is vital for the dignity and health of all people 2. Sanitation includes, Safe disposal of human and animal excreta, safe storage and handling of drinking water, personal hygiene, safe disposal of waste water, safe disposal of solid waste, food hygiene.
Poor sanitation leads to various communicable diseases, high infant mortality, high under-five mortality rate and reduced resistance and immunity among children. The effects of poor sanitation seep into every aspect of life including health, nutrition, development, economy, dignity and empowerment.

A study by the World Bank says that absence of toilets and conventional sanitation cost India 6.4% of its GDP in 2006. The economic impact of poor sanitation for India is at least USD 38.5 billion every year under Health, Education, Access time and tourism.

The Prime Minister of India launched the Swachh Bharat Mission on 2nd October, 2014 to achieve Universal Sanitation coverage which includes Solid and Liquid Waste Management activities and making society Open Defecation Free (ODF), clean and sanitised. The practices of open-air defecation, improper solid and liquid waste disposal are persistent in rural areas.

So, the present study was conducted to assess sociodemographic profile and sanitation practices in rural area of Maharashtra.

Objectives

1. To study sociodemographic profile of families in the village population
2. To assess sanitation practices among the families in the village population

Material and Method

The present study was carried in the Urse Village, in Taluka Maval, District Pune. This village is near National Highway Four, Bangalore Mumbai express highway and 8 kilometres away from Talegaon (D), Pune.

This was a cross sectional study to find out sociodemographic profile and sanitation practices among study population.

Household as unit was selected as sample for the study. Families residing Urse village for more than 6 months were included in the study. Families who were residing in the village for less than six months were excluded from the study.

As per Census 2011 data, there were total 805 households in the village out of which 25% (201) households were selected by simple random sampling. Pre-tested semi-structured questionnaire was used for collection of data. The questionnaire consists of sociodemographic profile, water and sanitation practices in households. The data collection was done by interview and observation method. The interview was conducted for the person who was present at the time of interview in the household. Respondents were housewives in the reproductive age group. Interviewer introduced himself/herself to the respondent and explained the purpose of study. Informed written consent was taken from the respondent. Institutional Ethical Committee approval was taken for conduction of the study.

Results

The data collection was done for 201 households. For the purpose of analysis, total 192 households were included in the study. Nine were excluded from the analysis due to incomplete information. The analysis was done in Microsoft Excel and Epi-Info Version 7 Software.

Average family size was 5.4, total population was 1044 out of which 567 (54.31%) were males and 477 (45.68%) were females. The Sex ratio i.e. number of females per thousand males was found to be 841 per 1000 males.

There were 67.7% households living in Pakka house followed by 18% in Kaccha-Pakka house and 14% were living in Kaccha house. There were 52.60% nuclear families and 47.4% joint families. Overcrowding was present in 32.29% of households. As per Modified BG Prasad Socio-economic classification, 74% were in Class I and II, 19.27% in Class III followed by 6.6% in Class IV and V Socio-economic status. There were 52.6% were nuclear families and 47.4% were joint families.

In the housing condition, lighting and ventilation were adequate in 114 (59.37%) and 101 (52.6%) respectively. There were 107 (55.72%) mosquito breeding places and 81 (42.18%) rodents present in the households. Cattles in vicinity of households were 31.77 percent.

There were 152 (79.16%) households with separate kitchen with kitchen platform out of which 115 (75.65%) were having smoke outlet. Fuel for cooking was LPG among 110 (57.3%) households and 20 (10.4%) were using Chulha for cooking and 62 (32.3%) were using both LPG and Chulha for cooking.
There were 146 (76%) households had tap water from Grampanchayat, 22 (11.45%) had dual water supply i.e., from tap water and well and 24 (12.49%) households had water supply from well water. Almost in all households, drinking water was stored in clean containers with covering.

It was observed that 48 (25%) of households were carrying refuse disposal by collection van of Grampanchayat while 144 (75%) of households were doing refuse disposal by throwing indiscriminately. There were 184 (95.83%) of households had latrine facility among them, 146 (79.34%) were private while 38 (20.65%) were public latrines. Out of these 71 (38.58%) had continuous water supply in latrine.

Table 1: Relation of presence of latrine in household and use of latrine

<table>
<thead>
<tr>
<th>Presence of latrine</th>
<th>Use of latrine</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes</td>
</tr>
<tr>
<td>Yes</td>
<td>170</td>
</tr>
<tr>
<td>No</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>173</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Chi square value with Yates correction = 27.7776
p value = 0.0000014
P<0.05

This table shows the relation between presence of latrine and use of latrine. The findings were statistically significant with chi square test with p value <0.05. This means that, people from households were not using latrines inspite of presence of latrine. The practice of open-air defecation is still practiced in rural area.

Discussion

As per census data 2011', for Urse village, total households were 805 with population 3635 of which 1964 (54%) were males and 1671 (46%) were females. In the present study, 192 households were included with 54.3% were males and 45.68% were females. The findings are consistent with the distribution of population.

Sex ratio for the sample population was observed to be 841 per 1000 males comparatively less than Census data 2011, it was 892 per 1000 males. The reason may be composition of population studied.

There were 67.7% households living in Pakka house followed by 18% in Kaccha- Pakka house and 14% were living in Kaccha house. There were 52.60% nuclear families and 47.4% joint families. The findings are coherent with study conducted by Swaroop (N) et al² which shows 50% were nuclear families. The family structure of joint families is persistent in rural areas.

As per Modified BG Prasad Socio-economic classification, 74% were in class I and II, 19.27% in Class III followed by 6.6% in Class IV and V Socioeconomic status. The observations are consistent with Swaroop N Study ². The reason of higher socioeconomic status in the study population may be village is located near express highway and industrial area, more job opportunities and agricultural land.

In the present study, 76% of households had tap water supply and 11.45% had dual tap water and well water supply. As per NFHS4 survey for Maharashtra (Rural) area ⁸, drinking water facility was 85.6% with well water and tap water. The findings are consistent with Study carried out by Ravi Pachori ⁹. The biggest change has been increase in piped water supply over a period of time and reliance on surface water is reduced in villages. In the study conducted by Anjana Kuberan ⁴, 92% households were with piped water supply.

In the present study, 79.34% were with private and 20.65% were with public toilets. Total 184 (95.83%) sanitary toilets were present among the study population out of which 38.58% toilets were having continuous water supply in the toilets. As per NFHS 4 survey 44.2% sanitation facility available in rural Maharashtra. Study carried out by Ravi Pachori shows 72% were private and 4.6% were public toilets present. Study done by Anjana, 25% households were not having access to toilets. Study done by Swaroop, 72% were having the facility of toilets among which 62% were improved and 10% were public toilets. Toilets are built up in rural areas also with the Swachh Bharat Mission Scheme, Government of India but there is comparatively less utilization of toilets.

Conclusion

As the village is located near industrial area, better socio-economic development is seen in the area. There were 95% households with either private or public toilets but still practice of open-air defecation is persistent in the village.
**Recommendations:** Awareness and change in practices regarding use of toilets, hazards of open-air defecation, sanitation of household and village among rural people for betterment of quality of life.

**Conflict of Interest:** Nil

**Ethical Considerations:** Institutional Ethical Committee approval was obtained for conduction of the study.

**Source of Funding:** Nil

**Acknowledgement**

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**REFERENCES**


Antenatal Health Care Seeking Behavior & Health System Response–A Cross Sectional Community Based Study

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ABSTRACT

Introduction: Maternal and child health services have potentially critical role in improvement of reproductive and neonatal health thereby, reduce infant mortality rate (IMR). Delay in access to the health care involves problem in decision making and availability of health services. Health care seeking behavior (HCSb) is an important component of Health Systems Research (HSR) which is necessary for planning health policies. Aims and Objectives: To study (1) Antenatal HCSb of mothers. (2) Source of healthcare sought during antenatal period (3) Pattern of initiation of breast feeding among mothers. Methodology: This was a cross sectional community based study wherein, 1903 mothers of under 5 (U-5) were interviewed. Data were coded, analyzed using SPSS package, results expressed as rates and proportions. Predictors of HCSb was estimated by odds ratios (OR) calculation and 95% confidence intervals (CIs) and a P value of less than 0.05 was considered significant. Results: All mothers in study had at least one Antenatal Checkup (ANC). Most of the mothers, 1629 (85.6 %) were informed regarding importance of breastfeeding during ANC and 1668(87.6%) had at least one antenatal ultra-sonogram done. Private Health Care System (PHCS) was most preferred for delivery and 1884 (99%) were hospital delivery. 1693(88.9%) of mothers had breast fed their babies within first 2 hours of life and 376 (19.7%) gave pre lacteal feeds on day one. Conclusions: Large section of the society are still dependent on PHS for antenatal services. Realistic formulations of health policies are needed based on utilization of health care services.

Keywords: Antenatal health, care seeking, Heath system Response

Introduction

Maternal and child health services have potentially critical role in improvement of reproductive and neonatal health thereby reduce IMR. WHO estimates that seeking prompt and appropriate health care could reduce child deaths by 20%1. Health interview surveys appear to offer the best vehicle for analyzing care seeking behavior. Delay in access to health care involves problem in disease recognition, decision making and availability of health services2. Realistic formulation of health policies and programs requires inputs from Health System Research (HSR), which is scarce in our country3. Better understanding of Health Care Seeking Behavior (HCSB) is needed both in terms of utilization of different sources of care and expenses on treatment for optimization of health care delivery4. Maternal mortality and morbidity continue to be high despite the existence of national programs for improving maternal and child health in India5. This could be related to several factors, an important one being non-utilization or under-utilization of maternal health-care services, especially among the rural poor and urban slum population due to either lack of awareness or access to health-care services.

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DOI Number: 10.5958/0976-5506.2019.01256.7
Thus, the purpose of this study was to study mother’s antenatal and HCSB for under five (U-5) childhood illness and study the health system response in Public Health Care system (PHC) and private Health Care System (PHCS).

**Methodology**

This was a cross sectional survey conducted in all 5 taluks of Dakshina kannada district (IMR of 10.9). Target sample size of 1980 mothers of U-5 children were considered for the study. 66 clusters around anganwadis were randomly selected by cluster random sampling method. UNICEF multi-indicator survey questionnaire was adopted, modified, pretested and used. Health care workers were trained to administer the questionnaire to mothers of U-5 who volunteered for the survey. All data of family, antenatal care sought, symptoms and illness in child and care sought and expenditures in the past 1 month were recorded. Data were coded and analyzed using the SPSS package. Results were expressed as rates and proportions. Outcome variables were compared with sociodemographic characteristics of families. Predictors of care seeking behaviour were estimated by calculation of odds ratios (OR) and 95% confidence intervals (CIs) and a P value of less than 0.05 was considered significant.

**Results**

1903 mothers of U-5 children were recruited in the study. 917 (48.3%) were below Poverty line (BPL) card holders out of which 229(24.9%) had a monthly income of less than Rs.1000 and 437 (47.6%) had income of more than Rs.3000. 32(12.2%) of people with income less than Rs.1000 did not have BPL card. PHCS was most preferred for delivery and 1884 (99%) were hospital delivery (Table 1). Most mothers, 1629 (85.6 %) were informed regarding importance of breastfeeding during ANC and 1668 (87.6%) were hospital delivery (Table 1). Most mothers, 1629 (85.6 %) were informed regarding importance of breastfeeding during ANC and 1668 (87.6%) were antenatal ultra-sonogram done (Table 2 ). 1693(88.9%) of mothers breast fed their babies within first 2 hours of life and 376 (19.7%) gave pre lacteal feeds on day one. Out of 1903 surveyed, illness episode was reported in 431 (22.6%) children in past 1 month. Among them 299 (69.4%) had ARI, 64(14.8%) had ADD, 15(3.5%) had infectious diseases and 53(12.3%) had other diseases. When it came to Child health care PHCS was most common source of health care, 335(77.7%) as compared to PHS 75 (17.4%). There was no difference in most aspects of health care response in either systems (Table 3).

**Discussion**

Health seeking trends of mothers irrespective of sociodemoographic factors is a good indicator reflecting effective utilization of health care delivery system both PHCS and PHS. Most mothers had undergone ANC, ultrasonography and health services were available within short distances, indicating good accessibility to healthcare. Significant percentage of needy families with monthly income <Rs.1000 do not have BPL cards and are deprived of benefits, while 47.6 % of BPL cardholders came from higher income group availing benefits meant for, contributing to “impoverished care”. Majority of poorer mothers in society seek health from PHS, and significant number from PHCS. This underlines the need for healthcare provision strategies to take account of both sectors. There is “impoverished” care in spite of overall progress in the district. Poorer section of population is seeking health care from PHCS probably due to financial burden experienced at PHS coupled with loss of income for the day.

As there is no difference in most aspects of health care response in either systems, measures to reduce the expenditure for OPD services, timing of OPDs to suite daily wagers and ensuring constant drug supply at various levels of PHS would result in increasing utilization of PHS. However good HCSB in the community of the district is reflected by IMR (10.9). Hence it is not right to blame the community for deficiencies in the system. Data on personal health care expenditure should be useful for ascertaining the capacity of people to pay for medical services, thereby curtailing impoverished care. There are very few studies regarding HCSB in the community and this behavior is probably under-utilized by the policy makers.

**Conclusion**

Large section of the society are still dependent on PHS for antenatal services. Realistic formulations of health policies are needed based on utilization of health care services. Significant percentage of needy families with monthly income <Rs.1000 do not have BPL cards and are deprived of benefits, while 47.6 % of BPL cardholders came from higher income group availing benefits meant for BPL families, contributing to “impoverished care.”
Table 1: Preferred place of delivery among various income groups: (N = 1903)

<table>
<thead>
<tr>
<th></th>
<th>&lt; Rs1000</th>
<th>1001–3000</th>
<th>&gt;3000</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Govt. (PHS)</td>
<td>156 (59.5%)</td>
<td>221 (50.2%)</td>
<td>293 (24.4%)</td>
<td>670 (35.2%)</td>
</tr>
<tr>
<td>Private (PHCS)</td>
<td>101 (38.5%)</td>
<td>211 (48%)</td>
<td>902 (75.1%)</td>
<td>1214 (63.8%)</td>
</tr>
<tr>
<td>House</td>
<td>5 (1.9%)</td>
<td>8 (1.8%)</td>
<td>6 (0.5%)</td>
<td>19 (1%)</td>
</tr>
<tr>
<td>Total</td>
<td>262 (100%)</td>
<td>440 (100%)</td>
<td>1201 (100%)</td>
<td>1903 (100%)</td>
</tr>
</tbody>
</table>

X2 = 214.303 p<0.001 vhs

Table 2: Number of ultrasound done in various income groups. (N = 1668)

<table>
<thead>
<tr>
<th>Number of USG done</th>
<th>INCOME</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>&lt;1000</td>
<td>1000–3000</td>
<td>&gt;3000</td>
<td>Total</td>
</tr>
<tr>
<td>1</td>
<td>118(55.9%)</td>
<td>149(37.5%)</td>
<td>401(37.8%)</td>
<td>668(40%)</td>
</tr>
<tr>
<td>2</td>
<td>73(34.6%)</td>
<td>212(53.4%)</td>
<td>518(48.9%)</td>
<td>803(48.15)</td>
</tr>
<tr>
<td>3</td>
<td>13(6.2%)</td>
<td>29(7.3%)</td>
<td>118(11.1%)</td>
<td>160(9.6%)</td>
</tr>
<tr>
<td>&gt;4</td>
<td>7(3.3%)</td>
<td>7(1.8%)</td>
<td>23(2.2%)</td>
<td>37(2.2%)</td>
</tr>
<tr>
<td>Total</td>
<td>211 (100%)</td>
<td>397(100%)</td>
<td>1060(100%)</td>
<td>1668(100%)</td>
</tr>
</tbody>
</table>

a X2 = 35.553 p<0.001 vhs

Table 3: Health care response in Public and private health care system

<table>
<thead>
<tr>
<th></th>
<th>Govt. (PHS) N = 75</th>
<th>Private (PHCS) N = 335</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>History taken</td>
<td>72 (96%)</td>
<td>322 (96.1%)</td>
<td>1 ns</td>
</tr>
<tr>
<td>Examination done</td>
<td>71 (94.6%)</td>
<td>311 (92.8%)</td>
<td>0.697 ns</td>
</tr>
<tr>
<td>Investigations done</td>
<td>21 (28%)</td>
<td>60 (17.9%)</td>
<td>0.101 ns</td>
</tr>
<tr>
<td>Injection given</td>
<td>22 (29.3%)</td>
<td>69 (20.5%)</td>
<td>0.212 ns</td>
</tr>
<tr>
<td>Medicine given</td>
<td>69 (92%)</td>
<td>245 (73.1%)</td>
<td>0.03 hs</td>
</tr>
<tr>
<td>Prescription given</td>
<td>27 (36%)</td>
<td>233 (73.0%)</td>
<td>&lt;0.001 hs</td>
</tr>
<tr>
<td>Referral</td>
<td>0 (0%)</td>
<td>7 (22%)</td>
<td>0.208 ns</td>
</tr>
</tbody>
</table>

Ethical Clearance: Institutional ethics committee

Source of Funding: Self

Conflict of Interest: Nil

REFERENCES


Validation of Newly Developed and Simplified Scoring Methods of Hirsuitism

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¹Department of Obstetrics & Gynecology, Sri Ramachandra Institute of Higher Education & Research (Deemed to be University), Porur, Chennai, India

ABSTRACT

A multiple linear regression model was used to evaluate body areas and their combinations to find which subset could serve as a best predictor of the full modified Ferriman Gallwey score. Among the selected five reliable areas namely upper lip, chin, chest, lower abdomen and thighs, combinations were obtained to further reduce the number of areas. A total score of seven in the upper lip, chin, lower abdomen and thigh is better area to evaluate hirsutism than using three areas upper lip, abdomen and thigh with the total score area of eight though reducing the scoring areas to three areas is less cumbersome. In this study we showed that the number of areas used for examination of hirsutism scoring is reduced to four areas, compliance of the patients will be good and this method can be applied for epidemiological studies.

Keywords: Hirsutism; Ferriman Gallwey scoring system; polycystic ovary syndrome (PCOS)

Introduction

Hirsutism is dermatological condition arise due to growth of male pattern of terminal hair in women¹. Unfortunately majority of women with hirsutism still believed this abnormality is primarily due to cosmetic disturbance and frequently seek help from a beautician, or cosmetologist rather a gynecologist². In order to diagnose and to follow up patients, study required quantification of hair growth¹, and then it becomes important to have reference range to define the regions yielding the best discrimination for distribution of hair in normal and hirsute women. In 1961 Ferriman and Gallaway was the first to develop a scoring system. It as the subjective tabulation of terminal hair growth on body parts³. This involves the scoring of eleven body areas including the lip, chin, chest, upper abdomen, lower abdomen, forearm, upper arm, thigh, lower leg, upper back, and lower back.

Ferriman Gallwey scoring system was later modified and used as very common method for scoring the terminal hair growth in the extent of body and facial⁴. This modified system involves only nine areas excluded of forearm and lower leg as these two areas do not get affected with androgen excess. A score of more than eight points is regarded as the cutoff value in original score system but later Ferriman modified cutoff score to five or more when defining hirsutism⁶. Later it was Knochenhauer modified it again and the score higher than six as the diagnostic criteria was set up⁷.

As previous scoring system require full body examination though makes patients feel uncomfortable most of time there is requirement to simplify this scoring system⁶. Considering the potential significance of hirsutism, this study was undertaken to deserve a simpler, less invasive and more widely applicable scoring system for hirsutism. Study assess whether the extent of hair growth in a specific body part can provide more simpler predictor of total body hirsutism and to derive a simpler method of scoring system in evaluation of hirsutism.

Materials and Method

Ethical Consideration: This study was conducted from November 2013 to October 2015 after approval from Sri
Ramachandra University Ethics Committee approval and after informed consent from the patient. The Sampling method is done by simple random sampling of a sample size, three hundred and seventy nine patients. The sample size was derived on the basis of statistical analysis (Figure 1).

**Subjects and Selection Criteria:** Patients with evidence of hirsutism without parlor activity were included in the study. Those with recent parlor activity, premenarchal, postmenopausal, patients who had gone under hysterectomy or bilateral oophorectomy prior to this study, or otherwise were on hormonal treatment for three months at least, were excluded from the study.

**Clinical Examination:** Scoring system includes the eleven areas as described earlier and each body area was evaluated virtually on scales which have a score of zero indicating no terminal hair growth, and a score of four indicating full male pattern terminal hair growth.

**Developing New Simplified Scoring System:** All examination was performed by a medical preactioner and data were recorded in SPSS 16.0 version, prospectively. Unpaired t-test was used to find the significant difference in Independent groups between the bivariate samples. A multiple linear regression model evaluated the all body areas used for scoring system and their combinations to find a better subset as a best interpreter of the modified Ferriman Gallwey score. The under influenced variable were eliminated step wise by backward elimination method and regression analysis was done for complete scores of six, seven, and eight. Specificity, Sensitivity, positive and negative predictive valve was calculated. Number of combinations possible with eleven variables will be two thousand and forty six. Eleven single areas, fifty five combination of two areas, hundred and sixty five combination of three areas, three hundred and thirty combination using four areas, four hundred and sixty two combinations with five areas, four hundred and sixty two combinations with six areas, three hundred combinations with seven areas, hundred and sixty five combinations with eight areas, fifty five combinations with nine areas, eleven combinations with ten areas. By backward elimination method, multiple regression analysis was generated by SPSS software. Variables entered in the first set of regression analysis were all eleven areas for which criteria set up by the software for this statistical analysis is \( \geq 0.1 \). By backward elimination method, the under influenced variable is eliminated one by one.

**Findings**

**Anthropometric and Demographic Variables:** Present work had 347 women patients enrolled in the study with minimum age of 18 years and maximum age group of 41, mean age was 26.5 years. More than 80% were aged below 35 years (Figure 2).

![Figure 1: Derived the sample size of 347 derivations by multiple linear regressions](image1)

![Figure 2: The age distribution of the study population](image2)
Clinical Diagnosis and Family History: Among participants, 283 (81.6%) were married and rest unmarried. 50.1% were nulliparous, and 49.9% were multiparous ranging children up to four (Figure 3). Body mass indexed indicates people were equally distributed in three categories normal (31.4%, 109), over weight (36.9%, 128) and obese (31.7%, 110).

Figure 3: Parity Distribution of Population

History of Hirsutism: Total number of study participants who had history of hirsutism were fifty six and total number of participants who came for other complaints than hirsutism were two hundred and ninety one. Out of which two hundred and eighty study people had hirsutism. Six out of those who had hirsutism complaints were not included under present cut off value of total score of 7 in the three body areas. Eleven out of the other presenting complaints did not fit into the cut off value and were not considered as having hirsutism.

Evaluation of New Simplified Scoring System: By backward elimination with a criteria of >=0.1 each area were further reduced done. The final result obtained is with a cut off score of 6, 7, and 8 for three variable three combinations and four combinations were obtained. Using backward elimination, F7 for (Upper lip, chin, lower abdomen and thigh) has an R VALUE of 0.706 and R SQUARE value of 0.495. The formula derived out of these 4 areas is upper lip x 0.15 +chin x 0.32 + lower abdomen x 0.178 +thigh x 0.146 – 0.172 which is equal to the total Ferriman Gallwey scoring.

Table 4 shows the presence of hirsutism for a cut off value of seven in the four areas in patients with and without history of hirsutism. Using backward elimination, a cut off value of F8 has R VALUE of 0.608 and R SQUARE value of 0.495. The formula derived out of these 3 area is upper lip x0.9 + lower lip x 0.9 +lower abdomen x 0.28+ thigh x 0.118- 0.112 which is equal to the total Ferriman Gallwey scoring. Present study compare the R values of the combination of four areas (chin, upper lip, lower abdomen and thigh which is R VALUE = 0.706 and R SQUARE = 0.495 has a better R value than upper lip, lower abdomen and thigh which is R VALUE –0.608 and R SQUARE – 0.369.

Table 1: Different models used in this study and their variables: At each model the numbers of body areas were further reduced and ability of new developed model was evaluated as scoring system

<table>
<thead>
<tr>
<th>Model</th>
<th>Variables entered</th>
<th>Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>upper lip, chin, chest, upper back, lower back, upper abdomen, lower abdomen, upper limb, forearm, thigh, legs.</td>
<td>Backward (criterion: Probability to remove &gt;=.100).</td>
</tr>
<tr>
<td>2</td>
<td>upper lip, chin, chest, upper back, lower back, upper abdomen, lower abdomen, upper limb, thigh.</td>
<td>Backward (criterion: Probability to remove &gt;=.100).</td>
</tr>
<tr>
<td>3</td>
<td>Upper lip, chin, chest, lower back, upper abdomen, lower abdomen, upper limb, thigh.</td>
<td>Backward (criterion: Probability to remove &gt;=.100).</td>
</tr>
<tr>
<td>4</td>
<td>Upper lip, chin, chest, upper abdomen, lower abdomen, thigh.</td>
<td>Backward (criterion: Probability to remove &gt;=.100).</td>
</tr>
</tbody>
</table>

Table 2: R square value of different model of this study: the different model were compared

<table>
<thead>
<tr>
<th>Model 1</th>
<th>Unstandardized coefficients</th>
<th>Standardized Coefficients</th>
<th>Sig.</th>
<th>95.0% Confidence Interval</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B</td>
<td>Std. Error</td>
<td>Beta</td>
<td>t</td>
</tr>
<tr>
<td>(Constant)</td>
<td>-0.073</td>
<td>0.018</td>
<td>-4.12</td>
<td>0</td>
</tr>
<tr>
<td>Upper Lip</td>
<td>0.243</td>
<td>0.042</td>
<td>0.717</td>
<td>5.771</td>
</tr>
<tr>
<td>Chin</td>
<td>0.063</td>
<td>0.035</td>
<td>0.19</td>
<td>1.802</td>
</tr>
</tbody>
</table>
Conted…

<table>
<thead>
<tr>
<th>Body Part</th>
<th>Beta</th>
<th>In</th>
<th>t</th>
<th>Sig.</th>
<th>Partial Correlation</th>
<th>Collinearity Statistics</th>
<th>Tolerance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chest</td>
<td>0.225</td>
<td>0.042</td>
<td>0.314</td>
<td>5.314</td>
<td>0</td>
<td>0.141</td>
<td>0.308</td>
</tr>
<tr>
<td>Upper Back</td>
<td>0.142</td>
<td>0.034</td>
<td>0.466</td>
<td>4.246</td>
<td>0</td>
<td>0.076</td>
<td>0.208</td>
</tr>
<tr>
<td>Lower Back</td>
<td>0.123</td>
<td>0.048</td>
<td>0.158</td>
<td>2.57</td>
<td>0.01</td>
<td>0.029</td>
<td>0.216</td>
</tr>
<tr>
<td>Upper Abdomen</td>
<td>0.117</td>
<td>0.038</td>
<td>0.203</td>
<td>3.075</td>
<td>0</td>
<td>0.042</td>
<td>0.192</td>
</tr>
<tr>
<td>Lower Abdomen</td>
<td>0.204</td>
<td>0.033</td>
<td>0.41</td>
<td>6.196</td>
<td>0</td>
<td>0.139</td>
<td>0.269</td>
</tr>
<tr>
<td>Upper Limb</td>
<td>0.165</td>
<td>0.041</td>
<td>0.32</td>
<td>4.072</td>
<td>0</td>
<td>0.086</td>
<td>0.245</td>
</tr>
<tr>
<td>Forearm</td>
<td>0.243</td>
<td>0.032</td>
<td>0.517</td>
<td>3.771</td>
<td>0</td>
<td>0.14</td>
<td>0.226</td>
</tr>
<tr>
<td>Thigh</td>
<td>-0.078</td>
<td>0.018</td>
<td>-1.592</td>
<td>-4.25</td>
<td>0.011</td>
<td>-0.115</td>
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</tr>
</tbody>
</table>

Model 2

<table>
<thead>
<tr>
<th>Body Part</th>
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<th>In</th>
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<th>Sig.</th>
<th>Partial Correlation</th>
<th>Collinearity Statistics</th>
<th>Tolerance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upper Lip</td>
<td>-0.059</td>
<td>0.015</td>
<td>-3.92</td>
<td>0</td>
<td>-0.089</td>
<td>-0.029</td>
<td>0.214</td>
</tr>
<tr>
<td>Chin</td>
<td>0.148</td>
<td>0.034</td>
<td>0.571</td>
<td>4.362</td>
<td>0</td>
<td>0.081</td>
<td>0.214</td>
</tr>
<tr>
<td>Chest</td>
<td>-0.085</td>
<td>0.051</td>
<td>-0.178</td>
<td>-1.66</td>
<td>0.1</td>
<td>-0.186</td>
<td>0.016</td>
</tr>
<tr>
<td>Upper Back</td>
<td>0.064</td>
<td>0.033</td>
<td>0.118</td>
<td>1.941</td>
<td>0.05</td>
<td>-0.001</td>
<td>0.13</td>
</tr>
<tr>
<td>Lower Back</td>
<td>0.063</td>
<td>0.027</td>
<td>0.272</td>
<td>2.369</td>
<td>0.02</td>
<td>0.011</td>
<td>0.116</td>
</tr>
<tr>
<td>Upper Abdomen</td>
<td>0.149</td>
<td>0.03</td>
<td>0.34</td>
<td>4.902</td>
<td>0</td>
<td>0.089</td>
<td>0.209</td>
</tr>
<tr>
<td>Lower Abdomen</td>
<td>0.115</td>
<td>0.027</td>
<td>0.301</td>
<td>4.252</td>
<td>0</td>
<td>0.062</td>
<td>0.168</td>
</tr>
<tr>
<td>Upper Limb</td>
<td>0.13</td>
<td>0.035</td>
<td>0.328</td>
<td>3.714</td>
<td>0</td>
<td>0.061</td>
<td>0.198</td>
</tr>
<tr>
<td>Thigh</td>
<td>-0.027</td>
<td>0.014</td>
<td>-0.712</td>
<td>-1.98</td>
<td>0.05</td>
<td>-0.053</td>
<td>0</td>
</tr>
</tbody>
</table>

Model 3

<table>
<thead>
<tr>
<th>Body Part</th>
<th>Beta</th>
<th>In</th>
<th>t</th>
<th>Sig.</th>
<th>Partial Correlation</th>
<th>Collinearity Statistics</th>
<th>Tolerance</th>
</tr>
</thead>
<tbody>
<tr>
<td>UPPER LIP</td>
<td>0.071</td>
<td>0.027</td>
<td>0.338</td>
<td>2.594</td>
<td>0.01</td>
<td>0.017</td>
<td>0.125</td>
</tr>
<tr>
<td>Chin</td>
<td>0.045</td>
<td>0.024</td>
<td>0.218</td>
<td>1.85</td>
<td>0.07</td>
<td>-0.003</td>
<td>0.093</td>
</tr>
<tr>
<td>Chest</td>
<td>0.045</td>
<td>0.03</td>
<td>0.101</td>
<td>1.59</td>
<td>0.13</td>
<td>-0.014</td>
<td>0.103</td>
</tr>
<tr>
<td>Upper Abdomen</td>
<td>0.134</td>
<td>0.026</td>
<td>0.376</td>
<td>5.096</td>
<td>0</td>
<td>0.082</td>
<td>0.186</td>
</tr>
<tr>
<td>Lower Abdomen</td>
<td>0.056</td>
<td>0.022</td>
<td>0.183</td>
<td>2.58</td>
<td>0.01</td>
<td>0.013</td>
<td>0.099</td>
</tr>
<tr>
<td>Lower Back</td>
<td>0.038</td>
<td>0.028</td>
<td>0.117</td>
<td>1.338</td>
<td>0.18</td>
<td>-0.018</td>
<td>0.093</td>
</tr>
<tr>
<td>Thigh</td>
<td>-0.019</td>
<td>0.008</td>
<td>-0.628</td>
<td>-2.27</td>
<td>0.02</td>
<td>-0.036</td>
<td>-0.003</td>
</tr>
</tbody>
</table>

Model 4

<table>
<thead>
<tr>
<th>Body Part</th>
<th>Beta</th>
<th>In</th>
<th>t</th>
<th>Sig.</th>
<th>Partial Correlation</th>
<th>Collinearity Statistics</th>
<th>Tolerance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Upper Lip</td>
<td>0.06</td>
<td>0.026</td>
<td>0.286</td>
<td>2.294</td>
<td>0.02</td>
<td>0.009</td>
<td>0.111</td>
</tr>
<tr>
<td>Chin</td>
<td>0.034</td>
<td>0.023</td>
<td>0.165</td>
<td>1.856</td>
<td>0.14</td>
<td>-0.011</td>
<td>0.079</td>
</tr>
<tr>
<td>Chest</td>
<td>0.04</td>
<td>0.03</td>
<td>0.09</td>
<td>1.354</td>
<td>0.18</td>
<td>-0.018</td>
<td>0.098</td>
</tr>
<tr>
<td>Upper Abdomen</td>
<td>0.126</td>
<td>0.026</td>
<td>0.354</td>
<td>4.917</td>
<td>0</td>
<td>0.076</td>
<td>0.177</td>
</tr>
<tr>
<td>Lower Abdomen</td>
<td>0.048</td>
<td>0.021</td>
<td>0.155</td>
<td>2.287</td>
<td>0.02</td>
<td>0.007</td>
<td>0.089</td>
</tr>
<tr>
<td>Thigh</td>
<td>-0.012</td>
<td>0.007</td>
<td>-0.397</td>
<td>-1.83</td>
<td>0.07</td>
<td>-0.025</td>
<td>0.001</td>
</tr>
</tbody>
</table>

based on “R” value and the most significant body areas were identified

Table 3: The equation generated out of the coefficient table for all models: the excluded body parts in each model

<table>
<thead>
<tr>
<th>Model 1</th>
<th>Beta</th>
<th>In</th>
<th>t</th>
<th>Sig.</th>
<th>Partial Correlation</th>
<th>Collinearity Statistics</th>
<th>Tolerance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Forearm</td>
<td>-0.028</td>
<td>-0.196</td>
<td>0.845</td>
<td>-0.011</td>
<td></td>
<td>0.083</td>
<td></td>
</tr>
<tr>
<td>Legs</td>
<td>0.025</td>
<td>0.196</td>
<td>0.845</td>
<td>0.011</td>
<td></td>
<td>0.106</td>
<td></td>
</tr>
</tbody>
</table>
Conted…

<table>
<thead>
<tr>
<th>Model 2</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Upper Back</td>
<td>0.018d</td>
<td>0.277</td>
<td>0.782</td>
<td>0.015</td>
<td>0.441</td>
</tr>
<tr>
<td>Upper Limb</td>
<td>0.059d</td>
<td>0.511</td>
<td>0.61</td>
<td>0.028</td>
<td>0.133</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Model 3</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Lower Back</td>
<td>0.117</td>
<td>1.338</td>
<td>0.182</td>
<td>0.028</td>
<td>0.133</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Model 4</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Upper Abdomen</td>
<td>0.107</td>
<td>1.031</td>
<td>0.142</td>
<td>0.018</td>
<td>0.113</td>
</tr>
</tbody>
</table>

Table 4: The presence of hirsutism for a cut off value: Evaluation of newly developed scoring system with only five areas

<table>
<thead>
<tr>
<th></th>
<th>F7</th>
<th></th>
<th>Hirsutism Present</th>
<th>Hirsutism Absent</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>H/O Hirsutism +</td>
<td>50</td>
<td>280</td>
<td>330</td>
</tr>
<tr>
<td></td>
<td>H/O Hirsutism -</td>
<td>6</td>
<td>11</td>
<td>17</td>
</tr>
<tr>
<td>Total</td>
<td>56</td>
<td>291</td>
<td>347</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>F8</th>
<th></th>
<th>Hirsutism Presence</th>
<th>Hirsutism Absence</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>H/O Hirsutism +</td>
<td>50</td>
<td>280</td>
<td>330</td>
</tr>
<tr>
<td></td>
<td>H/O Hirsutism -</td>
<td>6</td>
<td>11</td>
<td>17</td>
</tr>
<tr>
<td>Total</td>
<td>56</td>
<td>291</td>
<td>347</td>
<td></td>
</tr>
</tbody>
</table>

**Conclusion**

In present study entire three hundred and forty seven patients had PCOS diagnosed by Rotterdam’s criteria and all of the patient had a scan picture of polycystic ovary syndrome, which is similar in studies conducted by Meifong et al\(^8\) with eight hundred and fifty study participants, DeUgarte et al\(^9\) had forty eight percentage of their study group with hirsutism had polycystic ovary syndrome. Azziz et al\(^2\) and William et al\(^10\) had eighty five percentage of polycystic ovary syndrome in their study on grading hirsutism. The single most reliable predictor of hirsutism was lower abdomen, upper lip and thigh but their correlation coefficient is low and hence cannot be used for large population epidemiological study. Among the three areas for predictor of hirsutism, upper lip, chin, thigh or upper lip chin and lower abdomen is equally reliable predictable. By computing the area under the curve either four areas with F7 or three areas with F8 score, both has the same sensitivity of 71.4%, specificity of 5%, positive predictive value of 4.6%, accuracy of 38%. It most important to note that in contrast to the higher degree of sensitivity and the PPV of this screening method was relatively low. Knochenhauser\(^7\) had a positive predictive value of fifty eight percentages and heather et al had 92.5%. By computing the area under the curve in present study, either four areas with F7 or three areas with F8 score, both has the same sensitivity of 71.4%, specificity of 5%, positive predictive value of 4.6%, accuracy of 38%.

The number of areas used for examination of hirsutism scoring was reduced to four areas, compliance of the patients will be good and this method can be applied for epidemiological studies\(^11\). Examination of four areas for the diagnosis of hirsutism with cut off score of greater than seven is a better predictor of hirsutism than the modified Ferriman Gallwey scoring\(^12\). This study discovered that while assessing unselected population a confirmatory full body scoring to be done. The new scoring system can be beneficial in inhabitants with high incidence of hirsutism, the predictive value is higher compared to population with lower prevalence of hirsutism. This study will help to consider the hirsutism prevalence impact in such population while evaluating the predictive ability of the new screening method.

**Source of Funding:** Self

**Conflict of Interest:** Nil

**References**


Comparison of Marginal Discrepancy between Simulated Crowns Cast with Imported and Indigenous Alloy—An in Vitro Analysis

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ABSTRACT

Various factors are responsible for the success of a Ni-Cr prosthesis. Marginal fit or Integrity is one. The close adaptation of the margin of the prosthesis with the finish line of preparation leads to good Marginal Integrity

This study compares the marginal integrity between an imported Ni-Cr alloy and an indigenous Ni-Cr alloy.

There is no significant difference in mean values of vertical marginal opening between Indigenously and Imported alloy at “As-cast-fit” stage.

The mean value of vertical marginal openings of both alloys after opaque, Body-enamel and Glaze firings are comparable (No significant difference).

Keywords: Marginal Integrity, Marginal Fit, Metal Ceramic Restoration

Introduction

The metal-ceramic restoration was introduced to the dental profession in 1956, and since that time it has become one of the most widely used restoration in dentistry¹. Scientific studies and clinical practice have led to improvements in materials and techniques that have resulted in restorations of greater strength with esthetic qualities which were impossible to achieve previously. But one problem that persisted over these years is the achievement of excellent marginal adaptation of metal-ceramic restorations.

It has been widely observed that the “as-cast” fit of metal ceramic restorations deteriorates during the high temperature firing cycles employed for porcelain veneer application². Many investigators have indicated that firing shrinkage (12 - 15%) of the porcelain is largely responsible for distortion and loss of fit is associated with high temperature firing cycling of the metals.

Regardless of the specific factor involved, the common denominator is elevated temperature. It, therefore follows that, the higher the melting temperature of ceramic alloy, the more resistant it must be to temperature-related distortion.

At present, Ni-Cr alloys have received much attention in fixed prosthodontic procedures as they exhibit wide range of physical and mechanical properties, like, high yield strength, moduli of elasticity and porcelain-to-metal bond strength. However, the properties vary with alloy type and fabrication details.

Recently, a type of Ni-Cr alloy has been developed and manufactured indigenously by NFTDC (Non Ferrous materials Technology Development Centre), Hyderabad, the properties of which have not been studied so far.

Hence, the present study was taken up to compare the vertical marginal discrepancy that occurs at “As cast fit” stage and during each porcelain firing cycle, between
the already existing, imported (Kulzer Ni-Cr) alloy and the indigenously made Ni-Cr metal alloy by NFTDC (Non Ferrous materials Technology Development Centre), Hyderabad.

**Materials and Method**

The purpose of this study is to compare the vertical marginal adaptability between foreign made alloy Kulzer (Ni-Cr) and indigenous alloy (Ni-Cr alloy) manufactured by NFTDC (Non Ferrous materials Technology Development Centre) Hyderabad. The test samples twenty in number were divided into two groups of ten each.

**Test for Marginal Adaptation:** Test for marginal discrepancy was done at 4 stages by an optical microscope on four predetermined locations which were earlier marked.

1. “As cast fit” stage
2. After opaque firing stage
3. After body and Enamel firing stage
4. Glaze firing stage

The porcelain that was used for opaque, body and enamel is vita

**Results**

**Table 1: Mean, Standard Deviation and test of significance of mean values between Indigenous alloy NFTDC (Non-Ferrous materials technology development centre) and Kulzer Alloy. Students independent t-test was used to calculate the p-value.**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean ± S.D. Group I</th>
<th>Mean ± S.D. Group II</th>
<th>P- value*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Opaque</td>
<td>36.85 ± 5.22</td>
<td>36.27 ± 5.38</td>
<td>0.81 (NS)</td>
</tr>
<tr>
<td>Enamel</td>
<td>46.85 ± 4.99</td>
<td>47.52 ± 6.06</td>
<td>0.79 (NS)</td>
</tr>
<tr>
<td>Glaze</td>
<td>50.71 ± 2.92</td>
<td>51.18 ± 3.14</td>
<td>0.73 (NS)</td>
</tr>
</tbody>
</table>

*Student’s independent t-test was used to calculate the p-value.

Group - I (Kulzer)

Group - II (Indigenous)

Statistical analysis by student’s independent t-test showed that there in no significant difference in mean values between Group I and Group II as for as Opaque, Enamel and Glaze are concerned (P>0.05).

**Table 2: Results of student’s paired t-test to test for the significance of change between two stages in Group I (Imported Alloy)**

<table>
<thead>
<tr>
<th>Stage</th>
<th>Mean ± S.D</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Opaque</td>
<td>36.85 ± 5.22</td>
<td>&lt; 0.0001 (Sig)</td>
</tr>
<tr>
<td>Enamel</td>
<td>46.85 ± 4.99</td>
<td>0.003 (Sig)</td>
</tr>
<tr>
<td>Change</td>
<td>10.00 ± 2.00</td>
<td></td>
</tr>
<tr>
<td>Glaze</td>
<td>50.57 ± 2.92</td>
<td></td>
</tr>
<tr>
<td>Change</td>
<td>3.86 ± 3.06</td>
<td></td>
</tr>
</tbody>
</table>

Statistical analysis showed that there is significant differences between the Mean ± S.D values (Table 3)

**Table 3: Results of student’s paired t-test to test for the Significance of change between two stages in Group II (Indigenous Alloy)**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean ± S.D.</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Opaque</td>
<td>36.27 ± 5.38</td>
<td>&lt; 0.0001 (Sig)</td>
</tr>
<tr>
<td>Enamel</td>
<td>47.52 ± 6.06</td>
<td>0.008 (Sig)</td>
</tr>
<tr>
<td>Change</td>
<td>11.26 ± 3.57</td>
<td></td>
</tr>
<tr>
<td>Glaze</td>
<td>51.18 ± 3.14</td>
<td></td>
</tr>
<tr>
<td>Change</td>
<td>3.66 ± 3.45</td>
<td></td>
</tr>
</tbody>
</table>

Statistical analysis showed that there is significant difference between Mean ± S.D values. (Table 4)
Table 5: Comparison of mean changes between Group I and Group II. (Between Imported Alloy and Indigenous Alloy) By Student’s independent t-test

<table>
<thead>
<tr>
<th>Change 1</th>
<th>Mean ± S.D.</th>
<th>Group I</th>
<th>Mean ± S.D.</th>
<th>Group II</th>
<th>p-value *</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Opaque to Enamel)</td>
<td>10.00 ± 2.00</td>
<td>11.26 ± 3.57</td>
<td>0.35 (NS)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Change 2</td>
<td>3.86 ± 3.06</td>
<td>3.66 ± 3.45</td>
<td>0.90 (NS)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Statistical analysis by student’s independent t-test showed that there is no significant difference in mean changes between Group I and Group II.

Discussion

The concept of porcelain – fused to – metal restorations dates back to nineteenth century. Since that time, these restorations have gained much importance in the field of fixed prosthodontics. The metal-ceramic restorations combine the property of strength and accuracy of cast metal, with esthetic appearance of porcelain. However, these restorations have not produced excellent marginal adaptation as full metal cast restorations. Literature has documented several factors responsible for these marginal discrepancies.

Many investigators have indicated that firing shrinkage of the porcelain is largely responsible for the distortion.

An absolute requirement for fabrication of the metal ceramic restoration with minimal marginal discrepancy is that the metal coping must not melt when porcelain is fused to it.

With the development of improved investment material (which can withstand high temperature and produce sufficient expansion of the mold) and reliable casting technique for producing dental castings, many alloys have been developed to fabricate metal-ceramic restorations with very minimal but clinically acceptable marginal discrepancy

At present, high-fusing alloys (base metal alloys) have gained considerable interest, Ni-Cr alloys being the most common. These alloys have high melting temperature and therefore exhibit resistance to temperature related distortion during high temperature porcelain firing cycles.

Statistical Analysis was Done to

1. Compare the Mean, Standard Deviation and Test of Significance of mean values of marginal...
discrepancy between the simulated crowns cast with Imported (Kulzer) Alloy and Indigenous alloy, at “as cast-fit” stage.

The mean and standard deviation values for imported alloy crown and indigenous alloy crown are found to be 25.98 ± 2.17 and 25.42 ± 2.09 respectively. Suggesting, no significant difference of marginal opening between the crowns of two alloys at “as cast-fit” stage (p value obtained 0.56 ; p ≤ 0.05 was considered as the level of significance) (Table – 1)

From this study, it was found that, there was a minor difference in the marginal discrepancies (0.56 mm) between the two alloys. This could be due to compositional variations between the alloys as other parameters are kept constant during the study.

Elements like Chromium, Beryllium and Silicon have influence on the castability of alloy and even on marginal adaptation. Presence of chromium in alloy over 30% causes difficulty in casting. Imported alloy has 23.8% of chromium where as indigenous alloy has about 12.70%, the slight increase in marginal discrepancy of imported alloy over indigenous alloy might be due to presence of increased amount of chromium in imported alloy.

Presence of Beryllium in 1-2% in an alloy decreases the melting point the 100ºC, thereby increases the castability. Indigenous alloy has about 1.95% of Beryllium, where as, imported alloy was without Beryllium. This could also be the other reason for increased in marginal adaptation of indigenous alloy.

2. Compare the Mean, Standard Deviation and Test of Significance of mean values of marginal discrepancy between the simulated crowns of Imported Alloy and Indigenous Alloy after opaque, enamel-body and glaze firing.

After firing cycles (opaque, body-enamel and glaze firing) there was no significant differences in the marginal openings between the crowns cast with two alloys.

The mean marginal openings in crowns of imported alloy during opaque, body enamel and glaze was found to be 36.8mm, 46.85mm and 50.71mm respectively. Similarly, for indigenous alloy crowns it was 36.27mm, 47.52 mm and 51.8mm indicating no significant difference between the values. (Table – 2)

From this study it was determined that there is similar increase in marginal opening in both the alloys from ‘as cast fit’ stage to the end of opaque firing, (10.82 mm for imported alloy and 10.85 mm for indigenous alloy). This increase in marginal opening may be due to high fusion temperature required for opaque material and also might be due to release of residual stresses that resulted from casting and polishing process during the first firing cycle. Likewise, there is also considerable increase in marginal opening after body enamel firing (10mm for imported alloy and 11.26 mm for indigenous alloy). Gemalmaz et al suggested that the increase in marginal opening after body enamel firing might be due to porcelain contamination on the inner surface of the crowns. However, at the end of glaze firing. Both the alloys have shown less increase in marginal opening. 3.86 mm for imported alloy and 3.66 mm for indigenous alloy. The reason for less increase at the end of glaze firing may be due to release of all residual stresses during earlier firing cycles.

3. Compare the mean changes between marginal openings of simulated crowns cast with imported alloy and Indigenous alloy at two stages

- Opaque to enamel firing and
- Enamel to glaze firing

The mean change of marginal opening in imported alloy crown from opaque to body-enamel was found to be 10mm and for indigenous alloy crown it was 11.26 mm with p value 0.35 indicating no significant difference in change between the two alloys.

Similarly, the mean change of marginal opening in imported alloy crown from body-enamel firing to glaze firing was 3.86mm it was 3.66mm for indigenous alloy crown, p value 0.9 indicate no significant difference.

Hence the above statistical analysis indicates that indigenous alloy is well comparable to imported alloy at “As-cast-fit” stage as well as after firing cycles.

The total of the average changes from As-cast-fit stage to end of porcelain cycle did not exceed 30mm
for both alloys (Imported alloy, the average change was
24.75 mm. Similarly, for indigenous alloy it was found
to be 26.77 mm) which was similar to reported in studies of
Deniz Gemalmaz et al and others. Investigations
on the marginal distortion of metal ceramic crowns have
concluded that this value of marginal distortion, or 39
mm as suggested by Christensen was with in clinical
acceptability.

Conclusions

The following conclusions was drawn from the
study

1. There is no significant difference in mean values
of vertical marginal opening between Indigenously
and Imported alloy at “As-cast-fit” stage. (Table 1)

2. The mean value of vertical marginal openings of
both alloys after opaque, Body-enamel and Glaze
firings are comparable (No significant difference).
(Table 2)

Since, there is no significant difference of marginal
adaptation between the two alloys it is concluded that
Indigenous alloy can well be substituted for Kulzer alloy.

Conflicts of Interest: Nil

Source of Funding: Self

Ethics Clearance: This study was duly approved by
the ethics committee of Sree Balaji Dental College &
Hospital- SBDCH-ET-11-2010

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L-ascorbic Acid Supplementation Ameliorates Sodium Fluoride Induced Alteration of Cardiac Autonomic Functions in Hypoxic Rats

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ABSTRACT

Introduction: Long term exposure to fluoride is toxic to bones and organs like heart, liver, lung and kidney. Fluoride toxicities induced by oxygen sensing cell signal pathways, hence low oxygen microenvironment and fluoride exposure might have similar toxic manifestation in physiological system and a possible protective mechanism by antioxidant like l-ascorbic acid supplementation.

Aim: To investigate the supplementation of l-ascorbic acid on hypoxia or sodium fluoride (NaF) alone or in combination in cardiovascular electrophysiology of male albino rats.

Materials & Method: Male albino rats were divided into 8 groups (n= 6/group), group I(control), group II (l-ascorbic acid, 50 mg/100g b.wt), group III (hypoxia, 10%O₂), group IV (NaF ;20 mg/kg b.wt/day ; ip), group V (NaF + hypoxia, 10% O₂), group VI (l-ascorbic acid + hypoxia, 10% O₂), group VII (l-ascorbic acid + NaF) and group VIII (l-ascorbic acid + NaF + hypoxia, 10% O₂). The treatments were carried for 21 days. Gravimetry, electrophysiological parameters like noninvasive blood pressure (NIBP), mean arterial pressure (MAP), heart rate (HR), respiratory rate (RR), LF (low frequency), HF (high frequency) and LF/HF ratio were measured. Histopathological evaluations were done to identify changes in myocardial tissue (ventricle).

Results: Electrophysiological evaluation showed significant alteration in MAP in rats treated with hypoxia (group III), NaF (group IV) and NaF with hypoxia (group V). In case of l-ascorbic acid supplementation in group VI, VII and VIII showed remarkable improvement of altered MAP levels. Alteration in heart rate, LF, HF, LF/HF ratio and histopathology in myocardial tissue (ventricle) in rats treated with hypoxia, NaF and hypoxia with NaF indicate cardiac autonomic dysfunctions, but simultaneous supplementation with l-ascorbic acid were found to be beneficial against fluoride and hypoxia induced alteration of cardiovascular functions.

Conclusion: The study indicates a protective role of l-ascorbic acid on cardiovascular pathophysiology in rats treated with NaF, hypoxia and in combination of both.

Keywords: sodium fluoride, hypoxia, heart rate, sympathovagal balance, left ventricular myocardium

Introduction

Long term exposure to fluoride is toxic to bones and organs like heart, liver, lung, spleen and kidney1. Fluoride induces oxidative stress through low oxygen cell signal transduction pathways like hypoxia. Fluorosis is irreversible but preventable by appropriate timely intervention. Antioxidants and antioxidant rich food supplementation acts as antidote in the fluorosis management and fluoride intoxication 2,3. It is important
to know how low oxygen microenvironment influences cardiovascular autonomic malfunctions in presence of fluoride and a possible protective mechanism by antioxidant like l-ascorbic acid supplementation.

Hence the present study was designed to assess the possible protective role of l-ascorbic acid, a potent antioxidant on NaF and hypoxia or in combination on cardiovascular pathophysiology in male albino rats.

**Materials and Method**

Healthy adult male albino Wistar rats weighing about 150 -180 grams were procured from animal house. Acclimatized for one week to the laboratory conditions at 21-25°C and fed with laboratory stock diet and water *ad libitum*.

**Experimental Groups:** Male albino rats were divided into 8 groups (n= 6 in each group), group I (control), group II (l-ascorbic acid, 50 mg/100g. b.wt), group III (hypoxia, 10%O₂), group IV (NaF ; 20 mg/kg b. wt/ day ; ip), group V (NaF + Hypoxia, 10% O₂), group VI (l-ascorbic acid + hypoxia, 10% O₂), group VII (l-ascorbic acid + NaF) and group VIII (l-ascorbic acid + NaF + hypoxia, 10% O₂). The interventions were carried for 21 days.

NaF was dissolved in distilled water and injected intra peritoneally at a dose of 20 mg/kg body weight/day for 21 days⁴. L-ascorbic acid was administered orally by using force feeding needle with syringe for 21 days (50mg/100g body weight).

**Exposure of Rats to Hypoxia:** Rats in cage were kept in acrylic chamber and given mixture of 10% oxygen and 90% nitrogen to induce chronic normobaric hypoxia for 21 days. Soda lime granules were used to absorb carbon dioxide. Temperature was maintained at 22-27°C ⁵.

**Gravimetry:** Animals of all groups were weighed on the starting day of protocol and on the 21st day i.e. on the day of sacrifice using digital weighing balance. Percentage of body weight gain was determined. Heart was weighed after sacrifices at the end of experiment and further cardio somatic index was determined by using the following formula:

$$\text{Cardio somatic index} = \frac{\text{Weight of heart} \times 100}{\text{Body weight}}$$

**Electrophysiology:** Animals were anaesthetized with an intra peritoneal injection of Ketamine (60 mg/kg b.wt) with Xylazine (6 mg/kg b.wt) after the intervention period of 21 days. Heart rate variability (HRV) analysis were done by using Kubois software version 3.0.2. Heart rate (bpm), MAP, Respiratory rate, LF (low frequency), HF (high frequency) and LF/HF ratio for finding of sympathovagal balance were recorded by using Biopac MP45 instrument attached to PC with BSL 4.1 software.

**Histopathology Procedure:** Animals of all groups were sacrificed by cervical dislocation after electrophysiological analysis at the end of 21 days. The heart was carefully collected, isolated immediately and fixed in freshly prepared 10 % formalin for 24 hours. All the fixed tissues were embedded in paraffin and thin sections were taken. Staining was done with hematoxylin and eosin. Histopathological evaluations were done to identify changes in myocardial tissue (ventricle) for treatment groups and compared with control⁵. CPCSEA guidelines were carefully followed during experiments.

**Statistical Analysis:** SPSS software version 16.0 was used. One-way ANOVA followed by “Tukey” test were done to find out intergroup significant differences. All values were represented as mean ± SD. p ≤ 0.05 considered as statistically significant.

**Results**

Table-I shows significant decrease in % of body weight gain, heart weight and cardio somatic index of rats exposed to hypoxia (group III), NaF (group IV), hypoxia and NaF (group V) as compared to control (group I) at the end of 21st day. However simultaneous treatment with l-ascorbic acid showed greater % of body weight gain, heart weight and cardio somatic index in group VI (l-ascorbic acid + hypoxia), group VII (l-ascorbic acid + NaF) and group VIII (l-ascorbic acid + NaF + hypoxia).
Table 1: Effect of l-ascorbic acid supplementation on sodium fluoride and hypoxia induced changes in gravimetry. Group I (control), group II (l-ascorbic acid), group III (hypoxia), group IV (NaF), group V (hypoxia + NaF), group VI (l-ascorbic acid + hypoxia), group VII (l-ascorbic acid + NaF) and group VIII (l-ascorbic acid + hypoxia + NaF), values expressed as Mean ± SD, p ≤ 0.05 is significant, values with different superscripts a, b, c, d, e are significantly different from each other.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Group I</th>
<th>Group II</th>
<th>Group III</th>
<th>Group IV</th>
<th>Group V</th>
<th>Group VI</th>
<th>Group VII</th>
<th>Group VIII</th>
<th>P Value</th>
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<tbody>
<tr>
<td>Initial body weight (gm)</td>
<td>158.9 ± 5.31</td>
<td>155.33 ± 6.6</td>
<td>155.53 ± 1.75</td>
<td>155.33 ± 6.11</td>
<td>155.93 ± 2.6</td>
<td>154.47 ± 4.01</td>
<td>156.53 ± 4.6</td>
<td>155.67 ± 5.4</td>
<td>0.9693</td>
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<tr>
<td>(1st day)</td>
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<tr>
<td>Final body weight (gm)</td>
<td>208.33 ± 3.1</td>
<td>214.33 ± 3.7</td>
<td>180.67 ± 7.5</td>
<td>169.67 ± 8.6</td>
<td>163.03 ± 3.2</td>
<td>195.33 ± 5.5</td>
<td>193 ± 2.6</td>
<td>186.67 ± 2.8</td>
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<tr>
<td>(21st day)</td>
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<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Percent of body weight gain</td>
<td>31.17 ± 3.2</td>
<td>38.11 ± 4.9</td>
<td>16.14 ± 3.6</td>
<td>9.19 ± 1.3</td>
<td>4.55 ± 1.6</td>
<td>25.93 ± 1.4</td>
<td>23.33 ± 2.1</td>
<td>20.62 ± 2.4</td>
<td>&lt;0.0001*</td>
</tr>
<tr>
<td>Heart weight (gm)</td>
<td>0.78 ± 0.03</td>
<td>0.83 ± 0.03</td>
<td>0.52 ± 0.02</td>
<td>0.49 ± 0.03</td>
<td>0.38 ± 0.02</td>
<td>0.65 ± 0.01</td>
<td>0.61 ± 0.01</td>
<td>0.61 ± 0.01</td>
<td>&lt;0.0001*</td>
</tr>
<tr>
<td>Cardio-somatic index</td>
<td>0.37 ± 0.02</td>
<td>0.39 ± 0.02</td>
<td>0.29 ± 0.02</td>
<td>0.29 ± 0.01</td>
<td>0.23 ± 0.02</td>
<td>0.33 ± 0.01</td>
<td>0.32 ± 0.01</td>
<td>0.33 ± 0.01</td>
<td>&lt;0.0001*</td>
</tr>
</tbody>
</table>

Fig-1 shows significant increase of MAP in group III (hypoxia) rats whereas in case of group IV (NaF) and group V (NaF + hypoxia) rats showed decrease of MAP as compared to their respective controls. However simultaneous supplementation with l-ascorbic acid in group VI (l-ascorbic acid + hypoxia), group VII (l-ascorbic acid + NaF) and group VIII (l-ascorbic acid + NaF + hypoxia) rats showed significant improvements of MAP.

Fig. 1: Effect of l-ascorbic acid supplementation on sodium fluoride and hypoxia induced changes on mean arterial pressure in all groups. Group I (control), group II (l-ascorbic acid), group III (hypoxia), group IV (NaF), group V (hypoxia + NaF), group VI (l-ascorbic acid + hypoxia), group VII (l-ascorbic acid + NaF) and group VIII (l-ascorbic acid + hypoxia + NaF), values are expressed as Mean ± SD, p ≤ 0.05 is significant, values with different superscripts a, b, c, d, e, f are significantly different from each other.

Table-2 shows significant increase of heart rate in group III (hypoxia) rats whereas in case of group IV (NaF) and group V (NaF + hypoxia) rats showed decrease of heart rate as compared to their respective controls. However simultaneous supplementation with l-ascorbic acid in group VI (l-ascorbic acid + hypoxia), group VII (l-ascorbic acid + NaF) and group VIII (l-ascorbic acid + NaF + hypoxia) rats showed significant improvements in all the parameters. HF power band of HRV analysis showed a significant increase in group IV (NaF) and group V (NaF + hypoxia) rats.
as compared to group I (control). In case of LF power band, group IV (NaF) and group V (NaF + hypoxia) showed significant decrease as compared to group I (control). In case of group III (hypoxia) a decrease in HF and increase in LF power band were noticed. However simultaneous treatment with l-ascorbic acid supplementation in group VI (l-ascorbic acid + hypoxia), group VII (l-ascorbic acid + NaF) and group-VIII (l-ascorbic acid + NaF + hypoxia) showed significant improvements in LF and HF power band.

Table 2: Effect of L-ascorbic acid supplementation on sodium fluoride and hypoxia induced changes on heart rate, LF (sympathetic activity) and HF (parasympathetic activity) in all groups. Group I(control), group II(l-ascorbic acid), group III(hypoxia), group IV(NaF), group V (hypoxia + NaF), group VI (l-ascorbic acid +hypoxia), group VII (l-ascorbic acid +NaF) and group VIII (l-ascorbic acid +hypoxia + NaF), values are expressed as Mean ± SD, p ≤ 0.05 is significant, values with different superscripts a, b, c, d,e, f are significantly different from each other. LF- low frequency; HF, high frequency ; n.u., power in band; heart rate (bpm, beats/minute)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Group I</th>
<th>Group II</th>
<th>Group III</th>
<th>Group IV</th>
<th>Group V</th>
<th>Group VI</th>
<th>Group VII</th>
<th>Group VIII</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Respiratory rate</td>
<td>18.33 ± 0.58a</td>
<td>16.67 ± 1.53a</td>
<td>26.67 ± 2.52b</td>
<td>13.67 ± 1.53a</td>
<td>15.33 ± 1.53a</td>
<td>18.33 ± 1.53a</td>
<td>16 ± 1a</td>
<td>15.67 ± 0.58a</td>
<td>&lt;0.0001*</td>
</tr>
<tr>
<td>Heart Rate (bpm)</td>
<td>313 ± 8a</td>
<td>308 ± 9b</td>
<td>360 ± 16b</td>
<td>156 ± 10c</td>
<td>211 ± 4d</td>
<td>311 ± 1a</td>
<td>256 ± 1c</td>
<td>227 ± 5e</td>
<td>&lt;0.0001*</td>
</tr>
<tr>
<td>LF Power (n.u)</td>
<td>51 ± 0.6a</td>
<td>49 ± 1.16a</td>
<td>60 ± 5.01b</td>
<td>33 ± 2.6c</td>
<td>36 ± 1.2c</td>
<td>55 ± 1.9a</td>
<td>47 ± 1.4a</td>
<td>53 ± 1.0e</td>
<td>&lt;0.0001*</td>
</tr>
<tr>
<td>HF power (n.u)</td>
<td>48 ± 0.64a</td>
<td>49 ± 1.05a</td>
<td>39 ± 4.83b</td>
<td>65 ± 2.9c</td>
<td>62 ± 1.9d</td>
<td>44 ± 1.8c</td>
<td>52 ± 1.4a</td>
<td>45 ± 0.8e</td>
<td>&lt;0.0001*</td>
</tr>
</tbody>
</table>

Fig-2 shows significant increase of LF/HF ratio in group III (hypoxia) rats whereas in case of group IV (NaF) and group V (NaF + hypoxia) rats showed decrease of LF/HF ratio as compared to their respective controls. L- ascorbic acid supplemented in group VI (l-ascorbic acid + hypoxia), group VII (l-ascorbic acid + NaF) and group VIII (l-ascorbic acid + NaF + hypoxia) rats showed significant improvements in LF/HF ratio.

Experimental Groups

Fig. 2: Effect of l- ascorbic acid supplementation on sodium fluoride and hypoxia induced changes on LF/ HF ratio in all groups, Group I (control), group II (l-ascorbic acid), group III (hypoxia), group IV (NaF), group V (hypoxia + NaF), group VI (l-ascorbic acid + Hypoxia), group VII (l-ascorbic acid + NaF) and group VIII (l-ascorbic acid + Hypoxia + NaF), values are expressed as Mean ± SD, values with different superscripts a,b,c,d and e are significantly different from each other.
Fig-3 (a-h) shows H&E stained sections of left ventricular myocardium. Group I (control) and group II (l-ascorbic acid) showed normal left ventricular myocardium. Group III (hypoxia) showed mild hypertrophy, in group IV (NaF) left ventricular myocardium appeared fibrotic and group V (hypoxia + NaF) showed focal degeneration in left ventricle (Table/Fig- 5c) whereas in case of l-ascorbic acid supplementation left ventricular myocardium appeared normal in group VI (l-ascorbic acid +hypoxia), group VII (l-ascorbic acid + NaF) and group VIII (l-ascorbic acid + NaF + hypoxia) rats.

Fig. 3: Histopathology of left ventricular myocardium in all groups of rats, (a) group I-control (40x), (b) group II- supplemented with l-ascorbic acid (40x), (c) group III- hypoxia (40x), (d) group IV- NaF (40x), (e)group V-l-ascorbic acid and hypoxia(40x), (f) group VI- l-ascorbic acid and NaF (40x), (g)group VII -hypoxia and NaF (40x) and ( h) group VIII - l-ascorbic acid and hypoxia with NaF (40x)

Discussion

In this study protective role of l-ascorbic acid on cardiac autonomic functions were studied in hypoxia, sodium fluoride and in combination of hypoxia and sodium fluoride in experimental rats through evaluation of HRV, blood pressure and cardiac autonomic functions along with histopathology of cardiac tissues.

Results of our study are indicative of decrease in body weight and % of body weight gain, heart weight and cardio somatic index in hypoxic and NaF administered rats or in combination of both. This decrease in body wt (%) and cardio somatic index may be due to fluoride induced decrease of food and water consumption with altered growth rate 6. Supplementation with l-ascorbic acid showed % of body weight gain, heart weight gain and increased cardio somatic index due to cardio-protective actions of l-ascorbic acid in hypoxia and NaF induced alteration of growth rate 7.

In our study hypoxia induced alterations of sympathovagal balance in experimental rats are indicative of cardiac autonomic dysfunctions with possible sympathetic dominance 8. Our results on supplementation of l-ascorbic acid in cardiovascular electrophysiology of hypoxic rats corroborated with the findings of Kane et al 9.

Hypoxia alters the neuronal effector pathways controlling the heartbeat. Oxidant tone and nitric oxide within the medulla alter sympathetic and vagal outflow. L-ascorbic acid increases parasympathetic outflow at the level of nucleus ambiguous.

The present study also showed parasympathetic dominance in NaF treated rats which clearly indicates altered autonomic functions. These observations on NaF treatment in present study was found to be contrary to other previous study 10. Decrease in heart rate, MAP in case of NaF treated rats in present study may be due to vasodepressor action of NaF by combined depression of the vasomotor center of the brain and of vascular smooth muscle 11.

Improvement of all the electrophysiological parameters and ventricular histopathology in l-ascorbic acid supplemented hypoxia exposed or NaF treated or in combination of hypoxia exposure and NaF treatment indicate protective effects of l-ascorbic acid on cardiovascular pathophysiology. This could be due to potential antioxidant property of l-ascorbic acid against low oxygen microenvironment due to fluoride exposure in vivo in experimental rats.

Conclusion

Observations from the present study indicate amelioratic effects of l-ascorbic acid on cardiac autonomic functions in rats exposed to fluoride and hypoxia or in combination of both hypoxia and fluoride.

Acknowledgement

The first (JSR) and the last (KKD) author acknowledge the financial support from the Karnataka Science and Technology Promotion Society, government of Karnataka, India [KSTePS/05/K-FIST/2015-16. Dtd. 22-06-2016].

Conflict of Interest: None declared.
Ethical Clearance: The entire protocol for experiment was approved by Institutional Animal Ethical Committee bearing approval no (LCP/PG. Col/IAEC/Oct-2015/66).

REFERENCES


Comparative Evaluation of Shear Bond Strength of Composite Resin Bonded to Acid Etched and Lased Primary Enamel (Er, Cr:YSGG)

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1Professor, Sree Balaji Dental College, Pallikarani, Chennai; 2Assistant Professor, Government Hospital, Tirunelveli, TamilNadu; 3Professor and Head of the Department, Sree Balaji Dental College, Pallikarani, Chennai; 4Private Practice, Chennai

ABSTRACT

Aim: In vitro evaluation of shear bond strength of composite resin bonded to primary enamel which is pretreated using acid etching and E,Cr:YSGG Laser. Qualitative morphological changes in enamel surfaces were observed under a scanning electron microscope.

Materials and Method: Sixty extracted human teeth were divided into two groups of 30 each (Groups A and B). In Group A, prepared surface of enamel was etched using 35% phosphoric acid (Scotchbond Multipurpose 3M ESPE). In Group B, enamel surface was etched using Er,Cr:YSGG Laser beam (Waterlase MD, biolase, San Clemente,USA). Bonding agent (Adper, single bond 2, 3M ESPE) was applied over the test areas on 20 samples of Groups A and Groups B each light cured. Composite resin core (Filtrek z350 XT, 3M ESPE) was made in increments and light cured. The samples were tested for shear bond strength. Remaining 10 samples from each Group were observed under SEM.

Results: The mean shear bond strength with standard deviation values of Group A (18.39 ± 4.75 MPa) and Group B (6.37 ± 2.71 MPa) respectively.

Conclusions: Mean shear bond strength of Group A (Acid etching) was significantly higher than the mean shear bond strength of Group B (Laser etching). SEM observations of laser pretreatment showed micro-retentive surface with the presence of elevations and depressions not adequate to improve the bond strength as compared to Acid etching.

Keywords: Primary teeth, Acid Etching, Er,Cr:YSGG, Shear Bond Strength, Laser

Introduction

Enamel surface preparation was first introduced by Michael Buonocore in 1955 using phosphoric acid and since then it has changed substantially. Numerous investigations about acid etching onto enamel and dentin surface and shear bond strength, carried out in the past 35 years have resulted in a marked reduction in phosphoric acid concentrations and application times with no significant reduction in shear bond strength. Nowadays, 37% phosphoric acid conditioning for 15 to 20 sec is the standard procedure. An acid etch technique results in bonding of composite resin with enamel resulting in increased bond strength and decreased microleakage. The effects of conventional enamel conditioning using phosphoric acid is an unintentional demineralisation of the enamel surface with an irreversible loss of the mineralized surface of approximately 10µm. Alternative methods of enamel conditioning include air abrasion and laser application. Air abrasion has been successfully applied to bands, brackets and lingual retainers. Air abrasion technology makes use of a high speed stream of aluminium oxide particles propelled by air pressure. However, results for enamel conditioning seem to be controversial.
In 1960, Maiman developed the method of Light Amplification by the Stimulated Emission of Radiation, now commonly known by its acronym, LASER. Since then the use of lasers in dentistry has increased especially over the past few years. Goldman et al., (1965) investigated the application of the laser beam on dental hard tissues. The first dental lasers cleared by the FDA was used exclusively for soft tissue procedures which included carbon dioxide (CO2) laser, Neodymium-Yttrium-Aluminum-Garnet (Nd:YAG) laser, argon laser, and the semiconductor diode laser. Unfortunately argon, CO2 and Nd:YAG lasers have been reported by many researchers to produce major thermal effects, including melting, carbonization, the creation of fissures and cracks in the surrounding tissues, as well as an increase in pulpal temperature. Other approved systems include the Erbium-Chromium-Yttrium-Scallium-Gallium-Garnet (Er,Cr:YSGG) laser and the Erbium doped, Yttrium-Aluminum-Garnet (Er:YAG) laser.

The potential applications of Er,Cr:YSGG laser for dental hard tissue treatment have been tested by a number of investigators. This laser uses a pulsed beam system, from a fibre and a sapphire tip bathed in a mixture of air and water vapour. It has been shown to be effective for soft tissue surgery as well as for cutting enamel, dentin and bone. Er,Cr:YSGG laser was recommended for minimal invasive purposes due to its precise ablation of the enamel and dentin without any side effect to the pulp and surrounding tissues. It has a 2780-nm wave length and is absorbed strongly by both water and hydroxyapatite. These lasers are ideal for caries removal and tooth preparation when used with a water spray.

Laser etching has been evaluated as an alternative to acid etching of enamel and dentine. Literature search did not reveal any study done in primary teeth on shear bond strength comparing acid etching and laser etching using Er,Cr:YSGG, hence the present in-vitro study was done to evaluate and compare the same and also to observe qualitative surface changes in enamel under scanning electron microscope.

Materials and Method

Maxillary and mandibular primary canine teeth extracted for orthodontic purpose were collected, thoroughly cleaned using an ultrasonic scaler and were stored in distilled water and 0.2% thymol solution at room temperature until subjected to study. Sixty teeth which fulfilled the following inclusion criteria were selected:

- Teeth should be without any cracks.
- Teeth should be free from caries.
- Atleast one third root present.

They were divided into 2 groups, of 30 each Group A (Acid etching group) and Group B (Laser etching group).

The teeth were mounted in a self cure resin using an aluminium square block (3cmx1cm) leaving the crown exposed. Different colours were added to self cure acrylic to differentiate between the groups, Group A (RED) and Group B (YELLOW). Samples in each group were numbered from 1 to 30 for proper identification.

In Group A samples, enamel in the mid-labial surface was etched using 35% phosphoric acid (Scotchbond, Multipurpose, 3M ESPE) for 15s and rinsed with distilled water for 15s and the tooth surface dried with oil free compressed air for 10s. On the first 20 samples (no 1-20) bonding agent (Adper, Single bond 2, 3M ESPE) was applied with a brush, gently air thinned and a plastic straw (3mmx3mm) was placed on the enamel surface and light cured as per manufacturer’s instructions. Then a composite resin core (Filtek Z350 XT, 3M ESPE) was made in increments and light cured for 40s on each layer as per manufacturer’s instruction. The plastic straw was then cut and removed with the help of 11 size BP blade. The samples were then stored in distilled water for 24 hours. Then prepared samples were subjected to shear bond strength in a Universal Instron machine (FIE, UNITEK 94100) (Fig.1) in a direction perpendicular to the resin core, at a crosshead speed of 1mm/min (Fig. 2). The stress failure was recorded and tabulated as shear bond strength (Table 1). The bond strength values obtained were in KiloNewtons, which were converted into MegaPascals (MPa). Remaining 10 samples (no 21-30) were subjected to scanning electron microscopy at a magnification of 1000x to observe the etched pattern on the enamel surface.

Figure 1: Universal Instron machine
Figure 2: Specimen loaded for shear test

Table 1: Distribution and mean of shear bond strength of group A and group B

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Group A (Mpa)</th>
<th>Group B (Mpa)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>14.15</td>
<td>11.32</td>
</tr>
<tr>
<td>2.</td>
<td>11.32</td>
<td>4.95</td>
</tr>
<tr>
<td>3.</td>
<td>14.15</td>
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</tr>
<tr>
<td>4.</td>
<td>12.73</td>
<td>4.24</td>
</tr>
<tr>
<td>5.</td>
<td>21.23</td>
<td>4.24</td>
</tr>
<tr>
<td>6.</td>
<td>22.64</td>
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<td>8.</td>
<td>26.18</td>
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<td>9.</td>
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<td>10.</td>
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<td>12.03</td>
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<tr>
<td>20.</td>
<td>16.27</td>
<td>5.66</td>
</tr>
<tr>
<td>Mean</td>
<td><strong>18.39</strong></td>
<td><strong>6.35</strong></td>
</tr>
</tbody>
</table>

In Group B samples, enamel in the mid-labial surface were lased for 15s with Er,Cr:YSGG laser (Waterlase MD, Biolase, San Clemente, USA), operating at a wavelength of 2780nm with a power output of 2.5W in a free running pulse mode at a repetition rate of 50Hz and 80mJ/pulse energy. Air and water spray from the handpiece was adjusted to a level of 60% air and 50% water. The laser beam was aligned perpendicular to the surface and moved in a sweeping fashion by hand during the exposure period. The tooth surface was then dried with oil free compressed air for 10s. Out of 30 samples, 20 samples (no 1-20) resin core build up, and storage was done as in Group A. The samples were subjected to shear bond strength and SEM observation as done in Group A.

**Results**

Table 1 shows the shear bond strength of Group A and Group B samples. Table 2 shows the values of Group A and Group B samples statistically analysed using student’s t-test. The mean shear bond in Group A (18.39 MPa) is significantly higher than the mean shear bond strength of Group B (6.37 MPa). SEM observations at 1000x magnification of Group A samples showed that the acid etched enamel surface had porosity and honeycomb like appearance (fig 3). Group B samples had surface irregularities and micro cracks/fissures (fig 4).

Figure 3: SEM picture (1000x) showing honeycomb-like enamel surface after acid etching

Figure 4: SEM picture (1000x) showing surface irregularities and micro cracks/fissures after laser etching
Table 2: Comparison of shear bond strength of Groups A and B

<table>
<thead>
<tr>
<th>Groups</th>
<th>Mean ± SD</th>
<th>T TEST*</th>
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</thead>
<tbody>
<tr>
<td>Group A</td>
<td>18.39 ± 4.75</td>
<td>0.0001(sig)**</td>
</tr>
<tr>
<td>Group B</td>
<td>6.37 ± 2.71</td>
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</table>

Discussion

Composite resin restoration gained popularity after Buonocore’s work on acid etching of enamel. It is now used to replace enamel and dentin lost due to dental caries, fracture and to change the shape and shade of anterior teeth. Many researchers have studied adhesion to enamel and at present, acid etching is probably the best method of bonding resins to enamel.\(^\text{14}\) However, it has certain disadvantages like removal of a surface layer of enamel, variability in etch depth, contamination of the etched surface with water or oil, and inadequate washing or drying affecting bond strength adversely and also make enamel surfaces more susceptible to caries, especially if resin impregnation is incomplete or defective.\(^\text{15}\) Hence an alternative modality like laser was explored to pre-treat the enamel surface to achieve resin bonding.

The erbium laser, originally developed by Zharikov et al in 1975, was approved by the FDA in 1997 for caries removal, cavity preparation and modifying dentin and enamel prior to etching.\(^\text{16}\) Er,Cr:YSGG laser etching is painless and does not involve either vibration or heat but it’s easy handling of the apparatus makes this treatment highly attractive for clinical use.\(^\text{17}\) Er,Cr:YSGG is well absorbed by haemoglobin and water. It has high affinity for hydroxyapatite when used along with water spray. Hossain et al in 1999 found usage of water along with Er,Cr:YSGG resulted in increased ablation depths compared to those irradiated without water.\(^\text{18}\)

In our study 20 samples from each Group were subjected to shear bond strength using universal testing machine. The mean shear bond strength of acid and laser etch Group are 18.39 and 6.37 MPa respectively. These values when subjected to statistical analysis (Student’s t test), the acid group was found to be statistically significant than laser group with (P value < 0.0001). Similar study was done by Mridula Goswami et al in 2011 in enamel of permanent teeth using Nd:YAG Laser. The results were similar to our study which showed a statistically significant difference in mean values between acid etch and laser etch group (P value < 0.0001).\(^\text{19}\)

Scanning electron microscope observations of Group A samples showed regular honey comb pattern, thus increasing the surface area manifolds and offering better mechanical retention to resin tags. Similar appearance was also reported by Goswami and Singh in 2011 on permanent teeth using phosphoric acid. Group B samples showed surface irregularities and micro cracks/ fissures on the lased surface under SEM. This may have been produced as Er,Cr:YSGG laser has high affinity for water and hydroxyapatite, utilizing an interaction phenomenon that refers to as the hydrophotonic process. The laser energy from the Er,Cr:YSGG is able to interact with water droplets at the tissue surface to create water molecule excitation. This in turn cause water droplet microexpansion and propulsion. The laser impact site showing areas of indentation and bubble-like cavities was reported by Goswami and Singh in 2011 while using Nd:YAG laser on permanent teeth.\(^\text{19}\) Brauchli LM in 2011 stated that Er:YAG laser produces a network of microfissures on enamel lased surface which is also seen in our samples.\(^\text{20}\) Yu J et al in 2003 evaluated the morphological changes of Er,Cr:YSGG laser irradiated dental hard tissues and reported a scaly and rough surface appearance similar to our samples.\(^\text{21}\) These type of pattern offers less mechanical retention, hence lower shear bond strength as obtained in our study.

It can be concluded that Er,Cr:YSGG laser pre-treatment of enamel, with the parameters used in this study, did not result in higher shear bond strength of composite resin to enamel as compared to acid etching pre-treatment. Further studies with varying Er,Cr:YSGG laser parameters are recommended to evaluate its effect on primary teeth.

Conflict of Interest: Nil

Source of Funding: Self

Ethical Clearance: Approved by Institutional Ethical Committee, Sree Balaji Dental College & Hospital (Ref No: SBDCECM104/12/11)

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Modified Cantilever Bridge; A Novel Approach towards the Replacement of Missing Primary Anterior Teeth

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ABSTRACT

Early childhood caries or dental trauma may lead to premature loss of primary anterior teeth which might lead to unaesthetic appearance, psychological impairment and speech abnormality. Pediatric dentists face great challenges in the aesthetic rehabilitation of these young children. Parents are becoming more concerned about the esthetic appearance of their child which needs immediate replacement of the missing teeth. These case reports highlight a specific design for the replacement of anterior missing tooth which can be used successfully in day to day clinical practice.

Keywords: Aesthetics, Fixed space maintainer, Missing primary teeth.

Introduction

The common causes for premature loss of primary anterior primary teeth in infants and toddlers are Early Childhood caries (ECC) and dental trauma.¹ Pediatric dentist face the greatest restorative challenge for the replacement of such premature loss of primary anterior teeth.² Untimely loss of anterior primary teeth has a far reaching psychological impact as well as it reduces the level of confidence in the growing child.¹⁻² It can also lead to development of parafunctional habits, malocclusion and abnormal speech (Phonetics).³

A removable or fixed type of prosthesis may resolve the problem. Major difficulty faced with the removable prosthesis is the children’s compliance, cooperation and desirability to wear.⁴ While replacing the anterior primary teeth clinician should take into consideration that it should not interfere with eruption process of the underlying permanent teeth² and growth and development of jaw. Therefore esthetic prosthesis with limited extension on dentoalveolar tissue should be preferred. Till date very few fixed space maintainer design are available for the replacement of anterior primary teeth.

Thus, the modified cantilever bridge, a newer modality is discussed for the management of missing primary anteriors in the following case report.

Case Report

A 3 year old boy reported to the Department of Pedodontics and Preventive dentistry, Sharad Pawar Dental College, Sawangi with the chief complaint of missing and discolored upper front teeth since 4 months. Past dental and medical history was not contributory. On intraoral examination 51 was found to be absent and discoloration seen with 61. On taking thorough history it was revealed that the tooth got avulsed due to the traumatic fall 4 months back. On sensibility test, 61 was found to be non vital and therefore was indicated for pulpectomy. After considering patient’s mother wish and clinical situation fixed esthetic space maintainer was planned. Mother was explained about the treatment procedure and consent was obtained.

After completing oral prophylaxis, conservative tooth preparation was done with 61. Incisal tooth preparation was done incisally by 1.5mm for the incisal clearance using wheel bur WR 13 (Mani,Japan). Buccal, lingual and proximal preparation was done by using tapered fissure bur TR 12 (Mani,Japan) for the passive fit of the abutment tooth. The palatal preparation was done with flame shaped bur FO 32 (Mani,Japan). The two parallel groves were prepared on palatal side of the crown with TF 12 bur (Mani,Japan). After the tooth preparation putty impression was taken. The working cast was then sent to the laboratory along with the shade selected prior to the start of the tooth preparation.
Metal framework included the metal wing (extension) on the palatal side of 52, porcelain crown with 51 (pontic) and full coverage porcelain crown on 61. Trial fitting of the metal framework was done to check for the passive fit, esthetic and retention. After proper isolation, the appliance was cemented using adhesive resin cement (RelyX -3M ESPE). (Figure 1) (Figure 2) Mother was satisfied with the esthetic appearance of her child. Post operative instructions were given to maintain the proper oral hygiene. Recall visit was scheduled after every 3 months. The removal of prosthesis was informed at around 6-7 years of age to prevent the interference of erupting succedaneous permanent teeth.

Discussion

The requirement of esthetic in mutilated primary dentition is strongly demanded by parents. There is no strong evidence stating that the early loss of the maxillary incisors will hamper the growth and development of the child. Consideration for replacement of anterior teeth is mainly given to improve the speech, masticatory function and to prevent the parafunctional habits rather than the space loss. Absence of anterior teeth mainly affects the phonetics which is being produced by touching the tongue on the lingual side and labial side of the tooth.

In this case, considering the age of patient and patient compliance the fixed esthetic space maintainer was planned to restore the esthetics and function. Premature loss of the anterior teeth can be socially harmful for the child older than 3 year of age who started their preschool; immediate replacement of teeth might minimize the trauma. Removable space maintainer has certain advantage such as it can be easily worn, easy to fabricate, cost effective and can be clean easily. But the patient cooperation in preschool group with removable space maintainer is difficult. Removable space maintainer has certain disadvantage such as it is bulky, easily breakable and unpleasant.

In contrast the fixed esthetic space maintainer having less chance to damage the soft tissue by reducing the coverage area and can be worn for longer period of time. Various option are available with fixed space maintainer such as Groper appliance, Fiber reinforced composite for replacing the primary anterior teeth. But the selection of the appliance depends on the condition of the anchorage tooth, missing tooth, patient’s age and condition of the adjacent tooth. The adjacent tooth to the missing area was indicated for the tooth colored crown therefore no intentional tooth preparation was done in this case. The modified cantilever bridge is easy to fabricate and the patient can maintain the oral hygiene properly as there is no palatal extension of wire and banding on the molars. Appliance gave adequate retention because of the full coverage restoration one side of missing tooth and palatal extension on another side. In this case the pontic used was porcelain fused to metal which has longer life as compare to tooth colored acrylic and composite which gave the additional factor for pleasant esthetic. It provides both mechanical as well as chemical retention for the missing tooth. The prosthesis is having good strength and allows undisrupted growth of the jaw.

This fixed esthetic space maintainer provides adequate retention and esthetic which make it an preferred alternative for the replacement of missing anterior primary teeth by the pediatric dentist. The esthetic and
functioning of this appliance found satisfactory till the last visit of the child.

**Conclusion**

Careful selection of case, minimum preparation and proper design determines the success rate of the fixed anterior prosthesis in the toddlers. Clinician should focus on the replacement of anterior teeth to enhance the quality of life, esthetics, speech and function in the growing children.

**Ethical Clearance:** Prior approval to conduct the study was obtained from the ethical committee of the institutional review board.

**Source of Funding:** Self

**Conflict of Interest:** Nil

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Hybrid Encryption for Medical Applications Using Advanced Algorithms in Internet of Things

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ABSTRACT

Internet of things is connected for some reasons in medical life in restorative and human services, transportation, building and home mechanization and the modern applications, for example, fabricating, farming, framework application, metropolitan scale organizations, vitality the executives, natural observing and so on. In this way, taking the protection and security as a criteria we have to give a safe calculation to shield the correspondence over the web from the cryptanalyst. One of security calculation to scramble the information is RSA calculation. Authentication of login credentials using RSA algorithm is done. In this, the comprehensive survey of message/data security using SHA algorithm is explained. The protocols that are developed for IOT in terms of security goals, network models and computation overhead are presented. Based on the protocol, issues and research directions are identified and proposed.

Keywords: RSA, SHA-512, Encryption, Decryption, Security, Medical

Introduction

Internet of Things (IoT) is a system of devices, machines, objects and people provided with unique ID’s and to transfer the data over the network without involving H2H/H2C interaction. A thing (in IOT) is an entity, that as a unique ID, to transfer data over a network.

IoT systems are separated into two main categories:

1. **Commercial IoT**– IoT devices communicates only with the local devices. The communication was either Bluetooth or Ethernet.

2. **Industrial and Medical IoT**– IoT devices connects with IP network to the global network.

IoT platform is a technology that enables management, straightforward automation of connected devices within the IoT universe. It provides a set of features that speeds up the development, scalability and compatibility for connected devices. IoT Middleware, functions as a mediator between application layers and hardware, includes collection of data over different network topologies and protocols. There are many companies that are built in IoT platform like Microsoft Azure, AWS, Google cloud etc...

Sensor is a contrivance that detects transmutations in an environment and measures physical phenomenon (like temperature, pressure etc) and transforms into an electric signal. There are variants of sensors to quantify virtually all the physical properties around us. The most important properties for sensor are:

- **Range**– Sensor can measure the maximum and minimum values of phenomenon.
- **Resolution**– Sensor can detect the minimum change in the phenomenon.

IoT Security is the act of securing devices and network that are connected. It is main role to retain the customer’s trust on security to fulfill the IoT promise.

The three essential pillars to secure the IoT data are:

- Securing the device
- Securing the cloud
- Lifecycle Management

The drawbacks of IoT security are:

- New threats to data or Physical Security
- Inability of IoT systems to keep pace with change
- Regularity or Compliance challenges

Security Attacks are of two types: Active and Passive.

Active attacks modify the data or create the false statement. Hacker (third party) tries to change the data on target or en routes the data to target. Types of active attacks are:
- Masquerade
- Replay
- Modification of messages
- Denial of Service (DoS)
- Distributed DoS

Passive Attacks make use of information from the sender but don’t modify the data. The nature of passive attacks is monitoring the transmission of data from sender to receiver. Passive attacks are of:
- Traffic Analysis
- Release of message content

Cryptology involves both Cryptography (writing) and Cryptanalysis (solving). Cryptography means science writing which deals with network security. It classified into Symmetric, Asymmetric and Hashing. Encryption and Decryption are two important roles in Cryptography. Encryption encrypts the sender message using key and Decryption decrypts the encrypted message to get the original one. There are many algorithms to provide the message security like RSA, Elgamal, AES&DES, Reilience etc.

Cryptanalysis is the science art of breaking the cipher text without using the key that is used in Encryption. During the design of incipient cryptographic techniques to test the security, Cryptanalysis is utilized.

**Literature Survey**

The mechanism of encryption and protection of data is drawn. The security of communication between layers is also drawn. Mostly, the cryptographic algorithm is chosen here. [1] They have introduced three phases for transferring the message to secure. Using playfair cipher, the encryption of plain text with secret key is done. Next, XOR operation and RSA algorithm is processed. [2] The role of IoT in India is drawn. The comparison between IoT markets from Global to India is improved. They surveyed the most important risks and challenges in IoT. [3] It talks about the security and testing the methodology of IoT network and device and also showcased the applications of IoT. This paper also includes the firming cracking, a part of testing methodology. [4] Here, the secure feature is the elimination of $n$ from the RSA algorithm; instead, the incipiently engendered algorithm for $n$ can be utilized in both keys it is a prone to mathematical factorization attacks this issue making the algorithm more secure with a light increase of time involution. [5]

They presented the IoT security with the challenges, concerns and trends based on wide range of literature. It also presents the generations of IoT security with the variations. [6] By the results of Zone Routing Protocol, SHA3-512 is much better than SHA3-256. By comparing hash code of both the algorithms, SHA3-512 gives higher speed half of the SHA3-256. As length of the hash code in SHA3-512 is more, it requires more storage. [7] The routing approach in mobile networks is considered and attacks that are against routing protocols are analyzed. Secure routing requirements are presented. [8] The architecture done a multiple operation that performs all three SHA2 standards. Further, the performance of hardware implementations is lesser than the performance of proposed algorithm. It offers high secure length strength. [9]

**Method**

**RSA Algorithm**: RSA is a calculation utilized by the cutting-edge PCs to encode and unscramble messages. It is a lopsided cryptographic calculation. Halter kilter implicatively insinuates that there are two diverse keys. [11] This is open key cryptography, since one of the keys can be given to anybody. The other key must be kept private. [12] The calculation is since finding the components of a substantial composite number is troublesome, when the whole numbers are prime numbers; the issue is called prime factorization. It is a key match generator. [13] RSA includes both open key and personal key.

General society key will be famous to everyone; it’s utilized to cipher messages. Messages encoded utilizing the final population key should be unscrambled with the personal key. The keys for the RSA calculation are produced in the accompanying way:
1. Choose two diverse vast arbitrary prime numbers \( p \) and \( q \).

2. Calculate \( n = pq \), where \( n \) is the modulus for general society key and the private keys.

3. Calculate the totient: \( \text{Totient } n = (p-1)(q-1) \)

4. Choose a whole number \( e \) with the end goal that \( 1 < e < \text{totient } (n) \)

Where \( e \) is discharged as the general population key example

Alice gives her open key \((n \text{ and } e)\) to weave and keeps her private key mystery. Bounce needs to send her message \( 'm' \) to Alice to discover the figure content \( 'c' \)

\[ C = m^e \mod n \]

Where \( m = \text{messages} \), \( c = \text{cipher content} \).

**SHA:** It is driven by the slowness of RSA. The main aim of the SHA Algorithm is to achieve the speed in encryption and sign that. It was the initiation from the Message Digest 1 and 2 algorithms.

This algorithm is robust and fast secured algorithm. It is basic to secure the computer transactions. The Secured Hash Algorithm includes the different formats like SHA1, SHA2 and SHA3, Where SHA1 is a cryptographic algorithm which takes the input and gives the output of 160 bit hash value. It forms various security protocols and implementations by which includes secured shell protocol, Transport layer security protocol, pretty good privacy protocol, secure/multipurpose internet mail extension protocol. After a particular changes has been made in SHA1 algorithm the new algorithm has been raised for the security purpose known as SHA2 algorithm.

The SHA 2 group has 6 hash functions having 224,256,384 or 512 bits. The SHA 256 and SHA 512 is the similar algorithm in structure but they are distinct rounds. Due to less support from the windows XP SP2 or even earlier system while running in them the SHA2 was not successful initially irrespective of security that it will provide more efficient than the SHA1.SHA-3 is distinct from SHA1 and SHA2 algorithms where it utilizes sponge construction. In the process of sponge construction the data is first immerse into the sponge and clutched out.

**SHA-512:** SHA-512 is a capacity in cryptographic calculation SHA-2 which is a propelled variant of SHA-1. SHA resembles SHA-256. The message is broken into 1024-piece, the underlying hash esteem and round constants are explained to 64 bits. There are 8 adjusts in SHA-512. The message plan cluster has 80-64 bit. To expand the message plan exhibit, the circle is from 16-79. The word estimate is utilized for counts are 64 bit long. The additional length of the message in bits is a 128-piece whole number, the move and pivot capacities utilized are unique.SHA-512 is a near SHA-256 expect that it is utilized 1024 bits “squares”. What’s more, acknowledge as info a 2^128 bits most extreme length string.SHA-512 additionally has others algorithmic changes in examination with SHA-256.

**Findings**

In first step, the user authentication will take place, so we have to first enter our own password which we have to stay with us. Then some variable length size of string is added to our typed password.
In next step, the authentication takes places that mean we will have to login using the valid credentials, once if it is satisfied they are on the bridge. In next step, the RSA algorithm will comes to picture; here the encrypting is done by the public and private keys.

Here the message we are going to enter will undergo through the most secured hash algorithm and it encrypts the message by using the SHA-512 and it sends the encrypted message and then at the receivers end he will decrypt the message.

The overall view of our proposed algorithm is that first we are going to authenticate which will happen only through the correct login credentials and then the message is double encrypted using the RSA and SHA 512 algorithm. We have chosen SHA because it is the most trending secured hash algorithm which is widely used by the great companies like Google, Microsoft.
Discussion

Test case 1: The password input takes place, here the user needs to enter his liked password then the password will be appended to some other text and then it will add to the file automatically. The user added password along with then automatically generated password will be appended to the user password and will be stored in the file.

Then the password validation phase takes place, which means the user should need to get the password credentials from the text file and he needs to enter this in this phase in order to authenticate. The commands will be present like True or False; True command will be saved when the user has given the correct credentials. False command will be saved when the user given the wrong credentials. Here the command is true that means the user is a valid user.

Based on the commands that are present in the valid file the program executes. If the command present in it is true that means the user is the valid user and hence the program will execute successfully. Here the user has used the correct login credentials so the program executes and hence the exchange of messages takes place.

Test case 2: As in the above test case the user gives the input password and the program will take that as an input and it will add the password automatically of some variable length. The user generated password is authenticated with the automated randomly generated password and is texted into this text file.

Here in this validation phase the user is not the right user so the user enters some random password to check with the algorithm thinking that it might work. We can see that the command that is shown is false that means he is not the right user.

As we discussed earlier this phase depends on the valid text file so we can see that this is false in the above figure and we can clearly see that this the program failed to execute and displays the message as “Sorry, we are not able to authenticate”.

Conclusion

In this paper, we proposed a hybrid algorithm that makes the message even more secure. We have used already pre-defined algorithms and we have modified with our own algorithms and we made a hybrid algorithm. According to this, we can take care that the message are within the correct receiver. This can enhance the protection as we have a tendency to use the foremost wide used SHA-512 rule that is employed in major corporations like Google. The uniqueness about our proposed algorithm is the variable length key that means the cryptanalyst doesn’t knew the length of the key. It makes the cryptanalyst difficult if he tries brute force attack. This will improve the security of the various real time applications like a social media, secure texting in an android mobiles etc., it takes bit time more than the normal RSA algorithm because we have added two modules to it to increase the security so, by integrating this approach to both algorithms the security and confidentiality is improved.

Conflict of Interest: Nil

Source of Funding: Self Funding

Ethical Clearance: Not required as it is a review article.
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Non-Syndromic, Non-Familial Hyperdontia of Both Maxillary and Mandibular Region—A Case Report

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ABSTRACT

Hyperdontia had been reported with certain syndromes but hyperdontia in a non-syndromic individual are not commonly found and reported. The etiology of non-syndromic hyperdontia was not clearly known. This paper reports a case with multiple supernumerary and Supplementary teeth presents bilaterally.

Keywords: Supplementary Teeth, supernumerary teeth, non-syndromic hyperdontia

Introduction

A supernumerary tooth or hyperdontia is one that is additional to the normal series and can be found an excessive but organized growth of the dental lamina of unknown cause.[1, 2] Supernumerary may happen isolated mostly although some may be familial and others may be syndrome associated (Gardner’s syndrome, Cleidocranial dysplasia, Apert and Crouzon). Tomes suggested nomenclature for teeth in excess, they were defined as “supplementary” if they were present with a normal morphology and as “supernumerary” if they were present with morphologic and volumetric variations. [2] Depending on the position, a supernumerary tooth can have different names, such as a) mesiodens- located between central incisors, b) distomolar- a fourth molar erupts distal to third molar, c) paramolar it may be fully developed or hypomorphic, small in size. paramolar are found buccal or lingual to maxillary molars, preferably in relation to the first molar. The most common site is the maxillary incisor region, followed by maxillary fourth molars and mandibular fourth molars, premolars, canines, and lateral incisors. Supernumerary mandibular incisors are very rare [1]

The clinical situations that may indicate the presence of supernumerary teeth are [3]

- An absence of permanent teeth in the maxillary/mandibular arch
- Malposition of erupted permanent teeth
- Malocclusion
- Wide interincisive diastema
- Reabsorption of roots of the adjacent teeth with loss of their vitality and symptomatology
- Tumefaction on the vestibular or palatine/lingual area.
- Agenesis (confirming radiographically)

Clinical Case: A 21-year-old male reported to our outpatient department for correction of his misaligned teeth. Familial, medical and dental history was non-contributory. General examination and extra-oral examination showed no abnormality. Dental examination revealed the absence of 23, 34 and presence of one miniature tooth next to 16 teeth region. OPG revealed the congenitally missing 23, impacted permanent 17,18,28,38,48 and 6 additional teeth, and these
resembled premolars and molars (Fig 1). The patient was advised for CBCT (cone beam computed tomography) for further evaluation, but unfortunately, the patient did not turn up for further follow-up. Based on the dental findings and the absence of any associated disorder or syndrome, the present case represents those rare forms of bilateral non-syndromic hyperdontia.

Fig. 1: OPG reveals congenitally missing 23, impacted permanent 17, 18, 28, 38, 48 and six additional teeth, resembling premolars and molars.

Discussion

An intervention was advised only if these teeth showed any pathological changes or a tendency for cyst formation. These patients were educated and adequately counselled.

Tooth anomalies can result from a complex interference of genetic factors and developmental processes of odontogenesis. A second theory known as dichotomy suggests that the tooth bud is split to create two teeth, one of which is the mesiodens. The third theory stating localised and independent hyperactivity of the dental lamina is the most widely supported. According to this theory, remnants of the dental lamina or palatal offshoots of the active dental lamina are induced to develop into an extra tooth bud, which results in a supernumerary tooth [4,5,6,9]. The occurrence of non-syndromic supernumerary teeth is more often in maxilla than in mandible, in male than in female, in permanent dentition than in primary dentition [6] and unilaterally than bilaterally. [6] In our case we have both supernumerary as well as supplemental teeth and present in both maxillary and mandibular dental arches. Patients with non-syndromic supernumerary teeth might be related to heredity factor; therefore familial history should be carefully examined. [7]

Hypercoria is usually associated with developmental disorders or syndromes like supernumerary teeth developing such as Gardner’s syndrome, cleidocranial dysplasia, Down syndrome, Apert syndrome, and cleft lip and palate. An occurrence of multiple supernumerary teeth in the absence of any associated syndrome or condition is very uncommon. In such non-syndromic cases, mandibular premolar region is the preferred site of occurrence.

Classification: Hyperdontia teeth are classified into [1,13]

Supplemental: Normal size and shape. The most common supplemental tooth is permanent maxillary lateral incisor, not rarely premolars and molars present as supplemental teeth.

Rudimentary: Abnormal shape and smaller size types

Rudimentary supernumerary teeth are classified further into

Conical: Small, peg-shaped, malformed additional teeth most frequently form in the incisor or molar region. It develops with root formation ahead of or at an equivalent stage to that of permanent incisors and usually presents as a mesiodens [9].

Tuberculate: Barrel-shaped anterior with more than one cusp, tuberculate additional teeth are often paired and are commonly located on the palatal aspect of the central incisors

Molariform: Small premolar-like or molar-like.

Odontomas: Odontomes are the fourth in the category of a supernumerary tooth. Odontomes are considered hamartomas and could be placed within this classification, but these lesions are traditionally included in the list of odontogenic neoplasms. Two types of odontomas have been identified the complex type presents as a mass of disorganized odontogenic tissues and the compound odontoma presents as an appearance of well-organized tooth like structures.

Problems Associated with Supernumerary Teeth [10, 11]

- Failure of Eruption/dysodontiasis of permanent teeth
- Displacement/malposition
- Crowding
- Pathology- impacted supernumerary teeth are the cause of follicular cysts
Management of Hyperdontia\cite{12}: Treatment depends on the type and position of the supernumerary tooth and its effect or potential effect on adjacent teeth. The management of hyperdontia should form part of a comprehensive treatment plan and should not be considered in isolation. Removal of the hyperdontic tooth is recommended where:

- Central incisor eruption has been delayed or inhibited;
- Altered eruption or displacement of central incisors is evident;
- There is associated pathology;
- Active orthodontic alignment of an incisor in close proximity

Indications for monitoring without hyperdontia removal

Extraction is not always the treatment of choice for hyperdontia. They may be monitored without removal where:

- A satisfactory eruption of related teeth has occurred;
- No active orthodontic treatment is envisaged;
- There is no associated pathology;
- Removal would prejudice the vitality of the related teeth.

Conflicts of Interest: None

Source of Funding: Self

Ethics Committee Approval: Not obtained as it is a case study.

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Antibacterial Efficacy of Essential Oil of Two Different Varieties of Ocimum (Tulsi) on Oral Microbiota—An Invitro Study

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ABSTRACT

Introduction: Ocimum (Tulsi) is an Indian sacred plant which has immense medicinal values. There are various varieties of Tulsi grown in India most common being Ocimum sanctum and Ocimum basilicum.

Objectives: To test in-vitro the antibacterial efficacy of commercially available essential oil extracts of different varieties of Ocimum (Tulsi) on common oral pathogens.

Methodology: Commercially available essential oil of two varieties of Ocimum i.e. Ocimum sanctum and Ocimum basilicum were procured and checked for their antibacterial activity in-vitro. Five common oral pathogens were selected (two aerobic and three anaerobic). The organisms were incubated on respective culture media. Agar well diffusion method was used to check their activity. The oils were tested undiluted form and 1 in 10 dilutions. The activity of oils was compared with chlorhexidine.

Results: Both the oils showed antimicrobial activity against all the test strains. The zone of inhibition produced by Ocimum sanctum oil was maximum for Porphyromonas gingivalis (55 mm) followed by Prevotella intermedia (48 mm). The zone produced was much wider than that of chlorhexidine. For Fusobacterium nucleatum, the zone was equivalent to control. For aerobic bacteria, Ocimum sanctum, showed almost equal efficacy as of chlorhexidine but the effect produced by Ocimum basilicum oil was lesser than control.

Conclusion: The essential oil of two varieties of Tulsi showed good antimicrobial activity against the common anaerobic and aerobic organisms of the oral cavity. The activity was more pronounced against anaerobes and was found to be better than chlorhexidine. Ocimum sanctum oil produced a wider zone of inhibition as compared to Ocimum basilicum for all the test strains.

Keywords: chlorhexidine; Ocimum basilicum; Ocimum sanctum, Porphyromonas gingivalis, Prevotella intermedia

Introduction

India since time immemorial is a land where natural herbs and derived products have been used to cure various disease. Ocimum or commonly known as Tulsi is an aromatic plant in the family Lamiaceae which is native to the Indian subcontinent and is a widely cultivated plant throughout the Southeast Asian tropics. The plants are predominantly herbs or shrubs annuals or perennials inhabit. They possess glandular hairs or sessile glands secreting strongly scented volatile oils.

About 160 species of Ocimum genus are reported to be distributed throughout the world. Of the known species Ocimum sanctum, Ocimum basilicum, Ocimum canum, Ocimum gratissimum and Ocimum americanum are widespread in India. Tulsi is an important symbol in many Hindu religious traditions, which link the plant with Goddess figure and hence is grown very common in many households.
Medicinal plants are part and parcel of Indian society to combat diseases since the dawn of civilization. Tulsi also known as the “Queen of Herbs.” is an important medicinal plant and has been traditionally employed in hundreds of different formulations for the treatment of a wide range of disorders like common colds, headaches, stomach disorders, inflammation, heart disease, various forms of poisoning and malaria.\(^4\) It has also been used in treating many chronic non-communicable diseases like diabetes, hypertension and hyperlipidemia.\(^5\)\(^7\)

Dental diseases like dental caries and periodontal disease have affected human race throughout history and are considered one of the most prevalent diseases in the world. Although the nature of the disease and the methods of treatment have advanced tremendously during the past century, it is still not controlled worldwide.\(^8\)

Chlorhexidine is a widely used drug for control of dental disease. The proof of its efficacy in plaque control is beyond dispute. Almost three decades of its use by the dental professionals, chlorhexidine is now recognized as the gold standard against which other antiplaque and antigingivitis agents are measured.\(^9\)

However, use of chlorhexidine for dental disease prevention has been controversial owing to its various side effects like dry mouth, irritation, teeth staining and taste disturbances.\(^10\)

Use of herbal products offers a valuable alternative to chlorhexidine owing to their medicinal values and no side effects. A thorough literature search revealed that few studies had shown the antibacterial properties of various species of Ocimum on oral pathogens, but no comparative studies have been done on essential oil extracts. Hence the thrust of this study was the lack of literature comparing the effect of essential oil extract of different varieties of Tulsi on oral microorganisms as compared to chlorhexidine.

**Materials and Method**

This study used an in vitro experimental design. Ethical clearance to conduct the study was obtained from the Institutional Ethics Committee, Kasturba Hospital, Manipal with registration number IEC 470/2016. The study was carried out between January 2017 and April 2017 at Department of microbiology, KMC Manipal. Commercially available essential oil of two varieties of Tulsi i.e. *Ocimum sanctum* [Pure Holy Basil (Tulsi) Essential Oil - Ocimum Santum, dève herbes, New Delhi, India] and *Ocimum basilicum* [Basil Tulsi Essential Oil (Ocimum basilicum), Kazima Perfumers, New Delhi, India] were procured from market retailers. The oil used was 100% pure oil (as per manufacturer’s instruction). Commercially available chlorhexidine mouthwash 0.2% [Plakil mouthwash, Vishal Dentocare Pvt. Ltd. Gujarat, India] was also procured and used as a control.

**Bacterial Strains used in the Study:** The in-vitro antimicrobial activity of the tulsi extracts was tested on the bacterial isolates of *Staphylococcus aureus*, *Streptococcus mutans*, *Porphyromonas gingivalis*, *Prevotella intermedia* and *Fusobacterium nucleatum*. These isolates were obtained from clinical samples of patients diagnosed with periodontitis and dental caries.

**Inoculum Preparation:** *P. gingivalis, P. intermedia, F. nucleatum* and *S. aureus* isolates were grown on 5% sheep blood agar and *S. mutans* was grown on Brain Heart Infusion (BHI) agar. The anaerobic isolates were incubated in the anaerobic workstation (Don Whitley, Yorkshire, UK) for 72h. *S. aureus* plates were incubated aerobically for 48h at 37°C while *S. mutans* was incubated in the CO2 incubator (NuAire, Inc.) for 48 h. After checking for the bacterial purity, the colonies of anaerobic isolates were inoculated in thioglycollate broth, *S. mutans* in BH1 broth and *S. aureus* in peptone water, and the broths were incubated for 4-6h under appropriate incubation conditions. The turbidity of *S. mutans* and *S. aureus* was adjusted to 0.5 McFarland, turbidity for anaerobic isolates was adjusted to 1 McFarland.\(^10\)

**Product Inhibition Assay:** The antimicrobial susceptibility was determined by agar well diffusion (punch well diffusion) method. For agar well diffusion method, lawn culture of test organism was made on respective media. A sterile cotton swab was dipped into the inoculum and rotated against the wall of the tube above the liquid to remove the excess inoculum. The entire surface of agar plate was then swabbed three times with the cotton swab by rotating the plates by approximately 60° between streaks to ensure even distribution. The same procedure of inoculum preparation and inoculation of culture media was performed for all the bacteria tested. Following the lawn culture of test organisms, individual 9 mm wells were cut in agar plates with sterile borer and 100 µl amounts of oil extract or control were dispensed into these wells.
To avoid bias, the oils were transferred into same color bottles and were marked as oil 1 (Ocimum basilicum) and oil 2 (Ocimum sanctum) respectively. The essential oil extracts were tested in two concentrations, undiluted and 1 in 10 dilutions in ethanol. The microbiologist involved was unaware of the oil codes during the experiment.

Chlorhexidine gluconate (0.2%) was used as a control and its antimicrobial activity was determined against all the bacterial isolates. Vancomycin 30µg discs were used as a procedural control for S. aureus and S. mutans. Metronidazole 5µg (Hi Media Labs, Mumbai, India) discs were used as the procedural control for anaerobic bacteria. The culture plates with anaerobic organisms were incubated in the anaerobic workstation (Don Whitley A35 Anaerobic workstation) for 72h at 37°C. Mueller Hinton agar with S. aureus and BHI agar with S. mutans were incubated aerobically at 37°C for 48 h. All the procedures were performed under strict aseptic conditions and experiments were repeated in duplicates.

After the desired incubation period was over, the zone of inhibitions for the extracts was measured using a Vernier callipers. The diameters of the clear inhibition zones were measured to the nearest millimetre.

Results

The essential oil extracts were tested in two concentrations, undiluted and 1 in 10 dilutions. Vancomycin 30µg discs were used as a procedural control for S. aureus and S. mutans. Metronidazole 5µg discs were used as the procedural control for anaerobic bacteria.

The zone of inhibition produced by both the oils was better against anaerobes as compared to aerobes. The activity of Ocimum basilicum oil was comparatively less as compared to Ocimum sanctum oil for all the test strains.

Table 1: Activity of essential oils against test organisms

<table>
<thead>
<tr>
<th>Product</th>
<th>Zone of inhibition (in mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>S. aureus</td>
</tr>
<tr>
<td>Chlorhexidine</td>
<td>25</td>
</tr>
<tr>
<td>Ocimum basilicum (Undiluted)</td>
<td>13</td>
</tr>
<tr>
<td>Ocimum sanctum (Undiluted)</td>
<td>20</td>
</tr>
<tr>
<td>Ocimum basilicum (1 in 10 dilution)</td>
<td>15</td>
</tr>
<tr>
<td>Ocimum sanctum (1 in 10 dilution)</td>
<td>27</td>
</tr>
</tbody>
</table>

For S. aureus the zone of inhibition for Ocimum sanctum (1 in 10 dilutions) was 27mm which was more than chlorhexidine. For S. mutans both the oils had a lesser zone of inhibition as compared to chlorhexidine. The plates with the zone of inhibition are shown in Fig 1 for S. aureus.

Ocimum sanctum oil undiluted produced the highest zone of inhibition of 55 mm against P. gingivalis followed by 48 mm and 36 mm for P. intermedia and F. nucleatum respectively.

For F. nucleatum, Ocimum sanctum oil (undiluted) showed similar activity as chlorhexidine. For P. intermedia both the oils (undiluted) had a wider zone of inhibition as compared to chlorhexidine. For P. gingivalis, Ocimum sanctum oil (undiluted) showed a wider zone of inhibition as compared to chlorhexidine. The zone of inhibition for P. intermedia after 72 hours of incubation is shown in Fig 2.
India is a land of beautiful natural flora and has abundant medicinal plants growing throughout the country. Few plant extracts are known to possess antimicrobial activity, especially against bacterial pathogens. *Ocimum* (Tulsi) is one such plant which is predominantly present in the Indian subcontinent. The medicinal values of Tulsi extracts have been well documented in the literature. It has been described as the sacred and medicinal plant by Charaka in the Charaka Samhita and is frequently mentioned as one of the main pillars of herbal medicine.

The present study was carried out to test antibacterial activity of commercially available oil of two species of Tulsi against common oral gram positive and gram negative organisms. The oils were tested as undiluted and 1 in 10 dilutions. Ethanol was used as a diluent because the essential oils were more soluble in alcohol when compared to distilled water.

Although both the oils showed promising results against the various bacterial strains; the effect of *Ocimum sanctum* oil was much more pronounced than *Ocimum basilicum*. The active constituent present in *Ocimum* species is Eugenol and perhaps is primarily responsible for the therapeutic potentials of Tulsi.13

Few studies done in India have reported antibacterial activity of Tulsi. A study was done by Pai RK et.al to analyze the efficacy of *Ocimum sanctum* extract against various oral microorganisms. Maximum activity of the extract was seen against *S. mutans* and *S. sanguis*.14

Another study done by Agarwal P et.al showed that at 4% concentration of Tulsi extract, a zone of inhibition of 22 mm was obtained against *Streptococcus mutans*.15 An in-vitro study done by P Eswar et.al showed 6% w/v concentration of *Ocimum sanctum* extract was effective against the periodontal microorganism.16 However a study done by Mallikarjun S et.al showed that tulsi extracts exhibited resistance to *P. gingivalis* and *P. intermedia* which was in contrary to our results.17

*Ocimum sanctum* has also been tested against few other gram negative bacteria. A study was done by Goyal P et.al showed that Gram-negative *Salmonella typhi* was completely resistant to all the tested extracts of *Ocimum* however it was effective against Gram-positive strains.18

The current evidence obtained from this study shows a significant inhibitory effect of essential oil on aerobic and anaerobic microorganisms. The effect produced was better than that produced by chlorhexidine in the case of anaerobic bacteria. However, for aerobes, it was somewhat equivalent or less than that of chlorhexidine.

Since the essential oil obtained from Tulsi is a natural product, there are no associated side effects when compared to chlorhexidine. Also being native to the country and of religious importance, it has a better chance of being accepted by the people. These finding indicates the possibility of using the essential oil of *O. sanctum* in oral health care products for reducing microbial load in the oral cavity.

This study being an in-vitro provide just a preliminary evidence of antibacterial efficacy of essential oil of different varieties of Tulsi. Five major pathogenic

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**Fig. 2: Zone of inhibition against *Prevotella intermedia* after 72 hours of incubation**
bacteria were tested in this study. However, many other microorganisms have been implicated in the causation of oral disease.

The MICs of the purified active components from the Tulsi extracts against the common pathogenic oral microorganisms needs to be determined. Future clinical trials should be carried out to demonstrate its effect on the various microorganisms further and to elucidate its effects on other aspects.

Conclusion

The essential oil of two varieties of Tulsi showed antibacterial efficacy against the common anaerobic and aerobic organisms of the oral cavity. The activity was more pronounced against anaerobes. *Ocimum sanctum* oil produced a wider zone of inhibition as compared to *Ocimum basilicum*.

Acknowledgment

We would like to thank all the non-teaching staff of Department of Microbiology, KMC Manipal for their help in culture media growth and testing.

Source(s) of Funding: Nil

Conflicting Interest: None

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Study of Correlation between HbA1c and Renal Dysfunction in Type-2 Diabetes Mellitus

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ABSTRACT

Objectives: With the rising prevalence of type 2 diabetes it has come to pose a heavy burden on healthcare systems worldwide. Diabetic nephropathy is the most common cause of end-stage renal disease could have a seriously negative impact on the economies of developed as well as developing nations. Diabetic nephropathy can lead to tissue scarring, urine proteins loss and chronic kidney disease, requiring sometimes dialysis or even kidney transplantation. Since the aim of the study is to recognize the importance of measurement of HbA1c in renal dysfunction which might help for the application of appropriate drug regimens and to regulate and monitor glucose levels to improve health conditions in the care of type2 diabetic patients.

Method: Blood samples received from either OPD or IPD in plain and EDTA vacutainers was separated from blood to plain vacutainer by centrifugation at 3000rpm for 10 minutes. For HbA1c EDTA vacutainer samples are used. By using different methods serum urea, creatinine estimated on fully automated analyzer EM360

Results: The correlation coefficient as Pearson’s correlation coefficient is 0.333 between HbA1c and blood urea level with p value <0.0001 which is highly significant and between HbA1c and blood urea level it is -0.026, p value is 0.6484, indicating this negative correlation is significant. Serum creatinine and HbA1c shows positive correlation, p value is 0.4459 showing this correlation is significant. Correlation between HbA1c and serum creatinine in all three age groups is positive.

Conclusion: These findings may provide the basis for the application of appropriate drug regimens and to regulate and monitor glucose levels to improve health conditions in the care of diabetic patients. Since HbA1c is a important measure to assess the micro vascular complications and plasma glucose.

Keywords: HbA1c, serum creatinine, diabetic nephropathy, blood urea, renal failure

Introduction

Diabetes mellitus describes a metabolic disorder with different aetiologies which is characterized by a chronic hyperglycemia and disturbances of carbohydrates, fat, and protein metabolism resulting from defect in insulin. Since diabetes is the most common reason for renal dysfunction resulting in rise in level of serum urea and creatinine. This hyperglycemia in diabetes is associated in process of damage and failure of various organs including kidneys. Hyperglycemia causes the excess of glucose to combine with tissue proteins including hemoglobin. This results in increased amount of glycosylated hemoglobin (HbA1c) which indicates poorer control of blood glucose levels in past 3-4 months. Till date HbA1c is a useful parameter of how well blood glucose levels has been controlled in past 3-4 months. Increased levels of HbA1c might be associated with cardiovascular diseases, nephropathy, neuropathy and retinopathy.

Tests to measure glucose in blood were developed 100 years ago and hyperglycemia the sole criteria for diagnosis. Before 2010 virtually diabetes society recommended blood glucose analysis as the exclusive
method to diagnose diabetes. Notwithstanding these guidelines over the past few years many physicians have been using HbA1c to screen and diagnose diabetes because of its advantages 1.

Many factors can affect the interpretation of HbA1c measurement in patients with chronic renal failure 2. Also to recognize the ranges of HbA1c in diabetes, tracing back complications of diabetes and its control 3, 4, 5.

Since the aim of the study is to recognize the importance of measurement of HbA1c in renal failure. Proper glycemic control can decrease the incidence of diabetic nephropathy and earliest markers of nephropathy are serum creatinine and blood urea. With these circumstances this study is being carried out to measure the levels of HbA1c, serum urea, serum creatinine along with fasting blood sugar. A few researches carried out to find out the cut off values of HbA1c screening however focusing on the high risk groups. A study determined the normal range of HbA1c in a sample of non diabetic 6. Since HbA1c is an important measure to assess the micro vascular complications, also to find out the correlation between HbA1c and serum urea, serum creatinine.

**Materials and Method**

This study was conducted in a tertiary hospital after obtaining approval from institutional ethics committee. Since this is a retrospective study, data collected from the records of tertiary care hospital. All subjects were diagnosed cases of type 2 diabetes mellitus of the age group ranging from 20-80 years attending the OPD and IPD’S of the hospital. Patients of type 1 diabetes are excluded from the study and also patients below 20 years and above 80 years are also excluded because they are less in number. The biochemical parameters estimated for all these subjects in clinical biochemistry laboratory by the use of fully automated analyzer EM360 from Transasia. Blood samples received from either OPD or IPD in plain and EDTA vacutainers was separated from blood to plain vacutainers by centrifugation at 3000rpm for 10 minutes. For HbA1c EDTA vacutainers samples are used. Following methods were used for investigating different biochemical parameters.

<table>
<thead>
<tr>
<th>Name of Parameter</th>
<th>Methods Used</th>
</tr>
</thead>
<tbody>
<tr>
<td>HbA1c</td>
<td>Immunoturbidometric Method</td>
</tr>
<tr>
<td>Blood Sugar</td>
<td>GODPOD method</td>
</tr>
</tbody>
</table>

**Statistical Analysis**

Data for 300 patients, diagnosed cases of type 2 diabetes mellitus are collected. Statistical analysis was done by using software INSTA-STAT. The correlation regression test was applied to determine the correlation between different parameters. Results were presented in form Mean ± SD correlation coefficient and p value.

**Results**

**Table 1: Age wise Distribution**

<table>
<thead>
<tr>
<th>Age Groups</th>
<th>No.of Subjects</th>
</tr>
</thead>
<tbody>
<tr>
<td>20-40 Years</td>
<td>55</td>
</tr>
<tr>
<td>41-60 Years</td>
<td>114</td>
</tr>
<tr>
<td>61-80 Years</td>
<td>131</td>
</tr>
</tbody>
</table>

**Table 2: Correlation between HbA1c and FBSL**

<table>
<thead>
<tr>
<th>Name of Test</th>
<th>Mean ± S.D</th>
<th>Correlation Coefficient</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>HbA1c</td>
<td>7.42 ± 2.20</td>
<td>0.333</td>
<td>&lt;0.0001</td>
</tr>
<tr>
<td>FBSL</td>
<td>184.83 ± 84.11</td>
<td>0.333</td>
<td>&lt;0.0001</td>
</tr>
</tbody>
</table>

Fasting blood sugar level (FBSL) and HbA1c shows positive correlation, p value is <0.0001 showing this correlation is highly significant.

**Table 3: Correlation between Hba1c and BUL**

<table>
<thead>
<tr>
<th>Name of Test</th>
<th>Mean ± S.D</th>
<th>Correlation Coefficient</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>HbA1c</td>
<td>7.42 ± 2.20</td>
<td>0.026</td>
<td>0.6484</td>
</tr>
<tr>
<td>BUL</td>
<td>43.20 ± 34.32</td>
<td>0.026</td>
<td>0.6484</td>
</tr>
</tbody>
</table>

The correlation coefficient as Pearson’s correlation coefficient is -0.026 between HbA1c and blood urea level. P value is 0.6484, indicating this negative correlation.

**Conted…**
Table 4: Correlation between HbA1c and Serum Creatinine

<table>
<thead>
<tr>
<th>Name of Test</th>
<th>Mean ± S.D</th>
<th>Correlation Coefficient</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>HbA1c</td>
<td>7.42 ± 2.20</td>
<td>0.044</td>
<td>0.4459</td>
</tr>
<tr>
<td>Serum Creatinine</td>
<td>1.69 ± 1.63</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Serum creatinine and HbA1c shows positive correlation, p value is 0.4459.

Table 5: Age wise Correlation between HbA1c and FBSL

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Name of Test Range</th>
<th>Mean ± S.D</th>
<th>Correlation Coefficient</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>20-40 YEARS</td>
<td>HbA1c [4.2-16] FBSL[71- 501]</td>
<td>8.33 ± 3.20 192.89 ± 97.25</td>
<td>0.227</td>
<td>0.2440</td>
</tr>
<tr>
<td>41-60 YEARS</td>
<td>HbA1c [5.4-12.9] FBSL[56- 501]</td>
<td>8.22 ± 1.90 219 ± 99.64</td>
<td>0.201</td>
<td>0.1255</td>
</tr>
<tr>
<td>61-80 YEARS</td>
<td>HbA1c [3.1-13.7] FBSL[85- 436]</td>
<td>7.43 ± 2.05 193.32 ± 83.97</td>
<td>0.483</td>
<td>&lt;0.0001</td>
</tr>
</tbody>
</table>

Table shows age wise correlation between HbA1c and FBSL. In all three age groups correlation is positive p value. For age group 61-80 years is <0.0001 showing correlation is highly significant.

Table 6: Age wise Correlation between HbA1c and BUL

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Name of Test Range</th>
<th>Mean ± S.D</th>
<th>Correlation Coefficient</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>20-40 Years</td>
<td>HbA1c [4.2-16] Bul [16- 168]</td>
<td>8.33 ± 3.20 37.17 ± 32.39</td>
<td>0.0509</td>
<td>0.7970</td>
</tr>
<tr>
<td>41-60 Years</td>
<td>HbA1c [5.4-12.9] Bul [15- 183]</td>
<td>8.22 ± 1.90 44.55 ± 36.05</td>
<td>0.064</td>
<td>0.6269</td>
</tr>
<tr>
<td>61-80 Years</td>
<td>HbA1c [3.1-13.7] Bul [16- 178]</td>
<td>7.43 ± 2.05 53.28 ± 40.85</td>
<td>0.053</td>
<td>0.6500</td>
</tr>
</tbody>
</table>

Age wise correlation between HbA1c and BUL in age group 20-40 years is positive with p-value 0.7970. Remaining two groups that is 41-60 years and 61-80 years also shows a positive correlation in HbA1c and BUL with positive p-value 0.6269 and 0.6500 respectively.

Table 7: Age wise Correlation between HbA1c and Serum Creatinine

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Name of Test Range</th>
<th>Mean ± S.D</th>
<th>Correlation Coefficient</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>20-40 Years</td>
<td>HbA1c [4.2-16] Sr.crea.[0.7- 2.5]</td>
<td>8.33 ± 3.20 1.75 ± 2.24</td>
<td>0.075</td>
<td>0.7011</td>
</tr>
<tr>
<td>41-60 Years</td>
<td>HbA1c [5.4-12.9] Sr.crea.[0.7- 4.6]</td>
<td>8.22 ± 1.90 1.92 ± 2.18</td>
<td>0.117</td>
<td>0.3759</td>
</tr>
<tr>
<td>61-80 Years</td>
<td>HbA1c [3.1-13.7] Sr.crea.[0.8-10.8]</td>
<td>7.43 ± 2.05 2.02 ± 1.84</td>
<td>0.030</td>
<td>0.7954</td>
</tr>
</tbody>
</table>

Correlation between HbA1c and serum creatinine in all three age groups is positive and also significant. Mean for serum creatinine in age groups 20-40 years is 1.75, 41-60 years is 1.92, 61-80 years is 2.02 indicating age wise there increase in serum creatinine levels.
Discussion

Glycated hemoglobin (HbA1c) was before recognized as an “unusual” hemoglobin of diabetes over 40 years ago 7. HbA1c was introduced into clinical use in the 1980’s and subsequently has become a cornerstone of clinical practice. HbA1c reflects average plasma glucose over the previous 8-12 weeks 8. It can be performed at anytime of the day and does not require any special preparation such as fasting. Because of this convenience HbA1c become a preferred test for assessing glycemic control in people with diabetes. In recent days this is becoming a diagnostic test for diabetes and also screening test for persons at high risk of diabetes 9.

HbA1c has now been recommended by an international committee and by the ADA as a means to diagnose diabetes (9). Many studies have reported nephropathy as a complication due to long standing duration of diabetes and correlated it with microalbuminuria, hypertension but there are few studies which have correlated levels of serum creatinine and urea 10. Experimental evidences identify urea as a putative culprit of reduced insulin sensitivity and defective insulin secretion. Keeping in mind all these circumstances.

We collected data for 300 diagnosed cases of type 2 diabetes for HbA1c, BUL, and serum creatinine. Our results provide age wise distribution as in our last group 61-80 years more numbers of cases indicate, as the age increases there is an increase in incidence of type 2 diabetes (11). Relationship between HbA1c and BUL is coming negative and also it is significant. Lower than expected levels of HbA1c can be seen in patients of chronic renal diseases 11. As per American Diabetes Association results of HbA1c affected during kidney failure (uremia), chronic excessive alcohol intake and hypertriglyceridemia 11, 12, 13. In our study also, there might be interference with the estimation of HbA1c resulting in negative correlation with BUL. Renal failure can have complex influences on HbA1c formation and measurements14. The reason being the fact that urea derived isocyanate can lead to formation of carboxylated Hb, which can be indistinguishable from HbA1c during the time of estimation 15, 16. In diabetic patients with end stage renal disease erythrocytes lifespan tends to decrease. This may result in part form of iron deficiency anemia, recent transfusions or other effects of kidney disease on erythrocytes survival. Uremic patients with high blood urea levels also develop significantly high levels of carbamylated hemoglobin, which interferes with some HbA1c assays17. This might explain the negative correlation between HbA1c and BUL. HbA1c and serum creatinine show positive correlation with significance indicating creatinine increases with increase in HbA1c.

Serum creatinine is significantly associated with impaired glucose regulation independent of known metabolic risk factors.17. Nephropathy is the leading cause of chronic renal failure worldwide and also in India which is responsible for renal failure in about one–third of the patients who undergo dialysis18. The exact cause of diabetic nephropathy is unknown, but various postulated mechanism are hyperglycemia, advanced glycation products and activation of cytokines. Although it has been stated by various authors that poor glycemic status is one of the key factors responsible for diabetic nephropathy 19,20.

Persistent elevation in blood sugar and therefore HbA1c increases the risk of long term vascular complications of diabetes such as coronary disease, heart attack, stroke, kidney failure, blindness, neuropathy etc. poor blood glucose control also increases the risk of short term complications of surgery as poor wound healing (20). HbA1c causes an increase of highly reactive free radicals inside blood cells. Radicals alter blood cell membrane properties. This leads to blood cell aggregation and increased blood viscosity which results in impaired flow.

The use of HbA1c can avoid the problems of day to day variability of glucose values and importantly it avoids the need for the person to fast and to have preceding dietary preparations. These advantages have implications for early identification and treatment which have been strongly advocated in recent years. However, HbA1c may be affected by a variety of genetic, hematologic and illness related factors. The most common important factors worldwide affecting HbA1c levels are hemoglobinopathies (depending on the assay employed), certain anemia and disorder associated with accelerated red cell turnover such as malaria.

However negative correlation between HbA1c and BUL indicates that we should not rely on HbA1c assays when it is end stage renal damage.
Keeping in mind all the limitations as well as usefulness of HbA1c, we can say practice of assay methods has changed profoundly in recent years. The least reliable methods have been superseded by standardized procedures. Assays based on chromatographic or immunological techniques have strongly contributed to improve the quality of the results supplied to the clinicians. Therefore HbA1c is a useful indicator of how well the blood glucose level has been controlled in the recent past (over two to three months) and may be used to monitor effects of the diet, exercise and drug therapy on blood glucose regulation in people with diabetes. Since HbA1c measurement is ubiquitous it seems advisable for providers to become familiar with factors affecting the test in general and the limitations of the assays offered in their laboratory in particular.

**Conclusion**

In our study, there might be interference with the estimation of HbA1c resulting in negative correlation with BUL. Renal failure can have complex influences on HbA1c formation and measurements. The reason being the fact that urea derived isocyanate can lead to formation of carboxylated Hb, which can be indistinguishable from HbA1c during the time of estimation. (20). Therefore HbA1c is a useful indicator of how well the blood glucose level has been controlled in the recent past (over three to four months) and may be used to monitor effects of the diet, exercise and drug therapy on blood glucose in people with diabetes. Since HbA1c measurement is ubiquitous it seems advisable for providers to become familiar with factors affecting the test in general and the limitations of the assays offered in their laboratory in particular. These findings may provide the basis for the application of appropriate drug regimens and to regulate and monitor glucose levels to improve health conditions in the care of diabetic patients. Since and monitor glucose levels to improve health conditions in the care of diabetic patients. Since HbA1c is a important measure to assess the microvascular complications and plasma glucose.

**Ethical Clearance:** Taken from Ethical Committee

**Source of Funding:** ICMR approved project

**Conflict of Interest:** NIL

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The Psychological, Social and Political Measures, How Clients Think About the Utilization of Plastic Money Using in India

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ABSTRACT

Background: In this review article explain how India is adopting using of plastic money in psychological-behavioural-social aspect.

Aims: How customers consider use of plastic money, which is clarifying broadly. Indian business exchanges are commonly done by generally utilizing of liquid money.

Materials and Method: This article is a review paper, based on literature survey, reports, case study has prepared.

Result: This change has proposed individuals to start the usage of plastic cash instead of the fundamental hard money for doing exchanges once dependably which additionally connects with them the upside of credit buys and a post-reimbursement elective for the level of credit used on these cards.

Conclusion: Government needs to see how to improve and constantly secure area sections with high-security fix up programming which does not give a lead to information robbery or hacking of money related subtleties of the clients. Banks should train individuals through pondered the occupations of plastic and the usage headings to the monetarily botching masses proportionately as the present clients and to support a once in a while extending number of individuals to utilize plastic cash.

Keywords: Plastic money, Psychological Political Social approximation, IT industrialization, Buy-today-pays tomorrow option, Digitalisation in Indian economy.

Introduction

Plastic money is a system of cashless trade where credit, debit, charge, shopping and smart cards, (EMV) cards, etc. are considered to use in the customer day by day presence to small scale associations¹. Plastic money is used in procuring any tradable things instead of using paper cash which isn’t always available at any time and situations of one’s life. In India, in psychological, social and political approximation, how clients think about usage of plastic money that is explaining in a broader way. Indian business trades are generally done by mostly using of liquid cash. Still individual’s trust in liquid money close by¹. Financial organizations like Visa, Master, Maestro, and Ru-Pay (in India) empower electronic hold trade through the plastic money that does 24x7 and 366 days works. In India plastic money has ended up being pervasive by the customers of 719.51 million as demonstrated by 2016 measurements where 2017 database has revealed 860.17 million of such customers accounting 33.45% of enhancement of customers taking a glance at the consecutive years. In June 2018, 944 million Visa cards being used in India join as individual and corporate cards². The estimation of MasterCard and Visa card trades widely inclusive length of June 2018 accomplished more ₹46,629 crore, moderately growing from a year sooner. Platinum card trades the period went up by 33 percent to ₹3, 15,627 crores. This endeavour suggestion is to address the reason for such increased value in India or it’s the most part high enlargement interestingly with the prior years’ database. The endeavour also focuses the effect of the industrialization of information technology (IT) on plastic money customers in India.
With the rapid advancement and exponential refresh in the enhancement field, the utilization of plastic money and the essentials for a cashless society has progressed. The cashless society, where more and expensive to-control (direct) coins and notes are replaced by instigating electronic bits begun by various sorts of plastic cards is a charming prospect for the twenty-first century. The enlightened was the progress of the use of the plastic cash (money) at the offer of POS (Point of Sale) and has influenced cases that the UK could be the first central cashless society by International Journal of Retail and Distribution Management in 2001. Bank for International Settlement in 2001 demonstrated that plastic money has boated checks as the most totally saw non-money disperse and nations like South Korea and Australia was relied on to mastermind after an in every convenient sense gravely depicted perspective. All through late decade’s plastic money have wound up being sensibly open to the family as MasterCard fortify have stretched out credit to clients. Indirect focuses on the examination of individuals, gatherings, or affiliations and the structures they use to pick secure, use, and dispose of things, affiliations, experiences, or contemplations to satisfy needs and the impacts that these methods have on the customer and society (Professor Lars Perner, 1999)\textsuperscript{14}. The lead parts of the buyer are to an incredible degree touchy all around with the stores added to them and in that limit if all else fails their decisions are standoffish concerning their veritable bits of information\textsuperscript{28}. They may not keep running about concerning their inside motivations and may react to changes affecting their affinities finally stated\textsuperscript{30}. It is critical to search for after and think the gaining propensity as customers can’t be put down and have passed on the parts that influence their purchase. Moreover, he intertwines specific elements, for instance, social, political and psychological as basic determinants of purchaser facilitate\textsuperscript{4}. So India also makes digitalized by use of plastic money and e-transactions.

**Review of Literature**

Again, in claim to fame stores with over $1 million in deals, Visas represented 10% of the dollar deals volume in 1978. Year of 1980, Visas deals had expanded drastically to seventeen percent of the dollar deals volume. There is no uncertainty that IT systems for influencing trades can break even with, or enhance, money in certain regards, and for certain reasons. The speed of culmination is for the most part as quick, or some of the time quicker, with a plastic card or e-cash; (Zellekens and Rueter1996)\textsuperscript{21}. The charge card was at first utilized as a typical instalment mode for extravagances, for example, travel, and settlement. Be that as it may, it’s right now dynamically utilized for getting small things of comfort in our day by day lives beginning from the complex to the everyday (Lee, 2000)\textsuperscript{19}. People must have convincing motivations to change their instalment propensities. Else, they keep misuse recommends that of instalment, they’re most familiar with buyer fulfilment from the buy depends intensely on the season of lining and the season of undertaking an exchange at the counter. In Visa proprietorship and use conduct in Botswana examined the impact of Master-cards and administration experience interface was examined. They proposed that time is the greatest influencer pursued by a conviction that all is good and certainty\textsuperscript{4}. Limits and card offices and the effect were considered. In the social examination of Credit Card Users in a Developing Country: A Case of Bangladesh. This paper takes a gander at a developing economy where the vast majority of the statistic variables may not huge in driving the utilization of cards. An apparently less vital factor like limits and office is by all accounts a noteworthy choosing variable. World study report just as Indian statistics investigate Plastic Money (Especially on charge and Master-cards) taken from Forex Bonuses, Times of India, Medianama report, October 2018.

**Measures of Plastic money on psychological-political and behavioural aspect:**

**Psychological Aspect:** In India, the banking reforms have made the market greater aggressive and attractive. There is a want to look at the purchaser and how do they behave closer to the use of plastic money, specifically thru using credit cards, debit cards, smart cards and many more\textsuperscript{5}. As in comparison to the rest of the economies, credit score card has no longer been a driving supply for the Indian financial system. The development of economic services advertising has been sluggish and for a long time, the industry becomes primarily product led. According to
banks has awareness on geographical, socio-cost-effective and psychological characters to section the marketplace for economic services, although this isn’t always the proper predictor of the shopping for conduct7.

Political Aspect: On November 8, 2016, government cope with to the state and rupees 500 and rupees 1000 notes invalid. Govt. said it’ll diminish the deep-rooted ailment of corruption and black money. Furthermore, the Indian economic system has long gone a reset with large high-quality implications for liquidity, inflation, monetary and external deficit inside the brief term. With this flow, India’s function on transparency and corruption will improve on inside the international level, therefore including to its investor attraction. As the technique of demonetization comes into pressure, the state has to additionally look closer to plastic money as a new alternative to cash. India in urgent want for breaking thru the limitations of corruption can take a good deal and intention to fast adoption of plastic money10. Plastic money can get rid of the need for sporting large cash, which is also volatile and inconvenient. It additionally minimizes the danger of loss or theft as within the case of plastic cash like a debit/credit card, can record any be counted of robbery or loss to the financial institution and block the card for fending off misuse14. One of the specific benefits it could provide is the convenience of the use of it anywhere even overseas. Money exchanges were another device for deceitful gatherings to abstain from making good on the important government expenses and obligations19.

Social Aspect: The governing body recognizes, in any case, that the most ideal approach to ask people towards such a change is by making it less difficult and, even more fundamentally, engaging6. They are accordingly endeavouring to give inspiring powers to the client and shipper alike so they vivaciously make the required move towards ‘plastic money’. Purchasers can likewise get tax benefits as pay assess refunds relying upon the bit of their use that is made through computerized implies14. This implies more the utilization of plastic cash, more will be the salary assessment forms – an offer that is difficult to disregard. Banks usually charge 0.75 to 1 percent of payment on debit cards and up to 2 percent on credit cards as a convenience fee. To encourage increased electronic payments, CAIT plans to advise banks to cease these charges and instead offer cash back rewards for such payments. Mobile banking to takes up charge 1.50 per transaction as Unstructured Supplementary Service Data (USSD) charge which can be reduced by telecom companies. The memorandum also looks to increase the reportable limit on credit cards, allowing consumers greater flexibility to use credits for more transactions.

Recent trends in plastic money after digitalization in India:
- At present, there is a Merchant Discount Rate (MDR) of 0.75% on check card trades up to rupees 2,000 and 1% on all trades above rupees 2000. The probability of a decline in the MDR and the legitimization of the movement of the MDR across over different accomplices will be examined17.
- Tax reductions to the extent compensation survey limits to be considered to customers for paying an explicit degree of their utilization through electronic techniques.
- The affirmation necessities for different classes of trades could be re-examined subject to the danger profile and security requirements.
- Consider an interest of an apparent cash managing charge on trades more unmistakable than a foreordained measurement.
- Requesting settling of high regard trades of, state, more than rupees 1 lakh, just by electronic procedures (Transactions).
- At present, banks need to report the aggregate of all parts made by a view cardholder as one trade, if such a whole is rupees 2 lakh in a year. To help high regard trades, the most raised inspiration driving rupees 2 lakh could be related with state rupees 5 lakh or more11.

Information Technology (IT) Industrialisation influenced plastic money: IT industry has progressed significantly to its present shape where it is assuming an extremely predominant job in our every circle of life. It has rolled out progressive improvements in data social event and scattering just as in worldwide correspondence. It is making a for all intents and purposes paperless workplace and 24x7 work times. Technological advance unavoidably makes reliance on innovation. As without a doubt, as the world is currently reliant on its electronic frameworks, it will be subject to the developing data infrastructure18. The increasing portrayal of a wide
assortment of substance in advanced shape results in simpler and less expensive duplication and conveyance of data. This mixed affects the arrangement of substance. From one viewpoint, the substance can be disseminated at a lower unit cost. Especially in financial sectors has made a huge impact on information technology and creates industrialization.

Buy today- pays tomorrow (later) option in credit cards: The plastic money considers – Buy today, pay tomorrow (later), is perceived to be a present solace mantra. This is a 40 percent enhancement from charge 85,800 crores the prior year. According to a report by the Internet and Mobile Association of India (IAMAI), factors like making Internet entrance, improvement in electronic business and the simplicity of online bits have induced this movement. The upsides of a charge card are bewildering and join convenience, better security, and logically essential flourishing when meandered from cash. You can develop the benefits of your MasterCard by following these three key advances:

1. Become a whole plan customer by an enormous bit of the time using your charge card. The more you use it adequately, the more grounded its beneficial outcome on your budgetary evaluation. In line way, your chances of getting pushes from money lenders end up more grounded.

2. It is a not too horrendous practice to utilize the limit of your credit limit towards the beginning of your credit cycle. For example, if your charging cycle is from, express, the tenth of constantly, attempt to make the most preposterous use of your card closer to this date. This will empower you to benefit the most extraordinary free credit.

3. Try to keep up a basic division from littlest parts on your brilliant total. It is reasonable to pay 100 percent of your Visa charges past what many would think about conceivable. Keep yourself orchestrated to pay all your heavenly right on time as this reflects unfathomable credit lead. This again will genuinely affect your FICO rating.

Conflict of Interest: Uniquely in India, individuals are increasingly advantageous to utilize fluid money and there is no responsibility to promote check in future for appearing total national output.

Ethical Clearance: Not required as it is a review article.

Source of Funding: Self from related review articles, reports.

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A Comparative Study on Leisure Activity Status of School-going Adolescents in Urban and Rural Lucknow

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ABSTRACT

Background: In the last few decades, the Indian society has been witnessing rapid transformation in the environmental, social, and economic arenas of life under the impact of globalization. A major consequence of this has been the emergence of newer leisure opportunities for the younger people. Leisure activities should be novel and should provide arousing experience. A suitable balance among individuals’ daily activities, self-maintenance, work, leisure time activities, rest and sleep is important for remaining in good mental health. Adolescence is an important milestone in terms of personal development. It is during this critical period that later attitude towards life are formed. Leisure pursuits have an important role in adolescent’s personal development.

Method: This was a cross sectional study conducted in one school of urban and one school of rural Lucknow. A pre-defined semi-structured mixed questionnaire was used as a study tool to collect data. Teachers were requested to help students who could not understand a particular question. A total of 200 students from 2 schools participated and responded to the questionnaire. The data was entered in Excel spreadsheet and results were evaluated using SPSS 19.0 version.

Conclusions: The present study provides a picture of emerging scenario of leisure time activities in different segments of adolescents. In view of relevance of leisure time use to health, we need to acknowledge that leisure time is developmentally a valuable activity, and therefore it should be utilized to acquire and enhance competencies and wellness and not for burdening with health problems.

Keywords: Leisure time activity, Adolescents, Physical activity, Urban-Rural

Introduction

In the last few decades, the Indian society has been witnessing rapid transformation in the environmental, social, and economic arenas of life under the impact of globalization. Concomitant to these changes, the life tasks are being reorganized by the introduction of various time-saving gadgets, home appliances, entertainment devices, and communication instruments (e.g. laptop, mobile, videogames, iPod, iPad, television, and Internet). Taken together, they tend to reorganize the pattern of time use and engagement with physical exercise. A major consequence of this has been the emergence of newer leisure opportunities for the younger people.¹

“All work and no play make jack a dull boy” old saying poses importance to leisure among children. Leisure activities should be novel and should provide arousing experience. Leisure is defined as a “non-obligatory activity that is intrinsically motivated and engaged in during discretionary time, that is, time not committed to obligatory occupations such as work, self-care, or sleep” (Parham & Fazio, 1997).²

A suitable balance among individuals’ daily activities, self-maintenance, work, leisure time activities, rest and sleep is important for remaining in good mental health.
Passive leisure activities such as watching television, playing video games etc. leads to negative impacts like social isolation, sense of boredom and reduced physical activity. So it is not only necessary to include interesting leisure activities but it’s also more important to consider and encourage an active leisure activities.2

Adolescence is an important milestone in terms of personal development. It is during this critical period that later attitude towards life are formed. Leisure pursuits have an important role in adolescent’s personal development.3Indian adolescents’ use of free time, influenced by both tradition and modernization, varies according to class, setting (urban versus rural), and gender.4

Leisure in school children is influenced by time availability, freedom of stress, lack of available resources or materials, due to over load of student ratio, provision of novelty and opportunities to make choices etc. self-consciousness, too much challenge, limited choices and excessive competition are inhibitory to leisure interest and their participation.

Lack of leisure and inappropriate time use may lead to certain issues such as drug abuse, addicted habits, psychosocial problems which may influence their physical and mental well-being and thereby affecting academic achievements.2

Aim & Objectives

1. To assess the type of Leisure time activities.
2. To assess the pattern of Leisure time activities in Urban& Rural School going children.

Materials & Method

Study Design: Cross-sectional Study

Study Area: 1 School of Urban & 1 School of Rural Lucknow

Study Population: School-going Children

Study Duration: January 2019 – February 2019

Sample Size: 100 Urban & 100 Rural School-going Children

Sampling Technique: Purposive

Inclusion Criteria:

1. Students willing to participate.
2. Students present at the time of study.
3. Students coming under adolescents age criteria (10-19 years)

Exclusion criteria:

1. Students <10 years or >19 years of age.
2. Students absent during the time of study.
3. Students who do not give verbal consent to participate in the study.

Methodology

This was a cross sectional study conducted in one school of urban and one school of rural Lucknow. The students belonging to eco-education school were included in this study on the basis of a predefined inclusion and exclusion criteria.

The School authorities were explained about the need of the study and due permission was taken from concerned authorities. A pre-defined semi-structured mixed questionnaire was used as a study tool to collect data. The teachers in each school were briefed about the project and given the questionnaire to read for the knowledge and understanding. Teachers were requested to help students who could not understand a particular question. A total of 200 students from 2 schools participated and responded to the questionnaire. The questionnaire after completion were recollected by the teachers and submitted to the investigator.

The data was entered in Excel spreadsheet and results were evaluated using SPSS 19.0 version.

Operational Definitions:

Physically Active: children involved in at least 60 minutes of moderate to vigorous intensity physical activity like, dancing, brisk walking, running, fast cycling, fast swimming, competitive sports and games.5

Cultural Activities: include involvement in local festival or community events, local sporting event, local museum or zoo, volunteer activity for a charitable organisation, parades’, bowling, parties.6

Adolescent: WHO defines ‘Adolescents’ as individuals in 10-19 years age group.7,8
Results

Participants, recruited for this study, constituted a sample of 100 Urban school children and 100 Rural school children out of which in Urban school category there were 48% Male and 52% Female participants; 55% children were between 11-14 years of age and 45% were between 15-17 years of age and maximum number of children from urban school were from grade 7th (34%). In Rural school category there were 51% Male participants & 49% Female participants; 38% children were between 11-14 years of age and 62% were between 15-17 years of age and maximum number of children from rural school were from grade 6th (38%).

Table 1: Routine Activities of School Going Adolescents

<table>
<thead>
<tr>
<th>Variables</th>
<th>Place of Residence</th>
<th>Total (N = 200)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Rural</td>
<td>Urban</td>
</tr>
<tr>
<td>Own Laptop</td>
<td>No</td>
<td>96% 76%</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>4% 24%</td>
</tr>
<tr>
<td>Cultural Activities</td>
<td>No</td>
<td>70% 32%</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>30% 68%</td>
</tr>
<tr>
<td>Sleep Time</td>
<td>&gt;8 Hrs</td>
<td>0% 6%</td>
</tr>
<tr>
<td></td>
<td>8 Hrs</td>
<td>40% 12%</td>
</tr>
<tr>
<td></td>
<td>6 Hrs</td>
<td>56% 60%</td>
</tr>
<tr>
<td></td>
<td>&lt; 6 Hrs</td>
<td>4% 22%</td>
</tr>
<tr>
<td>Do Yoga Regularly</td>
<td>No</td>
<td>46% 86%</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>54% 14%</td>
</tr>
<tr>
<td>Go to Field Regularly</td>
<td>No</td>
<td>20% 70%</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>80% 30%</td>
</tr>
<tr>
<td>Enjoy Studying</td>
<td>No</td>
<td>2% 4%</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>98% 96%</td>
</tr>
<tr>
<td>Vigorous Physical Activity/Week</td>
<td>2 Days</td>
<td>24% 46%</td>
</tr>
<tr>
<td></td>
<td>4 Days</td>
<td>20% 20%</td>
</tr>
<tr>
<td></td>
<td>Daily</td>
<td>56% 12%</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>0% 22%</td>
</tr>
</tbody>
</table>

In this study, we found that more number of children from urban school (24%) was using laptop/desktop as compared to children of rural school (4%). Children from urban school were more involved in cultural activities (68%) as compared to children from rural school (30%).

Marked difference was found in the physical activity status of children from rural school as compared to urban school children. Children from rural school were more involved in physical activities like performing yoga and going to field regularly for outdoor games (54% & 80% respectively) as compared to urban school children (14% & 30% respectively). 56% children from rural school performs vigorous physical activity on daily basis for at least 60 minutes while only 12% children from urban school performs vigorous physical activity on daily basis.

Almost equal proportions of children from rural & urban school (56% & 60%) were found to take sleep of 6 hrs a day. Similarly, 30% children from urban school & 34% children from rural school spend time with their
parents for more than 1 hour per day. Having a walk with family members in free time was found to be the most common interest in both urban & rural school children (46% & 44%) followed by watching cinema (26% & 28%), gardening (26% & 24%) and riding scooty/bike/cycling (1% & 4% respectively).

Maximum number of children from both urban & rural school (68% & 62%) preferred playing in the field during their games class, 32% children from rural school preferred studying while 24% children from urban school preferred chatting. Main interest of children from urban school was found to be in music (60%) followed by sports (22%), computer (10%) & literature (8%) while main interest of children from rural school was found to be in music (44%) followed by literature & computer (24% each) and sports (8%).

![Fig. 1: Types & Pattern of Leisure Time Activities](image)

Fig. 1 shows various types of leisure time activities adopted by rural & urban school children. It was found that 70% children from urban school spend more than 60 minutes per day in watching television while 46% children from rural school spend more than 60 minutes per day in watching television. 26% children from rural school spend at least 30 minutes per day in playing videogames, 8% spend at least 60 minutes per day on laptop/desktop and 12% use mobile phone for more than 30 minutes per day while only 8% children from urban school spend 30 minutes per day on videogames, 18% spend time on laptop/desktop for at least 30 mins per day and 42% spend more than 30 minutes per day on mobile phones.

Apart from the above mentioned activities, few activities in which children were actively involved during their leisure time were dancing, skipping, jogging and walking. 28% children from urban school and 24% children from rural school spend their leisure time in dancing for at least 15 minutes per day. Children from rural school were more interested in skipping (36%) as compared to children from urban school (18%). Half of the children from rural school (50%) goes for jogging in their leisure time for at least 15 minutes per day while only 30% children do the same. 42% children from rural school and 34% children from urban school goes for walking for 30 minutes per day in their leisure time.

**Discussion**

This study sought to investigate the types of leisure time activities and their patterning among school-going adolescents’ of urban and rural schools. The results indicated a substantially greater engagement in sedentary leisure particularly watching television and mobile laptop/desktop use in urban school children and playing video games and watching television in rural school children. Similar findings were observed in the study conducted by Singh Et. Al, wheremore than half of the participants reported sedentary involvement (i.e. bike riding, mobile chatting, Internet, fast music, videogames, watching TV/cinema). Urban adolescent participants’ leisure time was distinguished by a greater use of the Internet than their counterparts from other two more playing of videogames, listening to fast music but less cultural participation.

In this study rural school children were found to be more involved in physical activities like yoga,
playing outdoor games, walking, skipping and jogging while children from urban areas were more involved in dancing, watching cinema, involving in cultural activities and sports.

Contrary to these findings, in a study conducted by Singh et al., rural adolescent participants displayed greater watching of TV/cinema, listening to fast music, involvement in religious behaviours but lesser practice of different types of sports and games in comparison with adolescent participants from metro cities. Urban adolescent participants’ leisure time was distinguished by a greater use of the Internet than their counterparts from other two more playing of videogames, listening to fast music but less cultural participation, in comparison to metro adolescents.

In this study, the most common interest of children from both urban and rural school was found to be in music. Similar findings were found in the study conducted by Fitzgerald et al., where about 76% of adolescents main interest was in music.

In our study we found out that most of the children from both urban and rural school spend more than 1 hour per day with their family. Similar findings were seen in a study conducted by Fitzgerald et al., where majority of the adolescents spend a lot of time with their families.

Conclusion

The present study provides a picture of emerging scenario of leisure time activities in different segments of adolescents. It indicates the continuance of narrowing of rural–urban divide, and several implications for leisure time use among Indian school adolescents for their health and well-being. In view of relevance of leisure time use to health, we need to acknowledge that leisure time is developmentally a valuable activity, and therefore it should be utilized to acquire and enhance competencies and wellness and not for burdening with health problems.

Recommendation

- Leisure time planning and management are important concerns related to overall wellbeing for adolescents. The well-being of adolescents is associated with choices made during leisure time. Apart from time spent in academic activities in college, physical activity can be addressed only during leisure time. More and more adolescents should be told regarding the importance of leisure time.

- Participation in organized recreation and physical activities/sports might help in skill development, stress reduction and constructive use of free time, thereby also reducing the future risk of NCDs.

Limitations:

- Leisure time spent and physical activity were self-reported thus had limited reliability and validity.

- The conclusions from this study may also be limited due to a possible selection bias in the sample.

- Some factors might have confounded the findings, such as parental socioeconomic status, etc., had not been assessed.

- Lack of research material on the study topic made it difficult for comparison with different studies, hence limiting the generalisability of the results.

Source of Funding: Self

Conflict of Interest: None

Ethical Approval: The study was approved by the Institutional Ethics Committee

REFERENCES


Implant Supported Overdenture for Resorbed Mandibular Ridge Opposing Partial Fixed Prosthesis

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ABSTRACT

The most frequently encountered clinical situation in a dental practice is the completely edentulous mandibular arch for which implant supported overdentures has been the predictable procedure over time. The greater flexibility of implant position and the enhancement of retention, support, stability of the overdenture make it an ideal treatment modality to begin a learning curve in implant dentistry. The following case deals with the successful rehabilitation of resorbed edentulous mandibular ridge using a overdenture supported and retained by two implants placed in the interforaminal region with ball abutments opposing the partial fixed prosthesis. Thus, implant supported overdenture turns out to be much simpler, affordable and minimally invasive procedure to treat majority of the patients.

Keywords: Implant, Overdentures, Edentulous, Ball abutments, Retention.

Introduction

Traditional mandibular dentures have limited retention and stability as they rest on the moving foundation provided by the mandible and its associated musculature. In the maxilla, the ability to cover a broader foundation presents the opportunity to fabricate a more retentive and stable denture.

Implant-supported overdentures are mainly useful for mandibular ridges, as they have undergone resorption and offer better retention than traditional dentures. However, the cost of implants is quite high; hence, the use of fewer implants (2 instead of 4) offers a less expensive option for an edentulous patient. There is a high success rate of mandibular implant supported over dentures. Van Steenberg et al has Mericske Stern et al and Jemt et al reported success rates 98%, 97% and 100% respectively.

Placement of the implants for overdentures in the mandible should be planned explicitly, as masticatory load transmission in mandibular implant-supported overdentures differs substantially from that of implant-supported fixed restorations.

In this case report, two ball retained attachments are used in mandibular arch in which each implant holds onto the metal attachment (male) that fits passively with another attachment (female) on the intaglio surface of the denture contributing to the maximum prosthetic stability for the patients.

Thus approach was undertaken to meet up the expectations of the patients by conceptually visualizing the patient first, later in wax, and finally in acrylic dentures.

Case Report

A 60 year old female patient came to the Prosthodontics Department with the chief complaint of loose ill fitting lower denture with difficulty in mastication and speech. On examination, patient had resorbed mandibular ridge which lead to inadequate retention of the lower denture prosthesis and patient is known to be a previous denture wearer for past 6-7 years. Patient was having partial fixed prosthesis in maxillary arch with two edentulous spaces. (Figure 1)
The Orthopantomograph findings showed resorption in mandibular arch. Thus implant supported overdenture was planned with two implants along with independent ball type attachments.

Blood investigations and informed consent were taken after discussing the treatment procedure with the patient. Irreversible hydrocolloid impression was made and pre-surgical diagnostic casts were prepared. Interocclusal distance was measured in the diagnostic casts. The implant location was marked at B and D positions independent of each other.

**Surgical Phase:** Under antibiotic prophylaxis and standard aseptic protocol, preparation of the patient was done by anaesthetizing the mandibular anterior segment with inferior alveolar nerve block using local anaesthesia of 2% lignocaine with 1:80,000 adrenaline. After the region was anaesthetized, full thickness Crestal incision was made with surgical blade number 15 extending from first premolar on right side to first premolar on left side. The mucoperiosteal flap was elevated and bone was exposed. A pilot drill was introduced into the bone and two osteotomy sites were created using piezosurgery device without causing any damage to the adjacent anatomical structures.

Two surgical implants (3.3 x 13 mm) were inserted ([Figure 2](#)) using motor driver. After the implant seating tip has reached the adequate depth, cover screws are placed. Later flaps are approximated, suturing done using 3-0 vicryl suture material. Patient was prescribed with antibiotics and anti-inflammatory coverage.

Patient was recalled after 7 days of surgery and suture removal was done.

**Post operatively after 3 months, osseointegration was evaluated clinically and radiographically ([Figure 3](#)) and the implants were well prepared to receive the prosthesis.**

The second stage surgery was performed in which cover screws were removed and healing abutments were inserted into the implants. After a time period of two weeks, peri-implant soft tissue healing was examined, and existing denture was relined after relieving at the abutment site. Later, the healing abutment is removed...
hex driver. Internal portion of the implant is irrigated and dried to make sure it is free of debris and soft tissue. Selected ball abutments were placed onto each implant using hex driver and 30 Ncm torque wrench.

![Figure 4: Placement of attachment housings along with the processing insert onto each abutment](image)

A transferable mark with an indelible pencil is placed on top of each ball abutment and denture is seated to ideally determine the location for attachment housings. Denture was fabricated along with metal base to aid in sufficient strength to the denture. It is followed by preparation of recesses in the intaglio surface of the denture to accommodate the housings. Lingual vent holes are made for escape of excess acrylic. Placement of nylon processing insert into each of the housings is done with insert seating tool. Seating of the attachment housing onto each ball type abutment is done. Undercuts are blocked out under the housing and soft tissue to prevent acrylic resin from locking the denture onto the abutment. (Figure 4)

![Figure 5: Placement of attachment housings along with the processing insert onto each abutment](image)

Application of self curing acrylic is done into recessed area and around titanium housings for bonding of the housings to denture. Insertion of denture was done and guiding the patient into proper occlusion with the opposing arch. After the curing of acrylic, denture is removed. Excess acrylic is removed around the housings and lingual vent hole later it is polished. Replace nylon retention insert instead of processing insert into the housings. The insert must seat securely in place and be in level with the housings rim. Overdenture is seated over the ball abutments (Figure 5). Proper instructions have been given to the patient on insertion and removal of prosthesis. The patient was recalled at 1 week, 3 weeks, 3 months, 6 months follow up appointments.

**Discussion**

For atrophic mandibular ridge, implant supported overdentures proves to be the most efficient of all. Considering the financial resources of the patient and also the presence of inferior quality of bone in posterior region compared to anterior of the same arch creates the need for the placement of two implants with ball attachments in the anterior region of mandibular arch which is located anterior to foramen.3

The use of two implants has shown to be biomechanically sound which provided better prosthetic stability and prevented rotational forces of the components.4

By placement of two independent implants at the same height, equidistant from the midline and parallel to each other with proper angulation prevents wearing away or disengagement of the attachments.5,6

Though nowadays, single piece implants have become popular due to its innumerable benefits, correct angulation is the most catastrophic mistake thereby achieving parallelism becomes crucial. So in this case conventional two piece implants were chosen over the single piece implants.

**Conclusion**

Edentulous patients often do not get used to wear conventional dentures. Their support is compromised by progressive bone resorption that will increase patient’s instability, insecurity and discomfort. Overdentures constitute a predictable and secure therapeutic alternative affording a great patient’s satisfaction due to simpler hygiene and good chewing efficiency. Overdenture use represents a cheaper treatment than fixed prostheses and, in some cases as those with lip support loss or with an interocclusal space larger than 15 mm, their use will prevent future aesthetic or phonetic problem.
Ethical Clearance: Taken from Institutional Ethical committee

Source of Funding: Self

Conflict of Interest: Nil

REFERENCES


Prevalence and Causes of Visual Impairment in an Area of Western Uttar Pradesh

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ABSTRACT

Introduction: It has been recently estimated by the World Health Organization (WHO) that there are 285 million visually impaired people worldwide, among whom 39 million are blind.

Aims and Objectives: To study Prevalence and causes of visual impairment in an area of western Uttar Pradesh.

Methodology: This was cross-sectional study in the 3217 Patients attending eye OPD in Saraswathi Institute of ophthalmology Hapur from Jan 2018 to October 2018. Patients above 30 years of age were enrolled for study. 2234 patients fit the inclusion criteria. 2016 participated in study. Detailed ocular examination was done. visual impairment was defined as visual acuity less than 6/18 in better eye. The details of patients and all routine investigations were carried out. The causes of visual impairment were found out. Data entered to excel sheet and analyzed by Excel software for windows 10.

Result: In our study we have seen that the majority of the patients were in the age group of 60-70 (39.14%), followed by 50-60 in 28.42%, 40-50 were 12.40%, >70 were 11.66%, 30-40 were 8.38%. The majority of the patients were Male i.e. 55.85% and Female were 44.15% Out of 2016 patients 665 i.e. 33% were having visual impairment. The most common cases were Cataract - 39%; Uncorrected refractive errors-21%; Retinal diseases like diabetic retinopathy and age related macular degeneration- 13%; Trauma- 9%; Glaucoma- 8%; Iridocyclitis- 6%; Corneal opacity -4%.

Conclusion: It can be concluded from our study that majority of the patients were in the age group of 60-70, the majority of the patients were Male. The prevalence of VI was 33% and most common causes were Cataract, Uncorrected, refractive errors, Retinal diseases, Trauma, Glaucoma, Iridocyclitis, Corneal opacity.

Keywords: Visual Impairment (VI), Cataract, Refractive errors, Retinal diseases, Corneal opacity, Glaucoma

Introduction

It has been recently estimated by the World Health Organization (WHO) that there are 285 million visually impaired people worldwide, among whom 39 million are blind. In India, 62 million people are estimated to be visually impaired, 8 million of them being blind.
ophthalmologist. All individuals with visual disability of 40% or higher are entitled to various concessions and job benefits according to guidelines issued by the Ministry of Social Justice and Empowerment of the Government of India. According to the 58th round data from the National Sample Survey Organization (NSSO) in India, blindness and visual impairment were found to account for 10.88% and 15.27%, respectively, of all categories of disabilities. So we have found out causes of visual impairment in an area of western Uttar Pradesh.

Methodology

This was cross-sectional study in the 3217 patients attending Eye OPD in Saraswathi Institute of ophthalmology Hapur from Jan2018 to October 2018. Patients above 30 years of age were enrolled for study. 2234 patients fit the inclusion criteria. 2016 participated in study. Detailed ocular examination was done. Visual impairment was defined as visual acuity less than 6/18 in better eye. The details of the patients and all routine investigations were carried out. The causes of visual impairment were found out. Data entered to excel sheet and analyzed by Excel software for windows 10.

Result

3217 Patients attended Eye OPD in Saraswathi Institute of ophthalmology Hapur from Jan2018 to October 2018. Patients above 30 years of age were enrolled for study. 2234 patients fit the inclusion criteria. 2016 participated in study.

Table 1: Distribution of the patients as per the age

<table>
<thead>
<tr>
<th>Age</th>
<th>No.</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>30-40</td>
<td>169</td>
<td>8.38</td>
</tr>
<tr>
<td>40-50</td>
<td>250</td>
<td>12.40</td>
</tr>
<tr>
<td>50-60</td>
<td>573</td>
<td>28.42</td>
</tr>
<tr>
<td>60-70</td>
<td>789</td>
<td>39.14</td>
</tr>
<tr>
<td>&gt;70</td>
<td>235</td>
<td>11.66</td>
</tr>
<tr>
<td>Total</td>
<td>2016</td>
<td>100.00</td>
</tr>
</tbody>
</table>

The majority of the patients were in the age group of 60-70 (39.14%), followed by

50-60 in 28.42%, 40-50 were 12.40%, >70 were 11.66%, 30-40 were 8.38%.

Table 2: Distribution of the patients as per the sex

<table>
<thead>
<tr>
<th>Sex</th>
<th>No.</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>1126</td>
<td>55.85</td>
</tr>
<tr>
<td>Female</td>
<td>890</td>
<td>44.15</td>
</tr>
<tr>
<td>Total</td>
<td>2016</td>
<td>100.00</td>
</tr>
</tbody>
</table>

The majority of the patients were Male i.e. 55.85% and Female were 44.15%

Table 3: Distribution of the patients as per the Visual impairment

<table>
<thead>
<tr>
<th>Visual impairment</th>
<th>No.</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cataract</td>
<td>259</td>
<td>39%</td>
</tr>
<tr>
<td>Uncorrected refractive errors</td>
<td>140</td>
<td>21%</td>
</tr>
<tr>
<td>Retinal diseases like diabetic retinopathy and age related macular degeneration</td>
<td>86</td>
<td>13%</td>
</tr>
<tr>
<td>Trauma</td>
<td>60</td>
<td>9%</td>
</tr>
<tr>
<td>Glaucoma</td>
<td>53</td>
<td>8%</td>
</tr>
<tr>
<td>Iridocyclitis</td>
<td>40</td>
<td>6%</td>
</tr>
<tr>
<td>Corneal opacity</td>
<td>27</td>
<td>4%</td>
</tr>
<tr>
<td>Total</td>
<td>665</td>
<td>100%</td>
</tr>
</tbody>
</table>

Out of 2016 patients 665 i.e. 33% were having visual impairment. Most common causes were Cataract - 39%; Uncorrected refractive errors- 21%; Retinal diseases like diabetic retinopathy and age related macular degeneration- 13%; Trauma- 9%; Glaucoma-8%; Iridocyclitis- 6%; Corneal opacity -4%.

Graph 1: Distribution of as per the patients as per the Visual impairment

Discussion

Eye diseases, vision loss and resulting disability remain major public health concerns. It has been
estimated that globally 253 million people are visually impaired out of which 36 million are blind and 217 million have moderate to severe visual impairment (VI). Though there has been a decline noted in prevalence of blindness over recent times, blindness has actually increased in absolute terms owing to increase in numbers of older people with rise in life expectancy. Much of this global burden is distributed unevenly and some regions have higher burden compared with others. The south Asia (that includes India) region contributes maximum to global blindness and moderate or severe visual impairment burden. It is estimated that south Asia has 12 million blind people and 61 million people with moderate or severe Visual Impairment. The age standardised prevalence of moderate or severe Visual Impairment in South Asia is three times higher than high-income regions. Much of the load of blindness (80%) has been attributed to avoidable causes that can be either prevented or corrected easily. The maximum Visual Impairment is seen in older adult population that is after 50 years of age. 86% of those blind and 80% of those with moderate or severe Visual Impairment are older than 50 years. The global eye health action plan 2014–2019, endorsed by the 66th World Health Assembly, charted out broad eye health programmatic components. A vital target was set to achieve reduction in prevalence of avoidable Visual Impairment by one-quarter until 2019 against baseline values in year 2010. One of the key objectives included under this plan was to undertake epidemiological surveys on Visual Impairment at regular intervals nationally and subnationally, so as to generate evidence about magnitude and causes of Visual Impairment. According to recent global estimates, India records one of the highest prevalence of Visual Impairment. The age-standardized prevalence of blindness and moderate or severe VI in India is 4% and 17%, respectively, among adults aged 50 and more. The last nationwide blindness assessment undertaken in India was published way back in 2008.

In our study we have seen that the majority of the patients were in the age group of 60-70 i.e 39.14%, followed by 50-60 (28.42%), 40-50 (12.40%), >70(11.66%), 30-40 (8.38%). Majority of the patients were Male i.e. 55.85% and Female were 44.15%. Out of 2016 patients 665 i.e. 33% were having visual impairment. The most common causes were Cataract - 39%; Uncorrected refractive errors- 21%; Retinal diseases like diabetic retinopathy and age related macular degeneration- 13%; Trauma- 9%; Glaucoma- 8%; Iridocyclitis- 6%; Corneal opacity -4%.

Sumit Malhotra et al found Visual Impairment to be 24.5% (95% CI 21.1 to 26.3) in their study. This is almost similar to recent population-level estimates from southern states of India. The reported prevalence of Visual Impairment in adults aged >50 years in a newly formed southern state of Telangana was 23.5% (95% CI 22.1 to 25.0). The Andhra Pradesh Rapid Assessment of Visual Impairment study that included both rural and urban clusters estimated prevalence of Visual Impairment as 23.1% (95% CI 21.8 to 24.5). They also found 87% of Visual Impairment was contributed by two causes—uncorrected refractive errors (50%) followed by cataract (37%). The most common causes for blindness (57%) and severe Visual Impairment (70%) was cataract. This is consistent with other studies where 80%–90% of Visual Impairment is attributed to these two causes. Globally, majority of Visual Impairment is contributed by uncorrected refractive errors followed by cataract. Cataract and uncorrected refractive errors combined contributed to 55% of blindness and 77% of vision impairment in adults aged 50 years and older in 2015. Also, globally in 2015, the leading causes of moderate or severe Visual Impairment in those aged 50 years and older were uncorrected refractive errors (52%) followed by cataract (25%).

**Conclusion**

It can be concluded from our study that majority of the patients were in the age group of 60-70yrs of age and majority of the patients were Male. The prevalence of Visual Impairment was 33% and most common causes were Cataract, Uncorrected, refractive errors, Retinal diseases, Trauma, Glaucoma, Iridocyclitis, Corneal opacity

**Conflict of Interest:** Nil

**Source of Funding:** The study was carried out at Saraswathi Institute Of Medical Sciences,Hapur and no extra financial support was required

**Ethical Clearance:** Ethics committee approval was obtained before study

**REFERENCES**


Association of Myo1h Gene Polymorphism in Mandibular Retrognathism in South Indian Dravidian Population

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ABSTRACT

Recently Myosin 1H gene has been implicated in mandibular retrognathism. But the quantitative influence of Myosin 1H polymorphism on mandibular retrognathism is yet unexplored. This study was conducted to understand the role of Myosin 1H single nucleotide polymorphisms in mandibular retrognathism using South Indian Dravidian population as samples. Lateral cephalograms were obtained from retrognathic and normal individuals and related to genotype to study the power of association between them. Definite influence of gene make up is seen on muscle growth and in turn mandibular retrognathism but quantitative association could not be determined due to possible over shadowing influence of cybernetics. In future studies considering gene- environment interactions should be investigated to estimate the overall risk of a large sample size to clarify the association of MYO1H gene in causing true mandibular retrognathism.

Keywords: Mandibular retrognathism, MYO1H gene, Gene Association

Introduction

Heritability of a particular physical feature or trait requires a consideration of the relationship between the genotype and phenotype.¹ The interaction between genetic and environmental factors controls the process of growth and development and to determine the morphological and physiological traits of an individual.² Mandibular growth and neuro-cranial growth are a combination of morphologic effect resulting from both capsular and periosteal matrices.³ Genetic alterations that affect muscle would also affect the adjoining skeletal areas.³ ⁴ Muscle function is characterized by the composition ratio of these types of muscle fibers. The composition ratio of muscle fibers is greatly influenced by genetic factors and rarely by environmental factors.⁵ Myosin heavy chain (MyHC), is one of the most important proteins expressed in skeletal muscle, both structurally and functionally⁶ and is expressed primarily in skeletal muscle located in human chromosomes 11 and 17.⁷

An understanding of the normal growth and development of the face enables the orthodontist to assess the effects of orthodontic and orthopedic forces that can modify the growth. Recent theoretical and experimental studies have fundamentally altered the understanding of both the functional anatomy as well as the growth process of the mandible.⁸ ¹⁰ Studies have been done on the polymorphism of Myosin 1H (MYO1H) gene in mandibular prognathism,¹¹ but not much emphasis has been laid on polymorphism of MYO1H gene in true mandibular retrognathism. The implication of Myosin 1H gene in case of mandibular retrognathism and/or retro positioning is now known, but there is clarity given by Richards et al., in its specific role in mandibular

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retrognathism or retroposition. Hence, there is paucity in the literature in this regard. Further, there is a need for larger independent investigation on this gene. Though phenotypic manifestation of genotype is well known, the quantitative influence of Myosin 1H polymorphism on mandibular retrognathism is yet unexplored. Hence, this study was aimed to understand the role of Myosin 1H single nucleotide polymorphisms in mandibular retrognathism using South Indian dravidian population as samples.

**Materials and Method**

The study design and protocol was approved by the ethical committee of Sree Balaji Dental College & Hospital, Chennai. (Reference number: SBDCH/IEC/01/2018/19 dated 20th March 2018). The subjects were explained the purpose of the study and an informed consent was obtained from them. In the event of subjects those below 18 years of age, informed consent was obtained from their respective parents/guardian. Subjects were clinically examined before the study. Sample Size of the study was 54, with 27 subjects in the study group and 27 subjects in the control group.

From each study group, lateral cephalograms were obtained. Tracings of the lateral cephalograms were done manually on acetate matte tracing paper. Different angular, linear, and planar values were measured on the tracings of both study and controls. For the genotyping, 4mL of blood was obtained from all the participants.

**Inclusion Criteria:**

- Patients having orthognathic maxilla and retrognathic mandible- Study group.
- Patients having orthognathic maxilla and orthognathic mandible- control group.
- Age- 13-29years
- Both the genders
- 27 patients having orthognathic maxilla and retrognathic mandible (SNA= 82° ± 2, SNB ≤ 78°) were selected as the study group,
- 27 patients with an orthognathic maxilla and orthognathic mandible (SNA= 82° ± 2, SNB = 80° ± 2) were selected as the control group from the outpatients of the department of orthodontics, Sree Balaji Dental College and Hospital, Chennai, India.

**Exclusion Criteria**

- Patients with retrognathic or prognathic maxilla.
- Patients with other genetic disorders.
- Patients with retropositioned mandible.
- Patients with prognathic mandible.

**Cephalometric Analysis:** Lateral cephalograms were obtained from each study subject. Cephalometric tracings were done manually on acetate matte sheet and standard reference points were traced.

**Clinical Sample:** 4ml of venous blood was collected in EDTA coated vacuum tubes and were transported on ice packs to the laboratory and stored at 4°C until used.

**Gene Extraction:** Genomic DNA was isolated as per standard protocol. MYOSIN 1H gene was amplified using gene specific PCR. Qualitative analysis of DNA was carried out by 0.8% agarose gel electrophoresis and quantification of DNA by using a Biophotometer (Eppendorf).

**Molecular Studies In Myosin 1h Gene**

Three single nucleotide polymorphisms of the MYO1H gene rs10850110 (promoter polymorphism), rs11611277 (Exon 1; Ser-37-Arg), and rs3825393 (Exon 30; Leu-1001-Pro) were genotyped using polymerase chain reaction and restriction fragment length polymorphism (PCR-RFLP).

**Pcr-Rflp Analysis:** PCR Amplification of MYO1H gene was carried using forward and reverse primers in a thermal cycler (Eppendorf Master Cycler gradient) using standard protocol.

**Statistical Analysis:** Within every gene sequence, the mean values of cephalometric parameters among every genotype were individually analyzed using one way ANOVA. The cephalometric measure was tested for significant difference among the control and test groups by Independent student t-Test (two tailed). SNP analysis was tabulated and analyzed for Odds ratio under 95% confidence interval and probability of error was found. Concordance of Allele frequency with Hardy Weinberg distribution was tested using Chi-squared distribution (degree of freedom = 1). All tests were performed within an error of 5%. All analysis were done using Microsoft excel version 2013.
Results

Comparison of these cephalometric values like SNB, SND, articular angle, Gonial angle and sum of all angles showed statistically significant differences between control and study groups except for SNA and saddle angle which did not show statistically significant differences.

MYO1H rs10850110 polymorphism and mandibular retrognathism: Of the 27 samples analysed, 16 (59%) were GG, 1 (4%) were AG and 10 (37%) were AA. Among 27 controls, 14 (52%) were GG, 6 (22%) were AG and 7 (26%) were AA. Hardy Weinberg p-value showed statistically significance in the study group. The major homozygote as reference genotype the calculated odds ratios and 95% confidence intervals were found. The frequency of AG genotype was different in both controls and study group with OR (95% CI) 0.16 (0.0518-0.495) and p value of 0.015 which shows significance. The AA mutant homozygous genotype was equally distributed in both controls and study groups with OR (95% CI) 0.472 (0.25-0.87) and p value of 0.178. The AA mutant homozygous genotype was equally distributed in both controls and study group with OR (95% CI) 0.25 (0.097-0.65) and p value of 0.0049 and showed significant association. The genotypes in the dominant model also have showed association with mandibular retrognathism with OR (95% CI) 0.408 (0.231-0.72) and p value of 0.002. Also, the single frequency allele A showed significant association in mandibular retrognathism with OR (95% CI) 0.4412 (0.23-0.82) and p value of 0.00

MYO1H rs11611277 polymorphism and mandibular retrognathism: Of the 27 samples analysed, 15 (55%) were CC, 8 (30%) were AC and 4 (15%) were AA. Among 27 controls, 20 (74%) were CC, 4 (15%) were AC and 3 (11%) were AA. Hardy Weinberg p-value did not show any statistical significance in study group. The major homozygote as reference genotype the calculated odds ratios and 95% confidence intervals were found. The frequency of AC genotype was different in both controls and study group with OR (95% CI) 2.69(0.31-5.58) and p value of 0.0064 and shows significant difference. The genotypes in the dominant model also showed significant association with mandibular retrognathism with OR (95% CI) 2.27 (1.25-4.13) and p value of 0.0069.

MYO1H rs3825393 polymorphism and mandibular retrognathism: Of the 27 samples analysed, 17 (63%) were GG, 8 (30%) were AG and 2 (7%) were AA. Among 27 controls, 11 (41%) were GG, 11 (41%) were AG and 5 (18%) were AA. Hardy Weinberg p-value did not show any statistical significance in study group. The frequency of AG genotype was different in both controls and study group with OR (95% CI) 0.472 (0.25-0.87) and p value of 0.178. The AA mutant homozygous genotype was equally distributed in both controls and study group with OR (95% CI) 0.25 (0.097-0.65) and p value of 0.0049 and showed significant association. The genotypes in the dominant model also have showed association with mandibular retrognathism with OR (95% CI) 0.408 (0.231-0.72) and p value of 0.002. Also, the single frequency allele A showed significant association in mandibular retrognathism with OR (95% CI) 0.4412 (0.23-0.82) and p value of 0.00

Discussion

The influence of genetics on maxillofacial skeleton is well described in the literature, the combination of cybernetics and genetics play a complimenting game to achieve the final adult facial skeleton. In this regard Myosin 1H gene is associated with mandibular growth and an investigation of its expression and its correlation to dentofacial deformities is going on.13 MYO1H is a class I myosin which is a protein coding gene and are found in various skeletal muscle sarcomeres. Myosins institute a superfamily of motor proteins that bind to actin and use the energy of ATP hydrolysis to generate force and movement along actin filaments.14 There is an association of MYO1H with mandibular prognathism which suggests that it may have a putative role in musculoskeletal development and sagittal jaw deformation and consequent malocclusion.11, 12 Various genetic studies have reported that the genetically altered size of muscle has marked secondary effects on the anatomy of bony attachment sites. Moreover, masticatory muscle resection or transposition has proven the correlation between craniofacial morphology and the force of masticatory muscle contraction in the model of experimental animals. There are various myosin family members which have been associated with mandibular growth since these molecular motors are mainly known to intermingle with each other. Thus, functions of jaw muscles are dependent on the correctly formed craniofacial skeletal structures.15

Studies revealed that mandibular prognathism and retrognathism may have a similar vertical facial phenotype but they have a different masseter muscle gene expressions.16 Gedrange et al., in their study showed that there are higher levels of myosin heavy chain (MyHC) in the anterior part of masseter muscle
MYO1H gene is present in chromosome no 12. There are various syndromes related to chromosome no 12 such as Achondrogenesis type II, where faces becomes flat and show under developed mandible. True mandibular retrognathism is a facial type where the corpus is narrow, symphysis is narrow and long and the ramus is narrow and short. Mandibular retrognathism is identified by measuring SNB angle cephalometrically which confirms the relation of mandible to the cranial base. Angles such as saddle angle assess the positional relationship of the mandible. The Gonial angle expresses the form of mandible and its growth direction.\textsuperscript{18, 19}

In order to facilitate early diagnosis, it is necessary to know the power of association of various genotypes in mandibular growth and development. If such a diagnosis can be made by blood test at an early age, it is a great advantage whereby right time of initiation of treatment can be programmed by the clinician. Nevertheless, retro-positioning have to be separately analysed for correlation with genotypes in the future studies.

Results showed that presence of GG genotype indicates mild predilection to retrognathism in the group rs10850110. Presence of A and G appears to move the mandibular growth towards normalcy whereas AA genotype shows predilection to retrognathism. In the group rs116121277 indicated presence of A genotype shows more predilection to retrognathism and presence of C genotype appears to be more towards normalcy. In the group of rs3825393, Presence of G genotype appears to favor mandibular retrognathism and A genotype appears to favor normalcy.

Thus, genetics play an important role in conferring risk for true mandibular retrognathism. In future studies considering gene- environment interactions should be investigated to estimate the overall risk of a large sample size to clarify the association of MYO1H gene in causing true mandibular retrognathism.

**Conclusion**

Since the Single Nucleotide Polymorphisms of MYO1H rs10850110 showed significant Hardy-weinberg distribution, definite influence of gene make up is seen on muscle growth and in turn mandibular retrognathism but quantitative association could not be determined due to possible over shadowing influence of cybernetics. Nevertheless, comparatively small sample size may have predisposed the role of true mandibular retrognathism and MYO1H gene polymorphisms. Moreover, only one particular gene has been taken into consideration in this study. In future, studies should include all the genes related to Myosin and having large number of controls to statistically eliminate the effect of cybernetics.

**Conflict of Interest:** There is no relevant conflict of Interest among the authors.

**Source of Funding:** Self funded study

**Ethical Clearance:** Taken

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Oral Lichen Planus-A Review

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ABSTRACT

Oral lichen planus is a chronic T-cell mediated disease of unknown etiology with diverse clinical manifestations. Several local and systemic factors are known to be associated with it. Both antigen specific and non-specific mechanisms are involved in the pathogenesis of lichen planus. The article discusses both these mechanisms of pathogenesis along with diagnostic criteria, differential diagnosis and treatment.

Keywords: oral lichen planus, T-cells

Introduction

Oral lichen planus, the mucosal counterpart of cutaneous lichen planus is a chronic inflammatory disease with a wide range of clinical manifestations. It affects women more than men (1.4:1) and frequently occurs in the fourth decade.¹ The oral lesions may be present alone or along with the skin lesions. It presents clinically as reticular, papular, plaque-like, erosive, atrophic or bullous types. The most commonly affected intra-oral sites are buccal mucosa, tongue and gingival.²

Etiology: Oral lichen planus is a chronic T-cell mediated disease of unknown etiology. Several systemic and local factors may be associated with it.³,⁴

Systemic Factors

1. Genetic Predisposition
2. Autoimmunity
3. Immunodeficiency
4. Drugs
5. Infectious agents
6. Diabetes and hypertension
7. Bowel’s Disease
8. Stress

Local Factors

1. Dental materials
2. Trauma
3. Habits
4. Food allergies

Pathogenesis: The pathogenesis of oral lichen planus can be studied under two broad headings- antigen specific and non-specific mechanisms.

Antigen Specific Mechanisms: The lichen planus antigen is unknown, although the antigen may be a self-peptide, thus making lichen planus a true autoimmune disease. Lesional keratinocytes present MHC Class I and MHC Class II restricted antigens. There is migration of T lymphocytes into the epithelium followed by their activation thus leading to keratinocyte apoptosis.

Two hypotheses have been proposed for the migration of T cells into the epithelium-

- Chance encounter’ hypothesis – CD8+ cytotoxic T cells may enter the oral epithelium on routine surveillance and encounter the antigen by chance.

- Directed migration’ hypothesis – according to this, cytokines secreted by the keratinocyte direct the T cells to migrate into the epithelium.

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DOI Number: 10.5958/0976-5506.2019.01271.3
Cytotoxic T cells secrete TNF-α which triggers keratinocyte apoptosis. The other mechanism may be the binding of T-cell surface CD95L (Fas ligand) to CD95 (Fas) on the keratinocyte surface. Granzyme B secreted by T cells enters the keratinocyte via perforin induced membrane pores and can thus lead to keratinocyte apoptosis.4,5

Non-Specific Mechanisms14: Many non-specific mechanisms may be involved in the pathogenesis of OLP, including

(i) mast cell chemotaxis and degranulation stimulated by T-cell RANTES
(ii) endothelial cell adhesion molecule expression stimulated by mast cell TNF-a
(iii) T-cell MMP-9 activation by mast cell chymase
(iv) epithelial basement membrane disruption by mast cell proteases or T-cell MMP-9
(v) keratinocyte apoptosis triggered by epithelial basement membrane disruption
(vi) intra-epithelial CD8+ T-cell migration through basement membrane breaks
(vii) inflammatory cell survival prolonged by T-cell RANTES
(viii) non-specific T-cell recruitment by keratinocyte-derived chemokines

Diagnostic Criteria8

Clinical Appearance

Lesions consist of radiating white, gray, velvety, thread-like papules in a linear, annular and retiform arrangement forming typical lacy, reticular patches, rings and streaks.

A tiny white elevated dot is present at the intersection of white lines called as striae of Wickham.

The lesions are asymptomatic, bilaterally/symmetrically anywhere in the oral cavity, but most common on buccal mucosa, tongue, lips, gingiva, floor of mouth, palate and may appear weeks or months before the appearance of cutaneous lesions.

Clinically it can be divided into six types:

- Reticular
- Erosive
- Atrophic
- Plaque-like
- Papular
- Bullous

Histopathologic criteria8,10: The main histopathologic characteristic of OLP are:

- Liquefactive degeneration of the basal cells with apoptosis of the keratinocytes.
- Dense band-like lymphocytic infiltrate at epithelium and connective tissue junction.
- Focal areas of hyperkeratinized epithelium as well as few areas of atrophic epithelium with saw tooth rete ridges.
- Eosinophilic colloid bodies known as Civatte bodies represent degenerating keratinocytes are present in the lower half of the surface epithelium.
- Histologic clefts known as Max-Joseph spaces may form and blisters on the oral mucosa (bullous LP) may be seen at clinical examination. B cells and plasma cells are uncommon findings.

When the histopathologic features are less obvious, the term “histopathologically compatible with” should be used

Final diagnosis OLP or OLL

To achieve a final diagnosis, clinical as well as histopathologic criteria should be included:

- OLP - A diagnosis of OLP requires fulfillment of both clinical and histopathologic criteria
- OLL - The term OLL will be used under the following conditions:
  1. Clinically typical of OLP but histopathologically only compatible with OLP
  2. Histopathologically typical of OLP but clinically only compatible with OLP
  3. Clinically compatible with OLP and histopathologically compatible with OLP.11

Differential Diagnosis: Interlacing white striae appearing bilaterally on the posterior buccal mucosa is often pathognomonic of lichen planus. The difficulties in diagnosis arise when there is superimposed candidal
infection. The differential diagnosis can include frictional keratosis, lichenoid reactions, leukoplakia, pemphigus, mucus membrane pemphigoid, lupus erythematosus, erythematous candidiasis and chronic ulcerative stomatitis.12

Lichenoid drug reaction patients present with a unilateral lesion and give a history of a new drug intake. Such case resolves when the use of drug is withdrawn, thereby helping in diagnosis. Dental restorative material induced lichenoid reactions can be identified when OLP like lesions are confined to areas of the oral mucosa in close contact or proximity to restorative materials, usually amalgam.13

Treatment

Up to now unique treatments are portrayed for OLP including drug treatment, medical procedure, laser and psoralen with bright light A (PUVA). Utilization of novel medication treatment is the most well-known strategy for treatment of OLP. Distinctive medications have been utilized as topical and systemic application for the treatment of OLP.14

Drugs utilized in topical shape are corticosteroids, immunosuppressives, retinoids, and immunomodulators. Medications which are utilized systemically are thalidomide, metronidazole, griseofulvin, and hydroxychloroquine, some retinoids and corticosteroids. Little and open erosive injuries situated on the gingiva and sense of taste can be treated by the utilization of a follower glue as a custom plate, which takes into consideration precise authority over the contact time and guarantees that the whole lesional surface is presented to the medications.12

Careful surgical excision, cryotherapy, CO 2 laser, and ND:YAG laser have all been utilized in the treatment of OLP. As a rule, medical procedure is held to expel high-risk dysplastic zones.

Photograph chemotherapy is another technique in which clinician utilizes UVA with wavelengths extending from the 320 to 400 nm, after the infusion of psoralen is additionally utilized.15

Conclusion

OLP is an exceptionally basic oral dermatitis and is a standout amongst the most successive mucosal pathoses experienced by dental experts. It is basic that the injury is distinguished definitely and appropriate treatment be controlled at the soonest. An appropriate comprehension of the pathogenesis, clinical introduction, conclusion of the infection winds up critical for giving the correct treatment.

Ethical Clearance: Taken from Institutional Ethical committee
Source of Funding: Self
Conflict of Interest: Nil

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The Politics Behind the Reproductive Health in India: Special Reference to Abortion Law

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ABSTRACT

Abortion is considered to be as one of the essential reproductive right of the women irrespective of the caste and creed. Even in many international conferences like in International Conference on Population and Development it has been repeatedly said that “Governments should take appropriate steps to help women avoid abortion, which in no case should be promoted as a method of family planning, and in all cases provide for the humane treatment and counseling of women who have had recourse to abortion. Abortion was considered to be as essential and basic right of the women”. Though women has to struggle for this right long back. But still in some parts of the world this right is not so easy to get. In India also, though Abortion is allowed under certain conditions. But many loopholes are there in the abortion law of India. One of such loopholes is that Indian Abortion law failed to consider the situation which may cause anguish to women if abortion is not allowed. Many situation are their where women were denied abortion in India. Like in the case of Dr. Nikhil Datar & others – vs – Union of India, (2008) 110 Bom L.R. 3293. Although it is mentioned in many international conferences that Abortion should not be used as Family Planning Methods. But in India Abortion is used as Family Planning methods which one can found from the language of Section 3 of MTP Act. 1971.

Through this research paper researcher will discussed about the politics behind introduction of Abortion law in India and about its drawbacks.

Keywords: Abortion, Indian Penal Code, Reproductive Right, Right to Privacy

Introduction

Before 1970s abortion was not legal except under certain conditions and it was punishable offence under Indian Penal Code. Abortion in India was legal from 1971 that too under stringent conditions. All this conditions were laid down by politician after the report submitted by Shantilal Shah Committee. As we know that, India was the first nation in the world to introduce the Five year family planning program that too in 19521. The Five year family planning program was introduced with an objective of “reducing birth rate to the extent necessary to stabilize the population at a level consistent with requirement of national economy.”2 So after the independence it was felt that there was an urgent need of controlling population. Also before MTP Act maternal mortality was also high due to illegal abortion. It was during August 25, 19643 the Central Family Planning Board recommended the Ministry of Health to constitute a committee for the study of abortion laws and its effectiveness in family planning programme. The most important part of this committee was that the committee was headed by a male remember. Their task was to make a law by which woman can safely accesses the abortion service. But present scenarios speaks something different story about the population and illegal abortion. Though MMR has been reduced 77%, from 556 per 100000 live births in 1990 to 130 per 100 000 live births in 20164. During 2010-11 the number of reported abortions in India was around 6, 20,472 where as the unreported was estimated to be 10 times higher than the reported one5.
where women can claim abortion on demand during First Trimester which is another drawback of current MTP Act. The current abortion law in itself is bias in nature as the entire law speaks about the power, duty and protection of physician. The MTP Act hardly gives any right to women for abortion. The Abortion law in India has given full authority to medical practitioner to decide whether to perform abortion or not.

**Material and Method**

This research is purely doctrinal in nature. Researchers have used both Primary and secondary sources available for this research like Gazettes of India, Acts, Books, Journals, and Newspaper etc.

**Prior to MTP Act, 1971:** Section 312- of Indian Penal code deals causing miscarriage which states that “Whoever voluntarily causes a woman with child to miscarry, shall, if such miscarriage be not caused in good faith for the purpose of saving the life of the woman, be punished with imprisonment of either description for a term which may extend to three years, or with fine, or with both; and, if the woman be quick with child, shall be punished with imprisonment of either description for a term which may extend to seven years, and shall also be liable to fine. Explanation- A woman who causes herself to miscarry, is within the meaning of this section”. As per this provision abortion is allowed only to save the life of the mother when continuing of pregnancy will be harmful for her health. Abortion for the cases of rape victim was allowed. Only therapeutic abortion was allowed. This was the reason that MMR was high during that time. Also as per this provision a women will be guilty if she cause herself to miscarry [Re Ademma, (1886) ILR 9 Mad. 369)]. Before MTP Act the law relating to abortion in India was strict in nature.

**Medical Termination of Act, 1970:** It was only after the MTP Act, 1970 the law relating to abortion become liberal but with conditions.

Section 3 of the MTP Act, speaks about that When Pregnancies may be terminated by registered medical practitioners.

“(1) Notwithstanding anything contained in the Indian Penal Code (45 of 1860), a registered medical practitioner shall not be guilty of any offence under that Code or under any other law for the time being in force, if any pregnancy is terminated by him in accordance with the provisions of this Act.

(2) Subject to the provisions of sub-section (4), a pregnancy may be terminated by a registered medical practitioner,-

(a) where the length of the pregnancy does not exceed twelve weeks if such medical practitioner is, or

(b) where the length of the pregnancy exceeds twelve weeks but does not exceed twenty weeks, if not less than two registered medical practitioners are.

Of opinion, formed in good faith, that,-

(i) the continuance of the pregnancy would involve a risk to the life of the pregnant woman or of grave injury physical or mental health ; or

(ii) there is a substantial risk that if the child were born, it would suffer from such physical or mental abnormalities as to be seriously handicapped.

Explanation 1.-Where any, pregnancy is alleged by the pregnant woman to have been caused by rape, the anguish caused by such pregnancy shall be presumed to constitute a grave injury to the mental health of the pregnant woman.

Explanation 2.-Where any pregnancy occurs as a result of failure of any device or method used by any married woman or her husband for the purpose of limiting the number of children, the anguish caused by such unwanted pregnancy may be presumed to constitute a grave injury to the mental health of the pregnant woman.

(3) In determining whether the continuance of pregnancy would involve such risk of injury to the health as is mentioned in sub-section (2), account may be taken of the pregnant woman’s actual or reasonable foreseeable environment.

(4) (a) No pregnancy of a woman, who has not attained the age of eighteen years, or, who, having attained the age of eighteen years, is a lunatic, shall be terminated except with the consent in writing of her guardian.

(b) Save as otherwise provided in cl.(a), no pregnancy shall be terminated except with the consent of the pregnant woman”.
Section 3 provides full immunity to doctors for doing abortion in women. Doctor has full authority to decide that whether to perform abortion or not. As women request for abortion will be entertained by the doctors only when their case will fall under the section 3 of the MTP Act.

Previously in IPC only therapeutic abortion was allowed. But now after the MTP Act, apart from therapeutic the following are the conditions where abortion will be allowed:

1. **Rape victim**: In cases of rape, victims will be allowed to go for abortion.

2. **Married**: In cases of any contraceptives failure used by the couples.

3. **Minor**: Minors will be allowed to go abortion under this Act.

Rest other cases of were not included in the Act like abortion right for unmarried, widow, divorcee. Thus if any of this women cause her abortion, then they will be punished according to the penal provisions of India because government is not at all concerned about the right of the women. In 21st century when living relationship is allowed in India after the judgment of Supreme Court, but abortion right for the living relationship women is not allowed because of their unmarried status. So here I can say rather that this law discriminates between Married women with unmarried women. This law clearly violates the Reproductive and Privacy Right protected under Article 14 and 21 of Indian Constitution. Law should not discriminate women on the basis of marital status.

**Politics behind Indian Government**: Abortion law and population control both are two different topics but somewhere they are interlinked to each other. In various family planning program Government speaks about the role of the abortion controlling or preventing the birth of unwanted child. According to Dr. Rodhinorton, “Family planning means activities of determining the time period between the birth of children and the number of required children for the couple themselves along with the health and family welfare”. Thus, family planning is a method for population control.

Following are the passage taken from different Family Planning program:

1. As per the paragraph **3.5.8 of 9th Five year plan i.e.1998-2002** “At the time of Independence the health care services in India were predominantly urban, hospital based and curative. General practitioners well versed in maternal child health and pediatricians and obstetricians provided health care to women and children who came to them. They did provide comprehensive, integrated, good quality services but technology available for detection and management of health problems was limited and outreach of services was poor. Majority of the population cially those belonging to the poorer segment and those residing in rural areas did not have access to health care. Consequently the morbidity and mortality rates in them were quite high. Many women died while seeking illegal induced abortion to get rid of unwanted pregnancy because they did not have access to contraceptive care for preventing pregnancies. Conceptions that were too early, too close, too many and too late resulted in high maternal and infant mortality rates. Antenatal, intrapartum, postnatal and contraceptive care were not readily available to women who required these services desperately.”

2. Again in the paragraph **3.5.13** of 9th Family Plan says that “The census of 1971 showed that population explosion was no longer a potential threat but a major problem to be tackled. The government gave top priority to the Family Planning programme and provided substantial funds for several new initiatives. Sterilization, IUD and condoms were made available through the Primary Health Centers. The hospital based Postpartum Programme provided contraceptive care to women coming for delivery. The MTP act enabled women with unwanted pregnancy to seek and obtain safe abortion services.”

3. Again in the paragraph **3.5.30** of 9th Family Plan says that “The National Family Health Survey indicated that in 1992-93: (a) 40.6% of currently married women used contraceptives; b) awareness about contraception was universal indicating that the IEC efforts in this direction had succeeded in reaching the population; c) in all States the wanted fertility was lower than the actual fertility; d) there was an unmet need for contraception (11.0% for birth spacing and 8.5% for terminal methods) (Table 3.5.4). Other studies have estimated that about one sixth of all pregnant women seek abortion because they do not want continuation of pregnancy. Illegal induced abortion continues to be a major cause of maternal morbidity and mortality.”

4. Again in the paragraph 3.8.9 of 9th Family Plan says that “As could be seen above, the highest number of maternal deaths in 1995 were due to bleeding of pregnancy and Puerperium which are preventable through better reproductive health care. Abortion which is the second high accounted for 17.6 per cent of total maternal deaths in 1995, although abortion was legalized as early as in 1972 as a health measure through the Medical Termination of Pregnancy (MTP) Act, 1971. Despite this special sanction, illegal abortions still continue to be performed by the unauthorized persons like the local quacks and untrained persons under unhygienic and unsafe conditions because of the non-availability of MTP services within the easy reach of most of the rural population. Further, about 47.5 per cent of deliveries were performed by untrained persons during 1995-96.”

5. Again in the paragraph 3.8.33 of 9th Family Plan says that “The other effective measures proposed in this direction include identification and management of high-risk mothers, appropriate management of anaemia, hyper-tension disorders and provision for emergency obstetric care. Further, steps will also be taken to close the gender gaps in the existing rates of both mortality and morbidity. Also, considering the fact that more than 50 per cent of the deliveries and a large number of illegal abortions are being performed by unqualified persons, particularly in the rural areas, special efforts will be made to promote ready access to medical termination of pregnancy and intra-partum care at Primary Health Centres. In areas where institutional delivery rates are low, focused TBA training will be undertaken.”

6. The sixth five year plan(1980-1985) laid down the long term demographic goal of reducing the net reproduction rate (NRR) to one by 1996 for the country as a whole and by 2001 in all states. See reference no.2

7. Again the 8th Five year plan i.e. in 1992-1997 laid down the long term demographic goal of reducing the net reproduction rate (NRR) to one by 2011-2016. See reference no.2

From point number 1 to 5 it is clear that Abortion was considered to be as one of the essential tool to tackle the problem of population growth and also to control the MMR of India. But one thing which Government failed to consider that abortion is important to prevent the unwanted pregnancy and it should not be limited for married couple only. A pregnancy can be unwanted for a woman in cases of live in relationship. In Payal Sharma v. Nari Niketan, 2001 (3) AWC 1778 : AIR 2001 All 254 the court held that a man and woman can live together if they wish without marrying. This may be regarded immoral by society but it is not illegal. We may mention there is difference between law and morality, as the British jurists, Bentham and Austin pointed out. Hence, merely because the petitioner lived with a woman voluntarily who was not his wife for seven months, this in our opinion, does not amount to the misconduct of bigamy, as there was no marriage.

Also in point number 6 and 7 the term NRR means “The Net Reproduction Rate (NRR) is a synthetic demographic rate that measures the average number of daughters per woman who survive to average reproductive age” Here in 6th Family Planning Government of India asked to maintain the NRR of 1 which means one woman can give birth to one living girl child only. This was done only to control the population and because of this step of the Government sex-selective abortion was increased resulted female feticide and skewed sex ratio at the end.

Conclusion and Suggestions

From the above discussion it is very clear that Abortion law in India was introduced as a political agenda for the purpose of controlling the population of India. This law was not introduced as a right for women to get free from unwanted pregnancy nor this law concerned with women reproductive health because the abortion law is discriminatory in nature on the basis of marital status. There is an urgent need of amendment in MPT Act, 1971. All women should get the right of abortion as their fundamental right under Article 21 of Indian Constitution.

Conflict of Interest: Pyali Chatterjee and Dr. Komal Vig declare that they have no conflict of interest.

Source of Funding: No funding for this research.

Ethical Approval: The study does not require the approval of Institutional Ethics Committee. As the study is the combination of socio-medico-legal issue. No field study is done for this research.
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A Study on Employee Performance Appraisal System in Hospitals—With Respect to Hospitals in Vellore City

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ABSTRACT

Health care system and professional has become more involved in performance management as hospitals organize to increase their effectiveness towards various growth sectors. Although they are hospital employees specialized in their health care professions, they are subject to performance appraisals because the hospitals are accountable to patients and the community for the quality of hospital services. The necessity for having a performance appraisal program in hospital is to direct the employee’s performance, motivate staff and improve hospitals self esteem growth. The performance of a health care professional may be appraised by the appropriate departmental manager, by other professionals in a team or program, based on prior consistency. Appraisal approaches may vary in different ranks. They include behavioral approaches such as rating scales, peer rating, ranking or nomination and outcome approaches such as management by objectives and their achievements. Yes, professionals should give and receive timely feedback on a flexible schedule. There are various parameters to measure the efficiency and capabilities of the employee and their dedication towards the organization. Where, in this article an attempt has been made to study the Performance Appraisal systems in hospitals especially in vellore city and to offer suggestions for their growth and improvement.

Keywords: Employees, Performance appraisal, Human resource management, Organizations.

Introduction

Performance appraisal is one of the important components in the rational and systematic process of human resource management. The information obtained through performance appraisal provides foundations for recruiting and selecting new hires, training and development of existing staff, and motivating and maintaining a quality work force by adequately and properly rewarding their performance. Without a reliable performance appraisal system, a human resource management system falls apart, resulting in the total waste of the valuable human assets a company has.

The British Association of Medical Managers (BAMM, 1999) has defined appraisal as “the process of periodically reviewing one’s performance against the various elements of one’s job”. Certainly this paper will describe the purpose & developmental criteria of an appraisal program that will regularly assess the performance of hospital employee.

Necessity of Performance Appraisal System in Hospital: The primary reason for having a performance appraisal program in hospitals is to monitor employee’s performance, motivate staff and improve hospital morale. In the hospital, monitoring employee performance requires routine documentation, which is accomplished through completing a performance appraisal form¹. When employees are aware that the hospital is mindful of their performance and they could be rewarded with increment and promotions, they will work harder. Confidence is enhanced when employees get acknowledgment or reward for their work. A powerful performance appraisal program will help the hospital and assist in accomplishing its objectives and goals². Not just, preparing necessities will be recognized and tended to amid performance appraisal survey; yet in addition concealed talent and approach to patients can be found too. Through distinguishing these preparation needs, staff can play out their positions at the great level and be in a superior position to address customers, individuals and clients concerns and questions³. A best and active staff is bound to be proactive, beneficial and ingenious, all of which helps give the hospital an aggressive edge, from enhanced customer relations to expanded profits and benefits.
Who Will Appraise Performance?: Physicians, nurses, social workers, clinical pharmacists and other professionals often work interdependently to care for patients; but during performance appraisal, they have formal input into each other’s appraisals. As hospitals increasingly focus on care delivery processes, physicians may be appraised by other professionals who share the responsibility for patient care and outcomes. Ensuring the quality of medical care is the responsibility of both regulatory bodies and hospitals. The way an organization is structured has a direct bearing on who conducts the appraisal. Hospitals generally use a combination of functional and, team or program approaches. In a functional approach, professionals focus on performing their own functions under the direct supervision of one boss. Teams or programs comprise individual professionals who also belong to traditional functional departments. In this case, however, professionals may have two supervisors - one in the department and one in the team or program.

What Performance Will Be Appraised?: Health Services Research Group (1992) wrote an article in CMAJ and reviewed the challenge of developing standards, guidelines and clinical policies as well as defining “quality” in relation to performance. Performance measures often include both process expectations (how the work gets done) and outcome expectations (the results of the process). Simon, L. (1992) suggested the following criteria to assess the performance of department head in the hospital: quality of service in the specific department, operational efficiency and effectiveness, and budget responsibility and accountability.

How Performance is appraised?: To date, health care organization literature on performance appraisal methods has tended to focus on employee-employer relationships instead of the practitioner-organization interface. Although, in the new era, most of the doctors are not hospital employees, their performance will be examined in the light of the strategic direction of health care organizations. McAuley, R.G., Paul, W.M & Morrison, G.H. et al (1990) conducted a peer assessment program in the College of Physicians and Surgeons of Ontario that is mainly covering the office practices. Kilshaw, M.F., (1992) said that these programs are traditionally based on peer review and include a welldefined committee structure involving medical staff representatives.

The specification of performance appraisal criteria is a recurring problem (Leatt, P. & Fried, B., 1988). One of the central issues is whether to evaluate traits, behaviors or outcomes of work. The trait approach, which is now outdated, evaluated such items as appearance, selfconfidence, alertness and ambition rather than job-related behaviors, productivity or quality of work.

The behavioral approach can be used in conjunction with peer evaluation. Three types of peer evaluation have been described: peer rating, peer ranking and peer nomination (Stone, T.H. & Meltz N.M., 1993). In peer rating, group members rate each other; in peer ranking, group members assign rankings to one another; and in peer nomination, each member of a well-defined group designates a number of group members as highest (and sometimes lowest) in an aspect of performance. The third type has been shown to distinguish with a high degree of reliability and validity group members whose performance is very good or very poor in the particular area (Kane, J.S., & Lawler, E.E., III, 1978).

Methodology

The study covered about 400 employees across 5 hospitals in Vellore.

1. Christian Medical College
2. Sri Narayani Hospital and Research center
3. Scudder Memorial Hospital
4. Schieffelin Institute of Health and Research
5. Kumaran Hospital

These hospitals approximately suited with 500 to 1000 bedded multi-specialty facilities providing comprehensive care to patients - Gynecology, general medicine, general surgery, pediatrics, ENT division, Ortho, Anastasia, physic Therapy, Ultra Sound Scanning, Endoscopy, Urology, Nephrology, Rheumatology and others.

The data’s were collected from employees through questionnaires which were based on random analysis and the sampling techniques. Discussions and informal interviews of the personnel revealed the first hand data. This data collection method can come out with good quality data. Questionnaires was based on Cascio et al., (1988)
Sampling Units: Employees of Hospital and senior employees
Sampling Technique: Convenience and Judgment
Sampling Research Instrument: Questionnaires and Interviews

Performance Appraisal Process in Hospitals:

The performance appraisal system forms an essential part of the employee development process in any organization. It reflects the aptitude of an organization to define goals and expectations from employees. An upright and consequential performance appraisal process is essential for the hospitals prosperity and at the same manner it plays a significant role in bringing out the best in workers. Salary revision following a performance appraisal is a great motivating factor and an upright performance appraisal process goes a long way toward reducing effectiveness rates.

The hospitals are applying 180 degree appraisal system. 180 degree performance appraisals mean that employees are appraised by two people (self and Boss/Manager). The time interval for performance appraisal is six months to one year. The performance appraisal system holds up both employees and organizational management and leaders benefit from a well-structured performance appraisal system which helps to built successful organization. These systems offer feedback and rewards to employees who perform well, while at the same time holding employees accountable for their performance. Where, each report will describe the purpose, benefits, and elements of a good performance appraisal system and outline a unique performance appraisal system for a human service organization.

The purpose of a performance appraisal system is to provide an evaluation and feedback on an employee’s performance. Most hospitals perform appraisals yearly and may call the appraisal by other terms such as a review. Even if appraisals are performed annually, management should have weekly consultations or meetings with staff to ensure each employee is kept up-to-date with policies and each employee knows what is expected of him or her. A manager should not wait until the end of a year to let an employee know that there has been a performance problem for the last eight months. Problems should be addressed as they arise to prevent any surprises during the appraisal process. The evaluation portion of an appraisal system is normally performed by management.

During this portion, management evaluates an employee’s performance to determine if there are any areas that need improvement. Ideally, all employees should meet or exceeding organizational standards. If an employee is not meeting standards, or has not met standards at some point within the previous year, his or her appraisal may have suggestions for improvement or there may be other consequences as a result of poor performance.

The feedback portion of an appraisal system normally takes place between management and the employee who is being apprised. Then management provides counseling. But many of the employees don’t understand the counseling purpose. So that should be in methodical and systematic manner. The main procedure for hospital is that first appraise fill the form, where they rate for themselves. Appraise writes his view over the actual achievement for the task and target assigned to him. Comments on fulfillment of task and target are written by the HOD. Both appraise and HOD sits together. Comment over strengths and weaknesses and areas for development are written which is undersigned by both. Then compilation of ratio with the target is done. But the main problem occurs with this 180 degree performance appraisal is compilation, collation of data and it is time consuming process. This method is useful if done in a methodical and systematic manner.

Data Analysis

1. Are you aware about your performance appraisal system or any evaluation done by your superior?
   a. Yes  b. No
2. A performance appraisal technique makes you eligible for promotion, demotion and transfer?
   a. Yes  b. No
3. Do you think performance appraisal is useful or just a waste of time?
   a. Useful  b. Waste of Time
4. Does the proper and adequate performance appraisal play crucial role in your career development?
   a. Very important  b. Important  c. Maybe in future  d. Useless
5. Performance appraisal system is most of the time fair and unbiased, is it right?
   a. Yes b. No

6. Does the organization provide counseling after appraisal?
   a. Yes b. No

**Results**

Table 1: Shows that 100% employees among (400 out of 400) in the individual organization is aware about performance appraisal system and evaluation done by their superiors in the organization.

![Graph showing performance appraisal system](image1)

Table 2: Shows that 100% employees think performance appraisal system in the hospital is more beneficial for promotion, demotion & Transfer.

![Graph showing performance appraisal benefits](image2)

Table 3: Shows that 85% employees think performance appraisal is useful.

![Graph showing performance appraisal usefulness](image3)

Table 4: Shows that 60% employees think current performance appraisal plays a crucial role in career development. So there should be more improvement in performance appraisal system than current system.

![Graph showing performance appraisal results](image4)

Table 5: Shows that 40% employees think performance appraisal system is biased. So management has to take care of it.

![Graph showing performance appraisal bias](image5)

Table 6: Shows that organization provides 62% counseling. But that should be formal so other employee also get counseling.

![Graph showing counseling provision](image6)

**Recommendations**

- Performance appraisal should be transparent, timely and effective for employees.
- People should be made more understood about appraisal process and benefits.
• Performance appraisal should be 360 degree appraisal.
• They should provide appropriate training or counselling after appraisal.
• Employees should be given feedback regarding their appraisal. This will help them to improve on their weak areas.

Conclusion

Health care organizations depend greatly on a professional strategy; concerned with their effectiveness they must pay attention to employee and physician performance. For an essentials and effective performance system a upright thing should be followed up priory which preferably includes documentation, standard goals, practical and simple format, evaluation technique, communication, feedback and personal bias. The main challenges lies in developing performance appraisal systems are the demand of flexible and appropriate system to the professional staff. This paper has suggested that performance is improved when outcomes or expectations are defined, goals are set and timely feedback is given. These principles also apply to physicians, nurses and other staff of hospital, particularly as their roles are affected by the restructuring of health care.

Ethical Clearance: Since the article studies about online promotion on herbal products there is no need of clearance.

Source of Funding: Self.

Conflict of Interest: NIL.

REFERENCES

Assessment of Pre-analytical Errors in Clinical Laboratory at a Tertiary Care Hospital of Southern India

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ABSTRACT

Background: Majority of the laboratory error occurs in the pre-analytical phase which affects the diagnostic accuracy. This study was done to examine the frequency of pre-analytical errors classify them and to identify quality indicators which will further help in minimizing the occurrence of errors.

Method: A two-month study was done to identify the pre-analytical errors occurred in the microbiology laboratory from February 15th 2016 to April 15th 2016 (n= 42079). We documented the types and frequency of errors.

Result: Improperly/Incompletely filled request form was the major pre-analytical error observed. The total percentage of pre-analytical errors observed was 0.9%

Conclusion: Pre-analytical phase in clinical laboratories should be continuously monitored and should be avoided by proper application of quality control.

Keywords: Pre-analytical phase, Errors in Clinical laboratory, quality control, Quality Indicator

Introduction

Laboratory medicine plays an important role in the diagnosis and management of diseases. Laboratories are now an essential component in the organization of modern health care sector.1 Accurate laboratory reports are very essential for the diagnosing the disease and also for the patient safety.2 60-70% of crucial decisions of patients affirmation, release, and medicine depend on laboratory results.3 The laboratory operation is divided into three stages pre-analytical, analytical and post-analytical phases. Pre-analytical phase starts from the time a laboratory investigation is requested by the clinician till the sample is ready for analysis. This includes the process of sample collection consisting of proper patient identification, selection of appropriate sample collection tubes or containers, proper labelling of specimen with patient name, age, sex and unique hospital number with barcode and time of sample collection.4 Analytical phase includes various diagnostic processes and procedure that eventually provides the results. The final phase of laboratory testing is the post-analytical phase that ends up with the production of the final result or diagnostic report. The combination of these three stages constitutes the “total testing process”. The total testing process (TTP) is the entire process from the ordering a test to the interpretation of test result. It starts and ends up with the patient.5,6 Services rendered by the laboratory should be accurate and precise as errors might happen throughout the process.

According to ISO, laboratory errors are defined as any flaw occurring at any part of the laboratory cycle from requesting a test to delivering laboratory reports, interpreting, and respond to results.5 Errors can occur in

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pre-analytical, analytical or post-analytical phase further leading to delay in diagnosis or wrong diagnosis. According to several studies, pre-analytical errors accounts for up to 70% of total errors. Errors due to analytical issues are less when compared with post-analytical (18.5-47%). Quality indicators are objective measures the critical areas in TTP.

We conducted a study to examine the frequency of pre-analytical errors occurring at Microbiology laboratory of the Kasturba Hospital, Manipal and to rule out the cause of the error and to identify quality indicators of pre-analytical errors.

**Materials and Method**

A prospective observational study to assess the frequency of pre-analytical errors occurring in Microbiology was conducted at Microbiology lab, Kasturba Medical College, Manipal. The study was done for a period of 2 months from February 15th 2016 to April 15th 2016. All Samples received in the microbiology lab were included in the study. All inpatient and outpatient samples received along with the request forms were screened for preanalytical errors. Daily errors and type of errors were registered.

**Sample Collection:** Outpatient samples were collected at sample collection Centre in the hospital by the laboratory staffs and transported to the laboratory by hand by the housekeeping staff. Samples from the inpatient were collected by the nursing staffs and immediately transported to the corresponding laboratory. Blood samples were collected in colour coded vacuum tubes and biological fluids collected in sterilized plastic collection bottles. Once the samples reach the Microbiology laboratory, it was cross-checked by the laboratory staffs for appropriate containers, adequate sample volume, properly labelling, whether the test requisition sheet is properly filled and sample leakage. The time when the sample was received was also noted. Further, the barcode was generated for each sample and then send for analysis. If any errors were identified it was recorded and informed to send a proper repeat sample.

The following are the various quality indicators used to detect pre-analytical errors.

a. Doctor signature/name unreadable or missing: The sample was rejected if concerned Doctor’s name and signature ordering the test was not mentioned legibly. For Serological test like HIV requires consent form filled by patient along with doctor’s signature.

b. Inadequate quantity of sample: if the quantity of the sample provided is not sufficient to conduct the test procedure the sample was rejected.

c. Improperly/Incompletely filled request form: Failure to provide all information required on the test request form or improper labelling lead to rejection of the sample.

d. Invisible patient ID: If the Patient name, age, sex, hospital number, that was lightly labelled and can’t readable was rejected.

e. Wrong specimen: When the type of specimen provided is not suitable for the test requisitioned.

f. Leaking sample: This could be due to the containers being small or could also be due to loosely attached caps. Overfilled samples.

**Result**

A total of 42079 specimens were (21549 in the first month and 20530 in the second month) received in the microbiology laboratory. Preanalytical errors as per the above-mentioned categories were found in 382 samples (0.9%). The most common error was observed in Improperly/Incompletely filled request form (113 samples), Doctor signature/name unreadable or missing (107 samples). Inadequate quantity of sample (67 samples), Invisible patient ID (45 samples), Wrong specimen (31 samples), Leaking sample (19 samples) [Table 1]. The highest pre-analytical error is occurred by request form errors such as request form without doctor sign/unreadable and improperly or incompletely filled request forms.

### Table 1: Distribution of Pre-analytical errors at various levels in Month 1 and Month 2

<table>
<thead>
<tr>
<th>Type of Pre-analytical Errors</th>
<th>Total sample</th>
<th>Month 1:21549</th>
<th>Month 2:20530</th>
<th>Total :42079</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
<td>Percentage (%)</td>
<td>Number</td>
<td>Percentage (%)</td>
</tr>
<tr>
<td>Doctor signature/name unreadable.</td>
<td>65</td>
<td>0.3</td>
<td>42</td>
<td>0.2</td>
</tr>
<tr>
<td>Insufficient amount.</td>
<td>42</td>
<td>0.19</td>
<td>25</td>
<td>0.12</td>
</tr>
</tbody>
</table>
Improperly/Incompletely filled request form | 61 | 0.28 | 52 | 0.25 | 113 | 0.27  
Invisible patient ID | 23 | 0.10 | 22 | 0.1 | 45 | 0.10  
Not suitable for requested test. | 22 | 0.10 | 9 | 0.04 | 31 | 0.07  
Leaking sample | 11 | 0.05 | 8 | 0.04 | 19 | 0.05  
**Total errors** | **224** | **1.04** | **158** | **0.77** | **382** | **0.9**  

Table 2: Rejection of sample due to sampling errors in the first month

<table>
<thead>
<tr>
<th>Rejection due to sample error: First Month</th>
<th>Errors</th>
<th>Numbers</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insufficient amount.</td>
<td>42</td>
<td>56.1</td>
<td></td>
</tr>
<tr>
<td>Not suitable for the requested test.</td>
<td>22</td>
<td>29.3</td>
<td></td>
</tr>
<tr>
<td>Leaking sample</td>
<td>11</td>
<td>14.6</td>
<td></td>
</tr>
<tr>
<td><strong>Total error</strong></td>
<td><strong>75</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 3: Rejection of sample due to sampling errors in the second month

<table>
<thead>
<tr>
<th>Rejection due to sample error: Second month</th>
<th>Errors</th>
<th>Numbers</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insufficient amount.</td>
<td>25</td>
<td>59.53</td>
<td></td>
</tr>
<tr>
<td>Not suitable for the requested test.</td>
<td>9</td>
<td>21.42</td>
<td></td>
</tr>
<tr>
<td>Leaking sample</td>
<td>8</td>
<td>19.05</td>
<td></td>
</tr>
<tr>
<td><strong>Total error</strong></td>
<td><strong>42</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Discussion**

Laboratory medicine plays an important role in delivering health care. Accurate and precise laboratory results are instrumental in the decision making by doctors. Most of the studies have reported that the majority of the laboratory errors occur in the pre-analytical phase.

In the present study, we have considered only those quality indicators that we thought were important in our laboratory setup. We studied seven quality indicators and observed the frequency of pre-analytical errors. Test requisition forms were the source of highest error followed by sample collection. Our findings emphasize the importance of regular monitoring of these preanalytical variables to minimize the errors. Hence control over the preanalytical phase will ensure a satisfactory performance of laboratory services.

Quality improvement in the laboratories by controlling the lab errors can be achieved by spreading awareness among nursing staff, laboratory personals and health care providers. By recording all errors and their causes by monitoring regularly with corrective action will help in reducing these pre-analytical errors. With proper training to the staffs, better communication with clinical staff, clinicians at all phases will minimize the sample rejections and thereby provide reliable test results within the shortest possible time.

To conclude that quality indicators are powerful tools for monitoring the TTP. Introduction of advanced laboratory information system can efficiently control many of these preanalytical errors.

**Ethical Clearance:** The Ethical clearance was obtained Institutional Ethics Committee of Kasturba Hospital, Manipal. (IEC105/2016)

**Source of Funding:** Self

**Conflict of Interest:** Nil

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Assessment of Knowledge, Awareness and Practice of Interdental Dental Aids as an Adjunct Oral Hygiene Tool among Dental Professional Students

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¹BDS, ²MDS, Associate Professor, Department of Periodontology, Manipal College of Dental Sciences, Mangalore, Manipal Academy of Higher Education, Manipal

ABSTRACT

Background: Daily oral hygiene is must for overall good health. The Dental professionals play vital role in maintaining a good and sound oral health.

Aim: To evaluate the knowledge and practice of interdental aids among dental students.

Methodology: Undergraduate and postgraduate students (351) of private dental college were included by simple random sampling method. Demographic information, knowledge and attitude about inter-dental aids were collected using specially designed pre tested questionnaire.

Result: Statistical analysis was done. Chi square test was used for comparison between groups in relation to use knowledge about interdental aids. P value of < 0.05 was taken as statistically significant. 78.6% of students had knowledge regarding interdental aids. Clinical students had good knowledge regarding interdental aids compared to pre-clinical students. 143 students practice interdental aids.

Conclusion: There was a gradual increase in the knowledge as well as usage of interdental aids with progression from preclinical to clinical education. A disparity has noted between the prevalent knowledge and its application in daily life has been noticed.

Keywords: Dental plaque; Interdental aids: Oral Hygiene

Introduction

Oral diseases constitute public health problem in developing countries due to their high prevalence, economic consequences, and negative impact on the quality of life of affected individuals. Dentaltotals] Dental caries, and periodontal diseases are the two most prevalent oral diseases and which largely preventable through a combination of professional and self-care activities. Oral care, as part of general health self-care, comprises wide spectrum of activities ranging from care, prevention, and diagnosis to seeking professional care.

It is proved that self-care is a deliberate action that individuals should engage in to maintain good health. It is emphasized by the World Health Organization (WHO) as the key strategy for health promotion and disease prevention. It comprises of a wide spectrum of activities ranging from maintenance, prevention and diagnosis of any presenting ailment upon seeking professional care. At an individual level, such practices are known to be effective preventive measure against various oral diseases.

The people’s attitude and behavior play an important role in development and prevention of oral diseases. ADA has advised that dental visits should be made on a regular basis.

Epidemiological surveys have indicated that bacterial plaque is the dominant etiological factor in
periodontitis. Furthermore, it has been convincingly demonstrated that gingivitis is most frequent and most severe in the interproximal areas. [4] Though tooth brushing is considered as the most vital part of oral hygiene. But, any toothbrush regardless of the brushing method used, does not completely remove oral biofilms from the interdental spaces.[5,6] Inefficient removal of plaque and debris from these highly inaccessible areas between the teeth can trigger periodontal disease, a common oral ailment. With this shortcoming in view, several other materials have been devised to supplement the toothbrush. Hence, use of interdental aids is crucial factor for maintaining overall oral health.[3]

In contribution to Oral health promotion, one’s knowledge and attitude towards it plays a key role in determining the oral health conditions of the general population. It acts as a prerequisite for health-related behavior. The behavior of oral health providers like dental students and their attitude towards their own oral health reflects their understanding of the importance of improving the oral health of their patients.[7] They are expected to be role models for their patients, friends and family by utilizing the knowledge and experience they gain in their dental curriculum and employing it in life. [8]

Most studies conducted thus far have focused on the behavior of dental students towards routine brushing aids and knowledge regarding general brushing practices. This study highlights and assesses the existing knowledge and use of interdental aids among a group of undergraduate and postgraduate dental students while emphasizing on increasing the awareness among the dental student community.

Materials and Method

The cross-sectional questionnaire-based survey was conducted among undergraduate and postgraduate students of private dental college. A total of 380 students were included by simple random sampling method. The study protocol was approved by institutional ethical and review board. A participant consent was obtained prior to data collection.

A specially designed pre-tested questionnaire was used which was validated by subject experts. The questionnaire consisted of two sections, of which, the first section contained questions pertaining to demographic information such as age, sex, year of the study oral hygiene habits and practices, regularity of cleaning the teeth and the aids used and the second section contained questions regarding knowledge and attitude of inter-dental aids. An informed consent form along with a brief description of the study was attached along with the questionnaire.

The collected data were subjected to statistical analysis and chi square test was used for comparison between groups in relation to use knowledge about interdental aids. P value of < 0.05 was taken as statistically significant. Few questionnaires were not included in the statistical analysis due to errors in completion of questionnaire.

Results

A total of 351 dental students (267 female and 84 male) ranging from the age of 18 years to 30 years completed the questionnaire. The sample description of students by year of study is given below (Figure 1). 29 questionnaires were not added in the data due to incomplete filling or multiple answers were ticked. Incompletely filled forms were not subjected for statistical analysis.

Figure 1: Sample distribution among the study participants

The findings regarding tooth brushing habit of participants was 100%. There were no significant differences in tooth brushing behavior between academic years. 43.3% of the respondents claimed to brush their teeth once daily while 56.7% claimed to brush twice daily.

It was reported that a considerable number of students faced dental and gingival problems with the most common being food lodgment and dental decay. The pie chart below shows the percentage of these problems experienced by them (Figure2).
Regarding the information on interdental aids, it was observed that 78.6% of students were aware about it. 84% students knew that interproximal area of teeth is the most difficult to clean with brush alone and hence needs to be cleaned with interdental aids. Dentists were the source of information for 44.7% of the students. Upon comparing the Statistical data it was observed that Clinical students had good knowledge regarding interdental aids compared to non-clinical students (P < 0.001) (Table 1 & 2, Figure 3).

### Table 1: Comparison between clinical and preclinical group

<table>
<thead>
<tr>
<th></th>
<th>Group</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Preclinical</td>
<td>Clinical</td>
</tr>
<tr>
<td>Knowledge of Interdental Aids</td>
<td>Count</td>
<td>93</td>
</tr>
<tr>
<td>Yes</td>
<td>% within Group</td>
<td>59.7%</td>
</tr>
<tr>
<td>No</td>
<td>Count</td>
<td>62</td>
</tr>
<tr>
<td>% within Group</td>
<td>40.3%</td>
<td>6.1%</td>
</tr>
<tr>
<td>Total</td>
<td>Count</td>
<td>155</td>
</tr>
<tr>
<td>% within Group</td>
<td>100.0%</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

Pearson Chi-Square 60.278 P VALUE <0.001*

### Table 2: Chi square analysis showing percentage of clinical students practicing interdental aids as compared to pre-clinical students

<table>
<thead>
<tr>
<th></th>
<th>Group</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Preclinical</td>
<td>Clinical</td>
</tr>
<tr>
<td>Practice of Interdental Aids</td>
<td>Count</td>
<td>55</td>
</tr>
<tr>
<td>Yes</td>
<td>% within Group</td>
<td>35.5%</td>
</tr>
<tr>
<td>No</td>
<td>Count</td>
<td>100</td>
</tr>
<tr>
<td>% within Group</td>
<td>64.5%</td>
<td>54.6%</td>
</tr>
<tr>
<td>Total</td>
<td>Count</td>
<td>155</td>
</tr>
<tr>
<td>% within Group</td>
<td>100.0%</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

Pearson Chi-Square 3.475 P Value 0.064
A similar pattern was seen in the use of interdental aids with 143 students practicing interdental aids. Clinical students practiced more as compared to non-clinical students (P =0.064) (Table 2).

Out of these, 27.9% of the students gave reason of general oral hygiene. Other reasons included spacing between teeth, orthodontic appliances, fixed prosthesis and food impaction. Type of interdental aid used and frequency of practice are shown in the table below (Table 3).

<table>
<thead>
<tr>
<th>Type of interdental aids</th>
<th>Percentage (%)</th>
<th>Frequency of use</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dental floss</td>
<td>27.4</td>
<td>Once daily</td>
<td>13.7</td>
</tr>
<tr>
<td>Interdental brush</td>
<td>9.4</td>
<td>Twice daily</td>
<td>7.4</td>
</tr>
<tr>
<td>Uni tufted brush</td>
<td>0.6</td>
<td>More than twice</td>
<td>2</td>
</tr>
<tr>
<td>Woodpicks</td>
<td>4.6</td>
<td>Occasionally</td>
<td>18.8</td>
</tr>
</tbody>
</table>

The common reasons given for non-usage of interdental aids included that it was difficult to use or that it required extra time an effort.

**Discussion**

As a major part of their role in the oral-health-care provision, dentists are considered experts in the field of oral-health education and promotion. The first step in establishing a positive oral-health habit is to provide significant knowledge to the patients and to raise their awareness regarding the ways to prevent oral diseases. Dental students should be a good example of positive oral health attitudes and behavior to their families, patients and friends. In general, they have been found to be motivated about maintaining a good oral health. In this manner high awareness regarding oral self-care among dental students enables them to assess their patients’ oral health condition and to motivate their patients and may help them to spread oral awareness in the general population [9-11]

The removal of inter-proximal plaque is considered to be important for the maintenance of gingival health, prevention of periodontal diseases and reduction of caries. Unfortunately, the toothbrush is relatively ineffective at removing inter-proximal plaque and therefore patients need to resort to additional home care techniques such as interdental aids. [12] In the present study majority of the participants brush their teeth twice daily this is in accordance with earlier studies. [13,14] This is in contrast to study by Anisha et al. 2017. [12] In that article authors felt lack of awareness may be the prime reason for these results.

The results of the present study indicated that the percentage score for oral-health knowledge, attitude, and behavior of clinical students were significantly higher than that of the preclinical students, which agrees with the results of some previous studies by Kawamura et al. 2000 [11,15] preventive dentistry and periodontology are taught in the 3rd year of dental studies, so the difference in the knowledge, attitude, and behavior percentages of preclinical and clinical dental students appears to reflect the variation in the student’s educational level.

Knowledge about interdental aid was around 76% and 84% of participant felt interdental area is difficult to clean by routine brushing techniques this was in contrast to study by previous study by Bennadi et al 2013.[16]

Oral health education needs to be provided in these areas in accordance with several studies where study results confirmed that knowledge and practice of interdental aids improved with increasing levels of education. [16] This improvement in personal oral health among dental students has been shown to be linked to their dental education experience. Knowledge and practice of inter dental aids seem to increase significantly in the fourth and fifth years of dental education. Additionally, the responses of the students in the fourth and fifth years were very similar.[11,16]

**Conclusion**

The study conducted observes that although the knowledge among dental students about interdental aids is good, there is a considerable gap in the implementation of this knowledge. There seems to be a gradual increase in the knowledge as well as usage of interdental aids with progression from preclinical to clinical education in the dental curriculum.

A small number of students experienced dental problems which can be attributed to the non-usage of
interdental aids. A disparity has been noted between the prevalent knowledge and its application in day to day life for which motivation seems to be the key to overcome this gap. This will enable the future dental health providers to ensure good oral hygiene among patients, family and themselves.

**Clinical Relevance:** Tooth brush regardless of the brushing method used, does not completely remove oral biofilms from the interdental spaces. Use of interdental aids is crucial factor for maintaining overall oral health. The behavior of oral health providers like dental students and their attitude towards their own oral health reflects their understanding of the importance of improving the oral health of their patients. They are expected to be role models for their patients, friends and family by utilizing the knowledge and experience they gain in their dental curriculum and employing it in life.

**Conflict of Interest:** Nil

**Ethical Clearance:** The ethical clearance for study protocol was taken from institutional ethical committee and review board, MCODS, Mangalore, Manipal Academy of Higher Education, Manipal.

**Source of Funding:** Self

**REFERENCES**


Invitro α-Glucosidase and α-Amylase Inhibitory Activities of Heartwood of *Pterocarpus Marsupium*

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**ABSTRACT**

Objective: Diabetes is the most prevailing disease of today’s world. Many complementary and alternative medicines are being used to treat diabetes mostly derived from plant sources. *Pterocarpus marsupium* is one such drug. Many works are being done to inhibit α-glucosidase and α-amylase enzymes there by controlling post prandial hyperglycemia. The present study was undertaken to see the anti enzymatic action of *Pterocarpus marsupium* against α-glucosidase and α-amylase enzymes.

Method: Invitro assessment was done to see enzymatic inhibition. The Ic50 was calculated using linear regression equation.

Result: The Ic50 value for α-amylase was found to be 31.03 µg/ml and the Ic50 value for α-glucosidase was 39.97 µg/ml.

Keywords: *Pterocarpus marsupium*, antidiabetic, α-amylase, α-glucosidase

**Introduction**

Diabetes mellitus is a chronic metabolic disorder. It may be defined as a disease of elevated blood glucose level with absent or inadequate pancreatic insulin secretion. It may be associated with or without concurrent impairment of insulin action. It is characterized by hyperglycemia and carbohydrate, protein and fat metabolism disorder. About 40.9 million people are diabetic in India which would rise up to 60.9 million by 2025. There are many types of diabetes out of which Type I and Type II diabetes are more common. Among the above said types, Type II diabetes which is also referred as non-insulin-dependent diabetes is more prevalent. It is mainly due to abnormal rise in blood sugar following a meal also known as postprandial hyperglycemia. Many works are being conducted to regulate postprandial glucose level. α-amylose and α-glucosidase are responsible for postprandial glucose level. So the use of carbohydrate digesting enzyme inhibitors can control postprandial hyperglycemia by reducing the intestinal absorption of glucose. The α-amylase are the calcium metalloenzymes which can’t function in the absence of calcium. This enzyme helps in the hydrolysis of the alpha-1,4 glycosidic linkages of the starch, amylopectin, amylose, glycogen, and numerous maltodextrins and is responsible for starch digestion. α-glucosidase or maltase catalyzes the final step of the digestive process of carbohydrates mainly starch by acting upon 1,4-alpha bonds and producing glucose as the final product. Due to excess activity of amylase enzyme and insulin deficiency or insulin resistance, level of blood glucose arises which might result in hyperglycemia. To control hyperglycemia several studies on inhibition of amylase enzyme activity is being studied. Inhibiting these two enzymes will help to control postprandial hyperglycemia. Many drugs are being used to treat diabetes mellitus. Acarbose is one of them which acts by inhibiting both α-amylase and α-glucosidase. This drug causes GI irritation which involves abdominal distention, flatulence, meteorism and possibly diarrhea. To overcome this problem many complementary and alternative medicines are being used to treat diabetes. These are generally derived from plant sources. World
health organization (WHO) is also promoting the use of traditional plant for diabetes for to its effectiveness and less or no sideeffect. \( \textit{Pterocarpus marsupium} \) is one such traditional plant used as antidiabetic. \( \textit{Pterocarpus marsupium} \) is a long deciduous tree which belongs to Leguminaceae family. It is mostly found in evergreen forests of India. This plant is commonly known as Indian Kino in English, also known as Vijayasar in Sanskrit, Bijsal, Bibla etc. are its other synonyms. Its anti diabetic effect is known from ages. In ayurveda it is described in a group called rasayana or immunomodulators.

**Materials and Method**

\textbf{Preparation of extract of \textit{pterocarpus marsupium}:} The heartwood of \textit{pterocarpus marsupium} was collected from local market. It was dried properly in shade at room temperature. Then the woods were cut into small pieces and grinded in electric grinder. The powder obtained was soaked in equal amount of water for 24 hrs. The macerated pulp was filtered through coarse sieve. The filtrate was dried in water bath at temperature ranging from 40°C to 60°C. A sticky consistency of filtrate was obtained. This filtrate was completely lyophilized by continuous freeze drying operation to obtain a dry powder.

\textbf{In vitro \textit{α}-amylase inhibitory assay:} 0.5ml of extract (1mg/ml) was mixed with 0.5ml of \textit{α}-amylase solution (0.5 mg/ml). \textit{α}-amylase solution was made by mixing 0.5mg of amylase in 1ml of 0.02M sodium phosphate buffer (pH 6.9 with 0.006M NaCl). This mixture was incubated at room temperature for 10mins. Then 0.5ml of starch solution (1%) 0.02M sodiumphosphate buffer (pH6.9 with 0.006MNaCl) was added to it. The resulting mixture was incubated at room temperature for 10 min, and the reaction was terminated using 1 ml of dinitrosalicylic acid as colour reagent. Then the test tube was placed in water bath at 100°C for 5 min and was cooled until room temperature was attained. The mixture was then diluted with 10 ml of distilled water, and absorbance was determined at 540 nm. The absorbance of blank (buffer instead of extract and amylase solution) and control (buffer instead of extract) samples were also determined.

\textbf{In vitro \textit{α}-glucosidase inhibitory assay:} 2.0 ml of 0.1 mol·L\(^{-1}\) potassium phosphate buffer (pH 6.8), 0.1 ml of sample solution or extract (1mg/ml), 50 µl of reduced glutathione (1 mg·ml\(^{-1}\)) and 0.1 ml \textit{α}-glucosidase solution (0.57 U·ml\(^{-1}\)) were taken and mixed well. The solution was then incubated for 15 min at 37°C. 0.2 ml of 4nitrophenyl-\textit{α}-D-glucopyranoside (PNPG of 20 mmol·L\(^{-1}\)) was added. It was incubated for 15 min at 37°C. the reaction was stopped by adding 10 mL of 0.1 mol·L\(^{-1}\) Na\(_2\)CO\(_3\). The amount of 4-nitrophenol was measured spectrophotometrically at 400 nm.

**Calculation of percent inhibition:** it was calculated using the formula

\[
\% \text{Inhibition} = \left( \frac{\text{Abs Control} - \text{Abs Sample}}{\text{Abs Control}} \right) \times 100
\]

**Calculation of IC50:** The IC50 was calculated using linear regression equation in which the concentration of the sample as the x-axis and percent inhibition as the y-axis. From the equation \( y = a+bx \), IC50 values was calculated.

**Result**

The In vitro \textit{α}-amylase and \textit{α}-glucosidase inhibition study demonstrated that the \textit{Pterocarpus marsupium} has an inhibitory action on both the enzymes. There was dose dependent increase in percentage inhibitory activity against both enzymes. The \% inhibition for alpha amylase was found to be 29.56% and 68.29% at concentration 10 \( \mu g/ml \) and 50 \( \mu g/ml \) respectively (table - 2). The \% inhibition for alpha glucosidase was found to be 24.43% and 61.45% at concentration 10 \( \mu g/ml \) and 50 \( \mu g/ml \) respectively (table - 1). The IC50 value for \textit{α}-amylase was found to be 31.03 µg/ml (fig.2) and 39.97 µg/ml for \textit{α}-glucosidase (fig.1).

| Table 1: (\textit{α}-glucosidase inhibitory effects of extract of \textit{pterocarpus marsupium}) |
|-----------------|-----------------|-----------------|
| **Plant species** | **Concentration (µg/ml)** | **% inhibition** |
| Pterocarpus marsupium | 10 | 24.43 |
| | 20 | 33.51 |
| | 30 | 40.08 |
| | 40 | 47.00 |
| | 50 | 61.45 |

| Table 2: (\textit{α}-amylase inhibitory effects of extract of \textit{pterocarpus marsupium}) |
|-----------------|-----------------|-----------------|
| **Plant species** | **Concentration (µg/ml)** | **% inhibition** |
| Pterocarpus marsupium | 10 | 29.56 |
| | 20 | 39.67 |
| | 30 | 49.00 |
| | 40 | 58.56 |
| | 50 | 68.29 |
Discussion

α-amylase and α-glucosidase are responsible for carbohydrate digestion. Inhibition of these enzymes helps to control post prandial hyperglycaemia in type II diabetic patients. There is delay in digestion of carbohydrate as a result of which there is low sugar level in blood which in turn reduces post prandial glucose level. The delay of carbohydrate digestion with a plant-based α-amylase and α-glucosidase inhibitor is a better option for management of type 2 diabetes mellitus. In clinical practice today many α-amylase and α-glucosidase inhibitors like acarbose, voglibose and miglitol are being prescribed. But these drugs are not cost effective as well as having many side effects. Pterocarpus marsupium is being used as an antidiabetic drug for ages from the time of charaka and susruta(charaka samhita).this study aims to investigate the enzymatic inhibition property of this plant using aqueous extract of its heartwood. The present study proved the inhibitory effect of the drug against α-amylase and α-glucosidase which is similar to some previous worker. They investigated taking account of the plants leaves and latex. From the above data it was found that this drug is a strong inhibitor of amylase than α-glucosidase as the Ic50 value for α-amylase was found to be 31.03 µg/ml and 39.97 µg/ml for α-glucosidase. It can be inferred that the heartwood is more potent than leaves as done by previous author.

Conclusion

From the In vitro study it can be inferred that the antidiabetic effect of Pterocarpus marsupium is also influenced by enzymatic inhibition of α-amylase and α-glucosidase including other factors. It can be positively used to decrease the post prandial hyperglycaemia.

Ethical Clearance: This study is approved from our Institutional Ethics Committee.

Source of Funding: Self

Conflict of Interest: None

References


and inorganic constituents of Phyllanthus amarus Schum. & Thonn. ash. Songklanakarin Journal of Science & Technology. 2014 Sep 1;36(5).


To Compare the Efficacy of Dexamethasone with Levobupivacaine versus Fentanyl with Levobupivacaine on Duration of Analgesia after Supraclavicular Brachial Plexus Blockade

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ABSTRACT

Objective: Supraclavicular brachial plexus block is one of the easiest and the most consistent method for anesthesia and perioperative pain management in surgeries below the shoulder joint. In this randomised control trial, we aimed to compare the analgesic efficacy of 0.5% levobupivacaine with 4mg dexamethasone and 25 mcg fentanyl as adjuvants for brachial plexus block (supraclavicular approach) in upper extremity surgeries.

Method: Ninety patients were randomly divided into 3 groups of 30 each. Group L: 25 ml 0.5% levobupivacaine + Normal Saline 1 ml. Group D: 25 ml 0.5% levobupivacaine + dexamethasone (4 mg). Group F: 25ml 0.5% levobupivacaine + fentanyl (25 mcg). Time of onset of sensory block, time of onset of motor block, duration of motor block and total duration of sensory block were noted. Postop analgesia and VAS score was recorded for 24 hours.

Results: Onset of sensory and motor block was 6.10+2.51 min and 11.57+3.19 min in Group D, 9.67+3.61 min and 15.73+3.83 min in Group F, 13.87+3.83 min and 21.57+3.53 min in Group L respectively.

Conclusion: Addition of 4mg dexamethasone to 0.5% levobupivacaine for supraclavicular plexus block shortens sensory, motor block onset time and motor block durations, extends sensory block, and analgesia durations

Keywords: Dexamethasone, fentanyl, levobupivacaine, supraclavicular brachial plexus block.

Introduction

The main aim of anesthesia is to ease the pain and anguish of the patient, so that surgical procedures can be performed without any distress. Pain is a physiological reaction in response to tissue injury. In recent times, intra-operative and post-operative pain relief has attained significance, in view of the immunological, central and peripheral stress response to tissue injury [1].

Patients experience severe, unendurable pain in the post-operative period [2]. This warrants the need for extended analgesia devoid of any side effects [3].

Regional blocks are based on the concept that pain is conveyed by nerve fibres, which are amenable to interruptions anywhere along the pathway [4].

One of the most commonly employed regional nerve block procedure for peri-operative anaesthesia and analgesia for upper extremity surgery is brachial plexus block [5]. The undesirable effects, of general anaesthetic drugs and upper airway manipulations can be avoided [6].

Supraclavicular approach is the most simple and reliable method for anaesthesia and peri-operative analgesia in upper limb surgeries [7]. In recent times, different adjuvants have been used along with local anaesthetics in brachial plexus block to achieve rapid, intense and extended block [8-9].

DOI Number: 10.5958/0976-5506.2019.01277.4
Adjuvants such as magnesium sulfate [10], clonidine [11], epinephrine [12], buprenorphine [13], midazolam [14], dexmedetomidine [15-16], etc. have been used but these have adverse effects like sedation, respiratory depression and psycho-mimetic effects. Previous studies have shown that dexamethasone as an adjuvant, have no significant neurotoxicity and elevation of blood glucose concentrations [17]. The usage of opioids as adjuvants in brachial plexus block enhances success quotient and post-op analgesia [18]. Dexamethasone is widely believed to augment the characteristics and duration of peripheral nerve block as compared to local anesthetic alone [19].

Levobupivacaine was found to have lesser cardiac and neurological adverse effects. Levobupivacaine has a better safety profile. Hence, the S (−) enantiomers of bupivacaine, levobupivacaine and ropivacaine were launched [20]. In India, levobupivacaine has been introduced recently and is being used in various health sectors [21].

Therefore the intention of this study was to evaluate the effectiveness, duration and characteristic of motor blockade and sensory blockade between patients receiving plain levobupivacaine and its combination with adjuvants like dexamethasone and fentanyl.

**Material and Method**

After the approval of the institutional scientific and ethics committee, 90 consenting patients fulfilling the inclusion criteria was considered for our study. A pre-anesthetic checkup was done for all patients which included a detailed history, general physical and systemic examination. Patients were randomly divided into three groups of 30 each. All the patients were subjected to brachial plexus block with supraclavicular approach with all aseptic precautions with a nerve locator needle, immediately lateral to subclavian artery. After eliciting motor response in the fingers using a nerve stimulator, drugs were administered as follows:

**Group L:** 0.5% levobupivacaine 25 ml + Normal Saline 1 ml

**Group D:** 0.5% levobupivacaine 25 ml + dexamethasone 1 ml (4 mg).

**Group F:** 0.5% levobupivacaine 25ml + fentanyl 1ml (25 mcg)

Time of onset of sensory block, time of onset of motor block, duration of motor block and total duration of sensory block were noted. Intraoperatively, all the patients received adequate intravenous fluids. Pulse rate (PR), blood pressure (BP), respiratory rate (RR) were monitored till the patients were shifted from operating table. Patients were watched for signs of pneumothorax, like tachypnea and respiratory distress. Intraoperatively and postoperatively side effects like nausea, vomiting, itching, dryness of mouth and sweating were observed.

After completion of surgery, patients were shifted to the recovery room. All analgesics and sedatives were withheld in the postoperative period, unless the patient complained of pain. Postop analgesia was recorded for 24 hours.

Evaluation of pain and pain relief was done according to visual analogue scale. When patients complained of pain (>3 VAS), parenteral analgesic (Inj. Diclofenac Sodium 50 mg in 100ml infusion over 10 min) was given.

**Parameters:**
- Sensory block: using pin prick method (assessment using 3 point scale)
- Motor block:
  - Radial nerve: Thumb abduction, extension at elbow and wrist
  - Median nerve: Thumb opposition
  - Ulnar nerve: Thumb adduction
  - Musculocutaneous nerve: Flexion at elbow

Haemodynamic parameters: heart rate, blood Pressure, SpO2, Respiratory rate at 5 min, 10 min, 15 min, 30 min, 45 min, 60 min, 75 min, 90 min, 120 min

Intra operative and postoperative monitoring of sensory block, motor block and visual analogue scale(VAS) at 30 min, 1hr, 2 hr, 4 hr, 6 hr, 12 hr, 24 hr

The primary outcome of the study was to compare the onset time and duration of sensory block between the 3 groups. The secondary outcome was to compare the onset and duration of motor block between the 3 groups.

**Sample Size:** The sample size required for correctly rejecting the null hypothesis with the power of 90% and 95% confidence interval was calculated and was determined that 90 participants were required who were randomized into three groups using computer generated randomization:
\[ n = \left( \frac{Z_\alpha + Z_\beta}{d'} \right)^2 \sigma^2 \]

\[ Z_\alpha = 1.96 \text{ at 95% confidence level, } Z_\beta = 1.28 \text{ at 90% power} \]

Statistical Analysis

The data was analysed using the following tests

- Chi-square test
- ANOVA test
- Bonferonni t test
- SPSS 17.0.

Result was considered statistically significant if P value <0.05

Findings

As shown in table 1, demographic variables such as age, weight, height and gender were comparable in all 3 groups

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Group D</th>
<th>Group F</th>
<th>Group L</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>39.07 ± 11.838</td>
<td>36.17 ± 10.429</td>
<td>43.67 ± 16.039</td>
<td>.084</td>
</tr>
<tr>
<td>Male</td>
<td>80.0</td>
<td>26.7</td>
<td>20.0</td>
<td>.54</td>
</tr>
<tr>
<td>Female</td>
<td>20.0</td>
<td>73.3</td>
<td>80.0</td>
<td>.461</td>
</tr>
<tr>
<td>Height</td>
<td>161.70 ± 10.564</td>
<td>164.20 ± 7.823</td>
<td>162.13 ± 5.728</td>
<td>.168</td>
</tr>
<tr>
<td>Weight</td>
<td>70.97 ± 9.894</td>
<td>67.60 ± 8.896</td>
<td>66.70 ± 8.555</td>
<td>.086</td>
</tr>
</tbody>
</table>

As shown in table 2, the mean onset time of sensory block was statistically significant in Group D with a P value of 0.000.

<table>
<thead>
<tr>
<th>Group</th>
<th>N</th>
<th>Mean (min)</th>
<th>Std. Deviation</th>
<th>95% Confidence Interval for Mean</th>
<th>ANOVA F</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>D</td>
<td>30</td>
<td>6.10</td>
<td>2.51</td>
<td>5.16 to 7.04</td>
<td>39.973</td>
<td>0.000</td>
</tr>
<tr>
<td>F</td>
<td>30</td>
<td>9.67</td>
<td>3.61</td>
<td>8.32 to 11.02</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L</td>
<td>30</td>
<td>13.87</td>
<td>3.83</td>
<td>12.44 to 15.30</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

As shown in table 3, the duration of sensory block was prolonged in Group D and statistically significant compared to other groups with p value = 0.000

<table>
<thead>
<tr>
<th>Group</th>
<th>N</th>
<th>Mean (min)</th>
<th>Std. Deviation</th>
<th>95% Confidence Interval for Mean</th>
<th>ANOVA F</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>D</td>
<td>30</td>
<td>1334.87</td>
<td>157.75</td>
<td>1275.96 to 1393.77</td>
<td>348.500</td>
<td>0.000 HS</td>
</tr>
<tr>
<td>F</td>
<td>30</td>
<td>761.83</td>
<td>77.89</td>
<td>732.75 to 790.92</td>
<td></td>
<td></td>
</tr>
<tr>
<td>L</td>
<td>30</td>
<td>533.60</td>
<td>114.28</td>
<td>490.93 to 576.27</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

As shown in table 4, the time of onset of motor blockade in Group D was faster which was statistically significant with a P value of 0.000.

<table>
<thead>
<tr>
<th>Group</th>
<th>N</th>
<th>Mean (min)</th>
<th>Std. Deviation</th>
<th>95% Confidence Interval for Mean</th>
<th>ANOVA F</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>D</td>
<td>30</td>
<td>11.57</td>
<td>3.19</td>
<td>10.37 to 12.76</td>
<td>60.830</td>
<td>0.000</td>
</tr>
<tr>
<td>F</td>
<td>30</td>
<td>15.73</td>
<td>3.83</td>
<td>14.30 to 17.16</td>
<td></td>
<td>HS</td>
</tr>
<tr>
<td>L</td>
<td>30</td>
<td>21.57</td>
<td>3.53</td>
<td>20.25 to 22.88</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

As shown in table 5, the duration of motor block in Group D was found to be prolonged as compared to Group F and Group L. This was found to be statistically significant with p value of 0.000
Table 5: Duration of motor block

<table>
<thead>
<tr>
<th>Group</th>
<th>N</th>
<th>Mean (min)</th>
<th>Std. Deviation</th>
<th>95% Confidence Interval for Mean</th>
<th>ANOVA F</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Lower Bound</td>
<td>Upper Bound</td>
<td></td>
</tr>
<tr>
<td>D</td>
<td>30</td>
<td>1214.50</td>
<td>160.87</td>
<td>1154.43</td>
<td>1274.57</td>
<td>275.231</td>
</tr>
<tr>
<td>F</td>
<td>30</td>
<td>667.53</td>
<td>101.00</td>
<td>629.82</td>
<td>705.25</td>
<td>HS</td>
</tr>
<tr>
<td>L</td>
<td>30</td>
<td>449.50</td>
<td>121.29</td>
<td>404.21</td>
<td>494.79</td>
<td></td>
</tr>
</tbody>
</table>

Discussion

In our study, the duration of sensory block in Group-D was found to be 1334.87±157.75 min vs 533.60±114.28 in Group-L and duration of motor block was found to be 1214.50±160.87 min vs 449.50±121.29 min in Group-L. Jasminka Persec [17] et al studied the effect of dexamethasone on analgesia, when added to levobupivacaine in ultrasound-guided supravacular blockade. Duration of motor (1,200 min. in group 1 vs 700 min. in group 2) and sensory (1,260 min. in group 1 vs 600 min. in group 2) blockade were significantly increased in group-1 (P<0.05) which was comparable to our study. In our study the time of onset of sensory block was 6.10±2.51 min in Group D vs 13.87±3.83 min in Group L which was highly significant whereas in their study, the onset of sensory block was 5 min in study group vs 3 min in control group which was not clinically significant (p= 0.72). In our study the time of onset of motor blockade in Group D was11.57±3.19 min vs 21.57±3.53 min in Group L which was found to be highly significant. In the study done by Jasminka Persec[17], time of onset of motor block was 8 minutes in study group versus 8 minutes in control group which was clinically insignificant. Kim YJ et al[19] showed that on administering 5mg dexamethasone as an adjunct in interscalene block, it was found to have a good pain control period extending up to 48 hours, without specific adverse effects in comparison to adding equal volumes of adjuvant normal saline or epinephrine (1: 40000) which is in confirmation with our study.

In our study, the duration of sensory block was 761.83±77.89 min in Group F and 533.60±114.28 min in Group L, which was highly significant(p =0.000). Time of onset of sensory block was 9.67±3.61 minutes in Group F vs 13.87±3.83 min in Group L and time of onset of motor blockade 15.73±3.83 min in Group F vs 21.57±3.53 min in Group L which was highly significant (p=0.000). Shirish G. Chavan et al [2] studied effect of addition of 50mcg fentanyl to 0.5%bupivacaine in brachial plexus block on duration of analgesia. The duration of sensory blockade was 623 ± 96 min in the study group vs 450 ± 79 min in control group which was comparable to our study.

Moharari R et al [22] have shown that addition of 75 mcg of fentanyl to 1.5% lidocaine solution in an interscalene brachial plexus blockade accelerates the onset time of sensory and motor blockade, which is in accordance with our study. Karakaya D et al[23] has shown that mean duration of sensory block, motor block and analgesia was increased when 100mcg fentanyl was added to 0.25% bupivacaine in comparison with local anesthetic alone in supravacular block which is comparable to our study.

Conclusion

Hence we conclude that addition of 4mg dexamethasone and 25mcg fentanyl to 0.5% levobupivacaine in supravacular brachial plexus block shorten the onset time and prolongs the duration of sensory and motor block in comparison to 0.5% levobupivacaine alone. It was also found that onset of sensory and motor block was shorter and duration of sensory and motor block was prolonged with dexamethasone in comparison to fentanyl.

Conflicts of Interest: None declared

Source of Funding: Self

Ethical Clearance: Institutional Ethics Committee, Kasturba Medical College, Mangalore. All procedures followed were in accordance with the ethical standards of the responsible committee on human experimentation (institutional and national) and with the Helsinki Declaration of 1975, as revised in 2000.

Acknowledgments

We would like to thank Kasturba Medical College, Mangalore and Manipal Academy of Higher Education, Manipal, Karnataka, India for their support in doing this study.
REFERENCES


Anti-Microbial Activity of *Psidium Guajava* Leaf Extract

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**ABSTRACT**

**Objective:** To assess the antibacterial and antifungal activity of *Psidium guajava* leaf extract.

**Method:** Two concentration of alcohol extracts were obtained by Soxhlet method and another extract was prepared with aqueous extraction method. All three extracts were assessed for antibacterial and antifungal activity using well-diffusion method.

**Results:** 70% ethanolic extract (S3) showed more antibacterial efficacy when compared with 100% ethanolic (S1) and aqueous extracts (S2) of *Psidium guajava*. Antifungal activity screening showed inhibitory zone of 13 mm with S1, 14 mm with S3. Aqueous extract (S2) could not show any effect on *Aspergillus niger* growth inhibition. Candida albicans inhibition was comparable among the three extracts. Higher concentration 1024 ug/ml of S3 showed superior efficacy of 17 mm when compared to other two extracts S1 and S2.

**Conclusion:** The findings of this study revealed the antibacterial and antifungal properties of the Psidium guajava leaf extract.

**Keywords:** Antibacterial activity, Antifungal activity, Quercetin, Psidium guajava, Polyphenolic flavonoids.

**Introduction**

Many natural products have shown to possess antimicrobial activity that includes various parts of different plants. This has given a scope to research on the plants that have antimicrobial activity and produce phytochemicals that are responsible for anti-microbial actions¹². Mechanism of antimicrobial action by plant extracts includes rupturing the cell wall, membranes and destroying intracellular matrix¹. The *P. guajava* plant products were used in folk medicine for treating various ailments like vomiting, dysentery, gastroenteritis, sore throat, malaria, tooth ache, inflamed gums, ulcers, wounds ³⁴. This plant was also reported for its beneficial activity against obesity, diabetes and hypertension⁵⁻⁷. *Psidium guajava* belonging to the Myrtaceae family, originated from South America. Among 150 species under genus *Psidium* only 20 species are good food crops and among these the most commonly grown plant is *P. guajava* L ⁸, Guava fruit today is considered minor in terms of commercial world trade, but it is widely grown in the tropics, enriching the diet of hundreds of millions of people in those areas of the world. This is a deciduous plant and its leaves measure about 2-6 inches in length and 1-2 inches in width with characteristics like coriaceous, stiff, aromatic and dull green in colour⁹. The phytochemical components in the leaf of this plant like cineol, flavonoids, tannins, malic acid, triterpenes, resins, were known to possess antibiotic, anti-diabetic and anti-obesity properties¹⁰. The common methods of plant extraction are maceration, infusion, percolation, digestion, decoction, Soxhlet extraction, aqueous-alcoholic extraction by fermentation, counter-current extraction, microwave-assisted extraction, ultrasound extraction, supercritical fluid extraction, and phytomic extraction. Maceration extraction was considered as simple extraction in which solvents diffuse and
solubilise compounds of plant material with similar polarity\textsuperscript{11}. Extract quality depends on various factors like origin, season, extraction method and secondary metabolite composition. Factors affecting extraction method includes time of the extraction period, solvent used, temperature and the solvent-to-sample ratio\textsuperscript{12}. The antimicrobial activity of various extracts from guava leaves were previously reported by Gonçalves et al., describing the phytochemical properties of essential oils in this plant\textsuperscript{13}. In their study, the extraction procedure included Soxhlet extraction and rotary evaporator using Clevenger type doser and Gottlieb et al., method was used for obtaining essential oils\textsuperscript{14}. Antimicrobial screening was done by many researchers with essential oil and solvent extract of guava leaves\textsuperscript{1, 4, 5, 16}. The mechanism of action for antimicrobial activity of essential oils in guava leaves is that they penetrate lipid layer of microbes’ cell membrane destroying its impermeable nature and causing leakage of vital cell contents\textsuperscript{17}. Antibacterial activity of ethanolic and aqueous extracts of various parts of guava plant were studied by Sanches et al., and found that ethanolic extract was more effective than aqueous extract against \textit{Staphylococcus aureus}\textsuperscript{18}. Gnan and Demello reported antimicrobial activity of \textit{Ps. guajava} leaf extract against nine different strains of \textit{Staphylococcus aureus}\textsuperscript{19}. Arima and Danno isolated four flavonoids and studied their inhibitory properties against Salmonella enteritidis and \textit{Bacillus cereus}\textsuperscript{20}. The other most active component found in the leaves of \textit{P. guajava} is Quercetin, a polyphenolic flavonoid molecule along with quercetin-3-o-glucopyranoside and morin\textsuperscript{21}. Quercetin showed antibiotic activity against some bacteria and also was reported as synergist when used with other antibiotics.

**Materials and Method**

**Plant Extract:** The powdered crude extract was processed using 100 \% ethanol and 70\% ethanol in Soxhlet apparatus and aqueous extraction method. The extract thus obtained was freeze dried and stored in sterile containers. The final extract obtained with 100\% ethanol, aqueous and 70\% ethanol were named as S1, S2 and S3 respectively.

**Panel of Microorganisms:** A group of microorganisms were selected which included \textit{Escherichia coli} (Ec), \textit{Bacillus subtilis} (Bs), \textit{Staphylococcus aureus} (Sa), \textit{Shigella flexnari} (Sf), \textit{Proteus vulgaris} (Pv), \textit{Micrococcus luteus} (Ml) and fungi like \textit{Candida albicans} (Ca), \textit{Aspergillus niger} (An) to evaluate the extracts against the growth of these organisms. Prior to sensitivity testing, each of the bacteria strains were cultured onto nutrient agar plates and incubated for 18 to 24 h at 37\textdegree C to obtain colonies, then selected with a sterile disposable inoculating loop and transferred to a glass tube of sterile physiological saline and vortex thoroughly. Each bacterial suspension turbidity was then compared to that of the 0.5 McFarland standard solution (containing about 1.5 \times 10^8 CFU/mL).

**Antibacterial Activity:** Antimicrobial evaluation was done using the well-diffusion assay according to the standard of the National Committee for Clinical Laboratory Standards\textsuperscript{22}. Nutrient agar was prepared and poured in the sterile Petri dishes and allowed to solidify. The 24 hours growing bacterial culture of bacterial pathogens was swabbed on it. The test sample in different concentrations was loaded in the wells made using cork borer. Tetracycline (10µL) was used as positive control. The plates were then incubated at 37\textdegree C for 24 hours and the inhibition diameter was measured in units of mm.

**Antifungal Activity:** This activity was screened using well diffusion method\textsuperscript{23, 24}. Potato dextrose agar was prepared and poured in the sterile Petri dish and allowed to solidify. 48 hours growing fungal cultures of \textit{Aspergillus niger} and \textit{Candida albicans} were swabbed on it. The test sample in different concentrations was loaded in the wells made using cork borer. Fluconazole was used as positive control. The plates were then incubated at 37\textdegree C for 48 hours and the inhibition diameter was measured using zone scale in mm.

**Results**

Ethanolic extract (S1) showed inhibition of Ec at higher concentration of 1000 µg/ml with 13 mm of inhibition zone in comparison to control (tetracycline (10µL)) 29 mm of inhibitory zone. S1 showed inhibition of Bs growth from 500 µg/ml in a dose dependent manner. The inhibitory zone increased from 10 mm to 14 mm at a dose range of 500 µg/ml to 1000 µg/ml while the control inhibition of Bs was 24 mm. Inhibition of Sa was seen at higher dose of S1 1000 µg/ml which was 12 mm and that of control was 30 mm. S1 could not show any inhibition on growth of Sf and Pv. Inhibition of Ml growth by S1 was seen from 250 µg/ml, in a dose
dependent manner. The inhibition increased from 11 mm to 14 mm at a dose range of 250 µg/ml to 1000 µg/ml and it was 27 mm with control (Figure 1). Aqueous extract did not show any inhibition in growth of the selected bacteria (Figure 2). Hydro alcoholic extract (S3, 70% ethanol) showed inhibition of Ec at dose from 500 µg/ml in a dose dependent manner. The inhibition was <11 mm to 14 mm at a dose range of 500 µg/ml to 1000 µg/ml, while that of control was less than 11 mm. Inhibition of Bs with S3 at a dose range of 250 µg/ml to 1000 µg/ml was comparable to control. Inhibition of Sa by S3 was between 10 mm and 11 mm at doses of 250-1000 µg/ml while that of control was 30 mm. S3 showed inhibition of Sf from 750 µg/ml in a dose dependent manner. It showed inhibition of 12 mm - 13 mm at dose range of 750 µg/ml to 1000 µg/ml. Control showed an inhibition of < 11 mm. S3 did not show any effect on growth of Pv. A dose dependent increase in inhibition of Ml growth was observed with S3 from < 11 mm to 16 mm at a dose range of 500 µg/ml to 1000 µg/ml, while control inhibitory zone was 18 mm (Figure 3) (Table 1). Antifungal activity against *Aspergillus niger*, assessed by well diffusion method revealed 15 mm of inhibitory zone with control (fluconazole), 13 mm with S1, 14 mm with S3. Aqueous extract, S2 could not show any effect on fungal growth inhibition (Figure 4). Candida albicans inhibition was comparable among the three extracts. Higher concentration 1024 ug/ml of S3 showed superior efficacy of 17 mm when compared to other two extracts S1 and S2 (Figure 5) (Table 2).

### Table 1: Antibacterial activity of the three extracts S1, S2, S3 of *P. guajava*

<table>
<thead>
<tr>
<th>Extract</th>
<th>Concentration (µg/ml)</th>
<th>Zone Measurement/Growth Inhibition (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Ec</td>
<td>Bs</td>
</tr>
<tr>
<td>S1</td>
<td>250</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>500</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>750</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>1000</td>
<td>13</td>
</tr>
<tr>
<td></td>
<td>Control</td>
<td>29</td>
</tr>
<tr>
<td>S2</td>
<td>250</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>500</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>750</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>1000</td>
<td>-</td>
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<tr>
<td></td>
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<td>15</td>
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<tr>
<td>S3</td>
<td>250</td>
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</tr>
<tr>
<td></td>
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<td>&lt;11</td>
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<tr>
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<td>1000</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td>Control</td>
<td>&lt;11</td>
</tr>
</tbody>
</table>

Table 2: Antifungal activity of the three extracts S1, S2, S3 of *Psidium guajava*

<table>
<thead>
<tr>
<th>Concentration ug/ml</th>
<th>Alcohol S1</th>
<th>Aqueous S2</th>
<th>Hydro alcohol S3</th>
</tr>
</thead>
<tbody>
<tr>
<td>16</td>
<td>-</td>
<td>NA</td>
<td>-</td>
</tr>
<tr>
<td>32</td>
<td>NA</td>
<td>7.2</td>
<td>7.1</td>
</tr>
<tr>
<td>64</td>
<td>9.5</td>
<td>7.2</td>
<td>7.1</td>
</tr>
<tr>
<td>128</td>
<td>10</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>256</td>
<td>NA</td>
<td>10</td>
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</tr>
<tr>
<td>512</td>
<td>12</td>
<td>13</td>
<td>12</td>
</tr>
<tr>
<td>1024</td>
<td>13</td>
<td>13</td>
<td>17</td>
</tr>
</tbody>
</table>

NA-not applicable, S1 - Ethanolic extract, S2 - Aqueous extract, S3 - Hydro alcoholic extract of *P. guajava*.

Discussion

The ethanol extracts of *P. guajava* was shown to possess triterpenoids, tannins, glycosides, phenols and flavonoids as phytoconstituents. The aqueous extract contained all the phytoconstituents of alcoholic extract along with saponins. Tannins exhibit antibacterial activity by interacting with proline which is essential for protein synthesis. An *in-vitro* study revealed antimicrobial property of Flavonoids through interaction with cell wall proteins. One such flavonoid reported in *P. guajava* leaf extract was Quercetin. Saponins, which were shown as phytoconstituents in aqueous extracts, were reported to inhibit gram-positive organism like S. aureus. But in this study aqueous extract could not inhibit the growth of this organism. Therefore, the phytochemical analysis in this study revealed the superior efficacy of S3 extracts in comparison with S1, S2 with additional control against few other organisms.
Antifungal activity was better with S3 extract in comparison to other two extracts of *P. guajava*.

**Conclusion**

Hydro alcoholic extract S3 showed better efficacy in antifungal and antibacterial activity when compared to other two extracts S1 and S2 of *P. guajava*. This can be further characterised and investigated for the clinical efficacy in clinical trials as it is a natural product with less side effects.

**Acknowledgement**

The authors would like to sincerely thank the Management, Sri Ramachandra Institute of Higher Education and Research, Chennai for providing the state of art research and library facilities required for the completion of the study.

**Source of Funding:** The study was self-funded.

**Conflicts of Interest:** The authors declare no conflicts of interest

**Ethical Clearance:** Ethical clearance was obtained from the Institutional Ethical Committee before commencement (Letter vide Aug 24, 2011)

**REFERENCES**


Aesthetic Correction of a Single Tooth with Calcific Metamorphosis with Minimally Invasive Porcelain Veneers—A Case Report

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ABSTRACT

Dental practitioner undergoes significant challenges during the management of traumatized permanent teeth. Young adults are prone to calcific metamorphosis as a result of trauma. Calcific metamorphosis is more common in the anterior region of the mouth and can totally or partially obliterate the pulp space radiographically. The pulp space therapy is not always intervened unless a periapical pathology is detected and/or when the concerned tooth becomes symptomatic. This case report presents a single anterior teeth with calcific metamorphosis treated with porcelain veneers.

Keywords: Discoloration, Dental trauma, Calcified canal, Porcelain veneers.

Introduction

Calcific metamorphosis is termed as pulpal response to trauma, commonly seen in the anterior teeth which can be recognized within couple of months after injury. Calcific Metamorphosis is characterized as rapid dentin deposition within the canal space.1 The other synonyms for canal metamorphosis are Dystrophic Calcification, Diffuse Calcification, Calcific Degeneration and Canal Obliteration.2

A lot of researches has suggested that the calcific metamorphosis is bound to be a pulpal response to traumatic injuries which can result in dentin deposition within the pulp space.3 The etiopathology for pulp canal obliteration remains unclear, but injury to the neurovascular bundle of the pulp is considered to be one of the reason.4 The treatment planning for calcific metamorphosis has been a controversial issue for a very long time.5 This case report outlines the conservative management of a single tooth with calcific metamorphosis with minimally invasive porcelain veneer.

Case Report

A 32-year-old female patient came to the department of conservative dentistry and endodontics with a chief complaint of discolored front tooth since 15 years and unfavorable esthetics. [Figure 1] After communicating with the patient for an elaborate history, the patient reported to have a trauma to the permanent teeth when she was 17-years-old. Intraoral clinical examination revealed discolored upper right central incisor. Pulp sensibility tests were performed on 21. Thermal and electric pulp testing reported to give negative response for 21 indicating the non-vital status of the pulp. Tenderness on percussion was absent with respect to 21. The radiographic examination using intra oral periapical radiograph revealed presence of calcified canal with respect to 21 with no periapical changes and Cone beam computed tomography (CBCT) was taken to confirm the presence of calcified canal. [Figure 2] Final diagnosis was confirmed as calcific metamorphosis with respect to 21.
Treatment planning was established after taking various factors into consideration such as amount of the tooth structure to be preserved, occlusion, esthetics, and economic status of the patient. At the initial appointment, oral prophylaxis was carried out. Tooth preparation for veneer was performed. Deep chamfer finish line were planned, super-coarse, round end taper diamond point burs (SC850-018, IQ Dental Supply Inc.) were used for preparing the finish line. Deep chamfer finish lines were kept at the equigingival level and window preparation was done. Tooth reduction of 1 mm was done on the labial aspect to provide space for the ceramic material. [Figure 3]

Vinyl polysiloxane impression material (Dentsply Caulk, USA) as putty and hydrophilic vinyl polysiloxane impression material as light body (Dentsply Caulk, USA) was used for impression making. [Figure 4] Pressable all ceramic material (Cergo Kiss, Dentsply, India) was used for the veneer. The prepared tooth was polished with pumice and thoroughly cleaned to free it from debris, if any. The final veneer was checked for occlusion and cemented using resin cement Rely XTM veneer cement (3M ESPE, Puerto Rico). [Figure 5] The prepared crown margin was then polished using ceramic polishing kit (Shofu, Inc., Japan). Follow-up of six months was done and the crown margins were in satisfactory condition. [Figure 6]
Discussion

This case report highlights the problem faced by the practitioner in negotiation of calcified canal in endodontic therapy. This report also addresses the challenges faced by the patient due to esthetic concerns. The traumatic injuries to the primary or the permanent dentition usually result in two types of pulpal pathologies - calcific metamorphosis or internal resorption. The incidence rate of calcific metamorphosis due to trauma usually ranges from 4-24%.6,7

Since calcific metamorphosis is bound to have dentin deposition within the canal space, the rate of deposition varies in permanent and deciduous dentition. Research has shown that, the average rate of dentin deposition in majority of the cases of anterior teeth is around 3.5μm/day. The average dentin deposition for deciduous teeth is bound to be 2.8μm/day when compared to permanent teeth which is around 1.5μm/day.8,9

The most important step for calcific metamorphosis is to rule out various treatment options based on radiographic and clinical analysis. Radiographic changes reveal absence of canal chamber. Radiographically, it is found that there is no presence of periapical lesions and the lamina dura remains intact in majority of the cases. But, some of the case reports have also shown that the teeth with calcific metamorphosis, can be symptomatic with periapical infection.7 Teeth affected with calcified canals, showing complete pulp obliteration with no periapical changes can be treated as conservatively as possible.10,11 This is in accordance with the present case report.

Pulp sensibility tests performed in the present case scenario confirmed the non-vitality of the involved tooth. This indicated the need for root canal treatment. CBCT taken in this case confirmed the presence of complete obliteration of the pulp chamber, which concluded that the endodontic therapy need not be instituted. As a matter of rule, before attempting any kind of treatment, continuous recall and follow-ups are made mandatory to check for any changes in the periapex. Studies have shown that development of periapical pathology with respect to calcified teeth is around 1 -16%.9

Based on the esthetic concern and preservation of tooth structure, ceramic veneer was planned in this case. The basic criteria in the treatment planning of a ceramic veneer in the initial treatment phase, should include clinical examination and radiographic interpretation, with the aim of ruling out all the etiological factors associated with the discoloration of the involved tooth.12

In this case scenario, history of trauma at an early stage of life was considered as an important tool to arrive at a proper diagnosis and treatment planning. With this case report, the involved tooth following traumatic exposure underwent one year follow-up and the presented tooth was completely free of any signs of periapical infection, however, drastic esthetic changes were observed. Oginni-e-Adekoya-Sofowora et al (2009) in his study, revealed that teeth following traumatic exposure, presented with severe discoloration.13 With the above observations made, the tooth involved was rendered free from pulp space therapy as the recall visits did not result in aggression of the existing problem.12,14,15

The dentin formation in calcific metamorphosis is presented with an irregular manner and as a result there is decrease in translucency and presentation of the yellowish color, due to which ceramic veneers were planned as the treatment modality. Cvek and Lundberg in their study revealed that following trauma in permanent maxillary incisors, the collagen content increases with markedly reduction in cell number.16

Research has shown that the treatment intervened for teeth with calcific metamorphosis may not improve the properties of the tooth, like wear resistance and micro-hardness.17,18 With this case report, after a thorough diagnosis and treatment planning, ceramic veneer was planned for the involved tooth. This procedure attempted made a conservative treatment approach, was well executed and gave satisfactory results. The patient consented to perform treatment as planned and the prognosis of treatment was also informed. The patient was kept on periodic recall visits to check for the changes in periapex, so as to observe the incidence of periapical pathology.

Conclusion

The desired treatment outcomes depend upon the patient acceptance and with skillful professional involvement. In this particular case report, the treatment for calcific metamorphosis is kept as conservatively as possible without pulp space therapy as there was no presence of periapical pathology. The esthetic management in this particular case was dealt using ceramic veneers.
REFERENCES


Assessment of In-Patient Satisfaction Using Importance-Performance Map Analysis

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ABSTRACT

In recent decades, hospital management has emphasized on measuring quality of healthcare services. Assessing healthcare service quality provides an insight for hospital managers and administrators to improve their service quality and patient satisfaction. The purpose of this study is to assess the hospital service quality and its effect on inpatient satisfaction in private hospitals.

A cross-sectional study was conducted comprising of 204 patients from two private hospitals in coastal Karnataka. A structured questionnaire was used to gather the patients’ perception on quality of health care services and satisfaction. SmartPLS was used for testing the reliability and validity of the instrument and for analyzing the data. Importance performance map analysis was done for exploring the importance of various dimensions of hospital service quality that effects inpatient satisfaction.

Findings revealed that quality of clinical and administrative services are the two important factors that determine patient satisfaction. However, healthcare managers should focus on all the dimensions of hospital service quality with a special focus on quality of clinical services and supportive services for enhancing patient satisfaction. The findings of the study provide an insight to hospital administrators and mangers in terms of a better understanding of preferences and perceptions of patients in meeting or exceeding their expectations. Hence adds value in terms of sustaining and improving patient-centered care in healthcare organizations.

Keywords: Patient satisfaction, Clinical services, Administrative services, Importance –performance map analysis, Hospital service quality

Introduction

Quality of health care services has become a major concern for both patients and hospital management. Hospitals now a days have become very different from what it was a couple of decades back¹. Health care industry has witnessed an increased competition. More aware and better educated patients consider the quality of services while selecting hospitals for fulfilling their health care needs. Increased patients’ perception about service quality has makes it difficult for hospitals to provide services that meet their satisfaction¹. Service quality provides a sustainable competitive advantage and is an important factor that decides patient satisfaction². Thus it increases service demand, referrals and reputation of hospitals³. Providing high quality services improves efficiency and effectiveness that results in cost savings, increased market shares and profitability⁴.

Patient satisfaction is a key parameter that reflect quality of care. It is as significant as conventional outcome measures such as mortality or functional status of individuals⁵. Therefore, healthcare organizations recognize patient satisfaction as a factor that plays a vital role in a highly competitive healthcare market. It offers an evidence on the provider’s achievement at meeting the expectations that are most relevant to the patient⁶. Therefore, measures of satisfaction are central tools for research, administration planning and management. Hence this study aimed to identify the important factors that healthcare managers need to focus on for improving patient satisfaction using importance-performance map analysis.
**Literature Review**

Several researchers stated that patients’ perception of actual services provided decides the service quality of a hospital. Identification of determinants of healthcare service quality and evaluation of patients’ satisfaction are the most significant steps in quality improvement process. Several studies on measurement of hospital service quality emphasized on the need of continuous attention on quality related issues in hospitals. Such practices serve hospital managers in tackling the potential problems related to quality management in hospitals.

Usually, it is argued that hospital service quality construct is multidimensional in nature. Several researchers used either SERVQUAL or modified SERVQUAL instrument for measuring healthcare service quality. The instrument SERVQUAL was also employed for the development of scale for measuring healthcare service quality in various studies such as in the studies. Additionally, instruments were developed for measuring service quality for hospitals such as Aagja and Garg “Pub Hos Qual” for public hospitals; Ramsaran-Fowdar “PRIVHEALTHQUAL” for private hospitals. Lawthers et al. used instruments designed by Picker Institute as well as Consumer Assessment of Health Plans study. Butler et al. used Hospital Quality Trends (HQT), trademark surveys of Hospital Corporation of America. Camilleri and Callaghan designed based on framework of Donabedian. Zineldin expanded the technical – functional quality model of Gronroos and SERVQUAL quality models in to a framework of five quality dimensions such as quality of object, processes, infrastructure, interaction and care atmosphere. Choi et al. introduced an integrative model consisting of service quality and value, patient satisfaction and behavioural intention. A study by Raftopoulos stated that food, nursing care, medical care, room characteristics and medical treatment affects service quality. Baalbaki et al., professed that support services influence patients’ perception of quality. Duggirala et al., reported seven dimensions of health care quality such as infrastructure, personnel quality, clinical care process, administrative process, safety practices and overall satisfaction. Evaluation of patient satisfaction by Ghosh identified four dimensions such as clinical care, internal environment, communication and administrative that significantly and positively affected patient satisfaction. Thus researchers have developed patient satisfaction constructs from different perspectives and it appears such that there is some degree of agreement as well as disagreements on the dimensions identified. These differences could be because of diverse culture and environments across countries.

**Methodology**

The present cross-sectional study is exploratory and descriptive in nature. The study was conducted in two multi-specialty tertiary care hospitals. The study adopted a judgmental sampling method. The inclusion criteria were the inpatients who have stayed in hospitals for more than 48 hours and about to get discharged. The data were collected from 204 patient respondents using a self-administered structured questionnaire. Face and content validity of the questionnaire was confirmed through subjecting it for the review of healthcare administrators and subject experts. The questionnaire consisted of two parts; first part included the questions regarding the demographic details of the respondents such as age, gender, educational level and financial status. The second part of the questionnaire consisted of 33 items that measure the perception of patients regarding hospital service quality and satisfaction. The questionnaire was designed based on five dimensions of hospital services quality such as clinical services (CLS), administrative services (ADS), supportive services (SS), communication with patients (PC) and outcome of care (OTC) provided. A five point Likert scale was used with the scores ranging from 1 to 5, where 1 being strongly disagree and 5 being strongly agree. In total, 300 questionnaires were distributed among the inpatients of both hospitals, out of which 246 filled questionnaires were received and 210 responses were found usable for data analysis. Thus a response rate reached at 70 per cent. The data analysis was done using SmartPLS3.

**Analysis and Findings**

Reliability test is performed to ensure that the instrument used in the study is reliable that it measures the constructs consistently. The traditional criterion for internal consistency is Cronbach’s alpha for all the constructs in the questionnaire is much higher than the acceptable value 0.7 and indicates very good internal consistency as given in table I. The composite reliability values of all the constructs are greater than 0.8 which is much higher than the threshold value 0.7 that indicates good reliability of the constructs.
The Average Variance Extracted (AVE) values for all the constructs are greater than the threshold value 0.5, and that shows the adequacy of the model\textsuperscript{23,25} and ensures the extent to which a measure correlates positively with alternative measures of the same construct.

### Table I: Construct reliability and validity

<table>
<thead>
<tr>
<th>Constructs</th>
<th>Cronbach’s Alpha</th>
<th>rho_A</th>
<th>Composite Reliability</th>
<th>Average Variance Extracted (AVE)</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADS</td>
<td>0.92</td>
<td>0.92</td>
<td>0.94</td>
<td>0.71</td>
</tr>
<tr>
<td>CLS</td>
<td>0.91</td>
<td>0.91</td>
<td>0.93</td>
<td>0.64</td>
</tr>
<tr>
<td>OTC</td>
<td>0.90</td>
<td>0.90</td>
<td>0.94</td>
<td>0.50</td>
</tr>
<tr>
<td>PC</td>
<td>0.86</td>
<td>0.86</td>
<td>0.90</td>
<td>0.70</td>
</tr>
<tr>
<td>PTSAT</td>
<td>0.94</td>
<td>0.94</td>
<td>0.95</td>
<td>0.71</td>
</tr>
<tr>
<td>SS</td>
<td>0.85</td>
<td>0.85</td>
<td>0.89</td>
<td>0.62</td>
</tr>
</tbody>
</table>

Table II explains Fornell-Larcker Criterion which is one more approach of measuring the discriminant validity. The discriminant validity was established with the correlational values in the diagonal cells greater than the correlation values for all the constructs.

### Table II: Fornell-Larcker Criterion

<table>
<thead>
<tr>
<th></th>
<th>ADS</th>
<th>CLS</th>
<th>OTC</th>
<th>PC</th>
<th>PTSAT</th>
<th>SS</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADS</td>
<td>0.84</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>CLS</td>
<td>0.68</td>
<td>0.82</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>OTC</td>
<td>0.75</td>
<td>0.80</td>
<td>0.91</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PC</td>
<td>0.78</td>
<td>0.76</td>
<td>0.78</td>
<td>0.84</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PTSAT</td>
<td>0.76</td>
<td>0.74</td>
<td>0.76</td>
<td>0.74</td>
<td>0.84</td>
<td></td>
</tr>
<tr>
<td>SS</td>
<td>0.73</td>
<td>0.72</td>
<td>0.79</td>
<td>0.77</td>
<td>0.73</td>
<td>0.79</td>
</tr>
</tbody>
</table>

The adequacy of structural model is measured based on the R-square value and here in this study the R-square value is 0.70 that is greater than the cutoff value 0.67 that confirms it as substantial model\textsuperscript{25}.

**Importance-Performance Map Analysis (IPMA):** The researchers verified fulfillment of the three requirements for carrying out IPMA analysis such as measurement scale, variables coding and indicator weight estimates. IPMA is mainly useful in prioritizing constructs to improve the specific target construct. The total effects of the constructs and performance values are shown in the table III below.

### Table III: Data of the importance-performance map for patient satisfaction

<table>
<thead>
<tr>
<th>Constructs</th>
<th>Total effects</th>
<th>Performance</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADS</td>
<td>0.31</td>
<td>74.24</td>
</tr>
<tr>
<td>CLS</td>
<td>0.23</td>
<td>85.32</td>
</tr>
</tbody>
</table>

**Contd…**

<table>
<thead>
<tr>
<th>Constructs</th>
<th>Total effects</th>
<th>Performance</th>
</tr>
</thead>
<tbody>
<tr>
<td>OTC</td>
<td>0.14</td>
<td>84.19</td>
</tr>
<tr>
<td>PC</td>
<td>0.10</td>
<td>79.95</td>
</tr>
<tr>
<td>SS</td>
<td>0.16</td>
<td>77.81</td>
</tr>
<tr>
<td>Mean Value</td>
<td>0.19</td>
<td>80.30</td>
</tr>
</tbody>
</table>

Among the five factors, administrative services (ADS) has the highest total effect (importance) with a value of 0.31, and the construct communication with patients has the least total effect with the value of 0.10. However, the performance value of ADS is lowest among all the five constructs and is much lower than the mean performance value 80.30.

The X-axis in the importance-performance map depicts the importance of the predecessor factors for explaining the target construct patient satisfaction, while the Y-axis represents the performance of the five constructs in terms of their average rescaled latent variable scores. The five constructs have a mean importance of 0.19 and a mean performance of 0.80 (Table III). These two mean values divide the importance-performance map into four different quadrants (Figure I).
The importance-performance map shows that administrative services has a relatively low performance of 74.24. In comparison with other four constructs, the performance value of ADS is slightly below average. On the other hand, with a total effect of 0.31 this construct’s importance is relatively high. Therefore, a one-unit increase in the administrative services construct’s performance from 74.24 to 75.24 would increase the performance of patient satisfaction by 0.31 points from 73.757 to 74.067. Hence, when managers aim at increasing patient satisfaction, their first priority should be to improve the performance of aspects of administrative services as this construct has the highest (above average) importance, but a relatively low (below average) performance. The construct clinical services are performing well with both importance and performance values above average the mangers need to emphasize on keeping up the good work. The other aspects such as supportive services, patient communication and care outcome follow subsequent priority.

Discussion and Conclusion

Measuring patient satisfaction is an important strategy for healthcare managers wanting to improve services. Existing literature argued that the patient satisfaction construct is multidimensional in nature. Many researchers used different dimensions for measuring patient satisfaction. Important dimensions of patient satisfaction construct, as found from this study, provide empirical support for a number of patient satisfaction dimensions described in the literature. However, this study emphasized on the performance of these aspects considering their significant importance in determining patient satisfaction. The study revealed that healthcare mangers have to focus on improving performance of administrative services as patient perceive it as important. Though, hospitals are doing great in terms of performance of clinical services, mangers should also focus on keeping up the good work as these are the core services of health care organizations.

Importance-performance map analysis empowers hospitals and healthcare managers to better understand patients’ perceptions and expectations. Based on the mean values of importance and performance of patient satisfaction constructs an X-Y coordinate plane could be divided into four-quadrant matrix, the results can be plotted so that each point indicates the strengths and weaknesses of the constructs of patient satisfaction. Results can help the decision makers to improve quality of healthcare services and patient satisfaction emphasizing healthcare consumers’ perceptions in each quadrant. The main limitation of the study is that data were mainly collected from patients of two multispecialty hospitals which may not represent the entire population. Therefore, further studies are recommended to endorse our findings and support generalizing them to the entire population.

Acknowledgements

Authors of the paper are thankful for Manipal Institute of Management, Manipal Institute of Technology and Manipal Academy of Higher Education for extending their continuous support and encouragement in carrying out this research.

Conflict of Interest: No conflict of interest

Ethical Clearance: Ethical clearance was obtained from the Institutional Ethics Committee of Kasturba Hospital, Manipal (IEC:873/2017).

Source of Funding: Self

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A Study Review of the Adverse Drug Reaction Monitoring, Documentation, and Reporting at Tertiary Care Multi-Specialty Hospital in South India

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ABSTRACT

Background: The present study assesses the ADRs monitoring, documentation and reporting at a tertiary care multi-specialty health care in South India.

Method and Material: A non-experimental descriptive study design was used to collect all the necessary and relevant data from patient’s case notes, treatment charts, and ADRs notification forms, patient’s interview and reporter’s interview, who was admitted at the hospital with developed adverse drug reaction after the first dose of any medication administration.

Results: Majority of patients were in the age group of 19-40 years and 17 (33%) patients were 41-60 years of age. Male to female ratio was 0.92:1. Majority, of patients developed itching, followed by patients with rashes and erythematous purpura. The severity levels of ADR depicts that only 13 (25%) patients had a mild level of severity and 39(75%) patients had a moderate level of severity after measures taken. Appropriate nursing documentation was found for 52(100%) patients.

Conclusion: The study concludes that majority, patients developed itching, rashes, and ciprofloxacin caused allergies 16 times. Documentation was appropriate and maintained related to ADR, but still, need to improve their documentation system. Regular monitoring of ADRs is very essential to avoid unnecessary exposure of patients to drugs.

Keywords: Adverse drug reaction; monitoring, documentation, and reporting; Tertiary Care Multi-Specialty Hospital; South India

Introduction

Adverse drug reaction (ADR) is defined by world health organization (WHO) as any response to a drug which is noxious and unintended, and which occurs at doses normally used in human for prophylaxis, diagnosis, therapy of disease, for the modification of physiological function ¹. The classification proposed by Rawlins and Thompson (2012) was used to establish the potential for predicting suspected adverse drug reactions ². The reactions were defined as Type A-When they were predictable, expected due to the drug’s pharmacological characteristics and Type B- When they were unpredictable.

ADR is a frequent cause of hospital admissions, and constitute a significant economic burden. The majority (75-80%) of adverse drug reactions are caused by predictable nonimmunological effects, remaining 20-25% of adverse drug events are caused by unpredictable effects that may or may not be immune-mediated. Immune-mediated reactions account for 5-10% of all drug reactions and constitute drug allergies falling in this category. The number and severity of ADRs reported in a given organization or setting would vary with the organization’s size, type, patient mix, drugs

DOI Number: 10.5958/0976-5506.2019.01281.6
used, and the ADR definition used as an allergic reaction an immunologic hypersensitivity, occurring as result of unusual sensitivity to a drug and an idiosyncratic reaction it is an abnormal susceptibility to a drug that is peculiar to the individual are also considered ADRs 3, 4, 5.

An ADR-monitoring and reporting program should include the following features: 1. the program should establish A. An ongoing and concurrent (during drug therapy) surveillance system based on the reporting of suspected ADRs by pharmacists, physicians, Nurses, or patients. B. A prospective (before drug therapy) surveillance system for high-risk drugs or patients with a high risk for ADRs. C. A concurrent surveillance system for monitoring Alerting orders. 2. Alerting orders include the Use of “tracer” drugs that are used to treat common ADRs e.g., orders for immediate doses of antihistamines, epinephrine, and corticosteroids, Abrupt discontinuation or decreases in a dosage of a drug, or stat orders for laboratory assessment of therapeutic drug levels. Prescribers, caregivers, and patients should be notified regarding suspected ADRs. 3. Information regarding suspected ADRs should be reported to the pharmacy for complete data 6, 7.

In this present prospective surveillance, we did a study to assess the adverse Drug Reaction monitoring, documentation and reporting at a tertiary care multi-specialty health care in South India. This study aimed to assess the symptoms occurred due to use of drugs, the number of ADR occurred and analyze the measures taken to manage ADR as per protocol and its effect on recovery level through the documented report. We also assess the level of severity of ADR and audit the documented report maintained by the ADR Protocol.

Method and Material

The study was designed to assess the ADR monitoring, documentation and reporting at Sri Ramachandra Medical Center, Tertiary Care Multi Specialty Hospital, Chennai. This hospital facility has more than 2000 beds and 150 Intensive care units, provides healthcare treatment for over 35,000 inpatients and 2,50,000 outpatients every year.

**Study Population:** Fifty-two patients were included in this study, who was admitted to the hospital with developed adverse drug reaction after the first dose of any medication administration.

**Inclusion Criteria:** A patient who was having documented with complaints of drug allergy, signs of adverse drug reaction, confirmed the report of a physician on adverse drug reaction and measures was taken against adverse drug reaction

**Description of the Tool:** A purposive sampling technique was used in this study. The tool of the study has three parts- Part A: Demographic variables include section 1- personal data on includes age, sex, and vulnerable group and section 2- clinical data includes types of adverse drug reaction, name of the drugs caused ADR, route of administration of drugs, measures taken and duration of allergy symptoms subsides. Part B: Drug severity assessment scale was used to categorize the severity like of ADRs in mild, moderate and severe. Part C has documentation audit form includes patient’s case notes, treatment charts, nurses notes, ADRs notification forms, patients interview, and reporters interview.

**Data Collection Procedure:** All the necessary and relevant data were collected from patients case notes, treatment charts, ADRs notification forms, patients interview, and reporters interview. ADRs alert form was framed and implemented in each and every ward of the hospital. The assigned nurse noted in the ADR alert form if they found any ADR during their routine patient care. The noted ADRs were assessed by using Hartwig and Seigel’s ADR severity assessment scale; the noted ADRs were into definite, probable, possible and unlikely. The patients were classified or categorized according to their demographics, diseases status, and disease severity. The collected ADRs data were reported to the quality improvement and patient safety team and pharmacy & therapeutic community. The types of reactions are classified and a causal relationship is established using an algorithm. This method is chosen
based on the study by palanisamy and co-workers (2009). Total score for a particular drug- ADR combination is calculated using severity assessment scale (Hartwig et al scale), and the association is termed - highly probable, probable, possible or doubtful depending on the score.

Finally, the data obtained were analyzed and results were formulated. Notification of adverse drug reaction was informed to the patient and obtained signature after explained about the adverse drug reaction to prevent the future risk and same was documented in the software and discharge summary of the patients. Specified allergy sticker was pasted on the patient’s case sheet. Descriptive statistics were used to assess the frequency and percentage distribution of demographic variables, ADR symptoms. Number of ADRs occurred, measured taken to manage ADR as per protocol, documentation of symptoms described after measure taken, and level of severity of ADR and audited the documentation report maintained by the ADR team.

Findings

The findings from the study are tabulated, analyzed and interpreted below. In relation to demographic variables, the majority of (n=25; 48%) patients were in the age group of 19-40 years and 17 (33%) patients were 41-60 years of age. Male to female ratio was 0.92:1.

Majority, of (n=22; 42%) patients developed itching, followed by patients with rashes (n=15; 28%), and erythematous purpura (n=6; 12%). Other minor symptoms included anaphylaxis, nausea, vomiting, pruritis, urticaria, fever, facial swelling and lymphadenopathy after the first dose of medication or injection (Table 1). Ciprofloxacin (n=16; 31%), omnipaque (n=6; 12%), Piperacillin and Tazobactum (n=5; 10%), and ceftriaxone (n=3; 6%) caused ADRs most frequently (Table 2). Upon development of ADRs, 31 (60%) patients discontinued medications and 21 (40%) patients antidote was administered as per the prescription soon after the drug allergy was noted and reported. For 43 patients the average time taken to subside the reactions was around 30 minutes after the measures were taken and took one hour for nine patients. The severity levels of ADR depicts that only 13 (25%) patients had a mild level of severity and 39(75%) patients had a moderate level of severity after measures taken.

### Table 1: Summary of symptoms post medication

<table>
<thead>
<tr>
<th>Types of Reaction</th>
<th>(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nausea</td>
<td>2</td>
</tr>
<tr>
<td>Vomiting</td>
<td>2</td>
</tr>
<tr>
<td>Pruritis</td>
<td>2</td>
</tr>
<tr>
<td>Itching</td>
<td>42</td>
</tr>
<tr>
<td>Rash</td>
<td>28</td>
</tr>
<tr>
<td>Urticaria</td>
<td>2</td>
</tr>
<tr>
<td>Erythematous Purpura</td>
<td>12</td>
</tr>
<tr>
<td>Anaphylaxis</td>
<td>4</td>
</tr>
<tr>
<td>Fever</td>
<td>2</td>
</tr>
<tr>
<td>Facial Swelling</td>
<td>2</td>
</tr>
<tr>
<td>Lymphadenopathy</td>
<td>2</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>100</td>
</tr>
</tbody>
</table>

### Table 2: Drug involved in case of adverse reports

<table>
<thead>
<tr>
<th>Name of the drug</th>
<th>(n = 52)</th>
<th>(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ciprofloxacin</td>
<td>16</td>
<td>31</td>
</tr>
<tr>
<td>Omnipaque</td>
<td>6</td>
<td>12</td>
</tr>
<tr>
<td>Piperacillin &amp; tazobactum</td>
<td>5</td>
<td>10</td>
</tr>
<tr>
<td>Ceftriaxone</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td>Ranitidine</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td>Levofloxacin</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Cerebroprotein</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Fosolin</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Clindamycin</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>Parenteral Iron; Cefoperaxone; L-Asparginase; Ondansetron; Vancomycin; Tramadol; Cefotaxime; Phenyltoin; Diclofenac; Thromphob; Paracetamol</td>
<td>11 (each one case)</td>
<td>22</td>
</tr>
</tbody>
</table>

Appropriate nursing documentation was found for 52(100%) patients, informed doctor & measures were taken for 50(96%) patients, recorded the duration of symptoms was subsided for 39(75%) patients, allergy sticker was pasted on the case sheet for 52(100%) patients, patient and family education was given for 50(96%), entered ADR details in the system for 50(96%) patients and nursing care plan was written for 20(38%) patients. From the doctor’s notes maintained regarding ADR was revealed for 46(88%) patients doctors confirmed ADR and prescribed an antidote for 50(96%) patients mentioned about ADR in discharge summary (Table 3).
Table 3: Source of documentation for auditing

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Audited documented report</th>
<th>(n)</th>
<th>(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Nurses notes maintained by the assigned nurse</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Written on ADR in the patient’s file</td>
<td>52</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>Informed doctor &amp; measures taken</td>
<td>50</td>
<td>96</td>
</tr>
<tr>
<td></td>
<td>Recorded the symptom subsided</td>
<td>39</td>
<td>75</td>
</tr>
<tr>
<td></td>
<td>Pasted the allergy sticker on the patient’s file</td>
<td>52</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>Gave patient and family education</td>
<td>50</td>
<td>96</td>
</tr>
<tr>
<td></td>
<td>ADR notes entered in the (patient details) System</td>
<td>50</td>
<td>96</td>
</tr>
<tr>
<td></td>
<td>Maintained nursing care plan</td>
<td>20</td>
<td>38</td>
</tr>
<tr>
<td>2.</td>
<td>Doctor-Maintained notes about ADR</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Confirmed ADR &amp; Prescribed antidote</td>
<td>46</td>
<td>88</td>
</tr>
<tr>
<td></td>
<td>Mentioned ADR report in Discharge summary</td>
<td>50</td>
<td>96</td>
</tr>
</tbody>
</table>

**Discussion**

The present study was done to assess the ADR monitoring, documentation and reporting at Sri Ramachandra Medical Center, Tertiary Care Multi Specialty Hospital, Porur, Chennai. ADRs can have a determinant effect on the patient’s wellbeing and the overall health care system. Data were analyzed from 52 documented reports maintained by the inpatient patient care team (doctors and nurses). This study was carried out for a period of 6 months from Feb 2016 to Aug 2016. The data for the study was taken from ADR notification form, case sheets of patients who had an ADR treatment charts, Investigation reports.

Naranjo’s causality assessment scale shows 39.80 % (41) of ADRs were definite, 34.95 % (36) of ADRs were probable, 22.33% (23) of ADRs were possible and 2.91% (3) were unlikely. WHO probability assessment scale shows 39.80% (41) cases were certain, 34.95% (36) ADR were probable, 17.47% (18) were possible, 2.91% (3) were unlikely, and 4.85% (5) were unassessable. Severity Assessment by Modified Hartwig and Siegel Scale showed that 56.31% (58) ADRs were moderate, 38.83 % (40) ADRs were mild and 4.85% (5) ADRs were severe. No lethal effects were observed. Many of the ADRs were reported from the general medicine department (33.98%), it is followed by the dermatology department (14.56%) and others. Most commonly identified ADRs was maculopapular skin rashes 28 (27.18%).

The study concludes that majority, patients developed itching, rashes, ciprofloxacin caused allergies for 16 times, discontinued the drug for 31 patients and for 21 patients administered antidote to subside ADR reactions, followed that 39 patients developed a moderate level of severity, through the measures taken by the assigned nurse and inpatient department medical doctors. It indicates that they had maintained the document related to ADR, but still need to improve their documentation system for the fullest level to achieve zero level ADR reaction. The study concludes that regular monitoring of ADRs is very essential in the day to day life to avoid unnecessary exposure of patients to drugs and chemicals. All healthcare professional should actively participate in the regular monitoring and reporting of ADRs to maintain the good quality of patient’s life.

The implication drawn from the study is of vital concern to the field of nursing including service, administration, education, and research. Nurses who are working in the hospital must be trained enough to handle the adverse effects occurred due to use of drugs, assess and measure taken to manage ADR as per protocol, to assess the duration of symptoms subsided after measures taken and documentation of the event appropriately and to report ADR on time to medication safety team. Nurse educator of both from the college of nursing & hospital and also the medication safety team needs to take the initiative to identify the adverse drug reaction, monitoring, documentation, and reporting by the nurses inappropriately. Thereby we can avoid fatally or any adverse events to the patients. The nursing administrator should know the impact of adverse drug reaction and the need for the training of medical staff and nursing staff about the adverse drug reaction monitoring, reporting and documentation to prevent further impact on the patient. Need to conduct a training program to update the knowledge, practice, and attitudes on ADR compliance. The nursing researcher needs to define a systematic, objectives process of analyzing the phenomenon of ADR and its consequences on the quality of patients care. Evidence-based practice improves the quality of care and reduces the risk of complication. This research finding directs the nurse researcher to conduct retrospective and prospective research studies.
Conclusion

This study was done for the period of only six months and at a single center at the Sri Ramachandra Medical Centre, Chennai, India. A multicentric study with large samples across the hospitals among outpatients and inpatients would be more to know the exact prevalence of ADRs in Indian hospitals. Continuous monitoring of patient outcomes and patterns of ADRs is imperative for evaluation of ADRs patterns, monitoring practices, and the effect of ADR program on overall and individual patient outcomes.

Conflict of Interest: Authors do not have anything to disclose and declare not conflict of interest.

Informed Consent: Informed consent was obtained from the participants with the option to withdraw them from the study at any time.

Source of Funding: None

REFERENCES


Assessment of Pre-surgical Perception of Pain and Post-Surgical Pain in Patients Undergoing Dental Implant Placement Using Modified VAS Scale: A Clinical Study

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¹Intern, Manipal College of Dental Sciences, ²Associate Professor, Dept. of Prosthodontics, Manipal College of Dental Sciences, Mangalore, Mangalore, Manipal Academy of Higher Education, Manipal, Karnataka, India

ABSTRACT

Implants are the most preferred choice of treatment options for replacement of missing tooth or teeth for all age groups. Excellent long term survival rates make it a viable option for both simple and complex dental rehabilitations. Involvement of a surgical procedure for implants makes the patient anxious and develops a rejection towards the procedure. Research has shown anxiety to play a role in pain perception prior to surgical procedure. This study analyses the role of pain perception to actual pain experienced by subjects undergoing elective dental implant procedure and the role of age and gender in this assessment using a modified visual analog scale.

Keywords: Pain, Dental implant placement, Visual analog scale

Introduction

Pain is considered to be a complex sensory and emotional experience, closely associated with factors, such as stress and anxiety. Generally, with anxiety, one is more sensitive to the stimulus of noxious events. Klingberg and Broberg described dental anxiety as a state of apprehension that something dreadful is going to happen in relation to dental treatment or certain aspects of dental treatment¹. This can also change one’s perception of a given situation and influence the final interpretation of the stimulus as painful or enjoyable.

Furthermore, the nature of the setting in which the stimulus is applied, ex: a dental clinic, can act as a pre-potent cognitive mediator of pain behavior ². Oral surgery is a common procedure that is rarely life threatening and has a relatively short recovery period, however, its physical and psychological impact makes it a stressful experience.

Dental Implants are fast becoming the most sought after treatment modality in today’s day and age. Survival rates of dental implants have been proved to be 94.6% over a two decade follow up period³. As a result, this treatment option continues to develop popularity amongst patients and clinicians alike⁴. Having stated that, it also happens to be one of the most feared and dreaded procedure for patients merely due to the mention of the word “surgery” in course of explaining the protocol to the patient. It is thus, always assumed that “unbearable pain” will be a part and parcel of the same.

The aim of this study was to record both subjectively and objectively the perception of pain levels in patients undergoing placement of dental implants, evaluating perception of pain before and after the surgical procedure. The fear experienced by a patient is a subjective phenomenon that varies from patient to patient. Scales such as the Wong-Baker’s facial pain scale (Visual Analog Scale) has been used to measure the patient’s experience of pain. Reliability of the VAS for acute pain measurement as assessed by the ICC appears to be high. Ninety percent of the pain ratings were reproducible within 9 mm. This data suggest that the VAS is sufficiently reliable to be used to assess acute pain⁵.

DOI Number: 10.5958/0976-5506.2019.01282.8
The *Wong-Baker Faces Pain Rating Scale* (styled *Wong-Baker FACES Pain Rating Scale*) is a numerical pain scale that was developed by Donna Wong and Connie Baker. It is a scale from 0-10. The scale shows a series of faces ranging from a happy face at 0 which represents “no hurt” to a crying face at 10 which represents “hurts worst.” Based on the faces and descriptions, the patient chooses the face that best describes their level of pain.6

This pain scale was originally developed for children, however it can be used for all ages and children as young as 3 years old. It is a useful pain scale for children because many children may not understand rating their pain on a scale of 0-10, but are able to understand the cartoon faces and the emotions they represent and point to the one that best matches their level of pain. This pain scale is also appropriate for patients who do not know how to count and those who may have impaired brain function. Cultural sensitivity of the scale was also assessed to determine its applicability and acceptance across different cultures.7

Methodology

41 patients above the age of 20 years were chosen to be a part of this study. The following criteria was adhered to:

**Inclusion Criteria:**
- Patients must be fit to undergo implant surgery
- Patients must have normal systemic health status

**Exclusion Criteria:**
- Patients not physically or mentally fit to undergo surgery
- Smokers and chronic alcoholics
- Uncontrolled diabetics.
- Recent history of cardiac conditions
- Patients unwilling for implant placement.

The Wong Baker facial pain scale (VAS) was provided to the patient just before the dental procedure, right before the commencement of the surgery, to evaluate the perceived pain levels and the same form was provided to the patients when they came for suture removal.

The Wong baker pain scale readings were then analyzed and the results interpreted.

### Results

**Table 1:** Paired T Test for Comparison of the Perceived and the Actual Pain

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>N</th>
<th>Std. Deviation</th>
<th>Paired Differences</th>
<th>t</th>
<th>df</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Mean Difference</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Perceived pain</td>
<td>6.25</td>
<td>40</td>
<td>0.776</td>
<td>3.05</td>
<td>21.329</td>
<td>39</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Post-op actual</td>
<td>3.2</td>
<td>40</td>
<td>0.564</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Visual Analog Scale Used-Wong Baker’s Facial Pain Scale
Table 2: Pain as Per the Age Groups: Paired t Test

<table>
<thead>
<tr>
<th>Age</th>
<th>Mean (Pain)</th>
<th>N</th>
<th>Std. Deviation</th>
<th>Paired Differences</th>
<th>t</th>
<th>df</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;=40</td>
<td>Perception of pain 6.5</td>
<td>8</td>
<td>0.756</td>
<td>3.5</td>
<td>13.096</td>
<td>7</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td></td>
<td>Post-op actual pain 3</td>
<td>8</td>
<td>0.756</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>41-50</td>
<td>Perception of pain 6.18</td>
<td>17</td>
<td>0.809</td>
<td>2.824</td>
<td>11.474</td>
<td>16</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td></td>
<td>Post-op actual pain 3.35</td>
<td>17</td>
<td>0.493</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>51-60</td>
<td>Perception of pain 6.33</td>
<td>9</td>
<td>0.707</td>
<td>3.222</td>
<td>11.6</td>
<td>8</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td></td>
<td>Post-op actual pain 3.11</td>
<td>9</td>
<td>0.601</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;60</td>
<td>Perception of pain 6</td>
<td>6</td>
<td>0.894</td>
<td>2.833</td>
<td>9.22</td>
<td>5</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td></td>
<td>Post-op actual pain 3.17</td>
<td>6</td>
<td>0.408</td>
<td></td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 3: Comparison of the Pain as Per the Gender

<table>
<thead>
<tr>
<th>Sex</th>
<th>Mean (Pain)</th>
<th>N</th>
<th>Std. Deviation</th>
<th>Paired Differences</th>
<th>t</th>
<th>df</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>F</td>
<td>Perception of pain 6.41</td>
<td>22</td>
<td>0.796</td>
<td>3.182</td>
<td>14.177</td>
<td>21</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td></td>
<td>Post-op actual pain 3.23</td>
<td>22</td>
<td>0.528</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M</td>
<td>Perception of pain 6.06</td>
<td>18</td>
<td>0.725</td>
<td>2.889</td>
<td>18.12</td>
<td>17</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td></td>
<td>Post-op actual pain 3.17</td>
<td>18</td>
<td>0.618</td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

Table 4: Consolidated Table Showing the Correlation of Age and Gender on Pain Perception and Postoperative Pain

<table>
<thead>
<tr>
<th>Gender</th>
<th>N</th>
<th>Mean (Pain)</th>
<th>Std. Deviation</th>
<th>Paired Differences</th>
<th>t</th>
<th>df</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>overall</td>
<td>Perception of pain 40</td>
<td>6.25</td>
<td>0.776</td>
<td>3.05</td>
<td>21.329</td>
<td>39</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td></td>
<td>Post-op actual pain 40</td>
<td>3.2</td>
<td>0.564</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;=40</td>
<td>Perception of pain 8</td>
<td>6.5</td>
<td>0.756</td>
<td>3.5</td>
<td>13.096</td>
<td>7</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td></td>
<td>Post-op actual pain 8</td>
<td>3</td>
<td>0.756</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>41-50</td>
<td>Perception of pain 17</td>
<td>6.18</td>
<td>0.809</td>
<td>2.824</td>
<td>11.474</td>
<td>16</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td></td>
<td>Post-op actual pain 17</td>
<td>3.35</td>
<td>0.493</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>51-60</td>
<td>Perception of pain 9</td>
<td>6.33</td>
<td>0.707</td>
<td>3.222</td>
<td>11.6</td>
<td>8</td>
<td>&lt;0.001</td>
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<tr>
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<td>Post-op actual pain 9</td>
<td>3.11</td>
<td>0.601</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>&gt;60</td>
<td>Perception of pain 6</td>
<td>6</td>
<td>0.894</td>
<td>2.833</td>
<td>9.22</td>
<td>5</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td></td>
<td>Post-op actual pain 6</td>
<td>3.17</td>
<td>0.408</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>F</td>
<td>Perception of pain 22</td>
<td>6.41</td>
<td>0.796</td>
<td>3.182</td>
<td>14.177</td>
<td>21</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td></td>
<td>Post-op actual pain 22</td>
<td>3.23</td>
<td>0.528</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M</td>
<td>Perception of pain 18</td>
<td>6.06</td>
<td>0.725</td>
<td>2.889</td>
<td>18.12</td>
<td>17</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td></td>
<td>Post-op actual pain 18</td>
<td>3.17</td>
<td>0.618</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**Discussion**

The purpose of carrying out this study was to assess the perception of pain in patients undergoing a dental implant placement and comparing it to the actual pain felt by the patients as per their recorded responses on the VAS scale. As has been discussed before, pain is a sensory emotion that is affected by several factors. Anxiety before any surgical procedure big or small, conditions the human mind to believe in a higher sense of pain perception. The reality of the situation however changes on response to the actual stimulus.⁸

In this study it is seen that on comparison of the mean values of Perception of pain and Post-op actual pain, the mean values of Perception of pain is higher with a difference of 3.05, and is statistically significant with a p value of <0.001.

It is also seen that the perception of pain is higher in individuals below the age of 40 as compared to those above that age range, however, the level of actual pain felt is higher in individuals below the age of 40 than above. Eltumi H et al has reviewed effect of age, sex and gender on pain sensitivity and has reported that acute pain is more prevalent in the younger generation while chronic pain is mostly reported in the elderly population.¹⁰

Gender of the patient has also affected pre and post op scores with females having a higher perception of pain both before and after the surgical procedure as compare to their male counterparts. The results are similar to a study conducted by Kim et al where 89 subjects were assessed and it was reported that the pain perception was higher in the female counterparts at various stages of assessment.¹¹

Going by the parameters stated above, it is now imperative for dentists to establish ways in which he/she can bring down the anxiety in patients and reason with them about the long standing benefits of Implant treatment. Many patients shun the idea of an implant due to their assumption that they will be in pain. There is a behavioral management required for these patients not only for the betterment of the patients oral health but also for the progressive future of Implant Dentistry.

A few ways in which a patient can be convinced to take up the treatment without any hidden fears is as follows:

1. By providing a description of the procedure with the help of audio visual aids, thereby bringing down the apprehension of the patient and giving them an accurate idea of the procedure.
2. Scheduling appointments earlier in the day so as to complete the procedure without much fatigue on behalf of the doctor. This also helps in taking care of any untoward complications that might develop during the day and can be tended to before the clinic closes or the doctor is unavailable. It also helps to provide the patient convenient stress-free appointment timing.
3. Avoiding the use of the term ‘Surgery’ thereby making the process sound less daunting and more patient friendly.
4. Using long acting anesthesia and administering it using the right technique thereby making the procedure pain free and comfortable for both the patient and the surgeon.
5. Administering a pain killer and anti-inflammatory shot to the patient post the surgery to avoid pain and swelling that is due to develop in the first 24 hours.
6. Prescribing safe and effective medication only on eliciting correct medical history and encouraging the patient to take them on time and stressing on the importance of completing the dosage.
7. Making the clinic environment more suitable and patient friendly by incorporating music, thereby soothing the patient’s anxious nerves.
8. Deep breathing exercises also help to relieve the patient’s anxiety.
9. In patients with extreme paranoia, the use of conscious sedation can help in conducting a smooth procedure; however, this practice must only be undertaken after proper training as it is very technique sensitive.

**Conclusion**

Under the Limitations of this study, it can be concluded that:

a. There is a statistically significant difference in the perceived pain and post-operative pain experienced.
b. Pain perception and actual pain experienced is higher for individuals below the age of 40 years.

c. Females had higher ranges of pain perception and pain experienced compared to their male counterparts.

**Conflict of Interest:** Nil

**Source of Funding:** Self

**Ethical Clearance:** Clearance obtained on 12/8/2017

**REFERENCES**


Comparison of Bacterial Prevalence in Saliva of Edentulous Patients with or without Complete Dentures by 16S rRNA Gene Based Metagenomic Analysis Identifies a Novel Bacterial Signature in Denture Patients

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ABSTRACT

Objective: The aim of this study was to investigate the bacterial flora in the saliva of edentulous patients with or without complete dentures, and relate the occurrence of bacteria with denture biofilm.

Material and Method: Saliva samples from four edentulous patients who had been wearing denture (EdD) for at least 10 years and four edentulous patients who had been so without complete dentures (Ed) for at least 10 years were collected in a sterile 1.5ml microfuge tube. Biofilm samples from the mucosal surface of both upper and lower complete dentures from two of the above patients were scrapped with a disposable synthetic swab and collected in a 1.5ml microfuge tube containing lysis buffer. All the samples were processed simultaneously to extract total genomic DNA, and were subjected to 16S rRNA gene sequencing analysis on a next generation sequencer, the PGS-Ion Torrent. Those bacterial genera with read counts greater than 1000 were considered as significant in the respective subjects and used to associate the occurrence in other subjects.

Results and Conclusion: Metagenomic analysis identified a higher prevalence of Streptococcus, Veillonella, Rothia, Lachnospiraceae, Prevotella and Alteromonas in the saliva of EdD patients. Four other bacterial species namely, Actinomyces, Haemophilus, Neisseria and Vibrio showed comparative pattern in the saliva of both EdD and Ed patients. Comparison of the read counts of bacteria identified in the saliva of two EdD patients with the biofilm bacterial population in their respective complete dentures showed a relatively higher prevalence of all the six bacterial species in the biofilms than in saliva. These findings clearly indicate that: 1) bacterial flora still exists, albeit at a lower level, in edentulous patients even in the absence of complete dentures, and 2) the biofilm on mucosal surface of complete dentures serve as niche areas for bacterial species.

Keywords: Oral flora in edentulous, Bacterial flora in edentulous, Bacterial flora in denture wearers, Denture biofilm, Denture bacterial flora.

Introduction

Diverse species of bacteriae populate and colonize soft tissues of oral cavity such as tongue and buccal mucosa both in dentulous and edentulous subjects besides colonizing natural dentition or complete dentures respectively. [1,2] Although saliva is bacteria-free while being secreted, it soon acquires bacteria from biofilms deposited on several oral sites. As a result, bacterial profile of saliva is often considered as a read out of oral biofilm bacterial population and used to evaluate the relative prevalence of oral bacterial flora.[3]

Hence the present study was designed to specifically investigate the bacterial prevalence pattern in edentulous patients with or without complete dentures by 16S rRNA gene based metagenomics analysis. 16S metagenomics analysis was employed, as the technique preferentially amplifies a hypervariable but highly genus specific 16S ribosomal RNA coding gene region that as a result, identifies the complete profile of bacteria at genus level in a given sample. The application of technique has broadened our understanding of the prevalence of both culturable and non-culturable bacteria with relative ease in diverse range of samples,[6, 7] including saliva.
samples of patients with dental caries.\cite{8} By applying this
technique on saliva samples of edentulous patients with
or without complete dentures, we hoped to understand:
1) the relative bacterial prevalence pattern in the two
groups, 2) bacterial prevalence in denture biofilms, and
3) associate bacterial prevalence in denture biofilm with
salivary bacterial prevalence.

Materials and Method

Patient Samples and DNA Extraction: Eight edentulous
patients – four patients who had been wearing denture
for at least 10 years and four patients who had chosen
not to use complete dentures and been edentulous for
at least 10 years were selected. The age of patients in
the either of the groups were in the range of 60 to 70
years. The patients who had been wearing complete
dentures were designated as EdD group, while those
without complete dentures were designated as Ed group.
The saliva samples were collected in 15ml pyrogen free
tubes (Tarsons, India) and were stored at -20°C until
being processed. Biofilm on mucosal surface of upper
and lower complete dentures were collected by scraping
with a synthetic swab in the presence of bacterial lysis
buffer from bacterial genome extraction kit (Cat #
NA2110-1KT, Sigma-Aldrich). Bacterial lysate from
both upper and lower complete dentures were pooled and
collected in a single 1.5ml microfuge tube. All samples
were then processed for DNA extraction simultaneously
as described earlier.\cite{8}

16S rRNA amplification, sequencing and sequence
selection parameter: PCR amplification and deep
sequencing of the 16S rRNA hypervariable region
was performed on all samples with five nanograms of
total DNA simultaneously, as described earlier.\cite{8} The
high confident sequences were selected as mentioned
earlier, and 16S rRNA Operational Taxonomic Units
(OTUs) were clustered independently at 95% identity
threshold using QIIME and a reference dataset from
the Ribosomal Database Project.\cite{9} Assignment and
hierarchical clustering of OTUs as most common and
abundant taxa was performed using UPGMA clustering
(Unweighted Pair Group Method with Arithmetic mean,
also known as average linkage).

Results

Bacterial flora in saliva of edentulous patients: The
total genomic DNA extracted from the saliva of four
EdD and Ed patients were investigated by 16S rRNA
gene sequencing. A higher prevalence of six bacterial
genera namely, *Streptococcus, Veillonella, Rothia,
Lachnospiraceae, Prevotella* and *Alteromonas* were
identified in the saliva of EdD group relative to Ed group
patients (Table 1.1). Of the above six bacteria, the read
count of *Streptococcus* was greater than 10,000 in each
of the patient in both EdD and Ed groups. However in
EdD patients, the *Streptococcus* read count was at least
two-fold higher than Ed group patients that indicated
a higher prevalence of *Streptococcus* in EdD patients
(compare individual patients between the two groups).
Similarly, the read count of *Veillonella* was higher by
at least three-fold in EdD group patients, while those of
*Rothia, Lachnospiraceae, Prevotella* and *Alteromonas*
were several fold higher in EdD group relative to Ed
group patients (Table 1.1) (compare individual patients
between the two groups). Interestingly, the read count
of *Alteromonas* was either insignificant (read count = 2)
or absent in the saliva of Ed patients (Table 1.1). Four
more bacterial species - *Actinomyces, Haemophilus,
Neisseria* and *Vibrio* with read counts greater than 1000
were also detected in both EdD and Ed patients, but
showed mixed pattern without a clear bias towards any
group (Table 1.1). In order to estimate the fold difference
in the occurrence of bacteria in these two groups, the
read counts of each of the bacteria identified in either of
the groups were pooled and difference in the read count
was calculated. This analysis indicated greater than 3
fold difference between the two group of patients, with
a definite preclusion of *Streptococcus, Veillonella,
Rothia, Lachnospiraceae, Prevotella* and *Alteromonas*
in the EdD group patients (Table 1.2). All bacteria with
read counts greater than 1000 belonged to four phyla
namely, Firmicutes, Actinobacteria, Bacteroidetes, and
Proteobacteria (Table 2).

<table>
<thead>
<tr>
<th>Bacterial species</th>
<th>EdD-1</th>
<th>EdD-2</th>
<th>EdD-3</th>
<th>EdD-4</th>
<th>Ed-1</th>
<th>Ed-2</th>
<th>Ed-3</th>
<th>Ed-4</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Streptococcus</em></td>
<td>49983</td>
<td>27384</td>
<td>42633</td>
<td>52577</td>
<td>12926</td>
<td>13510</td>
<td>10730</td>
<td>15398</td>
</tr>
</tbody>
</table>

Table 1: Read counts of salivary bacterial genus in edentulous patients with or without complete dentures
Comparison of bacterial community in saliva of EdD and biofilm on their complete complete dentures: The higher prevalence of Streptococcus, Veillonella, Rothia, Lachnospiraceae, Prevotella and Alteromonas in the saliva of EdD patients strongly suggested for the presence of a niche. The palatal and alveolar ridge (PAR) surface of complete dentures served as niche areas, as the contour of these areas follow closely that of supporting bone surface. Scraping of the biofilms from the PAR surface of complete dentures of EdD-1 and EdD-4 patients was carried. The biofilm lysates were first processed to extract genomic DNA and quantify to see whether the samples actually carried genomic DNA or not. Presence or absence of DNA would reflect the presence or absence of biofilm, and hence this step was considered very critical. Quantification of the biofilm samples showed at least five nanograms of DNA in both EdD-1 and EdD-4 samples, which indeed confirmed for the presence of biofilm on the PAR surface of complete dentures (data not shown). 16S rRNA gene sequence analysis of biofilm DNA along with their respective saliva samples indicated a definite higher occurrence of all six bacteria in the biofilm samples, albeit by slightly greater than 1 fold only, relative to saliva (Table 3). This indicated that the mucosal surface of complete dentures does indeed serves as niche for bacterial population.

Table 1.2: Fold difference of pooled read counts of salivary bacteria from all four patients in both groups indicate several fold higher presence of Streptococcus, Veillonella, Rothia, Lachnospiraceae, Prevotella and Alteromonas in edentulous patients with complete dentures relative to those without

<table>
<thead>
<tr>
<th>Bacterial species</th>
<th>EdD</th>
<th>Ed</th>
<th>Fold Difference in EdD</th>
</tr>
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<tr>
<td>Streptococcus</td>
<td>172577</td>
<td>52564</td>
<td>3.283178601</td>
</tr>
<tr>
<td>Veillonella</td>
<td>16946</td>
<td>1199</td>
<td>14.13344454</td>
</tr>
<tr>
<td>Rothia</td>
<td>53861</td>
<td>14130</td>
<td>3.811818825</td>
</tr>
<tr>
<td>Lachnospiraceae</td>
<td>7752</td>
<td>582</td>
<td>13.31958763</td>
</tr>
<tr>
<td>Prevotella</td>
<td>3557</td>
<td>392</td>
<td>9.073979592</td>
</tr>
<tr>
<td>Alteromonas</td>
<td>5234</td>
<td>2</td>
<td>2617</td>
</tr>
<tr>
<td>Actinomycetes</td>
<td>25702</td>
<td>20823</td>
<td>1.234308217</td>
</tr>
<tr>
<td>Haemophilus</td>
<td>12504</td>
<td>9176</td>
<td>1.362685266</td>
</tr>
<tr>
<td>Neisseria</td>
<td>48530</td>
<td>38875</td>
<td>1.248360129</td>
</tr>
<tr>
<td>Vibrio</td>
<td>24562</td>
<td>21407</td>
<td>1.147381698</td>
</tr>
</tbody>
</table>

Table 2: Phylum and genus of bacteria identified in the saliva of edentulous patients with or without complete dentures

<table>
<thead>
<tr>
<th>PHYLUM</th>
<th>GENUS</th>
</tr>
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<tbody>
<tr>
<td>FIRMICUTES</td>
<td>STREPTOCOCCUS</td>
</tr>
<tr>
<td></td>
<td>VEILLONELLA</td>
</tr>
<tr>
<td></td>
<td>LACHNOSPIRACEAE</td>
</tr>
<tr>
<td>ACTINOBACTERIA</td>
<td>ROTHIA ACTINOMYCES</td>
</tr>
<tr>
<td>BACTEROIDETES</td>
<td>PREVOTELLA</td>
</tr>
<tr>
<td>PROTEOBACTERIA</td>
<td>ALTEROMONAS</td>
</tr>
<tr>
<td></td>
<td>HAEMOPHILUS</td>
</tr>
<tr>
<td></td>
<td>NEISSERIA</td>
</tr>
<tr>
<td></td>
<td>VIBRIO</td>
</tr>
</tbody>
</table>

Table 3: Read counts of bacterial prevalence in the saliva of edentulous patients with complete dentures and biofilms on dentures from respective patients

<table>
<thead>
<tr>
<th>Bacterial species</th>
<th>EdD-1</th>
<th>DENTURE BIOFILM-1</th>
<th>FOLD DIFFERENCE</th>
<th>EdD-4</th>
<th>DENTURE BIOFILM-4</th>
<th>FOLD DIFFERENCE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Streptococcus</td>
<td>49983</td>
<td>84491</td>
<td>1.690394734</td>
<td>52577</td>
<td>77920</td>
<td>1.482016851</td>
</tr>
<tr>
<td>Veillonella</td>
<td>15157</td>
<td>29210</td>
<td>1.927162367</td>
<td>14767</td>
<td>31928</td>
<td>2.162118237</td>
</tr>
<tr>
<td>Rothia</td>
<td>4030</td>
<td>6302</td>
<td>1.563771712</td>
<td>4572</td>
<td>5031</td>
<td>1.100393701</td>
</tr>
<tr>
<td>Lachnospiraceae</td>
<td>3083</td>
<td>4182</td>
<td>1.35647097</td>
<td>2114</td>
<td>3104</td>
<td>1.468306628</td>
</tr>
<tr>
<td>Prevotella</td>
<td>1337</td>
<td>1699</td>
<td>1.270755423</td>
<td>753</td>
<td>1587</td>
<td>2.107569721</td>
</tr>
<tr>
<td>Alteromonas</td>
<td>2186</td>
<td>2976</td>
<td>1.361390668</td>
<td>686</td>
<td>1020</td>
<td>1.486880466</td>
</tr>
</tbody>
</table>
Discussion

The present study describes the prevalence and compares the bacterial flora in the saliva of edentulous patients with or without complete dentures, and then associates the prevalence in denture wearers with bacterial flora in biofilms on the PAR surface of complete dentures by 16S rRNA gene sequencing technique. The occurrence of *Streptococcus* and *Veillonella* is consistent with findings from other studies, where in both these bacteria were detected as dominant genera in geriatric edentulous persons wearing dentures.[5] It is important to note that both *Streptococcus* and *Veillonella* play a vital role in the early stages of development of biofilm.[10, 11] Hence the occurrence of these two bacteriae at higher read counts strongly suggests for their role in the development of biofilms on the denture surfaces, which also explains higher occurrence of the six bacteriae in the denture biofilm than saliva. While *Streptococcus*, *Veillonella*, *Rothia*, *Lachnospiraceae*, *Prevotella* and *Alteromonas* showed a definite predilection in EdD patients, four other bacteria - *Actinomyces*, *Haemophilus*, *Neisseria* and *Vibrio* did not exhibit such predilection towards neither of the two groups. The occurrence of these bacteria in both EdD and Ed groups suggests that the bacteriae may represent normal bacterial flora in edentulous mouth irrespective of denture usage and that the bacteriae may be populating the mucosal biofilms such as those that occur on the tongue and buccal mucosa as described in other studies.[13] Mucosal biofilms are known to harbour bacteria, but whether the mucosal biofilms of the patients investigated in the present study harbour the above bacteria needs to be investigated.

In order to identify the source of higher read counts of *Streptococcus*, *Veillonella*, *Rothia*, *Lachnospiraceae*, *Prevotella* and *Alteromonas* in EdD group patients, we analyzed the biofilm on the PAR surface of complete dentures from two patients as these surfaces have a higher propensity for biofilm formation.[13] During routine clinical observations we have noticed that the PAR surfaces are often less carefully cleansed than exposed areas of complete dentures by the patients, a chief factor that determines development and maintenance of biofilms, and hence was investigated in the present study. Metagenomic analysis of the genomic DNA extracted from these biofilms along with their respective saliva samples indicated a further higher prevalence of *Streptococcus*, *Veillonella*, *Rothia*, *Lachnospiraceae*, *Prevotella* and *Alteromonas* in the denture biofilm. The data is consistent with our hypothesis that the PAR surface of complete dentures may be acting as niche areas for bacterial population, which accounts for the higher prevalence of the above bacteriae in the saliva of EdD patients. The biofilm lysate from the complete dentures were prepared after gently washing off the residual saliva with phosphate buffered saline as described in the methods section, and hence the DNA extracted from biofilms may be expected to represent true bacterial population of denture biofilm. Although it is logically not possible to rule out altogether any bacterial contamination from saliva as the PAR surface of complete dentures and saliva often remain associated at any given point of sample collection. However, the higher prevalence of the above bacteria in the denture biofilm than saliva strongly advocates for a true representation from denture biofilm.

The findings of the present study have considerable clinical significance, as majority of atherosclerotic plaques are known to harbour *Streptococcus* and *Veillonella*, which have been associated with higher prevalence of the bacteria in oral cavity.[14] Besides the above two bacteriae, *Rothia* associated infective endocarditis and peritonitis and *Prevotella* associated ulcerative colitis have been reported in a few patients.[15, 16] Although the higher prevalence of these bacteria per se in patients investigated in the present study does not indicate future development of the associated diseases, it does project the importance of maintaining oral hygiene as elderly subjects are often prone to immune compromised conditions.[17, 18] A combination of routine maintenance by the patients combined with photodynamic therapy may reduce the bacterial population in the edentulous elderly subjects as such therapy has been shown to reduce oral bacterial population in other studies.[19]

Conclusion

The 16S rRNA gene based metagenomics study has identified for the first time the relative prevalence of bacteriae from four phyla in the saliva of edentulous subjects with or without complete dentures and associated the prevalence with denture biofilm.

Conflict of Interest: Nil

Source of Funding: Self

Ethical Clearance: Approved by institutional ethical committee sree balaji dental college and hospital
REFERENCE


A Study on Customer Intention to Pay a Premium Price for Organic Food

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ABSTRACT

The aim of this research is to contemplate the intention of the customers to give a high amount of money for organic food. This study represents the information gathered from the organic food customer of Punjab state of India, in 2018. Data of 500 respondents were collected from supermarkets, organic food shop and departmental stores in different areas of Punjab. The collected information was examined by using factor analysis, multiple regression and descriptive statistics. The outcome of this research shows that the health and food safety are the two most significant factors behind the intention to give a high amount of money, followed by product attribute, promotional activity, income level, awareness level, lifestyle, education level, environment consciousness.

Keywords: organic food, health, environment, lifestyle, awareness, promotion

Introduction

Excessive usage of chemicals and fertilizers destroying the environment and human being’s health. This is one of the big threats in leading a healthy life for the customer. So the customer is shifting towards high quality and chemical free foods¹. “Organic foods refer to food raised, grown and store and/or processed without the use of synthetically produced chemicals or fertilizers, herbicides, pesticides, fungicides, growth hormones and regulators or generic modification”². Price of Organic food is generally higher in comparison to conventional food items because it has higher production cost and high fees to obtain certified eco-labels³.

India emerged as a highest growing market for organic food⁴. Indian organic food market is approximately USD $813 million and expected to rise at a compound annual growth rate (CAGR) of over 25% during 2016-2020.

Review of Literature

Sriwaranun et al. (2015)⁵ studied that the customers are agreeable to give an extra amount of money for purchasing organic food if they are health conscious and if they have a strong environmental & ethical concern and realize the better quality and health benefits of it. Sujatha et al. (2013)⁶ examined that the customer is ready to pay 20 % extra price for organic food due to its benefits for health. Mohamad et al. (2014)⁷ explored that demand for organic food will increase with the increase of awareness about its nutritional values and health benefits. Customers are ready to pay a high price because they think that these products are good for the environment⁸. Rezai et al. (2013)⁹ examined that factors like food safety; environmental friendliness, perception, intention, motivation, income, geographical area, income and gender notably have an impact on customer’s readiness to pay a premium price for organic foods. Ramesh and Divya (2015)¹⁰ examined that the lack of trust on the authenticity of food and high price is the main obstacle in the expansion the market share of organic food. Higher income of the respondents increases the intention to give an extra amount of money for organic food¹¹. But in contrast to this study (Fotopoulos and krystallis 2002)¹² described that higher
income household does not essentially agree to pay a high amount of money for organic food. Some low-income segments of the society are more enthusiastic buyers. Premium prices of organic food are the major obstacle for further expansion of the marketplace for organic food products.

Research Gap

The impact of quality, price, health consciousness, environmental consciousness, awareness, lifestyle, product attributes has been studied in different studies. But these studies did not explain the impact and strength of all these factors on consumer’s intention to give a high amount of money for organic food. Hence, this research examines the relationship of these factors with the intention to pay a high amount of money for organic food.

Objectives of the Study

1. To analyze the attitudes of customers for organic foods.
2. To analyze the important factors that influences the decision to pay a high amount of money for organic food.
3. To explain the relationship between intention to pay the extra price with other influencing factors.

Research Methodology

Purposive sampling technique has been used for this research. Information was gathered in grocery stores, organic food shop and departmental stores in various zones of Punjab. This investigation concentrated on organic food items like Juices, Fruits, Processed Food, Rice, Tea, Honey, Dry fruits, Cereals, Spices, Coffee, Vegetables, etc. A sum of 500 respondents was covered through a structured questionnaire and information was collected on 5 points likert scale. The collected information was analysed by SPSS 22.0. Factor analysis was used as a data reduction technique to find the important factors. Multiple regression analysis uses to explain the relationship between the intention to pay high price with independent variables.

Data Analysis

Amongst the respondents, 63% of the respondents were among the age group between 21 to 40. 54.6% respondents are male and 45.4% are female.43.4% respondents have their income between 0 to 20,000.34.4% of the respondents are private employees and 23.8% are self-employed. 57% of the respondents are unmarried and 41.0% of the respondents are married.59.4% of the respondents are educated up-to graduation level and 22.8% are post graduated.

Factor Analysis

KMO and Bartlett’s Test: Value of Kaiser-Meyer-Olkin, in table 1 is 0.829. Bartlett’s test of sphericity value for p is 0.00. So the sample is adequate for factor analysis and a relationship present between the variables.

Table 1: KMO and Bartlett’s test

| Kaiser-Meyer-Olkin Measure of Sampling Adequacy | .829 |
| Bartlett’s Test of Sphericity | 9014.085 |
| Approx. Chi-Square | 741 |
| df | .000 |

Source: SPSS results of sample

Table 2: Total Variance Explained

<table>
<thead>
<tr>
<th>Component</th>
<th>Initial Eigenvalues</th>
<th>Rotation Sums of Squared Loadings</th>
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<td>Total</td>
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<tr>
<td>2</td>
<td>2.560</td>
<td>14.530</td>
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<td>3</td>
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<td>8.189</td>
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</tr>
</tbody>
</table>

Source: SPSS results of sample, Extraction Method: Principal Component Analysis.
Results of factor analysis gave eight important factors. These factors are food safety, health consciousness, environmental consciousness, promotional activities, lifestyle, awareness level and product attribute.

**Research Model**

A conceptual model has been developed in figure 1, to examine the factor that affects the intention to give a high amount of money for organic foods. Intention to pay was taken as a dependent variable and demographic characters (like age, income and education level) and factor coming out from factor analyses like food safety, health consciousness, environmental consciousness, promotional activities, lifestyle, awareness level, product attribute were considered independent variables.

![Figure 1: Conceptual model](image)

**Regression Analysis**

<table>
<thead>
<tr>
<th>Coefficients</th>
<th>Unstandardized Coefficients</th>
<th>Standardized Coefficients</th>
<th>t</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Model</strong></td>
<td>B</td>
<td>Std. Error</td>
<td>Beta</td>
<td></td>
</tr>
<tr>
<td>(Constant)</td>
<td>1.537</td>
<td>.276</td>
<td>6.259</td>
<td>.000</td>
</tr>
<tr>
<td>Health consciousness</td>
<td>0.482</td>
<td>.039</td>
<td>0.389</td>
<td>9.121</td>
</tr>
<tr>
<td>Food safety</td>
<td>0.415</td>
<td>.057</td>
<td>0.389</td>
<td>8.162</td>
</tr>
<tr>
<td>Product attribute</td>
<td>0.398</td>
<td>0.044</td>
<td>0.401</td>
<td>6.591</td>
</tr>
<tr>
<td>Promotional activity</td>
<td>0.251</td>
<td>.032</td>
<td>0.301</td>
<td>8.514</td>
</tr>
<tr>
<td>Income Level</td>
<td>0.249</td>
<td>.036</td>
<td>0.301</td>
<td>5.382</td>
</tr>
<tr>
<td>Awareness level</td>
<td>0.230</td>
<td>.050</td>
<td>0.287</td>
<td>4.63</td>
</tr>
<tr>
<td>Lifestyle</td>
<td>0.167</td>
<td>.056</td>
<td>0.178</td>
<td>4.59</td>
</tr>
<tr>
<td>Education Level</td>
<td>0.156</td>
<td>.056</td>
<td>0.0159</td>
<td>6.197</td>
</tr>
<tr>
<td>Environment consciousness</td>
<td>0.137</td>
<td>.033</td>
<td>0.151</td>
<td>3.64</td>
</tr>
<tr>
<td>Age</td>
<td>-0.076</td>
<td>.059</td>
<td>-0.061</td>
<td>-0.436</td>
</tr>
</tbody>
</table>

a. Dependent Variable: intention to give a high amount of money

On the basis of table 3, the equation for intention to give a high amount of money in this study is given below:

\[
\text{Intention to give a high amount of money} = 1.537 + 0.482 (\text{Health consciousness}) + 0.415 (\text{Food safety}) + 0.398 (\text{Product attribute}) + 0.251 (\text{Promotional activity}) + 0.249 (\text{Income Level}) + 0.230 (\text{Awareness level}) + 0.167 (\text{Lifestyle}) + 0.156 (\text{Education Level}) + 0.137 (\text{Environment consciousness}) - 0.076 (\text{Age})
\]

**Findings**

Health consciousness with the maximum beta value (0.482) is the most important factor that highly affects the consumers’ intention. Food safety is the second most significant variable with the beta value of 0.415. Product attributes like appearance, taste etc. came on the third position, followed by income level, awareness level, lifestyle, education level, environmental consciousness. Age has a significant negative association with the intention to give a high amount of money.

**Conclusion**

This research examined the determinants that affect customer intention to give a high amount of money for organic food. It was found that Health consciousness is the main factor that highly affects the consumers’ intention to
give a high amount of money for organic food. Food safety is the second most important variable. Product attributes like appearance, taste etc. came on the third position, followed by Income Level, Awareness level, Lifestyle, Education Level, Environment consciousness. The analyses demonstrate that demographic factors like income and education have a significant positive association with the intention to give a high amount of money.

**Ethical Clearance:** Not applicable in this study because of no patient involvement.

**Source of Funding:** Self

**Conflict of Interest:** Nil

**REFERENCES**


A Real-Time Road Traffic Congestion Detection Model Using Big Data

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ABSTRACT
This abstract identifies the road traffic events and analyse the delay in the estimated routes. The congested areas will be traced and identified with the help of big data techniques. The aim is to understand traffic patterns in the particular City. In cities, massive population and large number of vehicles cause problems, like congestion and accidents. A number of efforts to address these problems have been proven effectively. The new techniques road traffic model was named as Trafficshare which is used to find the unusual traffic events on the roads. The model shows the travel route, travel time, weather delays, road work alerts, emergency road blockage and traffic event messages will be notified. Traffic data refer to datasets generated and collected on moving vehicles and objects. The alert messages were correlated with real-time traffic. Using the detection model will detect the exact delays in the particular road of the city in case of blockage in the road. Based on the detection techniques the user can choose the alternate route. The observations that are tracked through GPS and Geotracker will be providing the traffic detection analysis using the model.

Keywords: Big Data, TrafficShare, Alerts, event, Map reduce

Introduction
This goal of this paper is to provide such a system where real-time traffic-flow data is monitored and the occurrence of accidents is detected before any official accident notification arrives from the area. This would help the city governments to dispatch emergency teams to prospective accident-prone areas, prevent accidents by taking extra-measures and manage costs efficiently.

Disruption of normal traffic flow results in wasted time, fuel costs and lost productivity. Officials are working around the clock to finish the regular maintenance activities as quickly as possible to keep the roads open and provide safe traffic flow. The traffic accidents and road work are among the most important causes that disrupt the normal traffic flow. Preventing an accident is important and it is very difficult to provide an accident-free road transportation system. It will be well prepared for future events in general. The paper is to analyse traffic events for the city and to provide a visual dashboard for analysing traffic patterns. The captured data are used from remotely sensed and information passed to data sources.

The prediction of travel time and delayed traffic event messages will be notified to the end-users in case of accident, road work or emergency block. The model allow the user compare inbound and outbound travel time is for any hour of any day and shows the alternate route travel time also if any events occurred in the road.

Workflow Process: GPS (Global Positioning System) is navigation software that works on and tablets or phones with the help of network support. It provides turn-by-turn navigation information and user-submitted travel times and route details, while downloading location-dependent information over a mobile telephone network. The traffic live updates will be tracked and alerted based on the congested area and the same time the end-user can also comment the road traffic status through the TrafficShare model.
The model states that the data from objects sources such as Semi-structured and unstructured. The flow shows the traffic alerts are shown only when traffic events occurred in their location. To avoid the traffic zone, alternate route is rerouted in case of emergency, road blockage or construction work.

We are applying this concept in finite dataset. Big data is a big part of the today’s business. With the rise of big data, the end-user may also be able to use real-time monitoring and alerts to the problems. Each route map location generates terabytes of data that requires real-time analysis to optimize traffic operations, maintain safety and meet all the compliance requirements. Traffic compensate for delays by adding slacks to the system. They usually delay during the winter or depend on the climatic condition. In order to evaluate the time factor, we need to know the probability of the incoming vehicle being too late and taking into account the incompressible time necessary to wait and delayed to be notified. Models already exist to estimate the delayed time. The existing model does not show any delay reasons whether climatic factor, road work or any accidents met. To overcome that situation we are using big data to share alert messages with the registered users.

Review of Literature

Kapileswar Nellore et.al. 1 the current study found that Wireless Sensor networks (WSNs) have gained increasing attention in traffic detection and avoiding road congestion. WSNs are very trendy due to their faster transfer of information, easy installation, less maintenance, compactness and for being less expensive compared to other network options. There has been significant research on Traffic Management Systems using WSNs to avoid congestion, ensure priority for emergency vehicles and cut the Average Waiting Time (AWT) of vehicles at intersections.

Siuli Roy, et.al.2 the current research study has made an attempt to analyse real time traffic congestion, detection and management using Active RFIS and GSM Technology3. It support the GSM and geolocation are the right methods to detect the congestion to traffic.

D.Fisheret.al. in this study, the interaction of Big data are analysed with basic sources. i.e., dataare in the form of emails, photos, videos, monitoring devices and audio which can be easily handled in big data. The features contain capturing the real information of data, data storage, analysis, sharing, search, visualization, querying, updating and privacy.

The objective of this paper is to analyse and under the traffic patterns for a particular city and to provide a visual dashboard for analysing the traffic data. The initial data sets used vary from remote sensed data and events updated from open-data sources. One of the challenges this paper achieve is the Big Data three V’s (volume, velocity, variety).

As mentioned earlier, such pieces of information are often generated by the company but consume a lot of money and time to load into an appropriate database for scrutiny. Therefore, such pieces of facts must be partitioned prior to examining them. It is well known that road traffic congestion causes of money in extra hours of travel and extra fuel. Since traffic congestion that may have an impact on delays in travel time is normally related to traffic incidents, which is usually nonrecurring in nature, it is important to proactively assess the emergence of traffic anomalies as an early warning incident signal, which might prevent or minimize the impact duration of traffic. The data is refreshed every 10-30 seconds providing congested area in the exact position. The display is an easy to use map with arrows showing the route that any chosen vehicle has taken.

Related Work: A static control system may block emergency vehicles due to traffic jams. Wireless Sensor networks (WSNs) have gained increasing attention in traffic detection and avoiding road congestion. WSNs are very trendy due to their faster transfer of information, easy installation, less maintenance, compactness and for being less expensive compared to other network options.

Recently, many efforts have been made to develop more efficient Inter-Vehicle Communication (IVC) protocols for on-demand route planning according to observed traffic congestion or incidents, as well as for safety applications. Because practical experiments are often not feasible, simulation of network protocol behavior in Vehicular Ad Hoc Network (VANET) scenarios is strongly demanded for evaluating the applicability of developed network protocols.

In this work, we discuss the need for bidirectional coupling of network simulation and road traffic micro simulation [2] for evaluating IVC protocols. As the selection of a mobility model influences the outcome of
simulations to a great extent, the use of a representative model is necessary for producing meaningful evaluation results. Based on these observations, we developed the hybrid simulation framework Veins (Vehicles in Network Simulation), composed of the network simulator OMNeT++ and the road traffic simulator SUMO.

With our developed methodology, we can advance the state-of-the-art in performance evaluation of IOT and provide means to evaluate developed protocols more accurately. GPS devices and webcam, Radar technology etc. congestion can also be detected. But these technologies have several drawbacks, such as installation problems and cost. Radio Frequency Identification (RFID) is an emerging technology that is still remains largely unexplored in the area of automatic congestion detection [3]. Vehicle detection and counting can be done effectively using RFID technology.

**Proposed System**

The predictive analytic tools presents traffic events information as data visualizations to help users to receive alert messages how to maximize network capacity as well as the choices made by travellers. To achieve this first we need to simulate the traffic flow of process and collect the data as traffic parameters instead of real data. The congestion to be evaluated and predicted for each and every route bases on the average calculation to be obtained. Every time period will be noticed with respect to traffic events. The architecture works as such GPS collectors feed traffic and information into the model. It is collecting information for each 10-meter of roadway and sometimes individual areas are tracked by a Geousers.

**Data Collection**

The datasets used in the K-means clustering algorithm are given in table 1,

<table>
<thead>
<tr>
<th>Attribute</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Timestamp</td>
<td>Date time of observation YYYY-MM-DD-HH:MM</td>
</tr>
<tr>
<td>Route</td>
<td>Road with 1 or more observed links</td>
</tr>
<tr>
<td>Link</td>
<td>Segment of road between 2 control sites</td>
</tr>
<tr>
<td>Direction</td>
<td>Direction of flow of traffic</td>
</tr>
</tbody>
</table>

With the help of clustering algorithm is used to track the exact point of location. K-means clustering is a type of unsupervised learning, which is used to have unlabelled data (i.e., data without defined categories or groups). The goal of this algorithm is to find groups in the data, with the number of groups represented by the variable K.

**Algorithm:** AdvancedK-Means clustering

1. Compute the distance between the path /* the congestion area points */.
2. Initialize the centroids with m random data /* number of clusters to be found */
3. Initialize \{u_i\} i^k = 1
4. FOR: Each cluster C_j
5. REPEAT:
6. Cluster the points based on the congestion area from the Detection centroid points.
7. Compute the centroids for each of the clusters.
8. UNTIL;

The algorithm works iteratively to assign each data point to one of K groups based on the features that are provided. Data points are clustered based on feature similarity.

The centroids of the K clusters which can be used to label new data. Labels for the training data (each data point is assigned to a single cluster). The interpolator fills in the rest and sends its information to both Google Big Query and to traffic flow, weather condition, congestion detection, and prediction algorithms methods such as relational databases. With the help of NoSQL database to overcome the challenges of the three V’s the approach stored volumes of data that on a single machine system would have been problematic. This iteration time for the big data cluster to analyze the data stored was set at 5 min. This 5-minute interval was determined simulation using different time intervals, concluding 5 min is sufficient time to obtain data of traffic events. The results were simulated by 64 traffic congestions in different division of streets and at different times. The table shows the results of two simulated data where the first row contains the first test results and the second row
contains the second test results. The first results indicate that 63 alerts were generated by the big data cluster, with one false alert and two alerts which were not generated. The test presented a traffic detection accuracy based on the traffic congestion algorithm.

The significance of this process has been achieved by addressing and presenting the following:

- Analysing the large size of traffic data sets to test its robustness and effectiveness.
- Selecting the most relevant attributes, to reduce the processing time and increase the prediction accuracy.
- Select the optimal algorithms that have the lowest processing time with the highest accuracy.
- Tackle the problem of class imbalance distribution in both accidents.
- Tracking the event occurred based on the event and noticed on the alerts.

According to real-time big data platform, NOSQL which aims to integrate and analyse real data feeds. High-performance systems such as transport are able to transform volume of raw GPS data into real-time actionable information. The transformation took place in the form of ETL Connector for Google Big Query.

Need of Big Data: Big data has various dimensions like Volume, Velocity, and Variety each one is described below. Datase in the form of emails, photos, videos, monitoring devices and audio which can be easily handled in big data. The features contain capturing the real information of data, data storage, analysis, sharing, search, visualization, querying, updating and privacy.

Volume: Volume refers to the enormousness of data. The size of Big Data is reported in numerous terabyte to petabyte. Report states that Facebook processes up to one million photographs per second. One petabyte is equal to 1024 terabytes of data can be stored and retrieved from the database.

Velocity: Velocity refers to the rate at which data are generated and the Speed at which it should be analyzed and acted upon. Unprecedented rate of data has been created from sensors and smart phones, which are needed for real time analytics and evidence-based planning.

Variety: Variety refers to different type of data like structured, semi-structured and unstructured data. The data available in spread sheets or relational databases in the form of tabular data is structured. Images, audio, video, text (chat messages) is unstructured. Extensible Markup Language (XML), textual language used for exchanging data on web is semi-structured.

Mongo DB: It’s a NoSQL database called Not only SQL with storage, index support and high Availability. It finds the traffic events in the time of driving, and checking if any blocked roads or delayed flow of traffic. It is an approach to data management and database design used for very large sets of distributed data.

Map Reduce: It is an open-source framework system that allows to store and process big data in a distributed environment across clusters of computers using simple programming models. Hadoop is an Apache managed software framework derived from Map Reduce and Big table.

Alert Management Phase: Big Data Analytics using Hadoop plays an effective role in performing meaningful real-time analysis on the huge volume of data and able to predict the emergency situations before it happens in real time. Traffic information system processed with massive and complex traffic data with the process of collecting real-time original GPS (Global Positioning System) data, matching positions to a map and generating traffic flow data, which predicts even-worse traffic condition in city.

The results validate the efficiency of the traffic detection system and its positive impact in detecting, reporting and rerouting traffic when traffic events occur. The classification approach worked as a proof of concept.

Conclusion

This paper provides an overview of relevant visualization techniques in the context of traffic analysis, and presents the common flow in traffic. An analysis of these phases to deal with traffic prediction and recognizing the problem with dashboard will display the different elements of the visualizations. The map is elegant and informative. Based on the traffic event prediction, emergency road block or accident alerts will be received to the users’ device and to further proceed with the alternate route.
**Ethical Clearance:** completed.

**Source of Funding:** Self

**Conflict of Interest:** NIL

**REFERENCES**


Excessive Weight Loss and Quality of Life after Laparoscopic Sleeve Gastrectomy—A Correlational Study

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ABSTRACT

Background: Laparoscopic Sleeve Gastrectomy (LSG) is the latest method of bariatric surgery used to treat clinically severe obesity. Percentage of excess weight loss (EWL) is commonly used as a marker of success or failure of LSG affecting the quality of life (QoL) of obese.

Objective: To find out the relationship between EWL and the QoL of patients after LSG.

Materials and Method: A descriptive cross sectional study of 100 patients who have completed at least six months after LSG were selected using convenience sampling technique. 50% of the sample was obtained from the GI Surgery OPD in a tertiary care hospital, Kerala and 50% through telephonic interview. Data on QoL was collected using SF-36 questionnaire.

Results: The mean weight of the subjects before surgery was 115.99Kg +/- 22.97, while the mean weight after surgery was 84.02Kg +/- 17.75. The mean percentage of EWL was 63.31Kg +/- 26.20. The mean BMI before surgery 42.46 Kg/m² +/- 6.02 came down to 30.76 Kg/m² +/- 5.04 after surgery. A positive correlation was found between QoL and EWL (p =0.768).

Conclusion: There is agreement that weight loss leads to better QoL. However, the need for longitudinal studies with multiple check points on the determinants of QoL including weight loss cannot be neglected.

Keywords: EWL, BMI, QoL, LSG

Introduction

Laparoscopic sleeve gastrectomy (LSG) is the recent bariatric surgery performed to reduce excess weight and improve quality of life (QoL) in morbidly obese. Percentage of excess weight loss is commonly used as a marker of success or failure of bariatric surgery. Studies have shown that QoL can improve as soon as 3 months after surgery. This may be probably due to the reason that most of the disabilities and co-morbidities are associated with the excess weight itself. However, the amount of excess weight loss (%EWL) among obese patients after bariatric surgery varies greatly in studies.

The amount of excess weight loss as a percentage (%EWL) was commonly used as a marker of weight loss success (EWL ≥ 50%) or weight loss failure (EWL < 50%)(1). %EWL is calculated using the following formula: 

\[ \text{%EWL} = \frac{\text{postoperative weight loss}}{\text{preoperative excess weight}} \times 100 \]

However, the dichotomous classification into success versus failure, with an arbitrarily defined cut-off at 50% EWL, does not reflect the considerably wide individual variation in postoperative weight loss that has been described in previous studies(3). Approximately 15% to 20% of all bariatric surgery patients fail to achieve adequate %EWL(4); inadequate weight loss is considered to be EWL < 25% according to the Reinhold criteria(5). The present study was aimed to find correlation between % of excess weight loss (EWL) and quality of life (QoL) in patients after Laparoscopic Sleeve Gastrectomy.

Surprisingly little is known about the factors that promote or hinder weight loss after bariatric surgery. Though studies have highlighted the influence of the severity of excess weight on QoL, changes in QoL were not associated consistently with the amount of weight loss.

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Materials and Method

A descriptive cross-sectional study with 100 patients after LSG taken through convenience sampling technique. Sample included only patients who have completed a minimum of six months after LSG. Ethical clearance was taken from the Institutional Ethical committee and informed consent obtained from each subject. The preoperative weight, BMI and date of operation were verified with the electronic medical record of the hospital. 50% of the patients were interviewed in the GI surgery OPD of a tertiary care hospital and 50% of the patients were interviewed through telephone as per prior appointment with them. The Short Form SF-36 questionnaire (RAND 36-Item Health Survey 1.0.) was used to collect data.

Results

![Bar chart showing distribution of sample based on obesity category before and after surgery.]

**Figure 1: Distribution of the sample based on obesity category before and after surgery**

**Table 1: Distribution of the sample based on weight loss—excess and actual**

<table>
<thead>
<tr>
<th>Clinical variable (in kg)</th>
<th>Min weight</th>
<th>Max weight</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight before surgery</td>
<td>80</td>
<td>188</td>
<td>115.99</td>
<td>22.97</td>
</tr>
<tr>
<td>Ideal body Weight</td>
<td>45</td>
<td>92</td>
<td>64.89</td>
<td>10.52</td>
</tr>
<tr>
<td>Excess Weight</td>
<td>18</td>
<td>104</td>
<td>51.10</td>
<td>17.66</td>
</tr>
<tr>
<td>Weight after surgery</td>
<td>53</td>
<td>128</td>
<td>84.02</td>
<td>17.75</td>
</tr>
<tr>
<td>Actual Weight loss</td>
<td>-15</td>
<td>83</td>
<td>31.97</td>
<td>15.27</td>
</tr>
<tr>
<td>Percentage of EWL</td>
<td>33</td>
<td>122</td>
<td>63.31</td>
<td>26.20</td>
</tr>
</tbody>
</table>

The mean weight of the subjects before surgery was 115.99Kg +/- 22.97, whereas the mean weight after surgery was 84.02Kg +/- 17.75. The mean percentage of EWL was 63.31Kg +/- 26.20.

**Table 2: Mean and Standard deviation of QoL after LSG**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Min</th>
<th>Max</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>QoL after LSG</td>
<td>22</td>
<td>94</td>
<td>80.93</td>
<td>18.18</td>
</tr>
</tbody>
</table>
Table 3: Correlation between EWL with QoL

<table>
<thead>
<tr>
<th>Variables</th>
<th>Correlation</th>
<th>Lower bound</th>
<th>Upper bound</th>
<th>Z</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>EWL with QoL</td>
<td>0.768</td>
<td>0.740</td>
<td>0.796</td>
<td>11.871</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

A statically significant positive correlation was found between EWL and QoL in the sample (p = 0.768).

Table 4: Association between EWL category and selected variables

<table>
<thead>
<tr>
<th>Variables</th>
<th>EWL category</th>
<th>χ² value</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Time after surgery</td>
<td>&lt; 0 (weight gain)</td>
<td>0-39</td>
<td>40-69</td>
</tr>
<tr>
<td>6months-1 year</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>1-3 years</td>
<td>1</td>
<td>1</td>
<td>9</td>
</tr>
<tr>
<td>3-5 years</td>
<td>7</td>
<td>16</td>
<td>16</td>
</tr>
<tr>
<td>&gt;5 years</td>
<td>8</td>
<td>22</td>
<td>6</td>
</tr>
<tr>
<td>Age in years</td>
<td></td>
<td>24.55</td>
<td>0.004*</td>
</tr>
<tr>
<td>18-30</td>
<td>2</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>31-42</td>
<td>0</td>
<td>9</td>
<td>2</td>
</tr>
<tr>
<td>43-55</td>
<td>3</td>
<td>18</td>
<td>19</td>
</tr>
<tr>
<td>56-68</td>
<td>8</td>
<td>17</td>
<td>11</td>
</tr>
</tbody>
</table>

The above table shows there is a statistically significant association between EWL category and time after surgery and age. It is worthy to note that 2 patients did not have weight loss after 5 years of surgery instead there was a gain in weight.

Discussion

In the present study nearly half of the study subjects (44%) were belonging to the age group of 31-42 years and 32% were belonging to the age group of 43-55 years. Most of the study subjects were females (61%). The mean weight of the sample before surgery was 115.99 + 22.97 which was reduced to a mean weight of 84.02 + 17.75 after LSG. The percentage of EWL was 63.31 + 26.20 and actual weight loss mean was 31.97 + 15.27. Nearly half of study subjects (46%) came down to the overweight category however the remaining 54 % were in the various categories of obesity (class 1- 36%, class 2- 14% and class 3- 4%). The percentage of EWL was 63.31 + 26.20 and actual weight loss mean was 31.97 + 15.27.

In India most of the patients undergoing weight-loss surgery lose 60-80% of their excess weight within 12 months. In another study done in Kerala (2017) among 70 patients the mean preoperative weight was 114.1 kg which was reduced to 86.47 kg at six months post LSG. It was found that the mean % EWL was 49.73% and the mean % EBMI loss was 58.95%. In the present study %EWL was higher (63.31 + 26.20) yet conforming to the previous studies among Indian patients. This may be probably due to the inclusion of subjects Post LSG six months to seven years in the present study while the former study included only subjects six months post LSG.

The results of the present study are also comparable to rates reported by other published studies like Lee et al. who reported the highest EWL of 83% at two years; Rawlings et al an % EWL of 86% and Piotr Major et al 58.8 % post LSG at one year follow-up. Lemanu et al also reported a % EWL of 56% at one year post LSG.

Himpens et al. reported the percentage excess weight loss (EWL) after sleeve gastrectomy as 77.5% and 57.3% at 3 and 6 years, respectively. Among super obese patients, the reported mean EWL was 52%, 43% and 46% at 72, 84 and 96 months follow up, respectively. The Fourth International Consensus Summit on Sleeve Gastrectomy in New York, 2012 included a survey of 46,133 sleeve gastrectomy cases, among 130 surgeons, at an average of 5 years after surgery. Excess weight loss was 59% at 1 year, gradually falling to 50% at 6 years.
The mean BMI before bariatric surgery was 42.46 + 6.02 which was reduced to 30.76 + 5.04 after surgery. The percentage of EBMI loss was 63.31 + 26.20.

In a single-center study in Switzerland, patients who underwent the procedure lost an average 57.4% of excessive BMI over 5 years as reported by Ralph Peterli and colleagues\(^{(14)}\). Overall, Peterli and colleagues found that the average excessive BMI lost after 1 year was 61.5%, and then 61.1% after 2 years. By 5 years, average excessive BMI lost was 57.4%. Those losses correspond with a BMI reduction of 12.6 kg/m\(^2\), 12.4 kg/m\(^2\), and 11.2 kg/m\(^2\), respectively. In the Brazilian study BMI differed between the pre and post-surgery groups (52.3 ± 8.3 kg/m\(^2\) vs. 32.5 ± 6.4 kg/m\(^2\), \(p < 0.001\))\(^{(15)}\). In the present study the mean BMI of 42.46 + 6.02 before bariatric surgery was reduced to 30.76 + 5.04 after surgery.

Although there has been effective weight loss outcome in clinically severe obese patients after surgery\(^{(16)}\) a subset of patients, perhaps as great as 20% fail to lose a significant amount of weight which has been attributed to poor adherence to the post surgical diet.\(^{(8)}\). In the present study also four patients were still in the category of class-3 obesity and 14 in class-2 obesity and 36 in class-1 obesity after bariatric surgery, probably because of similar reasons. It is worthy to note that 2 patients did not have weight loss after 5 years of surgery instead; there was a gain in weight ie. One patient did not show any weight loss at the time of the study and another gained 15 kg from his previous weight (from 110kg pre surgery weight to 125kg).

Most of the studies done in India and abroad available to the investigator had clearly shown more than 50% of excessive weight loss and excessive BMI loss though there were variations pertaining to time after bariatric surgery. In the present study also statistically significant association was found between EWL category and %EBMIL 12 months after surgery (\(p<0.001\)) showing better results in younger patients. The study concluded that patients younger than 45 years lose greater amount of excess BMI than older patients after bariatric surgery\(^{(16)}\).

A statistically significant association was found between EWL category and age in the present study. In a study done among 337 patients (both Roux-en-Y gastric bypass and sleeve gastrectomy) There was significant difference between age group and %EBMIL 12 months after surgery (\(p<0.001\)), showing better results in younger patients. The study concluded that patients younger than 45 years lose greater amount of excess BMI than older patients after bariatric surgery\(^{(16)}\).

The purpose of the study was to search for any correlation between EWL and QoL in patients after LSG. The present study have proved a statistically significant positive correlation between EWL and QoL in the sample (\(r = 0.768\)). The overall QoL assessed through SF36 was found to be quite good (80.93 ± 18.18). The study finding is in congruent with several previous research findings. Some studies indicate that weight reduction in the severely obese is accompanied by improvements in health related QoL (HRQL) and that a dose-response relationship exists between the magnitude of weight loss and HRQL benefits.

Karlson et al. examined trends and effects of weight loss treatment on HR-QoL in severely obese of SOS intervention Study over 10 years, and showed that long-lasting weight reduction in the severely obese has a general long-standing positive outcome on HR-QoL and the peak improvement was located between 6 months and 1 year after surgery.\(^{(7)}\)
Sarwer et al. assessed changes in quality of life and body image in the first 92 weeks following gastric bypass surgery in 200 individuals. Participants reported significant improvements in several domains of health- and weight-related quality of life, as well as changes in body image, following surgery which was correlated with percent weight loss.

Individuals who undergo bariatric surgery experience durable weight loss, at least for the 3 years period of follow-up. The present results are in line with other studies that also reported an improvement in HR-QoL after a weight loss of more than 30% after bariatric surgery.

Conclusion

There is agreement that weight loss leads to better quality of life. However, the fluctuations in weight loss after crossing certain threshold needs further longitudinal studies with multiple check points on the issue. Researches on determinants of weight loss- pre and post bariatric surgery- would be useful for better control of results of QoL.

Conflicts of Interest: Nil

Source of Funding: Nil

Ethical Consideration: Ethical clearance was taken from the Institutional scientific and Ethical committee and written informed consent was obtained from each subject.

REFERENCES


Knowledge and Attitude of Married Women towards Contraceptives Residing in Selected Slums of Udupi District

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ABSTRACT

Contraceptive use allows couples to determine and ascertain the desired number of children as well as the spacing of their child births. It has a direct impact on health, wealth and well-being of people.

Objectives: To assess the knowledge and attitude towards contraceptives. To find the association between knowledge, attitude and selected demographic variable. To find the relationship between knowledge and attitude towards contraceptives.

Methodology: A cross sectional descriptive study was carried out among 323 married women between the age group of 18 – 45 years residing in slums of Udupi district. The Five slums were selected by simple random sampling from Udupi district. Data was collected through interview method by using structured knowledge questionnaire and attitude scale towards contraceptives.

Results: The study result shows that majority 192(59.5%) of women had average knowledge, 122 (37.7%) had poor knowledge, only 9(2.7%) of women had good knowledge. Majority 321 (99.4%) of women had positive attitude towards contraceptive use. The number of living children (χ² =9.205 p=0.008) has significant association with attitude towards contraceptive use. There was weak positive correlation between knowledge and attitude which was statistically significant (p=0.256, p=0.001).

Conclusion: There is a need to create awareness among women of reproductive age group regarding contraceptive use.

Keywords: Birth control methods, awareness, view point, cross-sectional study

Introduction

In India population explosion is a major problem since independence. According to 2011 censes India’s population was 1.21 billion. India is the first country which has started the family planning programme in the year 1952, later which extended to cover health of mother, child, family welfare and nutrition. The objective of family planning programme is to decrease the birth rate to steady the population, consistent with the requirements of the national economy¹.

Family planning is not only restricted to controlling birth, it is also essential for improvement of socio economic status and health of the members of whole family. Spacing between births for at least 2 years is the main highlight of the family planning. Keeping the gap of 5 years between two children helps to improve the health of mother and children. Giving birth to more number of children increases medical expenditure and affects the socio economic status and parents will not be able to provide food, clothing, shelter, education for their children. If couples are using contraceptives and reducing the number of children in family helps them to promote health and stabilize the economic status².
According to National Family Health Survey-4 Total Fertility Rate in India is 2.2, children under 5 years of age whose birth was registered was 79.1%, only 53.5% married women aging between 15-49 years are presently using one or the other methods of contraceptives, total unmet need for contraception is 12.9%, unmet need for spacing is 5.7%.

A descriptive study was conducted to determine the knowledge, practice and attitude about the birth control measures among the women residing in Udupi district. About 136 samples were selected through Purposive sampling method. The study findings revealed that 67.60% of subjects had moderate knowledge, 14.70% had adequate knowledge, 17.60% had very little knowledge and most of the women had favourable attitude towards utilization of contraceptives.

A cross sectional study conducted to assess the attitude of married women of selected villages in Harayana. Purposive sampling method was used to select 200 samples. The tools used for data collection was attitude scale. Out of 200 samples 37% of women had unfavourable attitude and only 19% of women had favourable attitude. 44% of them had moderately favourable attitude regarding use of contraceptive methods.

Many of the studies were conducted in villages to assess the knowledge and attitude of married women towards contraceptives but in the slums only few studies were undertaken and also the researchers personal experience during the interaction with the women of slums made the investigator to feel that it is necessary to know whether the married women residing in the slums are aware about the contraceptives.

Materials and Method

This cross sectional descriptive study was carried out in the selected slums of Udupi district in the month of December 2017 and January 2018 among married women of reproductive age group. The sample size was calculated as 323 based on the findings of previous study. The slums were selected by simple random sampling method; subjects were selected using purposive sampling method.

Ethical committee clearance and administrative permission was obtained before data collection. CTRI registration was done (CTRI/2018/01/011572).

The house to house survey was conducted and the data was collected from married women who met inclusion criteria. The data was collected through interview technique using demographic proforma, structured knowledge questionnaire, five point likert’s scale developed by the investigator.

Knowledge questionnaire consisted of 26 items each question had four responses. Blue print for the tool was prepared under 3 headings such as types of contraceptives, instruction to use contraceptives, benefits and side effects of contraceptives. Correct responses were scored has 1 and wrong answers were scored has 0. Attitude scale had 20 items. It is a five point scale where each item was rated as either strongly agree (5), agree (4), uncertain (3), disagree (2), strongly disagree (1) for positive items and strongly disagree (5), disagree (4), uncertain (3), agree (2), strongly agree (1) for negative items. The the tools were validated by 7 experts and Pretesting of the tool was done by administering it to 5 married women. The reliability of knowledge questionnaire was calculated by split half method. The reliability co-efficient was r=0.789, attitude scale was calculated by Cronbach’s alpha. The reliability was r=0.798. Thus the tool was found reliable. Both the tools were translated to Kannada by language expert.

The data was collected after explaining the purpose of the study, the meaning of their participation in the study and a written consent was obtained from them. The women were assured that anonymity would be maintained throughout the study and the data would be used for research purposes only.

Statistical Analysis: The data was analyzed by using Statistical Package for the Social Sciences (SPSS) for Windows version 16.0 The statistics used for data analysis was frequency and percentage distribution of demographic variables, knowledge on contraceptives, attitude towards contraceptives. Association between knowledge on contraceptive and selected demographic variables and between attitude and selected demographic variable was done by chi-square. Spearman correlation co-efficient was used to analyze the relationship between knowledge on contraceptives and attitude towards contraceptives. A p-value of < 0.05 was considered to establish the statistical significance.
Result

A total 323 married women in the reproductive age group willing to take part are included in the study. The interview on barriers for non-utilization of contraceptives was conducted to those who are not using any contraceptives.

Section A: Description of Sample Characteristics:
Result shows that out of 323 participants 129 (39.9%) of women were in the age group of 25-31 years, majority 308 (95.4%) belongs to Hindu religion, 159(49.32%) had a primary education, 154 (47.7%) husbands had primary education, 176(54.5%) women were unskilled worker, 315(97.5%) of husbands were unskilled workers, 162 women had monthly family income is >15000 rupees, 126 (39.0%) women duration of marriage is 6-10 years,110(34.1%) of women had two children, 190(58.8%)of women belonged to nuclear family, 286(88.5%) of women had previous information about contraceptives. (47.4%) had got information about contraceptives from doctors, 23.5 % from nurses, 10.5 % from relatives and 3.4% from the ASHA worker.

Section B: Knowledge on Contraceptives

![Fig. 1: Frequency and percentage distribution of knowledge score on contraceptives](image)

Fig. 1 depicts that majority 192(59.5%) of women had average knowledge, 122 (37.7%) had poor knowledge, only 9(2.7%) of women had good knowledge.

Section C: Description of attitude towards contraceptives

| Table 1: Frequency and percentage distribution of attitude of married women towards contraceptives |
|----------------------------------------|------------------|-----------------|
| Attitude | Score range | Frequency (f) | Percentage (%) |
| Positive attitude | 50-100 | 321 | 99.4 |
| Negative attitude | <50 | 2 | 0.6 |

Table 1 shows that 321 (99.4%) of women had positive attitude towards contraceptives, 2(0.6%) had negative attitude towards contraceptive use.

Section D: Description of association between knowledge on contraceptives and selected demographic variables

| Table 2: Association between knowledge on contraceptives and selected demographic variables |
|-----------------------------------------------|------------------|-----------------|
| Demographic variables | χ² | p-value |
| Age in years | 2.37 | 0.30 |
| Education status of women | 1.03 | 0.91 |
| Occupation of women | 4.37 | 0.37 |
| Monthly income in rupees | 7.08 | 0.13 |
| Type of family | 1.14 | 0.60 |
| Duration of marriage | 5.58 | 0.43 |
| Number of living children | 7.66 | 0.41 |
| Previous information on contraceptives | 2.35 | 0.25 |
Fisher’s exact test was used to find the association between knowledge and selected demographic variables. There was no association found between knowledge and selected demographic variables.

**Section E: Description of association between attitude towards contraceptives and selected demographic variables**

**Table 3: Shows association between attitude towards contraceptive use and selected demographic variables**

<table>
<thead>
<tr>
<th>Demographic variable</th>
<th>$\chi^2$</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age in years</td>
<td>.801</td>
<td>.382</td>
</tr>
<tr>
<td>Education status of women</td>
<td>4.074</td>
<td>.667</td>
</tr>
<tr>
<td>Occupation of women</td>
<td>1.852</td>
<td>1.000</td>
</tr>
<tr>
<td>Monthly income</td>
<td>4.814</td>
<td>.502</td>
</tr>
<tr>
<td>Duration of marriage</td>
<td>3.752</td>
<td>.142</td>
</tr>
<tr>
<td>Number of living children</td>
<td>9.250</td>
<td>.008*</td>
</tr>
</tbody>
</table>

The fisher’s exact test value depicts that number of living children ($p=0.008$) has significant association with attitude towards contraceptives.

**Section F: Relationship between knowledge and attitude towards contraceptives**

**Table 4: Depicts relationship between knowledge and attitude towards contraceptive use and selected demographic variables**

<table>
<thead>
<tr>
<th>Variables</th>
<th>$\rho$ value</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge</td>
<td>0.256</td>
<td>0.001*</td>
</tr>
<tr>
<td>Attitude</td>
<td>0.256</td>
<td>0.001*</td>
</tr>
</tbody>
</table>

The spearman correlation co-efficient value shows weak positive correlation between knowledge and attitude which is statistically significant ($p=0.256$, $p=0.001$). It infers that knowledge has influence on their attitude towards contraceptives.

**Discussion**

Contraceptive method that help the couples to avoid unwanted pregnancy, helps to keep space between pregnancies, controls the time at which birth occurs in relation to the age of parents and determines the number of children in the family.

The present study result shows that out of 323 participants 129 (39.9%) of women were in the age group of 25-31 years, majority 308 (95.4%) belongs to Hindu religion. 159(49.32%) had a primary education. 286(88.5%) of women had previous information about contraceptives. (47.4%) had got information about contraceptives from doctors, 23.5 % from nurses, 10.5% from relatives and 3.4% from the ASHA worker.

Similar study conducted in Haryana in 2014 shows the mean age of the participants was 32.76 ± 4.6 years. Among the study participants, more than three-fourth have gone to primary school or above to seek education. More than 90% of the participants belonged to Hindu religion. (70.4%) of the participants got information about family planning methods were mainly from doctors/multipurpose health worker/anganwadi worker.

The present study revealed that majority 192(59.5%) of married women had average knowledge about contraceptives, 122(37.7%) of the women had poor knowledge about contraceptives, only 9(2.7%) of women had good knowledge.

The findings of the study is supported by a cross sectional comparative study conducted in Punjab with the aim to compare the knowledge of married women regarding contraceptive method among 100 married women of which 50 married women of Rural and 50 married women of urban was taken by non-probability convenience sampling technique. They found that 82% of the urban women had good knowledge and 18% had average knowledge.

The findings of the study is contradicted by a study conducted in 2009 on Knowledge and utilization of contraceptives among Racha Koyas of Andhra Pradesh, which showed that 81% had a high level of knowledge on different contraceptive methods.

The findings of the study are supported by the study conducted among 200 married women of reproductive age group residing in a rural area of Karnataka. In which 76% of study participants had positive attitude for contraceptive use.

The findings of the study are supported by a cross sectional study conducted to determine the view point of the married women.
of married women of selected villages in Harayana. 200 samples were selected by purposive sampling method. Out of 200 samples 37% of women had unfavourable attitude and only 19% of women had favourable attitude, 44% of them had moderately favourable attitude regarding use of contraceptive methods. It is also found that level of attitude of women was found to be statistically significant with age (χ²=13.6), educational status (χ²=89.5), occupational status (χ²=20.2), family income per month (χ²=17.2), duration of marriage (χ²=19.7), number of children (χ²=17.9).3.

Limitations of the Study: Use of Purposive sampling in the present study limits the generalization of the findings to the study samples

Conclusion

There is a wide gap between knowledge and utilization of contraceptives; hence an awareness programme should be conducted to motivate the married women to utilize contraceptives.

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

Source of Funding: Self-funded project. No other source of funding.

Ethical Clearance: Ethical clearance is made from the Ethical Committee. CTRI registration also done.

REFERENCE


Correlation of Lipid Profile with CD4 Count in HIV Treatment Naïve Patients

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ABSTRACT

Introduction: Dyslipidaemia is more common in HIV patients especially in patients on Protease inhibitors. Coronary artery disease and cerebrovascular disease are also more prevalent in HIV patients. However, there is not much literature on lipid abnormalities in treatment naïve HIV patients. Hence we aim to correlate the lipid profile with CD4 count in untreated HIV patients.

Material and Method: This was a cross sectional study of 97 newly diagnosed HIV patients who were not on anti-retroviral drugs. Their total cholesterol (TC), LDL, HDL and Triglycerides (TG) were compared with the CD4 count levels and with the stage of HIV infection.

Results: Total cholesterol and HDL did not show any significant correlation with CD4 count or with the stage of HIV. There was significant negative correlation between LDL and CD4 count as the Pearson’s correlation coefficient was -.201 (p value 0.04). The level of CD4 count of 373 had a sensitivity of 62% and specificity of 65% in predicting an abnormal high LDL level. There was significant positive correlation between triglycerides and CD4 count as the Pearson correlation coefficient was .202 (p value 0.004). The CD4 count of 479 and above had a sensitivity of 61% and specificity of 63% in predicting high triglycerides.

Conclusion: In treatment Naïve HIV patients, LDL cholesterol had negative correlation with the CD4 count whereas Triglycerides had positive correlation with the CD4 count.

Keywords: Dyslipidaemia, HIV, Treatment Naïve, Lipid profile, correlation,

Introduction

There are around 2.4 million Indians affected by HIV. There have been many studies that have looked at Dyslipidaemia in HIV patients on ART.¹ Many of the ART drugs especially Protease inhibitors are known to cause dyslipidaemia. With the longer lifespan of HIV individuals due to ART treatment, cardiovascular disease has become one of the most common noncommunicable disease that contributes to the morbidity and mortality in these individuals. Dyslipidaemia is an important factor in cardiovascular disorders. There are not many studies that have looked at this entity in treatment naïve HIV individuals in this part of the world. Among the few studies that have been done, some show high lipid values whereas some show low values.

Materials and Method

The main Aim of this study was to correlate the lipid profile with CD4 count in untreated HIV patients. The other objectives were to detect proportion of dyslipidemia in untreated HIV patients and to correlate the observed dyslipidemia with WHO defined stage of disease in untreated HIV patients. This was a cross-sectional descriptive study. The study was initiated after obtaining clearance from the institutional ethics committee. Informed consent was obtained from all the participants. The sample size when calculated for 95%
confidence level and 90% power came to 97. A total of 97 adult patients who were diagnosed to have HIV but not started on ART were included in this study.

**Exclusion Criteria:** People with uncontrolled diabetes (HbA1c > 8), on lipid lowering drugs, end stage liver and kidney disease, BMI < 15 and > 30, family history of familial hypercholesterolemia and already received ART were all excluded. The data collected included a detailed history and examination, co-morbidities, opportunistic infections, Blood investigations of CD4 count and fasting lipid profile were done. They were staged according to the WHO clinical stages for HIV.

**Statistics:** Data was analyzed using SPSSv11.5. Correlation between stages of HIV and lipid profile was analyzed by using Anova and p value <0.05 was considered as statistical significant. Correlation between CD4 count and lipid profile was analyzed by Pearson’s correlation coefficient and p value <0.05 was considered significant.

**Results**

In our study, most of the patients (59.79%) belonged to Category I of WHO Staging, 9.28% to Category II, 5.15% to Category III and 25.77% to Category IV.

**Total Cholesterol:** It was observed that 19.6% of the patients had high cholesterol. In patients with CD4 count less than 250 the mean total cholesterol was 177mg/dl and the mean total cholesterol in patients with CD4 count > 250 was 176mg/dl. The mean CD4 count in patients with normal total cholesterol was 461.50, and in patients with high total cholesterol was 382. The total cholesterol did not have statistically significant correlation with CD4 count as the Pearson coefficient was -.154 with a p value of 0.131. On applying the ANOVA it was noted that the total cholesterol did not have any significant correlation with the staging of HIV with a p value of 0.383.

**HDL:** In this study low HDL was found in 36.1% of the patients. The mean HDL was 45.5mg/dl in the patients with CD4 count <250, and the mean HDL in patients with CD4 count >250 was 42.5mg/dl. Mean CD4 count in people with normal HDL was 436 whereas the CD4 count in people with low HDL was 463.60. Both of these were not statistically significant. There was no significant correlation between HDL levels and stages of HIV disease either.

**LDL:** In this study LDL cholesterol was found to be higher in 40.2% of the patients. As seen in Table 1. The mean CD4 count in patients with normal LDL was 511, and mean CD4 count in high LDL group was 349 which was statistically significant. Pearson’s correlation was -.201 (p value 0.04) showing that there was significant negative correlation between LDL and CD4 count. When ROC curve was plotted, the level of CD4 count of 373 had a sensitivity of 62% and specificity of 65% in predicting an abnormal high LDL level. There was no significant correlation between LDL level and the stages of HIV.

**Triglycerides:** In our study 40.2% of patients had high triglycerides. In patients with CD4 counts less than 250, the mean triglyceride was 135mg/dl. In patients with CD4 counts more than 250 the mean triglyceride was 159mg/dl. As seen Table 2. The mean CD4 count in patients with normal triglyceride was 378.79 and was 546.10 in patients with high triglycerides. Pearson coefficient was .292 (p value 0.004) suggesting there was positive correlation between Triglyceride and CD4 count. When ROC curve was plotted, at the CD4 count of 479 and above the sensitivity and specificity of predicting high triglycerides was 61% and 63%.

<table>
<thead>
<tr>
<th>Table 1: Correlation of LDL with CD4 count</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Number of patients</strong></td>
</tr>
<tr>
<td>-------------------------------</td>
</tr>
<tr>
<td>LDL Normal level</td>
</tr>
<tr>
<td>LDL Abnormal level</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Table 2: Correlation of Triglycerides with CD4 count</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>PATIENTS</strong></td>
</tr>
<tr>
<td>----------------</td>
</tr>
<tr>
<td>TG Normal level</td>
</tr>
<tr>
<td>TG Abnormal level</td>
</tr>
</tbody>
</table>
**Discussion**

The total cholesterol did not show any significant correlation with either the CD4 count or with the staging of HIV in our study. Similar observations were made by Devanath A et al. Whereas, a study by Rose H et al. found that the total cholesterol levels were lower in treatment naïve HIV individuals. In our study there was no significant correlation of HDL level with either the CD4 count or with the stage of HIV disease. However in the study done by Devanath A et al. they found significant decrease in HDL levels, especially in stage 2 and 4 of HIV and also in people with CD4 count less than 500. In our study there was a significant negative correlation between LDL and CD4 count. Whereas, Tang AM et al. in their study found that the LDL levels were low as the CD4 counts dropped especially below a CD4 count of 400. In our study a significant number of patients had high triglyceride levels. Similar observations were found in a study by Adewole OO et al. In our study there was positive correlation between CD4 count and Triglyceride levels, especially above CD4 count of 479. Mondy K et al. in their study found that a high CD4 count was a good predictor of high Triglyceride. There was no correlation between Triglyceride levels and Stages of HIV disease. However in a study by L Khiangbe et al. Triglycerides were found higher in only later stages of HIV.

**Conclusion**

In treatment naïve HIV patients: LDL cholesterol showed negative correlation with the CD4 count. Triglycerides showed positive correlation with CD4 count. Total cholesterol and HDL did not show any correlation.

**Ethical Clearance:** Taken from the institutional local ethics committee before the start of the study.

**Source of Funding:** Self

**Conflict of Interest:** Nil

**REFERENCES**


Health Care Arrangement System for Doctor-Patient Communications

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ABSTRACT

The Doctor-Patient Communication System which deals with providing health care solutions to the patients. In this Application new feature is Patients can communicate doctor by using Text, Audio, and Video. Real time communication is new feature in this application by doctor can select communication type at time of doctor registration. Users can access medical tools (BMI, BMR, and HEART RISK) after login in to the Application. This is a secured and scalable application that hides all complexities from the patients (users). There is lot of methods to verify users and doctors by phone verification, email verification, background verification for doctors through third party agencies. users can search doctor by city and specialties then application list out doctors with their communication features based on user input and users can search medical store by entering city in input box then application will shows all stores of cities with maps. This project provides scalability, reliability and a high amount of security for the users and doctors which make the system very unique from other applications. Thus it is highly user friendly portal which helps the patients and doctors to communicate easily.

Keywords: BMI, BMR, Doctor-Patient Communication system, Email verification.

Introduction

There are many healthcare products available in market by which patient book appointment. the problem in all this products is that user cannot communicate with doctor[1].Main feature of this product is to provide best real time communication to patients in web. Users can select communication type (EMAIL, TEXT, AUDIO, VIDEO) based on their emergency. Moreover there are two ways for communicate provided in CALL DOCTOR.

- User can communicate through registration in CALL DOCTOR.
- User can also communicate without registration.

This is the new extraordinary feature by which client can impart to specialist without making his record. The record will be consequently made by CALLDOCTOR and the id and secret word will be sent to his/her enlisted email id. Utilizing these certifications, client can login into application[3].While first time login into application, clients and specialists email id and telephone number are confirmed through OTP and random secret key will sent to the mail of enlisted email. After the email and telephone number are checked, the client can login into application. When user wants communicate to doctor. We need a basic information is Name, Email Id, Problem description then based communication type amount is calculate when payment done by user through the PayPal payment gateway communication will be establish. To stop extortion specialists in application, different securities are given by which client can safely apply for convey to specialist. The specialist’s endorsements are confirmed by outsider foundation check groups. The proposed application is advanced on the basis of reliability, flexibility and security. The users can communicate to doctor after search doctors by city and specialty. The diagram shows flow of application.
Software Requirement Specifications

**Purpose:** This Software Requirements Specification (SRS) indicates the necessities of the call specialist which will be utilized by the client as a part of procedure getting treatment. This report will be utilized by the clients to guarantee all particulars are right and checked by the product specialist to outline the framework.

**Scope:** As rivalry has heightened and client needs have additionally expanded, so too have the difficulties confronted by numerous applications. The weight on edges has expanded, frequently determined by new market participants with lower cost bases, and the torrential slide of new directions and consistence appears to accumulate pace day by day. We can see long lines of patients in doctor’s facilities to get arrangement consistently. This line is the last aftereffect of the moderate preparing speed (Due to manual sections). In this way, a very intuitive and easy to use arrangement ought to be produced. With the execution of Call Doctor. When he is a Call specialist client, every one of the offices are associated under Call specialist. In this we are giving Audio, Video, Email and Text Consultations to the client. This anticipate is essentially in light of possibly building up an open source answer for every one of the clients to show signs of improvement treatment arrangement which would help the client with less push overhead.

BMI: Body Mass Index

BMR: Basal Metabolic Rate

User: The person who will be using the Application to get treatment.

**Proposed System:** In this application we are giving more offices to the client to get arrangement effortlessly by various meeting sorts, paying cash through web managing an account.

Our Product comprises for the most part of two sections i.e. Specialist and the Patient. The Patient would manage Medical apparatuses, demand for Appointment, and inside saving money capacities like booking arrangement. The booking arrangement would be only for the clients, who could take treatment from Doctors. Those two interface with a primary database server. The client interface is a standout amongst the most essential parts of any system since it decides how effectively you can make the project do what you need. An effective project with an ineffectively composed client interface has little esteem. In this we gave GUIs that utilization windows, symbols and pop-up menus have ended up standard on PCs and mobiles.

**Equipment Interfaces**

- 128MB or more RAM (256 prescribed)
- No less than 500 MB Hard circle space.

**Programming Interfaces**

- This item is produced chiefly utilizing open source innovations like apache, cakephp, and so on.
- Frontend: Ajax, JQuery, HTML, CSS, Bootstrap, CakePHP, JavaScript
- Backend: MySql
- Web Server: Apache
- Programming interface: Google Maps, WebRTC, Payment Gateway

**Correspondences Interfaces**

- Email, Text, Video, Audio, Appointment
Operations

- Counsels, Booking Appointment, Payment

Site adjustment necessities

- Needs to bootstrap and most recent form of program.

Product Functions

- Login System
- New Account Creation
- Search for specialists
- Administrator endorsement
- Administrator Removal
- Modify Appointment Rate
- Display Information
- Updating Personal Profile
- Change User Password
- Change Doctor Password
- View Doctor points of interest
- Request for Appointment
- Approve or cross out the solicitation
- Services-Mail, Voice Call, Video Call and Web Chat
- User evaluations for Doctor
- Track Clinics
- Online Medical Shop
- Logout System

Client Attributes

- IP address - The IP location of the client.
- Area - Where the client is physically found
- Profile fields - the fields of a client profile can be connected just to enlisted clients.
- Seek watchwords - the hunt catchphrases that the client has used to hunt down your site
- Gone to page - A page that was gone by the client
- Time of day - The time interim when the client has utilized your site

Constraints

- Enhancements to the security components may prompt execution overhead
- Recommended transmission capacity is 64 KBps
- Central Server ought to be all day, every day online

Assumptions and Dependencies: We have made the accompanying suspicions: The call specialist will be associated with the web amid the all day, every day hours of the day. The principle server could never go disconnected from the net.

Apportioning of Prerequisites: In future variant we need to add shopping office for clients to get pharmaceuticals. It will mostly comprise of the login screen which would request the username and secret key of the client or utilizing social logins. On fruitful confirmation, it would exchange the client to the client landing page. In the client landing page, there would be very much planned menus and submenus (and also catches) for performing a particular activity. On tapping on the fancied catch or menu thing, the client will be demonstrated the individual screens. The client would then enter the required information for handling and press the ‘Proceed or Done’ catch, after which the preparing would be done and the client would be come back to the client landing page. There would likewise be a sign out catch which would help the client to end his session and he will be exchanged back to the Login screen. It will fundamentally comprise of the login screen which would request the username and watchword of the Doctor. On fruitful check, it would exchange the client to the Doctor landing page. In the Doctor landing page, there would be all around planned menus and submenus (and in addition catches) for performing a particular activity. Specialist can redesign accessibility plan and can see his surveys given by the client. There would likewise be a sign out catch which would help the client to end his session and he will be exchanged back to the Login screen. This item utilizes a web association with interface with the fundamental database server. The Classes for the Call Doctor adequate for communicating the prerequisites are Consultation Types, Payment, Verification, and Booking Appointment. The most imperative component in the working of the entire venture is its Connectivity with the Server and the Mode of Connection\(^4\). In the event that the association is a 64 Kbps one then the execution of the Product would be greatly improved than that with a 10 Kbps association\(^5\).
Framework execution commonly benefits by irregular condition of client consideration and organization support\[6\]. Framework usage points of interest the client to impart and take up with various modules with more adaptability and security\[11][12\]. It covers the complexities from the clients and gives authentic client interface to basic section. Moreover it in like manner helps the client to clarify diverse inquiries related to their issue.

**CDRA Call Doctor Relevance Algorithm**

Call Doctor is on a stage to make mankind live more beneficial and longer. This starts with Doctor Search – our item that helps you locate the right specialist.

The Call Doctor Relevance Algorithm (CDRA\[7][8\]) is central to our search product and determines the order in which the search results are shown to each consumer for his/her specific query.

**How We Decide Relevance**

CDRA decisions are governed by a variety of parameters\[9][10\], some of which are detailed below.

1. **Location**: Since each listing on Call Doctor has been physically verified by trusted third party, we usually have the accurate location for each of them. When you put a search query, our system recognizes the city and assigns higher importance to give you choice, we also automatically show popular doctors in the neighboring area.

2. **Specialization**: We list doctors from over some recognized specialties and sub-specialties. These are matched with recognized specializations provided by governing bodies, again making sure that you see the specialists only relevant to your query.

3. **Appointment Experience**: This will measure by analyzing your consultation, availability of the Doctor, and of course, patient feedback.

4. **Patient Feedback**: We will consider patient feedback extremely seriously. Patients can provide feedback who already verified.

**Implementation**: This home page of application user can begin with search doctors here
**Email Conversation:** Here we showing doctor list with their available features. Available features list are showing in blue color and remaining are showing in grey color. After click on email conversation it going user basic data form. It will ask patient Name, Age, Problem type, problem description, occupation, weight, height, email. He/she can add previous medical history to form as images files. After click submit button it will check in db. if already register with email. It will redirect to payment gateway page otherwise it will ask some basic information (email, phone number). Account will be create automatically in background then it will redirect to payment page. After successful payment it will generate email and pdf file it send to respective email id. then after saw email by doctor. Doctor can direct reply to patient. This basic feature for general questions of patients. After click on booking appointment button. It renders timeslot layout of doctor at bottom of doctor record. It will shows all available times of doctors. When user picks timeslot from layout. It will redirect to confirmation page. Here it will asks name, age, appointment reason, email.

When click on submit button email is checking in users table in database then if it is exits redirect payment otherwise it will ask basic information for create account for transaction. After successful payment application creates appointment letter and it sends user email and doctor can see his appointments in his dash board.

![Fig. 3: Email conversation with doctor](image3)

![Fig. 4: Booking Appointment with doctor](image4)

**Booking Appointment:** Here we showing doctor list with their available features. Available features list are showing in blue color and remaining are showing in grey color. Based user emergency they selecting feature. Lets click on email Booking Appointment.

![Fig. 5: Appointment confirmation with doctor](image5)

**Conclusion & Future Work:** This paper is the Healthcare arrangement which helps the specialist and patient Real Time Communication. The framework is extremely secured than other accessible Health care arrangements. It incorporates more usefulness that are not accessible in any of the accessible medicinal services arrangements. Here the subtle elements of the specialist are exceedingly secured and it is checked physically by Product official. Accordingly there is zero chance that the points of interest of specialists are fake. Though there are some issues identified with execution speed as a portion of the work is completed physically, however it will be redressed in future. The task legitimizes itself on the premise of security and adaptability. In addition, the utilization of BOOTSTRAP makes the framework extremely responsive so that the perspective and appearance changes according to the screen size. The future extent of the framework is to make it completely programmed and to evacuate manual work. Likewise need to include new functionalities, for example, Face Recognition, Online Doctor Verification for more security and soundness of the framework.

**Ethical Clearance:** Nil

**Source of Funding:** Self

**Conflict of Interest:** Nil
REFERENCES


Changing Trends of Color Application in Hospitals (Assessing the Impact of Hospitals’ Interior Color on Patients’ Well-being)

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ABSTRACT

Background: This paper is based on the comparative assessment of color application in old and new hospitals in India and its effect on the well-being of patients and professionals, and to examine how colors’ are being used in hospitals at present time.

Method: A qualitative study was conducted; the study includes three case studies comprising two hospitals from different places. The views of twenty patients are scrutinized regarding their preference of healing color scheme in hospitals.

Results: The importance of painting of walls adds not only the physical appearance to the constructed abode but it also helps waving psychological gesture of inhabitants and healing of patients in the hospitals. The study however shows that India has a growing trend of attractive colour application in the hospitals. The hospitals which used poor design have negative impact on physiological indicators of wellness however the hospitals which used a good colors design on its walls have effective healing of its patients.

Conclusion: After recognizing the importance of color application in hospitals the hospitals use to apply such colours that help in the healing of wellbeing. Constructed environment of a hospital undoubtedly needs such considerations in creating hospital’s visual healing environment by colors.

Keywords: Hospitals, Colors, Healing effects, Patients

Introduction

Colors are considered as universal non verbal language. People use colors’ in many ways in their life, such as to get aesthetic, inspirational, physiological, and other psychologically motivated energy from different shades. its impact may be differs at different stages.

In last fifteen years, a substantial number of research papers based on hospital’s color-scheme suggest that colors do influence on the psychology of the patient and triggers the healing of patients considerably. Therefore adopting the color pattern based upon what the researches have been carried out, many health institutions reported that a visual environment had produced improved faster recovery rates. As Harris et al. 2002 describe that there are three dimensions of the physical healthcare environment that can have impact on health and well being. If we consider patients’ point of view, we would certainly grade the interior design features most due to its direct linkages with patients’ immediate environment, and thus the color of the wall and roof draw more attention.

It has been emphasized through research that Poor wall design or color application in hospitals leads to such negative consequences on patients like Anxiety, Delirium, High Blood Pressure, and increased intake of painkiller drugs (12).

The colors of a building affect our behavior and mood. Color and lighting can have an impact on people’s perceptions and responses to the environment (2) and also affect patient’s recovery rates improving the quality and overall experience of patient, staff and visitors (9).
This paper however aims to study the impact of colors on patients’ sense of well being. It also brings forth a comparative assessment of color application in old and new hospitals in India in order to analyze the changing trends of color application in the interior and exterior of hospitals. It includes three case studies comprising two hospitals from Delhi and one from Saharanpur. In this innovative project, the views of twenty patients have been scrutinized regarding their preference of healing color-scheme in hospitals. The study intends to show the color’s influence on the health and well-being of patients and professionals, and to examine how colors are being used in hospitals at present time.

The history of color has its roots in ancient Egypt. Ancient Egyptians and ancient Greeks built healing temples of light and colors. The Egyptians were the first civilization to research color healing. They created “color halls” within their great temples, such as Karnack and Thebes, in which they explored the impact of color on an individual’s ability to heal. Healing is a survival mechanism and represents an attempt to maintain normal anatomical structure and function. Several chemical and natural ways are adopted for healing. One of the way recommends the use of colors as a healing tool, this techniques was in use from ancient times. The early beliefs behind the healing power of color were fairly simple. Colors were associated with disease because disease produced color. Pythagoras was a great philosopher around 500 BC he also believed to have used music, poetry and color to cure diseases. Use of color became deeply embedded in Chinese and Indian medicine. Throughout history, color has been assumed to have an effect on health. The Assyrians, Babylonians, and Egyptians all used forms of color and light therapies in healing.

Laboratory research studies have shown that color can have a direct effect on a person physically as well as mentally. It is not compulsory that if a person feels better or like a color, he would be able to use the same color when he fall ill. As a person who likes red or orange color to get energy but the same color can be harmful at the time of his sickness or his eyes would not be able to see these colors. So there is no absolute definition of psychological effects of colors on human being. Kurt Goldstein is a recognized Psycho-neurologist he wrote, “It is probably not a false statement if we say that specific color stimulation is accompanied by a specific response pattern in the entire organism”. His studies have documented the effects of specific colors on Individuals having certain diseases. Graham believes that the human response to color falls within six categories, which are shown in table 1.

<table>
<thead>
<tr>
<th>1</th>
<th>Physiological:</th>
<th>Changes in blood pressure, pulse rate, automatic nervous system, hormonal activity, rate of tissue oxidation and growth.</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Within the eye:</td>
<td>Change in size of pupil, shape of lens, position of eyeball, Chemical response of retinal nerve endings.</td>
</tr>
<tr>
<td>3</td>
<td>Cognitive:</td>
<td>Memory and recall illusion and perceptive confusion, values judgment, associative response</td>
</tr>
<tr>
<td>4</td>
<td>Mood:</td>
<td>Stimulating, irritating, cheerful, relaxing, boring, exciting, melancholy, gay</td>
</tr>
<tr>
<td>5</td>
<td>Impressionistic:</td>
<td>Space seems larger, smaller, warmer, cooler, clean or dirty, bright or drab; people appear healthy or unhealthy, food is appetizing or not, older, younger, old, new</td>
</tr>
<tr>
<td>6</td>
<td>Associative:</td>
<td>With nature, with technology, religious and cultural traditions, with art and science, typical or atypical</td>
</tr>
</tbody>
</table>

During the past 30 years, there are very few studies that have been focused on how color affects patients in a hospital setting. However, 84 studies have examined how other environmental factors have been shown to impact well-being. The Center for Health Care Design stated that color is an important environmental feature in the design of hospitals that needs to be further explored. Although the human response to the application of color on walls within the interior hospital environment has not been thoroughly explored, the application of colored lights has been explored. Studies have been able to show that colored lights can have impacts on concentration, alertness, aggression, stress, and even dyslexia. The use of applying colored lights to relieve illness is known as chromo therapy.
The Purpose of Colors in Old Hospitals: Hospital is a complex institution and contains within itself many things. The architect has the task of designing a highly complex structure for a very complex organization but his design has to have sufficient clarity of form to be understood by all who use it. In addition he has to design individual territories, the departments for each of the groups whose successful interaction is the basis of the work of the hospital. It is same in the color scheme of hospitals. As it is concern that it is a public property and link to all kind of patient.

Prior to 1918 color scheme in hospitals was limited. Earlier the thinking was that the color should not be dirty soon, it should be for many years so they whitewashed walls above dado height and dark brown below. In the 1920s the introduction of washable paints did not produce variation in hospital colors but instead of whitewash white gloss paint was used and dado height some somber dirt concealing color a dark green or a brown. In 1930s all white became a vogue and in more progressive hospitals white tiled walls it dado height replaced the somber colors. But it was in some hospitals and mostly hospitals were using white with dark brown and dark green. But as the time beyond same new shades introduce in the market but technique is the same till today.

The operation theater was mostly in white paint as it has been thought that there should be full light in the room and white is a color which reflects the light.

The purpose of Color application in today’s Hospitals: The Apollo Indraprastha Hospital is a collaborative project of the renowned “Apollo hospitals” and the “Delhi Development Authority”. It spreads over 15 acres of prime land in South Delhi. It was completed in 1996 by Hafeez contractor. This is a hospital which fulfills the needs of the users and establishes an environment that is more human, pleasant and full of relaxation.

The hospitals of present time create a soothing and calming atmosphere by the use of bold, vigorous and animated colors and patterns, thereby establishing a cheerful environment and a feeling of a home away from home. The color scheme of hospital is cream, subtle orange & subtle brown is applied on the front façade that gives a very welcoming effect. All these colors convey solace, protection and warmth. Patients need this kind of environment for quick recovery. The external expression of the modern structure aims to break down the complexity normally inherent in such large institutional spaces. Externally, the simplistic geometry oriented form is an incredibly powerful expression of technologically advanced facility.

The second hospital is “Fortis Hospital Noida, India” designed by architect K C Kothari. This is a renowned hospital with compassionate feelings. The colors are soothing and full of healing fragrances. The lobby, corridor and waiting area are in light greenish yellow shades, which is the symbol of freshness, cooling, soothing youth, life and hope. The maternity ward is in the pinkish shade which reflects the feeling of happiness and delicacy of feminineness. The patient’s rooms are painted according to color therapy as the two walls in one color and the other two walls in another color scheme by mixing of lots of tints. All colors are looking very refreshing and soft. In some patients room lighting of different colors tries to change the atmosphere. Rooms are also decorated with the murals and beautiful curtain and bed sheets. The whole ambiences create a homely atmosphere feeling. There are some pictures of patient room showing the color of the walls.

Patients’ Opinions about the application of Colors in the Hospital: Patients willingly gave their opinions about the various colors applied in their rooms during their stay. Many of the male patients did not care for the color. They claimed that it made the room feel too dark. Some women really enjoyed the purple color. They said that it was very soft and made them feel comfortable. Overall, the opinions regarding the purple color varied with approximately an equal number of patients liking and disliking the color. The green color also produced various opinions. Some of the male patients claimed that they liked the color. They claimed that it probably wouldn’t be a color that they would put in their homes, but that they didn’t mind it in the hospital rooms. The majority of the women did not care for the green color. They stated that it reminded them of a “hospital green.” Upon investigation about what they believed a “hospital green” was, it was discovered that it referred to the color associated with a typical pair of scrubs. The patients’ opinions were very similar in regards to the orange color. The patients all claimed that they had noticed the color upon entering the room. Many said it was a surprise to see color on the wall. The patients felt that this color of orange brightened up the room and gave a welcome relief to the beige throughout the
majority of the hospital. Overall, more female patients than male patients enjoyed the purple color. The one main complaint was that it made the room feel dark. Regarding the green color, more male patients seemed to like, or at least not mind the color, than female patients. The female patients said the green color made the room feel too much like a hospital. Lastly, both the male and female patients enjoyed the orange color. Overall, the patients in the beige rooms appeared disappointed that their rooms did not contain colors on the wall.

**Conclusion**

The findings of the study are that all the colors have psychological effect good or bad. Sometimes which is good for someone at the same time it may be bad for others so it is not compulsory that every color has same affect on patients. As color red it is highly stimulating and exiting color and the pink is from the group of red which is cooling, pleasant and refreshing color on the other hand blue is so depressing if anybody looks continuously that colors more than 20 minutes it will be depressing, but mostly in the coronary and Intensive Care Unit (ICU) blue color is using it is planned as to avoid over stimulating or depressing effect from certain colors and lighting. Likewise in the psychiatric ward the light paint décor should be thoughtfully chosen to provide a desirable, therapeutic effect as these things may easily affect the mood and attitude of psychiatric patients.

The entrance of the hospital may be in welcoming colors. These colors play very vital role at the time of entrance in the hospitals. The lobby/corridor is the most important part of two contacts with hospital for a patient and visitor. It sets the tone for their visit. It is the place from where the people make their first opinion about the hospital. Many architects and experts say that the color chosen for the lobby should be calm, quiet, restful and dignified such as rose tones or pecan grey. Usually lobbies are always dark (without sun light) lots of tints can create light as well as lively. The color scheme of corridor walls should reflect light and create a cheerful atmosphere. Honey yellow, grey green and light cedar raised all some of the choices. Patients spend twenty four hours of the day in their room, for them the hospital is their temporary home. The taste of color scheme can be different from man to man. It can be according to age factor and sex factor as men, women child or old person. The most preferred colors for hospitals are melon grey dusty rose tone aqua pecan grey and honey lemon have been used with a great deal of success. The bright color like bright blue soft purple lavender tones bright yellow or strong should be avoided in patient’s room.

Now, the problem is that most of patients in the lying position tend to see more of the ceiling than any other place in the room. It is advisable that the ceiling should not be in white but in the same color as the side walls. Designers have invented to decorate the room with two complementary colors two walls in one color and the other two walls in one color. Operating and delivery room/surgery room/intensive care unit (ICU) etc., these rooms need maximum light, so these places should always be white and with a touch of the colors that would be restful to the eyes. A color that has been proved to be the ideal is little bit of grey-green. The kids section should be decorated in pink or blue or a combination of the two colors. Kids always get attracted to primary colors (R, B, Y, G). A small amount of these colors to be used in form of painting murals, having lamp, quilt, curtain, carpet etc.

**Ethical Clearance:** Only discussion with patients

**Source of Funding:** Self

**Conflict of Interest:** Nil

**REFERENCES**


Effects of Birth Weight on Cord Blood Thyroid Stimulating Hormone

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ABSTRACT

Background: There is a possibility of an association between birth weight and Cord blood Thyroid Stimulating Hormone (CbTSH) level. Congenital hypothyroidism (CH) is most common preventable cause of mental retardation in neonates. CbTSH level is a well known screening tool for CH.

Materials & Method: Cross sectional study was designed. A total of 462 neonates were studied for TSH levels by Chemi-Luminescence Immuno Assay (CLIA) technique.

Statistical Analysis: Comparison among birth weight outcome was done by using unpaired t-test. Pearson correlation was calculated to find out significance within groups of birth weight.

Results: In this study the mean birth weight (grams) of the neonates was 2810.62 S.D). 365 neonates had birth weight more than 2500 g and 97 neonates had low birth weight of less than 2500g. There was no significance between birth weight and CBSh.

Conclusion: Birth weight does not affect TSH values of term neonates.

Keywords: Cord blood thyroid stimulating hormone, congenital hypothyroidism, newborn screening

Introduction

In most cases, Congenital Hypothyroidism (CH) is permanent and results from an abnormality in thyroid gland development (dysgenesis or agenesis) or a defect in thyroid hormone synthesis. Less commonly, the hypothyroidism is transient which can be caused by transplacental passage of maternal medication, maternal blocking antibodies, or iodine deficiency. In rare cases, CH may result from a pituitary or hypothalamic abnormality.1

The fetus is entirely dependent on maternal thyroid hormone (TH) during the first half of the pregnancy. Despite the critical importance of TH on multiple organs, especially brain, most infants with CH appear normal at birth.2-3 The previous study was conducted to find the effect of mode of delivery on cord blood Thyroid Stimulating Hormone (TSH).4 Also there is no consensus on effect of birth weight on TSH values in neonates. High incidence of raised TSH has been documented in lower birth weight infants,5,6 whereas some studies document that birth weight has no effect on neonatal TSH levels.7,8,9 Many factors like mode of delivery, caesarean section vs. vaginal delivery, gestational age, birth weight and the day of sample collection may influence TSH levels in a screening program. The data on the possible influence of these factors on neonatal TSH is scarce and is with conflicting results. We undertook this study to find the effect of birth weight on neonatal TSH.

Material and Method

Study Design: A cross-sectional study of neonates born in KIMS Hospital Karad from Dec 2013 to February 2015 was done. Blood samples were collected from
the cord at birth and 24 hours sample collected from peripheral veins while observing all safety and aseptic precautions. Blood samples were analyzed for TSH using Lumax, based on Chemi-Luminescence Immuno Assay (CLIA) technique. A total of 462 samples were collected and all were included in the study. Descriptive statistics with respect to TSH values and birth weight were studied. Neonates were divided into groups on the basis of their birth weight. The relationship of TSH with birth weight was evaluated statistically.

**Statistical Methods & Analysis**

Descriptive statistical analysis was carried out in this study. Results on continuous measurements are presented as Mean SD (Min- Max) and results on categorical measurements are presented in Number (%). Significance was assessed at 5 % level of significance. Student t test (two tailed, independent) was used to find the significance of study parameters on continuous scale between two groups (Inter group analysis) on metric parameters. SPSS (Statistical Pacakages for Social Sciences) 20.0 software was used for the data and Ms-Excel have been used to generate graphs, tables etc.

**Results**

In this study 462 neonates were included based on inclusion and exclusion criteria. Samples for TSH were collected at birth. In our study the mean birth weight (grams) of the neonates was 2810.62 S.D). 365 neonates had birth weight more than 2500 g and 97 neonates had low birth weight of less than 2500g (Table 1 and Graph 1)

<table>
<thead>
<tr>
<th>Birth Weight</th>
<th>TSH (in mu/dl)</th>
</tr>
</thead>
<tbody>
<tr>
<td>LBW</td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>97</td>
</tr>
<tr>
<td>Minimum</td>
<td>.40</td>
</tr>
<tr>
<td>Maximum</td>
<td>10.90</td>
</tr>
<tr>
<td>Mean</td>
<td>5.3598</td>
</tr>
<tr>
<td>Std. Deviation</td>
<td>1.82355</td>
</tr>
<tr>
<td>NBW</td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>365</td>
</tr>
<tr>
<td>Minimum</td>
<td>.40</td>
</tr>
<tr>
<td>Maximum</td>
<td>19.50</td>
</tr>
<tr>
<td>Mean</td>
<td>5.6077</td>
</tr>
<tr>
<td>Std. Deviation</td>
<td>2.45942</td>
</tr>
</tbody>
</table>

Table 1: Showing birth weight and the levels of TSH

<table>
<thead>
<tr>
<th>Statistical Analysis</th>
<th>Unpaired ‘t’ test value</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

LBW- Low Birth Weight; NBW- Normal Birth Weight

![Graph 1: Column Diagram Showing Birth weight and TSH](image)

![Table 2: Showing correlation between birth weight and TSH](image)

<table>
<thead>
<tr>
<th>Birth Weight</th>
<th>TSH (in mui/dl)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson Correlation</td>
<td>.030</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td>.513</td>
</tr>
<tr>
<td>N</td>
<td>462</td>
</tr>
</tbody>
</table>

The correlation between birth weight and TSH was positive, but it was not statistically significant. (Table 2)

**Discussion**

There is no consensus on effect of birth weight on TSH values in neonates. Julie Herbstaman et al in a cross sectional study of 300 newborns observed that infants who were born with low birth weight (<2500 g) had higher cord blood TSH. Similar results were found by JE Frank et al 11 and Aidan McEIduff et al 3 in two separate studies. TSH was measured from blood samples collected on filter paper and they found values correlates inversely with birth weight.

However Chan LS et al 11 in their study to investigate the effect of various perinatal factors on the cord blood TSH found an independent positive association between cord blood TSH values and birth weight.

In our study the mean birth weight (grams) of the neonates was 2810.62 S.D). 365 neonates had birth
weight more than 2500 g and 97 neonates had low birth weight of less than 2500g (Table 1)

The mean TSH value in neonates with low birth weight (<2500 grams) was 5.35±1.82 (mean±S.D) and mean TSH value in neonates normal with birth weight 5.60 value is 1.354 (Table 1) which is not statistically significant indicating that birth weight has no effect on measured TSH values in samples collected.

Also we did a correlation test (Table 2) between birth weight and TSH values and there was no correlation found between birth weight and TSH values (Pearson correlation coefficient of -0.020).

This is in agreement with results found in three separate studies done by Fuse Y et al 6, R C Franklin et al 9 and Susan Uhrmann et al 10.

Fuse et al in their study measured cord blood TSH, FT4 and FT3 from 124 healthy term neonates and found that birth weight had no effect on cord serum TSH and free thyroid hormone levels.6

R C Franklin et al in their study measured T4,T3,FT4,RT3,TBG and TSH concentrations in 229 healthy term neonates at birth and at 5,10 and 15 day of age using radio immunoassay. They concluded that birth weight should be taken into account when interpreting neonatal T4 values however it need not be considered when TSH is measured for screening neonates for CH.

Similar results were found by Susan Uhrmann et al in their study of low birth weight infants in which they found high incidence of transient hypothyroxinemia with serum low T4 values but normal TSH values in low birth weight infants. Serum TSH values were normal in all low birth weight neonates. In our study, birth weight had no effect on measured TSH values in samples collected from neonates from the cord at birth.

Conclusion

There is no significant correlation between birth weight & TSH values in term neonates. So, it can be concluded that birth weight does not affect TSH values of term neonates.

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Nutritional Status and Anaemic Assessment of Female Stone Crushers of Manipur Valley

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ABSTRACT

Life Style, Standard of Living and Occupational Environment may directly influence the condition of one’s health condition. The present study aims to determine the health status of female stone crushers of Manipur valley. A total of 290 subjects from different 46 stone crushing units are considered for the present study. They were interviewed and followed by measurement of haemoglobin level, body-height, body-weight, total body water percent, waist girth and hip girth. Mean values of Haemoglobin level, Body Mass Index, Total Body Water% Waist Hip Ratio are found to be 11.66 ± 5.12 g/dl, 22 ± 3.33 kg/m², 57.57 ± 3.14% and 0.85 ± 0.06 respectively. Deviation from the normal range is revealed in some of the parameters resulting to a negative impact on their health status. Uses of International BMI Cut off in place of Asian Cut off by NFHS-4 can lead to inaccurate nutritional status. Higher content of total body water can be a contributing factor for normal as well as overweight category of BMI leading to false health condition. Higher prevalence of high waist ratio and higher prevalence of anaemia as observed in the present study can be considered as an indicator for the presence of public health problem in the studied population.

Keywords: Body Mass Index, Haemoglobin, Total Body Water, Waist Hip Ratio.

Introduction

Environment Protection Agency (EPA) report-2001 affirms that hundreds of stone crushing units are crushing stones round the clock in the vicinities of various cities¹. Different types of health hazardous fumes, gases and heavy dust concentration are released in the working environment of such crushing units that may affect the health of workers. Poor economic condition of workers compelled themselves to work there even though they know some ill effects of the occupation. Our societies doesn’t pay any attention towards them and seems to be neglected. It’s high time to pay our attention towards this deprived section. Keeping this in view, the present study aims to examine the prevalence of body mass index, waist hip ratio, haemoglobin status for assessing the health status of female stone crushers of Manipur valley.

Materials and Method

All the procedures of data collection and data analysis employed in the present study are carried out only after getting approval of “Ethical Clearance” from Ethical Clearance Committee, Manipur University. Details of inclusion-exclusion criteria, sample size, parameters considered, and relevant reference values are discussed below.

Inclusion Criteria:

a. Subjects must be an 18 years and above females only.
b. Must have at least a minimum exposure of 6 months in the working environment.
c. Those who are currently working and willingly give the informed consent.
d. Subject must be able to provide their actual Date of Birth from reliable documents like Horoscope, birth certificate, etc.
Exclusion Criteria:

a. Those female stone crushers who fail to fulfill any of the inclusion criteria as mentioned above will be excluded from the present study.

b. Workers having particular diseases like TB, HIV-AIDS, Hepatitis-B, etc. will be excluded.

c. Alcohol users.

d. Pregnant Women.

Sample size and Parameters considered: For a better reliable outcome, the present study attempted to reach all the available female stone crushers of Manipur valley by collecting relevant data from all the stone crushing units of Manipur valley. However, after going through the above inclusion and exclusion criteria, a total of 290 subjects from different 46 stone crushing units are found to be eligible for the present study. They were interviewed and followed by measurement of haemoglobin level, body-height, body-weight, waist girth and hip girth. Haemoglobin level, BMI, Waist-Hip Ratio and Total Body water are collected for assessing the health status. Height, weight, haemoglobin estimation, waist circumference and hip circumference are measured by using the most accepted standard techniques specified by Weiner and Lourie (1969)2 and WHO 3.

Reference Values:

a. Body Mass Index (BMI): Clinical classification of obesity is established on Body Mass Index (BMI). Therefore, the values of BMI were calculated for each subject using the following formula,

\[ \text{BMI} = \frac{\text{Weight (Kg)}}{\text{Height}^2 (m)} \]

The World Health Organization (WHO) has prescribed different BMI cut off for Asian people from the International Classification of BMI. National Family Health Survey-4 2015-2016, govt. of India use WHO’s international classification of BMI, even though the people of India are Asians. However, both Asian and International cut off of BMI will be worked out in the present study and a comparison will made a comparison with national and state prevalence reported by National Family Health Survey-4. The cut off values of BMI for International and Asian population are shown in the table 1 and 2 along with the prevalence.

b. Anaemia:

Definition of Anaemia: Female whose haemoglobin is less than 12 g/dl (Hb < 12g/dl). Haemoglobin, the respiratory pigment of human beings present in the blood carries oxygen from the respiratory organ, lungs to the rest of the body tissues for metabolic functioning. Deficiency of human respiratory pigment leads to a condition known as anaemia characterized by quick tiredness, weakness, shortness of breath, loss of consciousness, or increased thirst, etc7.

c. Waist-Hip-Ratio (WHR): According to the World Health Organization (WHO), a healthy WHR is 0.9 or less in men and 0.85 or less for women. In both men and women, a WHR of 1.0 or higher increases the risk for heart disease and other conditions that are linked to being overweight9,10. A chart of waist-hip ratio showing different categories of health risk with respect to sex for Asian population prescribed by WHO is given in table 4 along with the result.

d. Total Body Water: Total body water percentage (TBW %) is the total amount of fluid in the body expressed as a percentage of our total body weight10. Our body needs water for a wide variety of reasons including transportation of nutrients around the body and for waste products carried out of the body in the form of urine10. It also allows organs to function, regulates body temperature, aids digestion and helps our muscles to contract and relax. Being well hydrated will help concentration levels, performance and general wellbeing8. Standard TBW % of adult males and females are given in table 3 with the observed frequency. The average TBW % ranges for a healthy adult are, Females – 45 to 60% and Males – 50 to 65%.

Results

Table 1: BMI Status as per International Cut off

<table>
<thead>
<tr>
<th>Classification</th>
<th>BMI (kg/m²) Principal cut-off points 2004</th>
<th>Frequency</th>
<th>Prevalence %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Underweight or CED</td>
<td>&lt;18.50</td>
<td>23</td>
<td>7.93%</td>
</tr>
<tr>
<td>Normal range</td>
<td>18.50 – 24.99</td>
<td>208</td>
<td>71.72%</td>
</tr>
<tr>
<td>Overweight</td>
<td>≥25.00</td>
<td>52</td>
<td>17.93%</td>
</tr>
<tr>
<td>Obese</td>
<td>≥30.00</td>
<td>7</td>
<td>2.41%</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>20.34%</td>
</tr>
</tbody>
</table>
It is evident that 71.72% of the population are nutritionally fit whereas remaining 28.27% are unfit. Only 7.93% of the population are chronic energy deficient, 17.93% and 2.41% are overweight and obese. Overweight and obese altogether constitute 20.34%. Observed range of BMI is 16.2 - 35 kg/m² with a mean value of 22 ± 3.33 kg/m² (Table 1).

Table 2: BMI Status as per Asian Cut off

<table>
<thead>
<tr>
<th>Classification</th>
<th>BMI (kg/m²) Principal cut-off points for Asians, 2004</th>
<th>Frequency</th>
<th>Prevalence %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Underweight or CED</td>
<td>&lt;18.50</td>
<td>23</td>
<td>7.93%</td>
</tr>
<tr>
<td>Normal range</td>
<td>18.50 – 23</td>
<td>146</td>
<td>50.34%</td>
</tr>
<tr>
<td>Increased risk or Overweight</td>
<td>23 – 27.5</td>
<td>91 (121)</td>
<td>31.37%</td>
</tr>
<tr>
<td>High risk or Obese</td>
<td>≥27.5</td>
<td>30</td>
<td>10.34%</td>
</tr>
</tbody>
</table>

On applying the BMI cut off for Asians, the prevalence of normal category decreases from 71.72% (International Cut off) to 50.34 % (Asian cut off) whereas the prevalence of overweight and obese collectively increases from 20.23 % to 42.41%. In Asian cut off overweight alone accounts 31.37% (17.93 % international cut off) and obese shows 10.34 % (2.41 % international cut off) as observed in Table 1 and Table 2.

Table 3: Total Body Water Status

<table>
<thead>
<tr>
<th>Total Body Water % Principal cut-off points for females (Tanita)</th>
<th>Status Categories</th>
<th>Frequency</th>
<th>Prevalence %</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 45%</td>
<td>Low</td>
<td>3</td>
<td>1.03%</td>
</tr>
<tr>
<td>45% - 60%</td>
<td>Healthy</td>
<td>187</td>
<td>64.48%</td>
</tr>
<tr>
<td>&gt; 60%</td>
<td>High</td>
<td>100</td>
<td>34.48%</td>
</tr>
</tbody>
</table>

Table 3 reveals the Total Body Water percentage of the workers. It is observed that 64.48 % of the studied population possess healthy water content i.e. most of the workers are free from dehydration. The overall average Total Body Water % content of the workers is 57.57 ± 3.14 which is in the normal level of 45-60%. The minimum and maximum observed Total Body Water percentage of the workers is 43.64 and 80.46 respectively. It is revealed that 34.34% of the population belongs to high water content category and only 1.03 % of the population are found to be associated with dehydration (low total body water content).

Table 4: Waist Hip Ratio Status

<table>
<thead>
<tr>
<th>WHR Principal cut-off points, Women 2008</th>
<th>Health risk Categories</th>
<th>Frequency</th>
<th>Prevalence %</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.80 or lower</td>
<td>Low</td>
<td>67</td>
<td>23.10%</td>
</tr>
<tr>
<td>0.81–0.85</td>
<td>Moderate</td>
<td>70</td>
<td>24.13%</td>
</tr>
<tr>
<td>0.86 or higher</td>
<td>High</td>
<td>153</td>
<td>52.75%</td>
</tr>
</tbody>
</table>

Table 4 shows that 52.75 % of the population are in the High risk category, 24.13% are moderately risk group and 23.10 % accounts in the low risk category. Observed range of WHR is 0.56 – 1.11 with a mean value of 0.85 ± 0.06.

Table 5: Anaemic Status

<table>
<thead>
<tr>
<th>Hb (g/dl) Principal cut-off points 2002</th>
<th>Clinical Categories</th>
<th>Frequency</th>
<th>Prevalence %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hb 12 g/dL and &gt;</td>
<td>Not anaemic</td>
<td>135</td>
<td>46.55%</td>
</tr>
<tr>
<td>Hb 10 - &lt; 12 g/dL</td>
<td>Mild anaemia</td>
<td>102</td>
<td>35.17%</td>
</tr>
<tr>
<td>Hb 8 - &lt; 10 g/dL</td>
<td>Moderate anaemia</td>
<td>45</td>
<td>15.51%</td>
</tr>
<tr>
<td>Hb 6 - &lt; 8 g/dL</td>
<td>Marked anaemia</td>
<td>8</td>
<td>2.75%</td>
</tr>
<tr>
<td>Hb 4 - &lt; 6 g/dL</td>
<td>Severe anaemia</td>
<td>0</td>
<td>00</td>
</tr>
<tr>
<td>Hb &lt; 4 g/dL</td>
<td>Critical</td>
<td>0</td>
<td>00</td>
</tr>
</tbody>
</table>
Table 5 reveals that majority of this working population i.e. 53.44% are found to be Anemic of which 35.17% falls under Mild anaemia, 15.51% and 2.75% belong to Moderate and Marked anaemia respectively. Observed range of Hb level is 6 – 15 g/dl with a mean value of 11.66 ± 5.12 g/dl.

Discussions

The prevalence of overweight and obese among the Indian women is reported as 20.7% (NFHS-4, 2015-16) whereas 26% of prevalence is observed in Manipur12. According to NFHS-4 report 35.35% of the Indian females of 15-49 years are below normal category of BMI < 18.5 kg/m².

Here, in this present study, the high prevalence of normal BMI category, 71.72% (Table 1), International cut off and 50.34 % in Table 2, Asian cut off, are observed which seems to reflect that the health condition of female stone crushers of Manipur is healthy. In case of overweight and obese, the present study shows 20.34 % prevalence which is almost equalled to the national (20.7%, NFHS-4) but less than state level (26.00 %, NFHS-4) prevalence12.

But on applying the BMI cut off for Asians, the prevalence of overweight and obese collectively increases from 20.23 % to 42.41%. In Asian cut off overweight alone accounts 31.37% (17.93 % international cut off) and obese shows 10.34 % (2.41 % international cut off) as observed in Table 1 and Table 2. The proportion of overweight and obese in the present study comprising 41.41% is quite large. If the NFHS-4 were supposed to use the Asian BMI cut off, obviously, there will be higher prevalence of overweight and obese among Indians.

The prevalence rate as per two different cut off greatly varied and we know that WHO recommends to use separate lower BMI cut off for Asian population for better nutritional assessment from 2004 onwards. But the National Family Heath Survey -4, 2015-2016 remained used the international BMI cut off although the Indians belongs to Asian population which can lead to an inaccurate results at the time of nutritional assessment.

The higher prevalence of normal BMI category BMI (71.72% or 50.34 %) observed in the present study seems to reflect that the health condition of the majority of the female stone crushers of Manipur is healthy.

However, on crossed examining with other relevant parameters, 34.48% of the population has high total body water percent (Table 3). Total body water percentage (TBW %) is the total amount of fluid in the body expressed as a percentage of our total body weight10. It is one of the major component of fat free mass that affects the total body weight. Therefore, higher content of total body water may obviously be the reason which help those comparatively lower weight individuals get sifted to normal BMI status and normal BMI status individuals to overweight category. In short, higher content of total body water can be a contributing factor for normal as well as overweight category of BMI leading to give false health condition.

Therefore, in assessing the health status of a population, it is necessary to consider other biological parameters like Total Body Water (TBW), Waist Hip Ratio (WHR), Haemoglobin (Hb) content, etc.

Though general obesity reveals high prevalence of normal BMI (71.72% or 50.34 %), Waist Hip Ratio shows contrasting findings displaying 52.75% of the population in the high risk category (Table 4) which is also higher than prevalence of overweight and obese (20.34 % or 41.41 %). From the above discussion and many reported literatures, it is evident that BMI can lead to inaccurate health risk category and there are also various literatures reporting that WHR predicts better than BMI13, 14. Therefore, it is better to interpret the health status on the basis of WHR estimation, revealing that majority of the workers, 52.75 % are likely to have moderate risk to high risk of developing heart disease, high blood pressure, stroke and diabetes. Hence, the health status of the population is not healthy. It is also reflected by the higher prevalence of anaemia (53.44% in Table 5, ≥ 40.0 %). According to WHO global database on Anaemia, Worldwide prevalence of Anaemia 1993–2005, prevalence of anaemia ≥ 40.0 % is considered as severe public health problem8. Hence, the high prevalence of Anaemia observed in the present study indicates the presence of severe public health problem in the studied population and the majority of the workers comprising 53.44% are likely to face quick tiredness, weakness, shortness of breath, loss of consciousness, or increased thirst.
Conclusion

Uses of International BMI Cut off in place of Asian Cut off by NFHS-4 can lead to inaccurate nutritional status. Higher content of total body water can be a contributing factor for normal as well as overweight category of BMI leading to give false health condition. Higher prevalence of high waist ratio and higher prevalence anaemia as observed in the present study can be considered as an indicator for the presence of public health problem in the studied population. Further in-depth study is necessary to find out the underlying factors for the high prevalence of anaemia.

Conflicts of Interest: The authors have no Conflicts of interest.

Source of Funding: The financial assistance of this research work is funded by the grant of U.G.C.-J.R.F Fellowship.

Ethical Clearance: The Present Research work has been approved by the “Ethical clearance Committee Manipur University”.

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Interplay between Attitude and Purchase Intention: An Empirical Survey on Over-the-Counter (OTC) Drugs Consumer Behaviour

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ABSTRACT

Over-the-Counter drugs (OTC) segment is rapidly growing within the pharmaceutical sector in India. In 2009, the Indian OTC market exhibited a growth of US$1.8 billion however as per the estimates by PwC India is likely to witness a growth of US$11 billion - a CAGR of 18% by 2020. As OTCs are self-medicated it is essential to evaluate the stimulus that triggers a particular behaviour¹. In recent past, India has also witnessed an increase in OTC drugs purchase of health supplements². An empirical survey was conducted based on a validated questionnaire to assess the consumer behavioural intention towards OTC purchase. The survey involved assessment of key variables like “perceived behavioural control, attitude and subjective norm as per the theory of planned behaviour (TPB)”³. As per the survey the TPB model exhibited a variation of 39.4% in the purchase intention, wherein attitude appeared as the most important driver of intention closely followed by perceived behavioural control. Findings indicate that the TPB based model appropriately explains the interplay between the key variables influencing purchase intention of OTC drug products. Attitude was attributed to having the strongest influence ($β = 0.401, p = 0.000$) on intention among the variables studied. Perceived behavioural control was identified as the next most important variable.

Keywords: Consumer Behaviour, India, OTC, Theory of Planned Behaviour, Demographic

Introduction

The OTC segment is rapidly growing within the pharmaceutical sector in India. The Indian OTC market exhibited a growth of US$1.8 billion in 2009 and as per the estimates by PwC it is likely to grow up to US$11 billion - a CAGR of 18% by 2020. The primary reasons for this growth are believed to be the availability of broader distribution channels, direct consumer advertising, low price controls and increased customer consciousness⁵. OTC products contributed an approximately 4.2 billion USD of revenue in the year 2015⁶.

OTC products in India include:
- Pain Rubs like: Moov, Iodex balm, Zandu balm & Amrutanjan balm
- Pain killers & cold preparations like: Dcold, Disprin & Crocin
- Antacids like: Eno & Pudin Hara
- Skin therapies like: Itch Guard & Krack cream
- Cough drops like Strepsils & Honitus
- Ayurvedic products like chawanprash from Dabur, Zandu and Patanjali.

Consumer behaviour of OTC purchase: Loudon et al.⁷ defines “consumer behaviour as the decision process and physical activity individuals engage in when evaluating, acquiring, using or disposing of goods and services.” p.5 On the other hand attitude is defined differently per different concepts and “one conception is that attitude is how positive or negative, favorable or unfavorable, or pro or con a person feels toward an object.” (7:p.422-423)
Research Methodology

An empirical survey was conducted on a sample of 466, among the residents of three residential societies in the town of Zirakpur, Mohali, Punjab. The survey was conducted based on a validated questionnaire that was based on the recommended approach per “Theory of Planned Behaviour questionnaire”.

Questions were designed to cover three key components of the model i.e. attitude (behavioural norm), subjective norm (normative beliefs) and the perceived behavioural control (control beliefs).

Tested Hypotheses

Attitude
H1. The more positive an individual’s attitude towards an OTC product, greater is the intention to purchase the product.

Subjective Norm
H2. The more positive the perception of friends, family and healthcare professionals towards an OTC product, greater is the intention to purchase the product.

Perceived Behavioural Control
H3. Perceived behavioural control over using OTC products has a positive influence on the intention to purchase OTC products.

Attitude, subjective norm and PBC
H4. Attitude, subjective norm and PBC are equally important determinants of behavioural intention

Review of Literature and Theoretical Framework

A literature review was performed to identify evidence around OTC purchase behaviour and consumer attitude towards OTC drugs/products. The below section highlights evidence from individual studies identified in the review.

In UK a survey involving 118 consumers concluded that determinants like direct experience with the brand, price tolerance, brand trust and the subjective opinion of others triggered repeat purchase. Price sensitivity was considered as the primary factor in determining an individual’s attitude and intention to repurchase from a brand.

Nguyen investigated the drivers of repeat use of OTC anthelmintic medications to predict the behaviour and intention of mothers of young school going children in Vietnam. The study showcased attitude as the most important antecedent of behaviour and intention.

A study in Dutch population reported that the OTC users were quite confident of their skills to buy OTC products. People aged above 65 and less educated had significantly less confidence than younger and more educated people.

In a Polish study, the authors evaluated three major determinants: demographic determinants including age, gender, place of residence, number of children; socioeconomic determinants including salary compensation, pension benefits, status of employment, level of education, and behavioural determinants including assessment of health condition, patient’s behaviour in time of sickness, discomfort or pain, frequency of medical visits, consultation with doctor/pharmacist on first time use, reading the leaflet and views on the possibility of harmfulness. The study found all the determinants to be statistically significant except the place of residence, level of education and employment status.

A study in Hungary reported that 44% of the OTC consumers consulted a pharmacist while 21.7% made decisions based on information from the internet, parents, friends, or advertisements. Among factors affecting medication purchase, intended effect was the most important factor.

A survey by Ladha in West Vancouver, Canada concluded that with direct consumer advertising, awareness in the minds of consumers would be vital. Price and subjective norms were considered important drivers of OTC purchase behaviours.

A cross-sectional study involving 600 urban families living in the city of Jammu, concluded that the key factors influencing self-medication were patient satisfaction with the healthcare provider, cost of drugs, educational status, socioeconomic factors, gender and age.

A survey based on structured interviews was conducted across shopping centers in Belfast, Northern Ireland. The questionnaire assessed attitude towards community pharmacy, attitude towards the use of OTC medicine, views on OTC medicines in terms of safety, potency and effectiveness and knowledge around improper use. Thirty-two percent participants reported purchasing non-prescription medicines. Females and people below the age of 60 bought OTC medicines more
frequently. Pharmacists were considered as the most frequently influencing choice of OTC 15.

Another study reported that between the year 2001 and 2009, there was an increase in consumer awareness around potential risks consideration prior to OTC analgesic consumption. It was also concluded that healthcare professionals play an important role in the decision making 16.

A review on self-medication in India concluded that information from the pharmacist, family product leaflets friends and advertisements were key sources of information for OTC products 17.

Another study in the US compared the differences in behaviour and involvement of older people compared to young adults while making decisions around OTC purchase. Older people were reported to be more involved and were more frequently seeking help from the pharmacist in the decisions making process. Also label, package, and availability of advice from the pharmacist were vital to the elderly. However, safety of the OTC product, strength, and price were considered extremely significant by both older people and young adults 18.

A cross-sectional study conducted in India on 180 consumers from the rural and urban field practice areas of A. C. S. Medical College in Thiruvallur concluded that 51.7% of the population utilized self-medication. Moreover, cold was the most frequently reported underlying indication and financial constraints was a potential reason for self-medication 19.

Another cross-sectional study assessed the use of OTC products in Mandya city, India involving 800 participants. 77.50% urban and 68.25% rural population reported the use of OTC drugs. Aches and pain were the most frequently reported indication for the use of OTC products followed by fever 20.

The evidence thus indicated that OTC purchase was dictated by factors ranging from personal, societal to economic and the interplay could vary based on the differences on these perspectives.

**Theoretical Framework**

The evidence identified through keyword search was then utilized to perform bibliographic search of the included evidence. The identified evidence substantiated TRA and the TPB frameworks either being directly explored or pertinent variables assessed indirectly.

According to TRA (theory of reasoned action), a framework developed by Ajzen and Fishbein 21, the most important element of behaviour is intention. TRA hypothesized that the intention to execute a behaviour was a combination of attitude towards performing the behaviour and subjective norm 22,21.

Ajzen 23 suggested that “TRA was extended to include a measure of perceived behavioural control to form TPB”. Perceived Behavioural Control (PBC) is held to influence both intention and behaviour. Addition of PBC was expected to allow prediction of behaviours that were not under complete voluntary control.

The theory of planned behaviour hypothesizes three independent determinants of intention. The first is the attitude i.e. favorable or unfavorable assessment of the behaviour in question. The second predictor is subjective norm i.e. the social perception around the behaviour. The third antecedent is the degree of perceived behavioural control 23.

**Results of the Survey**

Among the surveyed population of 466, 81.8% of the population was in the age group of 18 to 50 years. Approximately 65.7% of the surveyed population were males while 34.3% were females. A majority of the respondents i.e. 42.9% held a bachelor’s degree while 37.8% held a post graduate degree. About 35.8% of the respondents reported an annual income between 5 to 10 lakhs followed by 28.1% with a household income of up to 2.5 lakhs.

Multiple regression analysis was used to test all four hypotheses. Three independent variables exhibited influence on the dependent variable, intention at the 0.05 significance level, supporting the tested hypotheses.

**Table 1: Correlations**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Pearson Correlation</th>
<th>Individual’s Intention to Purchase OTC Products</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attitude towards an OTC product</td>
<td>Pearson Correlation</td>
<td>.581**</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>466</td>
</tr>
<tr>
<td>Subjective norm</td>
<td>Pearson Correlation</td>
<td>.548**</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>466</td>
</tr>
<tr>
<td>Perceived behavioural control of using OTC products</td>
<td>Pearson Correlation</td>
<td>.423**</td>
</tr>
<tr>
<td></td>
<td>N</td>
<td>466</td>
</tr>
</tbody>
</table>
As shown in Table 1, attitude, subjective norm and PBC were all assessed to have a positive correlation with behavioural intention. Attitude was observed to have the strongest correlation with intention.

The direct measures of attitude, subjective norm, and perceived behavioural control explained 39.4% of variance in intention to purchase OTC products. Attitude had the strongest influence on intention ($\beta = 0.401$, $p = 0.000$).

Table 2: Model Summary

<table>
<thead>
<tr>
<th>Model</th>
<th>R</th>
<th>R Square</th>
<th>Adjusted R Square</th>
<th>Std. Error of the Estimate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>.628$^a$</td>
<td>.394</td>
<td>.390</td>
<td>.653</td>
</tr>
</tbody>
</table>

Note: Predictors: (Constant), perceived behavioural control of using OTC products, attitude towards an OTC product, perceptions of friends, family and healthcare professionals towards an OTC product.

Further, age of the respondents was strongly associated with intention to purchase OTC products based on Pearson chi square test ($p$ value = .000). However, the strength of the association was found to be weak (Cramers $V = .198$, $p = .000$).

Table 3: Chi-Square Tests

<table>
<thead>
<tr>
<th>Reported</th>
<th>Value</th>
<th>df</th>
<th>Asymp. Sig. (2-sided)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson Chi-Square</td>
<td>36.464$^a$</td>
<td>8</td>
<td>.000</td>
</tr>
<tr>
<td>Likelihood Ratio</td>
<td>29.121</td>
<td>8</td>
<td>.000</td>
</tr>
<tr>
<td>Linear-by-Linear Association</td>
<td>6.655</td>
<td>1</td>
<td>.010</td>
</tr>
<tr>
<td>N of Valid Cases</td>
<td>466</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Cramer’s $V = .198$, $p = .000$

Similar statistics when applied to gender demonstrated no association with intention while income was observed to have strong association with intention.

Survey respondents in the income group of 5 to 10 lakhs had the highest likelihood of OTC purchase at 39.6% followed by those in the income group of 0 to 2.5 lakhs at 35.4% and 18.8% for those in the income group of 2.5 to 5 lakhs. Only 6.3% of those with income more than 10 Lakhs reported likelihood of OTC purchase.

Table 4: Individual Intention to Purchase OTC Product Cross-Tabulation Household Income

<table>
<thead>
<tr>
<th>Individual’s Intention to Purchase OTC products</th>
<th>Household annual Income (INR)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0-2,50000</td>
<td>250000-500000</td>
</tr>
<tr>
<td>Unlikely</td>
<td>Count</td>
<td>3</td>
</tr>
<tr>
<td>Somewhat Unlikely</td>
<td>Count</td>
<td>6</td>
</tr>
<tr>
<td>Neutral</td>
<td>Count</td>
<td>88</td>
</tr>
<tr>
<td>Somewhat Likely</td>
<td>Count</td>
<td>17</td>
</tr>
<tr>
<td>Likely</td>
<td>Count</td>
<td>17</td>
</tr>
<tr>
<td>Total</td>
<td>Count</td>
<td>131</td>
</tr>
</tbody>
</table>

Major Findings & Conclusion

In the present study the TPB model explained for 39.4% of variance in intention which is in line with 39.0% of the variance in intention from a meta-analysis of 195 studies by Armitage et al.$^{24}$, 40.9% of the variance in intention is in cohesion to another meta-analysis of 56 studies by Godin et al.$^{25}$ and 32.3% variance that reported in the study by Nguyen$^9$. 
The results from the survey conclude that attitude is the most important predictor of intention compared to other variables of the TPB model i.e. subjective norm and perceived behavioural control. The same is aligned to the results reported in the literature involving application of the TPB model.

**Research Implications and Expected Contributions:**
TPB in practice offers interventions to influence the behaviour in question. The findings imply interventions that could be applied by OTC drug and marketing companies to explore this growing market.

**Key Interventions Include:**

**Altering attitude:** Based on the findings, attitude comes out as the most important determinant of behavioural intention. The manufacturers and marketing companies should thus focus on effective messaging around the product and advantages of its use to build positive attitude.

**PBC based Interventions:** Control beliefs emerge from the beliefs around feeling equipped to make the decision around OTC purchase. This involves both knowledge of & access to the product through appropriate channels.

**Limitations of the Current Evidence Synthesis:**
The current survey was conducted only in the town of Zirakpur and broadly covered only the educated and urban population. Furthermore, due to the nature of the study only the intention to purchase OTC products was assessed as opposed to the actual behaviour which would have required us to revisit the surveyed population.

**Conflict of Interest:** This survey was conducted as part of doctoral research. Among the authors, Manu Sehgal is an employee of a private healthcare consultancy company and Dr. Amit Mittal is Professor at Chitkara business school, Chitkara University, Punjab.

**Source of Funding:** No private or government organization funded this consumer survey.

**Ethical Clearance:** This is a consumer behaviour survey and was conducted by directly asking consumers to fill the questionnaire. The participation in the survey was voluntary and the survey did not involve administration of any intervention or enrollment of any hospital or healthcare institute.

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Assessing Patients’ Satisfaction for Polyclinics, Empanelled Hospitals and Drug Supply Chain Management in Punjab-India

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Lovely Professional University, Phagwara, Punjab, India

ABSTRACT

Purpose: The study aims to focus on impact of drug supply chain management and treatment provided in empanelled hospitals and polyclinics of Public healthcare systems. These issues are of tremendous significance to developed as well as to not so developed countries. India being a highly populated and tropical country has its own inherited challenges in healthcare systems. The Public sector is one of the largest standing employers of human resources, regularly contribute sizeable numbers of highly motivated and disciplined peoplepost-retirement to society. The present study endeavoured to find the gaps and suggested remedial measures.

Methodology: Descriptive research is carried out by giving questionnaires to the patients visiting empanelled hospitals and polyclinics by having personal interviews with respondents about their opinion on drug supply and treatment being provided in empanelled hospitals and polyclinics. Responses of 100 patients were recorded for the 22 questions. The patients were selected randomly from major cities as well as from smaller cities. SPSS and MS Excel were used to analyse the data for this cross-sectional study.

Findings: It is observed that there exist significant differences in expectations and observations in some of the factors for which patients were not satisfied like maintenance of medical records, delivery of medical services at promised time, provisions of medicines, post-treatment and services, inadequacy of modern test equipments and doing right things very first time. However, their expectations exceeded in solving individual issues, paying adequate individual attentions and convenient working hours of empanelled hospitals.

Keywords: Drug Supply chain, Expectations, Hospitals, Policy, Satisfaction.

Introduction

An effective Drug supply management is to ensure that products or drugs should be available and supplied accordingly to the customers at the right time and the right place when they are required, in the correct amount for proper utilization. The effective management will be helpful not just for the organization but also for the consumers. The main purpose of this study to identify the factors influencing customer satisfaction with regards to treatment in polyclinics and empanelled hospital and to understand the respondent’s opinion on drug supply management,

Patient expectations have been recognized as a factor for patient satisfaction in medical consultations. Although various studies explored the relationship between patient expectations and patient satisfaction in developed countries, there is a lack of research evidence in public healthcare systems in developing countries like India where the meeting of patient expectations could relate to satisfaction.

There is a significant difference between pre consultation expectation and post-consultation expectation. Post consultation expectation impacts patient satisfaction. Health care service providers should emphasize the actual experience of consultation. The responses from patients of central government health schemesand Ex-servicemen health schemes have been analyzed in this research paper.

Drug Supply Management: Many countries have recognized the need for sound Drug Supply Management systems. Drug Supply Management divided into four stages are as follows:

- Selection: The careful choice of medicines, diagnostics and other items according to need and
to national or international guidelines e.g., of the World Health Organization.

- **Procurement:** Purchasing the necessary items, of proven quality, in appropriate quantities and at the best possible price.

- **Distribution:** Bringing the goods through continuous and secure systems to the point of use.

- **Rational Use:** Prescribing and using the items to obtain the best health outcomes.

**Patient Expectations and Satisfaction:** Patients have specific expectations when visiting the health service providers, which usually reflects concerns and problems they want the health service providers to address during the consultation. It might also include their desires for specific services. Interestingly, most of the patients’ expectations are mainly focused on the health care provider’s ability to show interest like, listening to patients’ concerns, which is reported to be the general nature of expectation.

Healthcare organizations have endorsed patient experience measurement as an important component of a data-driven, comprehensive model for improving service and creating long-term value. Health care organizations use patient experience data to identify best practices and define process improvement opportunities.

There is uncertainty about the usefulness of ‘after-visit’ patient experience surveys to measure satisfaction and identify opportunities to improve service or health care quality. However, in-visit surveys would provide immediate feedback which allows patients to more accurately recall the experience they had during their appointment, whereas, post-treatment responses are more pronounced in the analysis of satisfaction.

The aim of this observational study was to compare patient satisfaction among those who rated the patient expectations at the conclusion of their outpatient appointment, to that among those who rated the patient experience after their outpatient treatment.

**Challenges:** Outdated national guidelines for testing, diagnosis and treatment that are inconsistent with recent international guidelines and best practices often cause health care managers to make unwise choices. Lack of accurate data and information about the quantity and quality of the products required also undermines their work.

1. There are three main challenges to rational procurement are poor quantification, corrupt procurement and tender practices and procedures, and poor financial management and payment methods. Inaccurate quantification is common in the absence of reliable data on illness and usage.

2. The distribution includes storage and inventory management, physical distribution and tracking of products. The distribution is frequently handicapped by inadequate infrastructure, excessive centralization, lack of effective management information system, shortage of warehouses, transport vehicles, poor roads and clinics without secure storage space.

3. Lack of accurate data to bridge the gap between patients expectations and experience in respect of healthcare services of public hospitals.

**Literature Review**

Public sector healthcare systems design and institutionalized to provide primary, secondary and tertiary health facilities to the organized sector employees. Most of the organizations have their own polyclinics and general hospitals to provide primary and secondary healthcare facilities, in case they are unable to provide requisite advanced treatment they opt for private empanelled hospitals.

The related literature has been reviewed to analyse the issues which have not been addressed hitherto. Brown, Franco, Rafel and Hatzell described nine quality dimensions of health service delivery that lead to patient satisfaction. These dimensions are effectiveness, efficiency, technical competence, interpersonal relations, and access to service, safety, continuity, and physical aspect of health care. The purpose of the study by Brody et al., was to regulate the relation between patient satisfaction with their physician. The study has been analyzed before and after the care encounter. It was noticed the patients with less work and treatment were highly satisfied with their physicians. This study by Hall and Dorman reviewed the relationship between patient satisfaction and patient characteristics using quantitative meta-analytic techniques. Authors claimed that patient satisfaction is associated with age, education, social and marital status. Fitzpatrick suggested that some sound measures of patient satisfaction are psychometric.
Williams and Calnan\(^5\) cited the satisfaction rating to general aspects of the healthcare experience. Specific aspects of the experience were problematic because of the personal nature of their physician. The researchers also found overall satisfaction over professional competence and patient health care provider relationship. Williams and Calnan\(^5\) observed that the most consumers give high ratings to general aspects of the health care experience and noticed that certain level of satisfaction with health care are relevant and regardless of the type of medical settings. Guyatt et al.,\(^6\) found with the help of the scale that most of the patients are satisfied with the health care providers who give full attention to the patients and their families. Kane et al.,\(^7\) revealed that patients had more positive health care experience with their treatment and follow-up in the hospitals. Sitzia and Wood \(^8\) found that patient’s satisfaction could be evaluated by measuring the degree to which patients care possesses certain attributes and the patient’s evaluation of those attributes. They suggested that satisfaction must be interpreted in the context as compared to the measure of the quality of care. According to Li et al.,\(^9\) SCM practices impact not only overall organizational performance but also the competitive advantage of an organization to achieve its market-oriented goals as well as its financial goals for drug supply management amongst others. Shah et al. \(^10\) used a field approach of study to examine how a particular health care supply chain was able to increase performance by decreasing service time and increasing service quality in a decentralized network of healthcare providers. There are studies which have linked organisational performance to leadership. Soodan and Pandey \(^11\) attributed the success of organisation to the style of leadership style being adopted. Gupta and Rokade\(^12\) found that it is very important for the hospital to keep an eye on their services as such it is an essential part of their growth to know which area needs improvement and whether patients are satisfied or not. The main motive should be on attracting new customers and retain their existing customers for the long run.

**Research Methodology**

The patients were selected randomly from major cities as well as from smaller cities. Descriptive research is carried out by giving mailing questionnaires to the patients visiting the empanelled hospitals and polyclinics by having personal interviews with some of the respondents about their opinion on drug supply and treatment. Responses of 100 patients were recorded for the 22 questions based on Likert Scale. The numbers of males were 60 and females were 40 in the total sample size. Data analysis and interpretation of results were carried out through suitable parametric and non-parametric tests with the help of SPSS and MS Excel. Gap Analysis, Cross-tabulation, chi-square test and ANOVA were used for further interpretation.

**Hypotheses:** Three hypotheses have been framed to find the relationship between adequate quality of drugs and satisfaction level of patients for polyclinics and empanelled hospitals.

- \(H_01\): There is no significant difference for expected and observed responses in providing treatment to the patient in polyclinics and empanelled hospitals.
- \(H_02\): Infrastructure of polyclinics and empanelled hospitals does not have negative impact on customer satisfaction.
- \(H_03\): The expectations and observations have no relation for patient satisfaction in culture of hospitals and drug supply management.

**Analysis of Data:** All the 22 questions of questionnaire were divided broadly into three segments, viz., drug supply management, satisfaction level in polyclinics, general hospitals of the organisations and empanelled hospitals. It is evident from the table below that there was maximum variation in drug supply management for expectations and observations followed by satisfaction levels in general hospitals.

<table>
<thead>
<tr>
<th>Segments of Questions</th>
<th>Strongly Agreed</th>
<th>Average Responses</th>
<th>Strongly Disagreed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Drug Supply Management</td>
<td>5</td>
<td>14</td>
<td>7</td>
</tr>
<tr>
<td>Satisfaction level in General Hospitals</td>
<td>8</td>
<td>18</td>
<td>12</td>
</tr>
<tr>
<td>Satisfaction level in Empanelled Hospitals</td>
<td>6</td>
<td>12</td>
<td>8</td>
</tr>
</tbody>
</table>

**Table 1: Classification of Responses**
Conted…

<table>
<thead>
<tr>
<th></th>
<th>Expected</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Drug Supply Management</td>
<td>10</td>
<td>15</td>
<td>9</td>
</tr>
<tr>
<td>Satisfaction level in General Hospitals</td>
<td>12</td>
<td>21</td>
<td>13</td>
</tr>
<tr>
<td>Satisfaction level in Empanelled Hospitals</td>
<td>7</td>
<td>16</td>
<td>7</td>
</tr>
<tr>
<td>Total</td>
<td>48</td>
<td>96</td>
<td>56</td>
</tr>
</tbody>
</table>

**Source:** Compiled data from respondents treated in general and empanelled hospitals.

It is established that there is a strong and positive correlation in expectations and observations. The F test of ANOVA also indicates that the null hypothesis of no relation between expectations and observations to be rejected. However, only four questions related to treatment in polyclinics, adequacy of staff and drug supplies in polyclinics observations have exceeded the expectations, two related to differential treatments in general hospitals for serving and retired patients and delivery of medicines within promised time frame have expectations equal to observations. 14 questions related treatment at empanelled hospital, infrastructure of polyclinics and quantity/quality of medicines respondents have more expectations than observations.

Table 2: Correlation between Patients’ Expectations and Observations

<table>
<thead>
<tr>
<th></th>
<th>Expectations</th>
<th>Observations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Expectations</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Observations</td>
<td>0.9834</td>
<td>1</td>
</tr>
</tbody>
</table>

Table 3: ANOVA for Patients’ Expectations and Observations

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>SS</th>
<th>DF</th>
<th>MS</th>
<th>F</th>
<th>P-Value</th>
<th>F-Critical</th>
</tr>
</thead>
<tbody>
<tr>
<td>Expectations</td>
<td>17.98791531</td>
<td>99</td>
<td>0.1817</td>
<td>118.61</td>
<td>2.41</td>
<td>1.3941</td>
</tr>
<tr>
<td>Observations</td>
<td>0.070709239</td>
<td>1</td>
<td>0.07071</td>
<td>46.157</td>
<td>8.24</td>
<td>3.9371</td>
</tr>
<tr>
<td>Error</td>
<td>0.151659362</td>
<td>99</td>
<td>0.00153</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>18.21028391</td>
<td>199</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 4: Chi-Square Tests to test Hypotheses

<table>
<thead>
<tr>
<th>Quality of medicine issued by the Polyclinic</th>
<th>Value</th>
<th>Df</th>
<th>Asymp. Sig (2-sided)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson Chi-square</td>
<td>2.843a</td>
<td>3</td>
<td>.417</td>
</tr>
<tr>
<td>Likelihood Ratio</td>
<td>2.812</td>
<td>3</td>
<td>.422</td>
</tr>
<tr>
<td>N of Valid Cases</td>
<td>100</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| Infrastructure of Polyclinic                   |       |     |                      |
| Pearson Chi-square                             | 5.447a| 4   | .244                 |
| Likelihood Ratio                               | 6.229 | 4   | .183                 |
| N of Valid Cases                               | 100   |     |                      |

| Infrastructure of empanelled hospitals.        |       |     |                      |
| Pearson Chi-square                             | 5.447a| 4   | .244                 |
| Likelihood Ratio                               | 6.229 | 4   | .183                 |
| N of Valid Cases                               | 100   |     |                      |

| Treatment and after services being provided by empanelled hospitals |       |     |                      |
| Pearson Chi-Square                                        | 2.206a| 4   | .698                 |
| Likelihood Ratio                                          | 2.563 | 4   | .633                 |
Results and Discussion

The responses of 100 patients were analyzed for important issues like drug supply chain management, infrastructure, organization culture and behaviour of medical professionals towards the patients. The results of the analysis indicate that patients are highly satisfied and agreed with the following issues like When a patient has a problem, general hospitals/clinics show a sincere interest in solving it. Patients of general hospitals/clinics feel safe in dealing with the general hospital/clinic. Patients are empowered to select the hospital for their treatment out of listed empanelled hospitals. Empanelled hospitals have operating hours convenient to all their patients.

However, they are rather discontented with the issues like General hospitals/clinics do not insist on error-free records and they are not providing their services at the
time they promise to do so. Empanelled hospitals do not have adequate modern diagnostic equipment and they are not getting things right the first time. Chi-square tests were applied to find the difference in perceptions of males and females for important aspects of hypothesis testing. It indicates that the null hypothesis for a significant difference in infrastructure, quality of drugs, organization culture and services provided before and after the treatment at polyclinics/empanelled hospitals be rejected. It also indicates that both males and females have similar responses to the above questions.

Significance and Implication of Research: This study will assist the administration to take corrective steps to reduce the gap between expectations and realities of the treatment as well as administrative aspects of the healthcare systems. This first-hand information will definitely go a long way to improvements in the behavior of the administrators and medical staff towards the patients. In case hospitals are lacking in basic facilities and infrastructure then their administration will be intimated for corrective actions. The results indicate that patients are not too happy with the services provided by the empanelled hospitals vis-à-vis General hospitals/polyclinics. Patients desired medical staff should be increased in polyclinics.

The quantity of the medicines should be increased as it is difficult for the aged patients to visit polyclinics. There should be a provision to procure medicines from the local market in case of emergency and expenses can be reimbursed at a later stage. The patients are satisfied for the option to choose an empanelled hospital out of the recommended pool of hospitals. The medicines for the first month should be provided by empanelled hospitals and later on patients can get these medicines from polyclinics of their organisations. The after services of treatment and infrastructure need to be improved.

Conclusion

The public health schemes were launched with the aim to provide quality health care to public servants, pensioners and their dependents through a network of general hospitals/polyclinics. Private empanelled and Government hospitals are spread across the country. The schemes are structured to provide cashless treatment, as far as possible, for the beneficiaries. All out efforts have been made by the public hospitals to cater for the needs of the servicemen and their dependents. Continuous improvements and developments have been taking place to ensure maximum satisfaction of the patients. The present study is therefore useful to gauge gaps in in patient satisfaction which will assist in further improvements in healthcare systems in the country. The research results can help the governing bodies to select the appropriate time limit for effective service delivery of healthcare to the patients.

Ethical Clearance: Present study is restricted to analysis of satisfaction level in patients and therefore doesn’t involve any medical trial on humans. Necessary approval was taken from Institutional Review Board (IRB) for this study in accordance with the guidelines laid down by COPE.

Source of Funding: The study received no financial support for research, authorship and/or publication of this article.

Conflict of Interests: Author declare that there is no conflict of interest.

REFERENCES


Study of Prevalence of Peripheral Neuropathy in Newly Diagnosed Type 2 Diabetic Patients in and around Mallareddy College, TS

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ABSTRACT

Background: Diabetic peripheral neuropathy (DPN) predisposes to foot ulceration and gangrene. It has been reported that DPN is lower in Indians relative to Caucasians. Studies among recent onset patients with type 2 diabetes mellitus (T2DM) are very few. We studied the prevalence and risk factors of DPN in patients with newly diagnosed T2DM.

Materials and Method: We prospectively studied 80 consecutive patients over age 30 with a duration of diabetes ≤1 year. All underwent a clinical and biochemical evaluation and were screened for DPN using TCSS scale (Toronto clinical scoring system) and Leeds Assessment of Neuropathic Symptoms and Signs (LANSS) pain scale.

Results: The cases had a mean age of 60.28 years and duration of symptoms of DM is <1 year prior to presentation. The overall prevalence of DPN was 12.5%. The prevalence of DPN showed an increasing trend with FbS (trend chi-square= 3.517, \( P = 0.0304 \)). A logistic regression analysis showed that DPN was independently associated with Fasting Blood Sugar (\( P = 0.0304 \)), Body mass index (\( P = 0.0389 \)), HbA1c (\( P = 0.0451 \)), family history (\( P = 0.0426 \)) and physical activity (\( P = 0.0219 \)) but not with age, sex and education.

Conclusions: Our study showed high prevalence of PN in recently diagnosed patients with T2DM, which was independently associated with age and duration of symptoms of diabetes prior to the diagnosis. FBS, HbA1c, BMI, were found to be risk factors for prevalence of Diabetic Neuropathy.

Keywords: Diabetic Peripheral Neuropathy, Newly Diagnosed, Type 2 Diabetes Mellitus.

Introduction

India has one of the highest prevalence of type 2 diabetes mellitus (T2DM) in the world.\(^1\) It is estimated that by the year 2030 there are are will be nearly 80 million Indians with T2DM in the country.\(^2\)\(^3\) The disease constitutes a substantial burden for both the patient and health care system, mainly due to macrovascular and microvascular complications.\(^1\)\(^2\) In contrast to patients in industrialized countries, Indians with T2DM have an earlier age at onset of the disease and fewer resources for achieving optimal metabolic control, potentially predisposing higher prevalence of complications.\(^4\)\(^5\)\(^6\)

The prevalence of diabetic peripheral neuropathy (DPN) varies greatly in different studies, ranging from 8% to 59%\(^7\)\(^8\)\(^9\)\(^10\). DPN significantly increases the risk of complications such as foot infections, deformities, gangrene, and amputations.\(^11\) In India, the adverse effects of peripheral neuropathy (PN) are compounded by poor foot hygiene, improper foot wear, and frequent bare foot walking. In such circumstances, complications
of foot infections and gangrene are a common cause of hospital admissions.\cite{1},\cite{12}

T2DM is characterized by a long asymptomatic phase (ranging from 4 to 7 years) between the actual onset of hyperglycemia and clinical diagnosis which may explain the relatively high prevalence of microvascular complications in newly diagnosed patients with T2DM.\cite{13} The prevalence of DPN at diagnosis of type 2 DM ranges from 10% to 48%, depending upon the population studied and method used to evaluate neuropathy.\cite{14},\cite{15},\cite{16}

In view of the poor awareness and lack of regular screening programs, the initial presentation to the physician is frequently delayed. This may predispose to an increased rate of microvascular complications at onset. Ethnic differences in the prevalence of various diabetes-related complications have also been documented.\cite{17}

There is a paucity of reports on DPN in Indians. In a study comparing European and south Asian subjects with T2DM in United Kingdom, the prevalence was lower in the latter. However, in surveys in Indian patients, the prevalence has ranged from 26% to 31%.\cite{18},\cite{19} In these studies, no controls were studied. Since PN is present in a significant proportion of healthy individuals, especially among the elderly, this fact needs to be taken into account before ascribing the PN to hyperglycemia.\cite{11},\cite{20},\cite{21}

Its end-stage complications such as foot ulceration and amputation are associated with substantial health care costs, socioeconomic consequences including loss of work time and reduced quality of life.\cite{22}

### Patients and Methods

**Patients and Controls:** Over a period of 6 months (January 2016 and June 2016), we studied 80 consecutive patients with newly diagnosed T2DM. Inclusion criteria included age ≥35 years, Patients willing to co-operate, Patients detected with Type 2 DM recently (within 1 YEAR) and Patients with FBS- > 120 mg/dl, HbA1c- > 6.5%. Patients diagnosed with DM for more than 1 year, Patients with preexisting complication like Diabetic foot, Patients with Type 1 DM, Patients with Gestational Diabetes Mellitus, patients with acute illness or chronic diseases such as leprosy, those with disability and patients taking medications known to impair nerve function were excluded from the study. The protocol was approved by the institutional ethics committee. Informed written consent was obtained from all subjects.

Screening for peripheral neuropathy and case definition of diabetic neuropathy

a. Tests were performed in a random sequence among different patients. Patients were screened for DPN using TCSS scale (Toronto clinical scoring system). This scale was used to assess for the presence of painful Peripheral Neuropathy. In short, for TCSS, symptoms like pain, tingling, numbness, weakness, ataxia, upper limb symptoms as symptom score, knee reflex and ankle reflex as reflex score and pin prick, temperature, light touch, vibration sense, position sense as sensory score were taken into account. Scoring was based on symptoms, reflexes, sensory tests. Depending upon the abnormalities, a point of 0 or 1 was given. Score of 0-5= no peripheral neuropathy; 6-8= mild PN; 9-11= moderate PN; 12-19= severe. The TCSS have been previously been validated against electro-diagnostic studies.\cite{24}

b. Leeds Assessment of Neuropathic Symptoms and Signs (LANSS) pain scale was used to assess the severity and pain score of the subjects. This pain scale can help to determine whether the nerves that are carrying the pain signals are working normally or not. Scoring was given. Total score (maximum 24) If score < 12, neuropathic mechanisms are unlikely to be contributing to the patient’s pain and If score ≥ 12, neuropathic mechanisms are likely to be contributing to the patient’s pain.\cite{25}

### Statistics

Continuous data have been expressed as mean ± SD and 95% confidence interval (CI) were determined for the variables. The Student’s t-test was used for comparison of continuous variables if found to be normally distributed while chi-square test was used to compare categorical variables. Variables associated with PN were tested using univariate logistic regression analysis. Variables shown to have a significant association by this analysis were tested by multivariate logistic regression to determine the variables independently associated with PN. A P value <0.05 was considered significant. Statistical analyses were performed using the SPSS software package (version 15.0; SPSS Inc., Chicago, IL, USA).
Results and Discussion

85.1% of the patients agreed to participate in the study when informed about the purpose and importance of the study.

Table 1 shows, on recruitment; the patients newly detected with DM belonged to age group above 60. HbA1c % of most of the patients on recruitment was above 10%. FBS levels of most patients were less than 200 mg/dl. PLBS of most of the patients was seen to be higher than 250 mg/dl. RBS of most of the patients was seen to be above 180mg/dl.

Table 1: Anthropometric Measurement Details

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Males (N=40)</th>
<th>Females (N=40)</th>
</tr>
</thead>
<tbody>
<tr>
<td>AGE &lt; 60 years</td>
<td>16 (40%)</td>
<td>12 (30%)</td>
</tr>
<tr>
<td>&gt; 60 years</td>
<td>24 (60%)</td>
<td>28 (70%)</td>
</tr>
<tr>
<td>HbA1C (%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt; 10%</td>
<td>8 (20%)</td>
<td>14 (35%)</td>
</tr>
<tr>
<td>&gt; 10%</td>
<td>32 (80%)</td>
<td>26 (65%)</td>
</tr>
<tr>
<td>FBS (MG/DL)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt; 200 mg/dl</td>
<td>24 (60%)</td>
<td>22 (55%)</td>
</tr>
<tr>
<td>&gt; 200 mg/dl</td>
<td>16 (40%)</td>
<td>18 (45%)</td>
</tr>
<tr>
<td>PLBS (MG/DL)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt; 250 mg/dl</td>
<td>16 (40%)</td>
<td>12 (30%)</td>
</tr>
<tr>
<td>&gt; 250 mg/dl</td>
<td>24 (60%)</td>
<td>28 (70%)</td>
</tr>
<tr>
<td>RBS (MG/DL)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt; 180 mg/dl</td>
<td>6 (15%)</td>
<td>10 (25%)</td>
</tr>
<tr>
<td>&gt; 180 mg/dl</td>
<td>34 (85%)</td>
<td>30 (75%)</td>
</tr>
</tbody>
</table>

We detected a high frequency of DPN in newly diagnosed patients with T2DM. DPN was independently associated with increasing age and duration of symptoms of diabetes prior to diagnosis. In various Caucasian populations, the prevalence of DPN in newly diagnosed T2DM varies widely from 10% to 48%. This may be due to different methodologies employed for detection of neuropathy as well as variability in patient ages and time elapsed before diagnosis. However, ethnic differences in DPN may also be relevant.[17] Interestingly, it has been previously reported that both DPN and foot ulcers are lower in Indians compared with European Caucasians.

We detected a high frequency of DPN in newly diagnosed patients with T2DM. The prevalence of newly diagnosed patients was 19.5% and 27.8% in those with known diabetes.[18] However, the frequency of DPN in the subjects without diabetes was not studied.

Prevalence of mild neuropathy was found to be 15%, moderate Neuropathy was found to be 8.75% and severe Neuropathy was found to be 6.25% based on the TCSS and LANSS criteria (Fig 1). High FBS (>200mg/dl), HbA1c (>10%), BMI (>30 kg/m²), were found to be risk factors for prevalence of Diabetic Neuropathy.

Since PN is found in a proportion of healthy individuals, especially in the elderly, comparison with a matched control group is essential. We noted PN in 30% of age- and sex-matched control subjects, which increased with advancing age. This fact should be taken into account.

Monofilament sensation is a measure of protective sensations in the foot and is strongly associated with risk of foot ulceration.[28] The prevalence of impaired monofilament sensation was 6%, considerably lower than that of DPN. This low frequency may be reflective of the fact that the 10-g (5.07) monofilament testing is appropriate for the clinical assessment of risk for foot ulceration[28] but not a sensitive means to detect prevalence of neuropathy. In the latter case, a monofilament of 1g or less may be more appropriate.[29]

Previous studies have identified several risk factors for DPN such as age, poor glycemic control, increasing duration of diabetes, gender, height, body mass index, retinopathy, hypertension, smoking, and alcohol consumption.[14][15][16][18] In the current study, FBS, HbA1c, BMI, family history and physical activity were significant risk factors for Diabetic Peripheral Neuropathy. The prevalence of DPN showed an increasing trend with FBS (trend chi-square= 3.517, P= 0.0304). A logistic regression analysis showed that DPN was independently associated with Fasting Blood Sugar (P = 0.0304), Body mass index (P= 0.0389), HbA1c (P = 0.0451), family history (P= 0.0426) and physical activity (P= 0.0219) (Table 2). Since elderly patients have other risk factors for foot ulcerations, such as vision abnormalities and vascular involvement, neuropathy screening assumes an even greater importance in this age group.
Table 2: Chi Values in Case of Diabetic Neuropathy

<table>
<thead>
<tr>
<th>Risk Factor</th>
<th>Complication</th>
<th>P Value</th>
<th>Chi Value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes</td>
<td>No</td>
<td></td>
</tr>
<tr>
<td>Age (years)</td>
<td>40-60</td>
<td>9</td>
<td>19</td>
</tr>
<tr>
<td></td>
<td>&gt; 60</td>
<td>15</td>
<td>37</td>
</tr>
<tr>
<td>Sex</td>
<td>MALE</td>
<td>14</td>
<td>26</td>
</tr>
<tr>
<td></td>
<td>FEMALE</td>
<td>10</td>
<td>30</td>
</tr>
<tr>
<td>FBS (mg/dl)</td>
<td>&lt; 200</td>
<td>10</td>
<td>36</td>
</tr>
<tr>
<td></td>
<td>&gt; 200</td>
<td>14</td>
<td>20</td>
</tr>
<tr>
<td>HbA1c (%)</td>
<td>6.5 – 10</td>
<td>3</td>
<td>19</td>
</tr>
<tr>
<td></td>
<td>&gt; 10</td>
<td>21</td>
<td>37</td>
</tr>
<tr>
<td>BMI Kg/m²</td>
<td>≤ 30</td>
<td>5</td>
<td>25</td>
</tr>
<tr>
<td></td>
<td>&gt; 30</td>
<td>19</td>
<td>31</td>
</tr>
<tr>
<td>FAMILY PRESENT</td>
<td>17</td>
<td>28</td>
<td>0.0426</td>
</tr>
</tbody>
</table>

The strength of our study is that it was a prospective design; patient evaluation was done by a single physician, and the use of both qualitative and quantitative mode of assessment of neuropathy. It has a few limitations; it was clinic based and may not reflect the actual prevalence of DPN in the community. We did not investigate metabolic causes of PN other than diabetes.

Summary and Conclusion

In summary, we detected a high prevalence of PN in recently diagnosed patients with T2DM. The neuropathy was independently associated with age and duration of symptoms of diabetes prior to the diagnosis. Screening for DPN using simple clinical examination is cost-effective means to prevent foot ulceration and infections in Indian patients with T2DM.

Acknowledgements

We thank all patients for their cooperation in this study.

Source of Funding: The study was not funded by any grant.

Conflicts of Interest: No conflicts of interest have been declared.

Informed Consent: Informed consent was obtained from all individual participants included in the study.

Ethical Clearance: All procedures performed in studies involving human participants were in accordance with the ethical Standards of the Institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or Comparable ethical standards.

REFERENCES


Study of Different Clinical Spectrum of Hypothyroidism in Telangana Population

Vishal Nanduri
Assistant Professor, Department of General Medicine, Mallareddy medical college for women, Jeedimetla, Quthbullapur, Hydarabad, Telangana

ABSTRACT

85 patients (63 females and 22 males) aged between 20 to 50 year were selected for study. The clinical manifestation were, 22(25.8%) had weight gain, 7(8.23%) had fatigue, 5(5.88%) had body pain, 4(4.7%) had loss of appetite, 6(7.05) had neck swelling, 3(3.52%) had constipation, 5(5.88%) had tingling sensation of feet, 3(3.52%) had hair fall, 4(4.70%) had increased somnolence, 5(5.88%) had puppy face 7(8.23%) had dyspnea, 4(4.70%) had cold intolerance, 6(7.05%) had depression. The manifestations related gynaecology were, 11(17.4%) had primary infertility, 18(28.5%) had secondary infertility, 13(20.6%) had DUB, 5(7.93%) had fibroid uterus 12(19%) had PID, 4(6.34%) had utero-vaginal prolapsed. The TSH levels were. 69(81%) patients had 4.2-99 (µiu/ml) 16(18.8%) had > 10 (µiu/ml). This pragmatic study of different clinical spectrum will be quite helpful to physician endocrinologist and Gynaecologist. Because hypothyroid is common and under diagnosed.

Keywords: TSH = Thyroid stimulating Hormone, DUB = Dysfunctional uterine Bleeding. PID= pelvic Inflammatory Disease. Telangana

Introduction

Hypothyroidism as a clinical syndrome was described for the first time in London in 1870. It was named myxedema. In 1888 it was widely accepted that cretinism myxedema, post thyroidectomy changes were loss of TSH function of the body.

Hypothyroidism is characterized by underactive thyroid gland where there is reduced synthesis and secretion of thyroid hormones by the gland. The prevalence of hypothyroidism between 8-12% population and the palpable goiter was observed in south Indian population was about 12%, signs and symptoms of the hypothyroidism helps in early diagnosis of the disease. Hypothyroidism has wide clinical spectrum because it involved multi organ dysfunction. Although oral iodine and iodized salt will be effective strategy to prevent iodine deficiency and hypothyroidism. Hashimoto’s Thyroiditis is the commonest cause of hypothyroidism in places where the iodine intake is adequate. The diagnosis and treatment of hypothyroidism is very often considered to be simple when clinical features are established with the estimation of TSH (thyroid stimulating Hormone) but due to multi factorial symptoms like depression infertility, PID, will be have differential diagnostic values hence attempt was made to study the every clinical spectrum in both sexes of different age groups.

Material and Method

Out of 85 patients 63 females and 22 males aged between 20-50 years. Who were regularly visiting Mallareddy college for women Jeedimetla, Quthbullapur, Hyderabad- 500055. (Telangana) selected for study.

Majority of the patients belonged to middle socioeconomic status every patients history was recorded, All the necessary investigation were carried
out Blood Exam included RbS ESR TC DC CBC, and TSH, (Thyroid stimulating Hormonal assay)

The patients detected as Malignancy of thyroid, and HIV patients were excluded from the study.

The ratio of female and male patients was 2:1.

The patients having similar signs and symptoms were segregated with percentage. The duration of study was about 4 years.

**Observation and Results**

Table-1 clinical manifestation of hypothyroid patients 22(25.8%) had body weight gain, 7(8.23%) had fatigue, 5(5.88%) 4(4.70%) had loss of appetite, 6(7.05%) had neck swelling 3(3.52%) had constipation 5(5.88%) had tingling sensation of feet 3(3.52%) had hair fall, 4(4.70%) had dry skin, 4(4.70%) had increased somnolence, 5(5.88%) had puffy face, 7(8.23%) had dyspnea 4(4.70%) had cold intolerance, 6(7.05%) had depression (or mood disorders)

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Particulars</th>
<th>No of patients</th>
<th>Percentage %</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Weight gain</td>
<td>22</td>
<td>25.8</td>
</tr>
<tr>
<td>2.</td>
<td>Fatigue</td>
<td>7</td>
<td>8.23</td>
</tr>
<tr>
<td>3.</td>
<td>Body pain</td>
<td>5</td>
<td>5.88</td>
</tr>
<tr>
<td>4.</td>
<td>Loss of appetite</td>
<td>4</td>
<td>4.70</td>
</tr>
<tr>
<td>5.</td>
<td>Neck swelling</td>
<td>6</td>
<td>7.05</td>
</tr>
<tr>
<td>6.</td>
<td>Constipation</td>
<td>3</td>
<td>3.52</td>
</tr>
<tr>
<td>7.</td>
<td>Tingling sensation of feet</td>
<td>5</td>
<td>5.88</td>
</tr>
<tr>
<td>8.</td>
<td>Hair fall</td>
<td>3</td>
<td>3.52</td>
</tr>
<tr>
<td>9.</td>
<td>Dry skin</td>
<td>4</td>
<td>4.70</td>
</tr>
<tr>
<td>10.</td>
<td>Increased somnolence</td>
<td>4</td>
<td>4.70</td>
</tr>
<tr>
<td>11.</td>
<td>Puffy face</td>
<td>5</td>
<td>5.88</td>
</tr>
<tr>
<td>12.</td>
<td>Dyspnea</td>
<td>7</td>
<td>8.23</td>
</tr>
<tr>
<td>13.</td>
<td>Cold intolerance</td>
<td>4</td>
<td>4.70</td>
</tr>
<tr>
<td>14.</td>
<td>Depression</td>
<td>6</td>
<td>7.05</td>
</tr>
</tbody>
</table>

Table-2 clinical manifestation referred from Gynecology OPD 11(17.4%) had primary infertility, 18(28.5%) had secondary infertility, 13(20.6%) had DUB. (Dysfunctional uterine bleeding) 5(7.93%) had fibroid uterus, 12(19%) had PID (pelvic inflammatory disease). 4(6.34%) had utero-vaginal prolapsed.

**Table 2: Clinical manifestation referred from gynecology OPD**

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>Particulars</th>
<th>No of patients</th>
<th>Percentage %</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Primary infertility</td>
<td>11</td>
<td>17.4</td>
</tr>
<tr>
<td>2.</td>
<td>Secondary infertility</td>
<td>18</td>
<td>28.5</td>
</tr>
<tr>
<td>3.</td>
<td>DUB (dysfunctional uterine bleeding)</td>
<td>13</td>
<td>20.6</td>
</tr>
<tr>
<td>4.</td>
<td>Fibroid uterus</td>
<td>5</td>
<td>7.93</td>
</tr>
<tr>
<td>5.</td>
<td>PID (pelvic inflammatory disease)</td>
<td>12</td>
<td>19.3</td>
</tr>
<tr>
<td>6.</td>
<td>Utero–Vaginal prolapsed</td>
<td>4</td>
<td>6.34</td>
</tr>
</tbody>
</table>

Table-3 study of TSH levels in Hypothyroid patients 69(81.1%) were between 4.2 to 9.9, 16(18.8%) had > 10(µiu/ml)

**Table 3: Study of TSH levels in hypothyroid patients**

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>TSH (µiu/ml)</th>
<th>No of patients</th>
<th>Percentage %</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>4.2-9.9</td>
<td>69</td>
<td>81.1</td>
</tr>
<tr>
<td>2.</td>
<td>&gt;10</td>
<td>16</td>
<td>18.8</td>
</tr>
</tbody>
</table>

**Discussion**

The present study of different clinical spectrum of hypothyroidism in Telangana population. The clinical manifestation were, 22(25.8%) had weight gain 7(8.23%) had fatigue 5(5.88%) had body pain, 4(4.70%) had loss of appetite 6(7.05%) had neck swelling, 3(3.52%) had constipation 5(5.88%) had tingling sensation of feet, 3(3.52%) had hair fall, 4(4.70%) had dry skin, 4(4.70%) had increased somnolence, 5(5.88%) had puffy face, 7(8.23%) had dyspnea 4(4.70%) had cold intolerance, 6(7.05%) had depression. (Table-1) The manifestations of Gynecology were 11(17.4%) had primary infertility, 18(28.5%) had secondary infertility, 13(20.6%) had DUB 5(7.93%) had fibroid uterus, 12(19%) had PID, 4(6.34%) had utero-vaginal prolapsed (Table-2) the TSH levels were, 69(81.1%) had 4.2 to 9.9(µiu/ml). 16(18.8%) had > 10(µiu/ml) (Table-3). These findings were more or less in agreement with previous studies$^{(5)(6)(7)}$. 
As hypothyroidism has multiple clinical manifestation hence to establish the diagnose biochemical tests should be routine to confirm the hypothyroidism.\(^{(8)}\) It was also reported that incidence of spontaneous hypothyroidism observed in 3.5/1000 people/year in females and 0.6/1000/year in males.\(^{(9)}\) Moreover hypothyroidism mainly implicated in broad spectrum of reproductive manifestations ranging from menstrual irregularities to pregnancy loss infertility, DUB, PID,\(^{(10)}\) Apart from this depression cretinism, increased somnolence puffy face, weight gain hoarseness of voice like presentations of hypothyroidism leads to social with draw and inferiority in the patients suffering with hypothyroidism. Hence hypothyroidism is not only a clinical problem but social problem too, especially observed in the adults, who has to lead the family and society as well.

**Summary and Conclusion**

The study of different clinical spectrum of hypothyroidism will be useful to physician, endocrinologist, Gynecologist. To treat such patients with proper diagnose and treatment, but this study demands further genetic, his to-pathological, biochemical, nutritional, hormonal study because exact mechanism, quantum of secretion of TSH hormone is still un-clear.

**Ethical Clearance:** This research work was approved by ethical committee of Mallareddy medical college for women’s Jeedlimeta, Quthbullapur Hyderabad – 500055 (Telangana)

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

**Source of Funding:** No funding.

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Study on Presence of Pathogenic Bacteria in Serving Cutleries from Food Outlets in and Around a Medical College

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1Dept of Microbiology, 2Dept of Pharmacology, 3MBBS Students, Melaka Manipal Medical College, Manipal Academy of higher Education (MAHE), Manipal, Karnataka, India

ABSTRACT

Objective: To isolate and identify pathogenic bacteria present on the serving cutlery items in restaurants and food joints in and around a medical college premises. To create awareness about the hygienic practices among food handlers.

Method: A cross sectional study. Collected 100 samples from restaurants and food joints in and around a medical college premises. Sterile swabs moistened with sterile saline was used to collect samples which were then streaked on MacConkey’s agar and incubated overnight at 37°C. The colonies were identified by standard methods.

Flyers regarding the importance of hygienic practices was distributed to the food handlers as a step to create awareness among them.

The statistical method applied was convenient sampling method and the data was analysed in the table form.

Results: In total sample of 100, 33% of the samples were found to have bacteria. The samples from the food joints had slightly higher number of bacteria compared to the samples collected from restaurants. The data collected showed highest number of Klebsiella sp. (4%) followed by Citrobacter (3%) in the samples collected from restaurants. Citrobacter (10%) and Staphylococcus aureus (4%) were seen in the samples collected from food joints. Escherichia coli was identified from one of the samples collected from restaurants.

Conclusion: Pathogenic organisms were found in the serving cutleries, screening the cutleries periodically can reduce the spread of food associated infection. Further study is needed to confirm the findings.

Keywords: Food handlers, Cutleries, Klebsiella species, Staphylococcus aureus

Introduction

Food is the prime necessity of life, and in recent times, food businesses have become widespread, in response to the changing life style and food consumption of people [1]. The importance of eating safe food containing optimal quantities of nutritions is a major precondition for good health and is now a days widely recognized[2]. There is also an awareness of using naturally produced antimicrobial agents like bacteriocin as preservatives in food[3].

Food contaminated by microorganism is of major health issue worldwide. Contamination with pathogenic organism can occur due to unhygienic practices within food processing environment, thereby making food risky, in terms of safety of the consumers[4]. The number of factors which contribute to food contamination are storage room, equipment, utensils, knives, wooden boards, the tables and other surfaces which come in contact with food, the food ingredients, water, air, cutlery, serving dishes used in food preparation and service. The source of infection for food borne disease which is acquired in hotels and restaurants is mainly through contaminated dishes and other kitchen equipments[5].

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Research on the significance of bacterial contamination started four decades ago. In early studies, it was observed that uncooked material was the major source of contamination in kitchen. Foodborne diseases remain a global challenge with higher rates of incidence in the developing nations [6].

Studies have been done to determine the effect of cross contamination of microorganism via chopping board, cutlery, and hands on the prepared meal ready to eat [7,8,9,10]. The presence of Escherichia coli (E. coli) is considered as an indicator of faecal contamination, which in addition, might contain pathogenic parasites, bacteria or viruses [11]. E. coli lives in the enteric tract of humans. E. coli infection can lead to food borne diseases which ranges from bloody diarrhoea to haemorrhagic colitis and haemolytic uremic syndrome [12]. Studies have indicated that the organism can survive for long time on stainless steel surface and domestic plastic cutting boards. Contamination of these surfaces may cause infection [13]. Bacteria can be present in large numbers on the surface of the equipments which look sparkling clean in the kitchen [14].

Food safety has to be guaranteed to prevent food poisoning. Wholesomeness of the food product has to be maintained through all stages of processing, until it is served. Hence, it is important to make sure dishes, spoons and cutlery are kept clean [15].

This study determined the bacterial profile in plates, spoons, forks, knife and cups used in restaurants and food joints in and around a medical college premises and also to create awareness about the hygienic practices among food handlers.

**Materials and Method**

**Sample Area:** The study sites were various restaurants and food joints located in and around a medical college premises.

**Sample Size:** This cross sectional study was conducted to know about the presence of pathogenic bacteria in serving cutleries. A total of 100 samples was collected from plates, spoons, forks, knives and drinking cups.

Five (5) samples were collected from each of the ten (10) restaurants and food joints were taken and all the samples were labelled properly. These restaurants and food joints were popular among students in terms of availability and affordable cost of food.

**Sample Collection:** Sterile swabs moistened with sterile saline was used to collect samples. The sample was collected by rolling the moistened swab over the various parts of cutleries. Precaution was taken to collect the sample in a sterile environment. The container was sealed with adhesive tape and labeled after placing the swab inside it.

**Inoculation of the Culture Media:** The samples were transported to the laboratory and it was then streaked on MacConkey’s agar and incubated overnight at 37°C.

**Identification of the Isolates**

**Gram Staining:** Based on Gram reaction bacteria isolated were grouped into Gram positive and Gram negative.

**Biochemical Identification:** After performing the Gram staining of the isolates, the colonies were also subjected to various biochemical tests for the identification of bacteria isolated. The colonies were identified by standard methods.

Biochemical test employed were: coagulase test, oxidase test, catalase test, indole test, citrate utilization test, urease test, motility test and triple sugar iron test

**Statistical Analysis**

The statistical method applied was convenient sampling method and the data was analysed in a tabular form.

Flyers regarding the importance of hygienic practices was distributed to the food handlers as a step to create awareness among them.

**Findings**

In total sample of 100, 33% of the samples were found to have bacteria.

The samples from the food joints had slightly higher (17) number of bacteria compared to the samples collected from restaurants (16).

The data collected showed highest number of Klebsiella sp. and Staphylococcus epidermidis (8%) followed by Citrobacter sp. (6%) in the samples collected from restaurants (Figure 1).
E. coli was identified from one of the cup samples collected from restaurants. Staphylococcus aureus was isolated from spoon and knife from different restaurant. (Table 1)

![Figure 1: Percentage of Pathogenic Bacteria Found in Serving Cutleries from Restaurants](image)

Table 1: Organisms isolated from cutleries used in restaurants and food joints

<table>
<thead>
<tr>
<th>Type of Food Outlet</th>
<th>Spoon</th>
<th>Fork</th>
<th>Knife</th>
<th>Cup</th>
<th>Plate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Restaurants</td>
<td>Staph. epidermidis</td>
<td>-</td>
<td>-</td>
<td>Staph. epidermidis</td>
<td>Staph. epidermidis</td>
</tr>
<tr>
<td></td>
<td>Staph. epidermidis</td>
<td>-</td>
<td>Staph. aureus</td>
<td>E. coli</td>
<td>Enterococcus</td>
</tr>
<tr>
<td></td>
<td>Enterococcus</td>
<td>Klebsiella</td>
<td>-</td>
<td>Citrobacter</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>-</td>
<td>-</td>
<td>Citrobacter</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>-</td>
<td>-</td>
<td>Klebsiella</td>
<td>Klebsiella</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Staph. aureus</td>
<td>-</td>
<td>Klebsiella</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Citrobacter</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>Klebsiella</td>
<td>-</td>
</tr>
<tr>
<td>Food Joints</td>
<td>Klebsiella</td>
<td>-</td>
<td>Staph. aureus</td>
<td>Citrobacter</td>
<td>Citrobacter</td>
</tr>
<tr>
<td></td>
<td>Citrobacter</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>-</td>
<td>Staph. aureus</td>
<td>Citrobacter</td>
<td>-</td>
<td>Citrobacter</td>
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<tr>
<td></td>
<td>-</td>
<td>Citrobacter</td>
<td>-</td>
<td>-</td>
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<tr>
<td></td>
<td>Citrobacter</td>
<td>Klebsiella</td>
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<td>Citrobacter</td>
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<td></td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>Staph. aureus</td>
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<tr>
<td></td>
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<td>-</td>
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<td>-</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>Citrobacter</td>
<td>-</td>
</tr>
</tbody>
</table>

Staph. aureus (Staphylococcus aureus), Staph. epidermidis (Staphylococcus epidermidis), E. coli (Escherichia coli), No growth (-)

Citrobacter sp. (20%), Staphylococcus aureus (8%) and Klebsiella sp. (6%) were seen in the samples collected from food joints. (Figure 2).
Staphylococcus aureus was isolated from spoon, fork, knife and plate from different food joints (Table 1).

When compared between the different serving cutleries from restaurants and food joints, spoons had the highest number of bacteria isolated (Figure 3).

![Figure 2: Percentage of Pathogenic Bacteria Found in Serving Cutleries from Food Joints](image)

![Figure 3: Bacteria Found in Serving Cutleries from Restaurants and Food Joints](image)

**Discussion**

There has been increased number of food borne disease outbreak in recent years. The potential causes for these outbreaks include cross contamination, improper storage temperature, inadequate thermal treatment, poor hygiene conditions of processing facilities and contaminated food contact surfaces [16, 17].

The presence of Staphylococcus aureus which is a normal flora of skin and nose is mainly due to human contact and it suggests poor hygiene practices of the operators [18, 19].

The presence of these organisms on crockery and cutleries will create health hazard when they are ingested, or when they come in contact with the human skin. Maori L et al [5] also had isolated these organisms from crockery and cutlery. In our study also we had isolated the organisms. Orogu et al [4] study showed ranges of the bacterial densities found in spoons, knives and forks. Our study also was in concordance with the above.

It is necessary that foods must be free from contaminations to the possible extent. The presence of pathogenic Escherichia coli, Staphylococcus aureus strains indicates a potential health risk, as they are and have been implicated in food borne diseases [20, 21]. By good hygiene practices like Good Manufacturing Practices (GMP) and Hazard Analysis Critical Control Point (HACCP) application in the chain of food production and processing we can prevent food borne illness. It is necessary that the food handlers/food vendors
must be educated about the food safety practices. A close stringent supervision should be carried out by authorities to prevent contamination of food\textsuperscript{[22, 23]}.

**Conclusion**

Since pathogenic organisms were found in the serving cutleries, screening the cutleries periodically can reduce the spread of food associated infections. Further study is needed to confirm the findings.

**Conflicts of Interest:** The authors have no conflicts of interest to declare.

**Ethical Clearance:** Taken from Institution’s ethical clearance committee IEC 886/2016.

**Source of Funding:** No funding agency

**REFERENCES**


Screening of Methicillin Resistant *Staphylococcus Aureus* Carriers among Food Handlers

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ABSTRACT

Objective: Food handlers play an important role in the transmission of food borne diseases and spread the disease worldwide. *Staphylococcus aureus* infections acquired in the community has been increasing with the emergence of strains resistance to methicillin.

In this study assessment was done among food handlers to know the carriers status of *Staphylococcus aureus* from nasal cavity and skin at a Coastal town in Karnataka

Method: A total of 56 food handlers consented for the study. Out of which 112 samples were collected from anterior nares and palms from these food handlers. The analyses was done by using standard conventional methods for isolation and identification of *Staphylococcus aureus*. Antibiotic susceptibility of the isolates was done by Kirby-Bauer disc diffusion method. Food handlers harbouring *Staphylococcus aureus* as carriers were advised to decolonize with topical mupirocin ointment.

Results: Out of a total of 56 food handlers, fifty were males. Majority of the food handlers were in the age group of 18 to 30 years. Methicillin resistant *Staphylococcus aureus* (MRSA) was isolated from four samples and eight samples grew methicillin sensitive *Staphylococcus aureus*. All the strains were susceptible to vancomycin.

Conclusion: Food handlers can harbour MRSA in the nasal cavity or skin, and can spread the disease to consumers. Effective prophylactic measures like health education, wearing of proper protective gadget while handling food, maintaining personal hygiene, decolonization with mupirocin ointment and periodic screening of food handlers for MRSA can increase the measures of food safety.

Keywords: Food handlers, MRSA carriers, MSSA, anterior nares, skin

Introduction

Transmission of food borne diseases by food handlers are recognized to contribute significantly to the incidence and spread of diseases worldwide. *Staphylococcus aureus*, which is the primary microorganism in food microbiology causing hazards.

Food handlers harbouring the virulent strains of *Staphylococcus aureus* can be the source of bacteria in the transmission of disease. Food handlers are considered as the primary source for contamination of the food, causing food poisoning by this bacteria. Staphylococcal food poisoning causes gastroenteritis, presenting with vomiting and with or without diarrhea [1,2]. Recently it has been noted that emergence of Methicillin Resistant *Staphylococcus aureus* (MRSA) infections has occurred in healthy individuals in community [3]. Despite the fact that the incidence of MRSA colonization in healthy persons in the community is rather low, it has raised concern since it indirectly reflects that there might be a reservoir of people with asymptomatic MRSA carriage that could act as a source for transmission in

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the community [4]. Hence infections caused by MRSA are now classified as community-associated MRSA (CA-MRSA) and health care-associated MRSA (HA-MRSA) [6,7]. Both these strains differ in antigenicity, antibacterial susceptibility, epidemiology and clinical manifestations [5]. Community-acquired MRSA colonization varies from 0 to 9.2 percent [6]. Colonization is mainly seen in the nasal cavity and skin areas having breach in the skin surface (wounds and device exit sites) [8]. Recurrent MRSA infection and transmission is mainly because of individuals harbouring the organism in the nasal cavity [9]. MRSA a prime pathogen, associated with foodborne illness has recently been listed as one of the high-priority antibiotic-resistant pathogens by World Health Organization. The emergence of resistance to methicillin and resistance to non-beta-lactam antibiotics has resulted in narrowing the treatment options for the MRSA carriers. Since there was lack of information on the prevalence of MRSA carriers among food handlers, we screened the food handlers in and around a Coastal town in Karnataka and advised decolonization for the carriers of Staphylococcus aureus.

**Method**

Institutional ethical clearance was taken (IEC 891/2016) for the study. After taking consent from 56 food handlers, who were working in and around the coastal town of Karnataka, a total of 112 samples were collected from them. Sterile cotton swabs was used for the sample collection. These swabs were moistened with sterile normal saline before collecting the samples. Samples were collected from the palms and both the nostrils. Different swabs were used for palms and anterior nares. Swabs were then immediately inoculated into the brain heart infusion broth and kept overnight at 37°C in an incubator. Next day it was sub-cultured into blood agar and MacConkey’s agar and culture plates were incubated for 16-18 hours. Identification of Staphylococcus aureus was done according to the standard procedure [10]. Colonies showing Gram positive cocci in clusters and colonies with lactose fermented colonies on MacConkey’s agar were subjected to biochemical tests like catalase test, coagulase test, urease production and mannitol fermentation to confirm Staphylococcus aureus [11]. Screening of the isolated strains of Staphylococcus aureus for methicillin resistance was done by modified Kirby-Bauer method using cefoxitin (30 μg) disc on Mueller-Hinton agar (MHA) [12]. Cefoxitin disc was placed on the MHA and incubated aerobically at 37°C for 18 to 24h. It was considered as MRSA strains if the isolates had an inhibition zone diameter ≤21 mm around cefoxitin disc [13]. Vancomycin disc (30 μg) on MHA was used for screening vancomycin susceptibility.

Vancomycin-resistant was confirmed by VITEX 2 System (Bio Merieux, Inc Durham NC). Antibiotic susceptibility to all the strains of Staphylococcus aureus isolates against other antibiotics such as erythromycin 15μg and ampicillin10μg were determined by the Kirby-Bauer method. Colonies from Mueller-Hinton agar were picked and inoculated into Mueller-Hinton broth and incubated for 4-6 h. The density in the Mueller-Hinton broth was equivalent to a 0.5 McFarland turbidity.

Controls strains such as S. aureus ATCC 43300 and ATCC 25923 were used. Antibiotic discs were purchased from Hi-Media Laboratories Pvt., Ltd., Mumbai, India. Antibiotic susceptibility testing and interpretation of the result were done according to CLSI guidelines [14]. Food handlers with Staphylococcus aureus as carriers were advised decolonization with topical mupirocin ointment (2%) for 2 weeks and also advised hygienic instructions like frequent washing of bed linen, clothes and towels. Repeat samples after 2 weeks could not be collected as the food handlers could not be reached.

**Findings**

Out of a total of 56 food handlers, 50 were males and the rest six were females [fig 1]

![Gender-wise distribution among food handlers](image)

**Fig. 1: Gender-wise distribution among food handlers**

Age wise distribution of food handlers showed that maximum number of food handlers were in the age group of 18 to 30 years of age [Fig 2]
Out of the total 112 samples collected, four samples were MRSA, these samples were obtained from three carriers. One carrier had MRSA in nasal cavity and also on the palms, eight were MSSA isolated from seven carriers. [Table 1]

Table 1: Isolation of carriers and non-carriers of Staphylococcus aureus among food handlers
All the eight Methicillin sensitive Staphylococcus aureus (MSSA) strains were susceptible to ampicillin (100%) and erythromycin (100%). Both MSSA and MRSA strains were susceptible to Vancomycin (100%) [Fig 3.]

**Fig. 3: Antibiotic susceptibility testing**

**Discussion**

Our study showed that number of male food handlers were more than the females (89% & 11%) and large number of food handlers were in the age group of 18 to 30 years of which 88.88% (32/36) were males and 11.11% (4/36) were females. Similar study conducted by Dagnew M. et al [15] from North West Ethiopia among food handlers showed large group of profile were from the age group of 21-30 years (54.28%) of which females were more than males (15/19 females and 4/19 males).

Study conducted by Alsamarai A M. et al [16] in Iraq had only male food handlers, there were no females. Study conducted by Castro A. et al [17] showed 19.8% carriers of Staphylococcus aureus in the nasal cavity and 11.1% in the palms, in our study we had Staphylococcus aureus in the nasal cavity and from the palms 3.57% (4/112) with MRSA of 3.57% (4/112) with a total Staphylococcus aureus carrier rate of 17.87% (20/112). Study conducted earlier from the same place from the anterior nares of the health care professional did not show any Staphylococcus aureus, they were carriers of Coagulase negative Staphylococcus species[18]. Another study conducted in the same place where samples were collected from the anterior nasal cavity of students from different ethnic groups showed 23.7% Staphylococcus aureus [19]. Study conducted by Christophe J. et al [20] researched that the general population of 20%-30% are S. aureus carriers harbouring in the anterior nasal cavity and skin. In our study, MSSA was susceptible to ampicillin (100%) and erythromycin (100%). All the Staphylococcus aureus strains, both MRSA and MSSA were susceptible to vancomycin. Study conducted by Dagnew M. et al [15] showed 64.23% resistance to ampicillin and 46.15% resistance to erythromycin. Study conducted earlier from the same place had showed that all the strains of Staphylococcus species were susceptible to vancomycin[18]. Topical mupirocin is the drug of choice for decolonization in MRSA carriers [20-22] which was in concordance with our study, where in mupirocin was advised for decolonization of carriers. Carriers were also advised hygienic instructions like frequent washing of bed linen, clothes and towels apart from educating. Face mask were advised to use for personal hygiene while handling food products. Repeat samples after 2 weeks could not be collected as the food handlers could not be reached. In other studies MRSA was controlled by screening, decolonization of carriers, isolation of the patient, hand decontamination and protective clothing [20]. Study conducted by Sukandar EY et al [23] showed MRSA can be cured by synergistic action of ampicillin and Curcuma xanthorrhiza and not by ampicillin alone. Divyashanthi CM et al [24] in their
study showed treatment option of MRSA was either teicoplanin, linezolid or vancomycin.

**Conclusion**

Our findings suggested that food handlers might be the source of contamination with MRSA that can spread the disease to consumers since Staphylococcus aureus is a human pathogen colonizing in the anterior nares and the skin. These food handlers may be asymptomatic but can be a potential source of food contamination. With only a few limited number of antibiotics like Vancomycin or Teicoplanin for the disease treatment or mupirocin ointment for topical use, these drugs has to be used with caution. Food handlers have to be screened periodically and MRSA carriers to be decolonized immediately. These measures can increase the food safety. Since the sample size were few, the data warrant a more comprehensive surveillance of MRSA among food handlers.

**Conflicts of Interest:** The authors have no conflicts of interest to declare.

**Ethical Clearance:** Taken from Institution’s ethical clearance committee IEC 891/2016.

**Source of Funding:** No funding agency

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Effectiveness of Structured Teaching Program on Knowledge and Practice Regarding Breast Milk Expression among Postnatal Mothers of Newborn Admitted in Neonatal Intensive Care Unit at a Tertiary Care Hospital

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ABSTRACT

Introduction: The health benefits provided by breast milk are significant. The very preterm newborn babies and those with any deformities and not able to suck the breast are given expressed breast milk (EBM). Knowledge of proper technique and timely expression of breast milk is the first step towards adequate and successful milk expression for preterm babies. This study was done as a part of quality improvement initiative to improve the knowledge and practice of expression of milk for preterm newborns

Objectives: (1) To assess the knowledge and practice regarding breast milk expression among postnatal mothers of newborn admitted in neonatal intensive care unit (NICU).

(2) To assess the effectiveness of structured teaching program on knowledge and practice regarding breast milk expression among the postnatal mothers of newborn in NICU

Method: A study was conducted using quantitative approach and pre-Experimental one group pre-test and post test design on 50 postnatal mothers in selected areas of NICUs of a tertiary care hospital by purposive sampling technique. Structured interview and observational checklist was used to collect the relevant data regarding expression of breast milk.

Results: A total of 50 postnatal mothers were enrolled. The mean (SD) of pre-test knowledge score was 10.02 (3.22) and mean (SD) of post-test knowledge score was 18.3 (1.87), which was significantly improved. The mean (SD) value of pre-test expression of breast milk practice score was 7.12 (2.07) and mean (SD) of post-test practice score was 13.62 (1.13) which significant increase. The knowledge and practice of postnatal mother regarding breast milk expression were significantly improved after the structured teaching program.

Conclusions: The multidisciplinary structured teaching program was effective in promoting the proper breast milk expression by improving relatively simple and modifiable factors

Keywords: Expressed breast milk, Structured teaching program, postnatal mothers, Neonatal intensive care, knowledge, practice

Introduction

Human milk is the preferred food for all infants, including sick newborns and preterm infants. Breast milk is the best nutritious food, provided by the nature for neonates. Expression of breast milk is a way to maintain breast milk feeding when mother and infant are separated or baby is very preterm to suck at the breast. The newborn may not be able to suck or there may be
poor coordination between swallowing and sucking. The prematurity is the most common cause of admission in neonatal intensive care unit. The breast milk expression has proven to be helpful in establishing and continuing the breast milk feeding. In the United States now use breast pumps and bottles to provide human milk to their infants, with many doing so soon after delivery or at high frequency.3

But in India the practice of Expression of breast milk remains low.4 One of the main reasons for this may be the lack of adequate information and appropriate knowledge about expression of breast milk leading to inadequate milk for their newborns. It is thus of importance that all mothers should have adequate scientific knowledge about expression of breast milk so that she will be able to prevent the problems if any and increase the milk supply for their sick infants.

Present study was planned to study the level of knowledge and practice of mothers towards expression of breast milk and to study the pattern of expression of breast milk in them.5

Expression of breast milk is way to maintain breast milk feeding when mother and infant are not together due to illness.6 Expression of breast milk usually done by two methods: Manual or with an electronic breast pump. In developing countries where 96% of the world’s approximate 5 million annual neonatal deaths occur. In 2016 of the 26 million babies born in India. Every year one million babies died before the age of one month accounting for 30% of the total neonatal deaths. Importance of breast milk feeding indicates that both timing of initiation and type of breastfeeding pattern exert independent influences on neonatal mortality. Interventions to improve early infant feeding practices can result in considerable reductions in neonatal mortality.

Neonatal mortality could be reduced if all infants initiated breastfeeding on day 1 of life, by 16.3% and by 22.3% if initiation took place within the first hour. The risk of neonatal death is increased approximately fourfold if milk-based fluids are given to breastfed neonates.7 Expressing milk by hand can be done to relieve engorged breasts or to stimulate let down of milk when you are ready to begin nursing, which help to reduce the neonatal mortality.8

Hand expression of milk can be easily taught to postnatal mothers and they can follow that at their home if needed. Some Authors showed the video of hand expression of milk and it was quite effective.9

Breast milk is unquestionably the best milk for the newborn. Exclusive breast milk feeding for the high risk babies will help to reduce the neonatal mortality rate. Manual Expression of Breast milk with the help of structured teaching program might help the postnatal mothers to express the breast milk correctly and in adequate amount for their preterm and high risk babies. This will avoid formula feeds which has been identified as one of the risk factor for the development of necrotizing enterocolitis, sepsis as well may others morbidities in low birth weight babies. So we planned to study the effect of structured teaching program on knowledge and practice regarding breast milk expression among postnatal mothers of newborn admitted in NICU.

Objectives of the Study

1. To assess the knowledge and practice regarding breast milk expression among postnatal mothers of newborn in NICU.

2. To assess the effectiveness of structured teaching program on knowledge and practice regarding breast milk expression among the postnatal mothers of newborn in NICU

Material and Method

Study was conducted using quantitative approach and pre- Experimental one group pre-test and post test design on 50 postnatal mothers in selected areas NICUs of PGIMS, Rohtak by purposive sampling technique. The study was cleared by the institutional ethical committee. Structured interview, booklet, posters, videos and demos were shown to mothers and pre and post test observational checklist were used to collect the relevant data from samples regarding Expression of breast milk. Lecture cum focused group discussion was selected as an appropriate method of teaching. The data was collected on day 5 of comprehensive structured teaching program.

Criteria to assess knowledge level of the postnatal mothers of newborn admitted in NICU: Structured questionnaire is developed to assess the knowledge of postnatal mother of newborn admitted in NICU containing 24 items (web table). According to the total score obtained by each subject knowledge was classified into three sections (Maximum score: 24):
Criteria to assess Practice score of the postnatal mothers of newborn admitted in NICU: Observation check list is developed to assess the Practice score of breast milk expression of postnatal mother of newborn admitted in NICU containing 17 items of practice techniques. According to the total score obtained by each subject practice was classified into three sections (Maximum score 17):

- Poor practice 0-6
- Good practice 7-12
- Excellent practice 13-17

Validation of the Tool: The tool was validated by the research committee, College of Nursing, Pt. B. D. Sharma, P.G.I.M.S. Rohtak. The experts in addition to judging each item were also requested to identify any area that has been missed from the tool. The clarity, relevance and appropriateness were judged by experts and suggested amendments were done by the researcher in the tool.

Reliability of the Tool: Reliability is the degree of consistency and accuracy with which an instrument measures the attribute for which it is designed to measure.

The pre-test was done to establish the reliability and to determine the language clarity and using split half method with accessed feasibility of the tool reliability of knowledge questionnaire and observational checklist used as a tool for the study.

Results

A total of 50 postnatal mothers were included in the study. Detail of the mothers regarding age, education, occupation, type of family, per capital income, parity are given in Table 1. Majority of postnatal mothers (72%) lie in the age group of 18-25 years. Majority of postnatal mothers about (42%) were illiterate. Majority of postnatal mothers (82%) belongs to joint family. Most of the postnatal mothers (60%) related to rural area and (88%) mothers were housewife. Majority of postnatal mothers (54%) mothers were primigravida. Majority of postnatal mothers (66%) having the family income less than 10000Rs.

Table 1: Demographic characteristics of the population

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Baseline Variables</th>
<th>N = 50</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Age in year</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A. 18-25</td>
<td>36</td>
<td>72%</td>
<td></td>
</tr>
<tr>
<td>B. 26-30</td>
<td>11</td>
<td>22%</td>
<td></td>
</tr>
<tr>
<td>C. 31-35</td>
<td>2</td>
<td>4%</td>
<td></td>
</tr>
<tr>
<td>D. 36-45</td>
<td>1</td>
<td>2%</td>
<td></td>
</tr>
<tr>
<td>2. Education</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A. Illiterate</td>
<td>21</td>
<td>42%</td>
<td></td>
</tr>
<tr>
<td>B. Primary</td>
<td>10</td>
<td>20%</td>
<td></td>
</tr>
<tr>
<td>C. Middle</td>
<td>8</td>
<td>16%</td>
<td></td>
</tr>
<tr>
<td>D. Secondary and above</td>
<td>11</td>
<td>22%</td>
<td></td>
</tr>
<tr>
<td>3. Type of the family</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A. Nuclear</td>
<td>9</td>
<td>18%</td>
<td></td>
</tr>
<tr>
<td>B. Joint</td>
<td>41</td>
<td>82%</td>
<td></td>
</tr>
<tr>
<td>4. Area of residence</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A. Rural</td>
<td>30</td>
<td>60%</td>
<td></td>
</tr>
<tr>
<td>B. Urban</td>
<td>20</td>
<td>40%</td>
<td></td>
</tr>
<tr>
<td>5. Occupation of the mother</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A. House wife</td>
<td>44</td>
<td>88%</td>
<td></td>
</tr>
<tr>
<td>B. Private Job.</td>
<td>0</td>
<td>0%</td>
<td></td>
</tr>
<tr>
<td>C. Govt. Job.</td>
<td>1</td>
<td>2%</td>
<td></td>
</tr>
<tr>
<td>D. Self employment</td>
<td>5</td>
<td>10%</td>
<td></td>
</tr>
<tr>
<td>6. Parity</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A. 1st baby</td>
<td>27</td>
<td>54%</td>
<td></td>
</tr>
<tr>
<td>B. 2nd baby</td>
<td>20</td>
<td>40%</td>
<td></td>
</tr>
<tr>
<td>C. 3rd baby</td>
<td>2</td>
<td>4%</td>
<td></td>
</tr>
<tr>
<td>D. more</td>
<td>1</td>
<td>2%</td>
<td></td>
</tr>
<tr>
<td>7. Family Income</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A. Rs. Less than 10000</td>
<td>33</td>
<td>66%</td>
<td></td>
</tr>
<tr>
<td>B. Rs. 10000-20000</td>
<td>10</td>
<td>20%</td>
<td></td>
</tr>
<tr>
<td>C. Above Rs. 20000</td>
<td>7</td>
<td>14%</td>
<td></td>
</tr>
</tbody>
</table>

Table 2: Pretest and post test knowledge level of postnatal mothers

<table>
<thead>
<tr>
<th>Knowledge level</th>
<th>Pre Test (n = 50)</th>
<th>Post test (n = 50)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Frequency</td>
<td>Percentage</td>
</tr>
<tr>
<td>Inadequate Knowledge</td>
<td>25</td>
<td>50%</td>
</tr>
<tr>
<td>Moderate Knowledge</td>
<td>23</td>
<td>46%</td>
</tr>
<tr>
<td>Adequate Knowledge</td>
<td>2</td>
<td>4%</td>
</tr>
</tbody>
</table>
50% of postnatal mother had inadequate knowledge and 46% had moderate knowledge and 4% had adequate knowledge in the pretest score. After administration of structured teaching program 84% postnatal mother had adequate knowledge and 16% had moderate knowledge regarding expressed breast milk (Table 2).

**Table 3: Effect of structured teaching program on knowledge**

<table>
<thead>
<tr>
<th>Practice</th>
<th>Pre test</th>
<th>Post test</th>
<th>Mean difference</th>
<th>t value</th>
<th>Df</th>
<th>Inference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge</td>
<td>Mean</td>
<td>SD</td>
<td>Mean</td>
<td>SD</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Knowledge</td>
<td>10.02</td>
<td>3.22</td>
<td>18.3</td>
<td>1.87</td>
<td>49</td>
<td>(Significant)</td>
</tr>
</tbody>
</table>

Table 3 there was a significant difference between the pretest and posttest knowledge of the postnatal mother regarding breast milk expression.

**Table 4: Pretest and posttest score of expression of milk practice of the postnatal mothers**

<table>
<thead>
<tr>
<th>Practice level</th>
<th>Pre Test (n = 50)</th>
<th>Post test (n = 50)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Frequency</td>
<td>Percentage</td>
</tr>
<tr>
<td>Poor Practice</td>
<td>27</td>
<td>54%</td>
</tr>
<tr>
<td>Good Practice</td>
<td>23</td>
<td>46%</td>
</tr>
<tr>
<td>Excellent Practice</td>
<td>0</td>
<td>4%</td>
</tr>
<tr>
<td>Total</td>
<td>50</td>
<td>100%</td>
</tr>
</tbody>
</table>

54% of postnatal mother had poor practice and 46% had good practice and 0% had excellent practice in the pretest. After administration of structured teaching program 84% of postnatal mother had excellent practice and 16% postnatal mother had good practice regarding expressed breast milk (Table 4).

**Table 5: Effectiveness of STP on breast milk expression practice score**

<table>
<thead>
<tr>
<th>Practice</th>
<th>Pre test</th>
<th>Post test</th>
<th>Mean difference</th>
<th>T value</th>
<th>Df</th>
<th>Inference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Practice</td>
<td>Mean</td>
<td>SD</td>
<td>Mean</td>
<td>SD</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Practice</td>
<td>7.12</td>
<td>2.07</td>
<td>13.62</td>
<td>1.13</td>
<td>23.08</td>
<td>49</td>
</tr>
</tbody>
</table>

Table no.5 inferred that there is a significant difference between the pretest and posttest practice of the postnatal mother regarding breast milk expression.

**Discussion**

The present study suggests that a simple and feasible structured teaching program can lead to improved techniques and knowledge in mothers of preterm neonates admitted in NICU. There is persistent need of improved strategy to reduce the time to first milk expression and to increase frequency of expression as well as night time expression of milk in postnatal mothers. According to Kishore et al. 39% of the mothers had satisfactory knowledge about the breastfeeding. Chaudhury et al. found that only 10% of the mothers had the good knowledge regarding initiation of breastfeeding. In a Delhi study that only 15% of the mothers initiated breastfeeding within 2 h. In Vadodara city, study has shown 32.6% of the mothers initiated breastfeeding within 1 h of delivery in a tertiary care hospital. Mangalgi et al. study 50.5% knew about expressed breast milk and its technique was known to 49.5% mothers. Our study 50% of postnatal mother had inadequate knowledge and 46% had moderate knowledge and 4% had adequate knowledge in the pretest score. After administration of structured teaching program 84% postnatal mother had adequate knowledge and 16% had moderate knowledge regarding expressed breast milk. The assessment of knowledge and practice and use of the acquired data in changing our existing program is essential to improve care of newborn and neonatal mortality rates.
Health care professionals should educate the mothers and counselling must start before delivery or just after delivery. Most of the Postnatal mothers got benefitted with structured counseling program and were able to start expressed breast milk timely and with proper technique. This concept can be practiced by community health nurses and the health workers can be educated by the nurses subsequently. Continuing nursing education program to acquire advanced knowledge regarding the expression of breast milk can be the key of this quality improvement initiative.

A similar study can be replicated on a large sample to generalize the findings with including additional demographic variables. Intervention can also be given to the community through mass media, role play, and class room teaching etc to enhance the knowledge and practice of breast feeding.

**Conclusion**

There was lack of knowledge and practice among postnatal mothers regarding breast milk expression. Structured teaching program was found to be effective in enhancing the knowledge and practice of the postnatal mothers regarding breast milk expression. Mothers gained significant knowledge and practice about breast milk expression resulting in improved breast milk feeding of their newborns. Health care professionals should ensure proper technique and timely initiation of breast milk expression.

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

**Source of Funding:** None

**Ethical Clearance:** The study was cleared by the institutional ethical committee.

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The Prevalence of Cardiorespiratory Fitness Level (Vo2max), Socio Demography, Risk Factors and Diseases among Hajj Pilgrim of Indonesia 2016 (1437H)

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ABSTRACT

The aim of this study is to describe the prevalence of Cardiorespiratory fitness level (CRF), Socio demography characteristic, risk factors and diseases of Indonesia hajj pilgrim 2016. Methods: all secondary data of cardiorespiratory fitness was collected from Siskohatkes 2016 – Computerized system of hajj health data - MOH with STATA 13 version. Descriptive analysis was used to find the risk of hajj pilgrims. Results: A total of 71686 completed all physical fitness from 152429 participant. Prevalence of cardiorespiratory fitness good level = 33.43%, Moderate level= 54.79%, and Poor level was 11.78%. Discussion: The fitness prevalence of Indonesian hajj pilgrims in 2016 found for fitness level = 33.43% good, 54.79% moderate, and 11.78% poor. In addition, 44.66% hajj pilgrims were employees, who were likely to have good physical activity. Similar what WHO founding (2015) Cardiorespiratory endurance is the ability of the heart and blood vessels to function optimally in rest and exercise to take oxygen and distribute it to active tissue for use in the process of body metabolism (Permaesih, 2001). Table 4 above shown prevalence for obesity was 12.8% and overweight was 35.46%. Conclusion: the proportion of most fitness status is Moderate level (54.79%), age 50-59 (35.55%), Medium Education level (35.46%), Households/employees (44.66%), female gender (54.82%). Hajj pilgrims with IMT overweight (35.46%), hypertension (71.34%), Anemia (21.53%), hyperglycemia (43.76%), Hajj pilgrims with high cholesterol (59.46%), waist circumference (59.46%), hajj behavior with smoking (13.23%). For pre-existing, circulatory disease rank was the highest (31.94%). For outpatient, respiratory diseases was the highest (53.20%), and inpatient rank (0.41%).

Keywords: Hajj pilgrim, prevalence, cardiorespiratory fitness, risk factor, diseases

Introduction

Risk factors among hajj pilgrim comprised namely Internal risk factors and external risk factors. Internal risk factors such as hypertension, heart disease, asthma, COPD, diabetes, stroke, etc. external risk factors come from during hajj pilgrim done ritually in Saudi Arabia, include: (a) Tawaf (around the Ka’ba seven times.); (b) Sai (walking back and forth as many as seven times from Safa hill to Marwa); (c) Wukuf at Arafah for one day (depart from Mecca the day before, and sleep under a tent on the night before wukuf); (d) Overnight at the Musdalifah; (e) Jumroh once a day for three days. The journey to Jamarat is 2-5 km. During this season, physical fitness is needed for Hajj pilgrims to carry out physical activity during Hajj pilgrimage is in holy land (Saudi Arabia). One component of physical fitness associated with health is Cardiorespiratory by assessing the consumption of the maximum amount of oxygen (\(\text{VO}_{2\text{max}}\)). (3-5) \(\text{VO}_{2\text{max}}\) indicates the oxygen consumed during the move. Physical fitness is an important thing in performing the pilgrimage, good physical condition is needed in order to run all series of activities in performing the pilgrimage properly and can be a hajj mabrur. Good physical fitness should be supported by other health factors such as: Hemoglobin, blood sugar, blood pressure, BMI, cholesterol, Waist circumference, and lifestyle behavior (smoking).
About 312000 pilgrims underwent outpatient treatment, both at airport clinics, Madinah, Makkah, Arafah Muzdalifah, and Mina during hajj season.

**Material and Method**

Descriptive study was carried out among pilgrims seeking medical checking ups before depart to Saudi Arabia. Sample size of 71868 pilgrims was used to determine the risk factors of cardiorespiratory fitness level. Data were analyzed using Stata version 13.0. The sample size study was 71868 hajj pilgrims.

**Results**

In association between cardiorespiratory fitness level (VO2\text{max}) (expressed with 1.6 walking test duration per minutes rock pot), of 71868 study sample of their physical activity and CRF level was measured as presented respectively at table 1.

**Table 1: The Prevalence cardiorespiratory fitness (CRF) level of Indonesian hajj year 2016 per Provinces**

<table>
<thead>
<tr>
<th>Provinces</th>
<th>Total</th>
<th>Good (%)</th>
<th>Moderate (%)</th>
<th>Poor (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>NAD</td>
<td>1,423</td>
<td>56.29</td>
<td>40.06</td>
<td>3.65</td>
</tr>
<tr>
<td>Babel</td>
<td>310</td>
<td>56.77</td>
<td>39.68</td>
<td>3.55</td>
</tr>
<tr>
<td>Bali</td>
<td>52</td>
<td>63.46</td>
<td>36.54</td>
<td>0.00</td>
</tr>
<tr>
<td>Banten</td>
<td>2,980</td>
<td>43.49</td>
<td>54.13</td>
<td>2.38</td>
</tr>
<tr>
<td>Bengkulu</td>
<td>646</td>
<td>52.63</td>
<td>41.64</td>
<td>5.73</td>
</tr>
<tr>
<td>DIY</td>
<td>921</td>
<td>30.18</td>
<td>47.88</td>
<td>21.93</td>
</tr>
<tr>
<td>DKI</td>
<td>1,972</td>
<td>32.71</td>
<td>55.43</td>
<td>11.87</td>
</tr>
<tr>
<td>Gorontalo</td>
<td>193</td>
<td>16.58</td>
<td>65.80</td>
<td>17.62</td>
</tr>
<tr>
<td>Jabar</td>
<td>22,631</td>
<td>24.87</td>
<td>60.90</td>
<td>14.22</td>
</tr>
<tr>
<td>Jambi</td>
<td>497</td>
<td>48.09</td>
<td>48.89</td>
<td>3.02</td>
</tr>
<tr>
<td>Jateng</td>
<td>10,794</td>
<td>38.37</td>
<td>51.66</td>
<td>9.97</td>
</tr>
<tr>
<td>Jatim</td>
<td>15,510</td>
<td>32.21</td>
<td>52.71</td>
<td>15.09</td>
</tr>
<tr>
<td>Kalbar</td>
<td>383</td>
<td>42.04</td>
<td>51.96</td>
<td>6.01</td>
</tr>
<tr>
<td>Kalsel</td>
<td>701</td>
<td>20.97</td>
<td>51.21</td>
<td>27.82</td>
</tr>
<tr>
<td>Kalteng</td>
<td>226</td>
<td>69.91</td>
<td>30.09</td>
<td>0.00</td>
</tr>
<tr>
<td>Kaltim</td>
<td>414</td>
<td>45.41</td>
<td>49.28</td>
<td>5.31</td>
</tr>
<tr>
<td>Kepri</td>
<td>442</td>
<td>51.36</td>
<td>44.57</td>
<td>4.07</td>
</tr>
<tr>
<td>Lampung</td>
<td>1,306</td>
<td>26.88</td>
<td>67.69</td>
<td>5.44</td>
</tr>
<tr>
<td>Maluku</td>
<td>7</td>
<td>85.71</td>
<td>14.29</td>
<td>0.00</td>
</tr>
</tbody>
</table>

Notes for Province abbreviation: NAD = Nangro Aceh Darussalam; Babel = Bangka Belitung; DIY = Yogyakarta Special Region; DKI = Daerah Jakarta Special Region; Jabar = West Java; Jateng; Central Java; Jatim= East Java; Kalbar= West Kalimantan; Kalsel= South Kalimantan; Kalteng = Central Kalimantan; Kaltim; East Kalimantan; Kepr = Riau Island; Malut= North Molucas; NTB= West Nusa Tenggara; NTT= North Nusa Tenggara; Sulbar= West Sulawesi; Sulsel= South Sulawesi; Sultra= South-East Sulawesi; Sulut= North Sulawesi; Sumbar= West Sumatera; Sumsel= South Sumatera; Sumut= North Sumatera.

The fitness prevalence of Indonesian hajj pilgrims in 2016 found for fitness level = 33.43% good, 54.79% moderate, and 11.78% poor. For provincial category, Gorontalo is the lowest good prevalence (16.91%), while Central Kalimantan is the highest good prevalence one (69.91%). Still for provincial category but for moderately good fitness level, Maluku province is the lowest prevalence (14.22%), while NTB province is the highest prevalence one (69.23%). For provincial category on low fitness, Banten province is the lowest prevalence (2.38%), while Gorontalo province is the highest prevalence one (17.62%). If we like to know the Cardiorespiratory Fitness level (VO2\text{max}) of hajj pilgrims, from which province as the highest one? So, the answer is from Moluccas Province, due to they in the highest position of prevalence with totally 7 hajj pilgrims (85.71%), while Gorontalo Province with totally 32 pilgrims (16.58%), it called the lowest CRF level. See Table 1.

**Conted…**

<table>
<thead>
<tr>
<th>Provinces</th>
<th>Total</th>
<th>Good (%)</th>
<th>Moderate (%)</th>
<th>Poor (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Malut</td>
<td>352</td>
<td>54.83</td>
<td>44.32</td>
<td>0.85</td>
</tr>
<tr>
<td>NTB</td>
<td>1,427</td>
<td>31.25</td>
<td>59.22</td>
<td>9.53</td>
</tr>
<tr>
<td>NTT</td>
<td>13</td>
<td>23.08</td>
<td>69.23</td>
<td>7.69</td>
</tr>
<tr>
<td>Papua</td>
<td>158</td>
<td>38.61</td>
<td>61.39</td>
<td>0.00</td>
</tr>
<tr>
<td>Papua Barat</td>
<td>22</td>
<td>40.91</td>
<td>45.45</td>
<td>13.64</td>
</tr>
<tr>
<td>Riau</td>
<td>748</td>
<td>39.17</td>
<td>45.05</td>
<td>15.78</td>
</tr>
<tr>
<td>Sulbar</td>
<td>155</td>
<td>47.74</td>
<td>44.52</td>
<td>7.74</td>
</tr>
<tr>
<td>Sulsel</td>
<td>822</td>
<td>50.24</td>
<td>40.75</td>
<td>9.00</td>
</tr>
<tr>
<td>Sulteng</td>
<td>613</td>
<td>60.20</td>
<td>36.05</td>
<td>3.75</td>
</tr>
<tr>
<td>Sultra</td>
<td>299</td>
<td>63.21</td>
<td>26.42</td>
<td>10.37</td>
</tr>
<tr>
<td>Sulut</td>
<td>229</td>
<td>33.62</td>
<td>63.32</td>
<td>3.06</td>
</tr>
<tr>
<td>Sumbar</td>
<td>951</td>
<td>42.69</td>
<td>52.89</td>
<td>4.42</td>
</tr>
<tr>
<td>Sumsel</td>
<td>2,608</td>
<td>21.59</td>
<td>66.79</td>
<td>11.62</td>
</tr>
<tr>
<td>Sumut</td>
<td>2,063</td>
<td>52.59</td>
<td>42.95</td>
<td>4.46</td>
</tr>
<tr>
<td>Total</td>
<td>71,868</td>
<td>33.43</td>
<td>54.79</td>
<td>11.78</td>
</tr>
</tbody>
</table>
Demographically, we found how important was demographic characteristic of hajj pilgrims. How their CRF status during hajj season, age, education background, employment and last but necessary to know is the proportion of men and women. See table 2.

Table 2: Frequency distribution by Demographic characteristics of Hajj pilgrims 2016

<table>
<thead>
<tr>
<th>Variable</th>
<th>Category</th>
<th>N</th>
<th>(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cardiorespiratory Fitness Level (VO_{2max})</td>
<td>Good</td>
<td>24,025</td>
<td>33.43</td>
</tr>
<tr>
<td></td>
<td>Moderate</td>
<td>39,378</td>
<td>54.79</td>
</tr>
<tr>
<td></td>
<td>Poor</td>
<td>8,465</td>
<td>11.78</td>
</tr>
<tr>
<td>Age</td>
<td>&lt; 40 yr</td>
<td>6,869</td>
<td>9.56</td>
</tr>
<tr>
<td></td>
<td>40 - 49 yr</td>
<td>17,675</td>
<td>24.59</td>
</tr>
<tr>
<td></td>
<td>50 - 59 yr</td>
<td>25,546</td>
<td>35.55</td>
</tr>
<tr>
<td></td>
<td>&gt; 60 yr</td>
<td>21,778</td>
<td>30.3</td>
</tr>
<tr>
<td>Education</td>
<td>Lower</td>
<td>24,448</td>
<td>34.02</td>
</tr>
<tr>
<td></td>
<td>Middle</td>
<td>25,484</td>
<td>35.46</td>
</tr>
<tr>
<td></td>
<td>High</td>
<td>21,936</td>
<td>30.52</td>
</tr>
<tr>
<td>Employment</td>
<td>Army</td>
<td>639</td>
<td>0.89</td>
</tr>
<tr>
<td></td>
<td>Civil Servant</td>
<td>32,093</td>
<td>44.66</td>
</tr>
<tr>
<td></td>
<td>Trade/Farmer</td>
<td>15,222</td>
<td>21.18</td>
</tr>
<tr>
<td></td>
<td>Households/ student</td>
<td>23,914</td>
<td>33.27</td>
</tr>
<tr>
<td>Sex</td>
<td>Men</td>
<td>32,473</td>
<td>45.18</td>
</tr>
<tr>
<td></td>
<td>Women</td>
<td>39,395</td>
<td>54.82</td>
</tr>
</tbody>
</table>

The statistics and calculation resulting from demographic characteristic (table 2) above shown the highest proportion of fitness status is moderate (54.79%), age 50-59 (35.55%), middle education level (35.46%), civil servants (44.66%) , women (54.82%).

Risk factors for Haj pilgrims, such as BMI, blood pressure, hemoglobin, blood sugar, cholesterol and waist circumference and risk behavior are the main problems that can threaten the health of hajj pilgrim.

Table 3: Frequency Distribution of Hajj pilgrims risk factors

<table>
<thead>
<tr>
<th>Variable</th>
<th>Category</th>
<th>N</th>
<th>(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>IMT</td>
<td>Normal</td>
<td>37,707</td>
<td>52.47</td>
</tr>
<tr>
<td></td>
<td>Overweight</td>
<td>25,481</td>
<td>35.46</td>
</tr>
<tr>
<td></td>
<td>Obesity</td>
<td>8,680</td>
<td>12.08</td>
</tr>
</tbody>
</table>

Conted…

| Blood Pressure | normal | 20,599 | 28.66 |
|               | hypertension | 51,269 | 71.34 |
| Haemoglobin   | Normal | 50,053 | 70.58 |
|               | Hyper  | 1,363  | 1.90  |
|               | Hippo  | 12,228 | 17.01 |
| Glucose       | Normal  | 28,193 | 39.23 |
|               | Hyper   | 31,447 | 43.76 |
|               | Optimal | 29,496 | 41.04 |
| Cholesterol   | Hyper   | 42,372 | 58.96 |
|               | Normal  | 29,132 | 40.54 |
| Waist Circumferences | Risk | 42,736 | 59.46 |
| Risk Behavior | Not Smoking | 62,359 | 86.77 |

Table 3 above shown hajj pilgrims with BMI overweight (35.46%), hypertension (71.34%), Anemia (21.53%). hyperglycemia (43.76%), high cholesterol (59.46%), waist circumference risk (59.46%), smoking behavior (13.23%).

There are 7 major diseases in Hajj pilgrims, based on ICD X, starting from pre-existing illness, outpatient and inpatient. Pre-existing diseases comprised such all diseases related as circulatory; respiratory; metabolic; psychiatric illness; neoplasm; musculoskeletal; and infection.

Table 4: Frequency Distribution based on pre-existing diseases, outpatient and inpatient characteristic of hajj pilgrim Year 2016

<table>
<thead>
<tr>
<th>Variable</th>
<th>Pre-existing diseases</th>
<th>Outpatient</th>
<th>Inpatient</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>%</td>
<td>%</td>
<td>%</td>
</tr>
<tr>
<td>1. Circulatory</td>
<td>31.94</td>
<td>17.18</td>
<td>0.41</td>
</tr>
<tr>
<td>2. Respiratory</td>
<td>4.23</td>
<td>53.20</td>
<td>0.36</td>
</tr>
<tr>
<td>3. Metabolic</td>
<td>31.24</td>
<td>5.33</td>
<td>0.31</td>
</tr>
<tr>
<td>4. Psychiatric illness</td>
<td>0.19</td>
<td>0.18</td>
<td>0.05</td>
</tr>
<tr>
<td>5. Neoplasm</td>
<td>1.49</td>
<td>0.12</td>
<td>0.04</td>
</tr>
<tr>
<td>6. Musculoskeletal</td>
<td>5.97</td>
<td>4.70</td>
<td>0.04</td>
</tr>
<tr>
<td>7. Infection</td>
<td>1.47</td>
<td>3.02</td>
<td>0.09</td>
</tr>
</tbody>
</table>

Table 4 above shown patient rank with Circulatory pre-existing diseases was higher (31.94%), and
Metabolic pre-existing diseases was secondly higher (31.24 %). Meanwhile, patient rank with outpatient of respiratory disease was highest (53.20%), whereas in the case of inpatient of circulatory disease was highest (0.41%).

**Discussion**

The CRF level prevalence of Indonesian Hajj pilgrims in 2016 found for fitness level = 33.43% good, 54.79% moderate, and 11.78% poor. For provincial category, Gorontalo is the lowest good prevalence (16.91%), while Central Kalimantan is the highest good prevalence one (69.91%). Still for provincial category but for moderately good fitness level, Maluku province is the lowest prevalence (14.29%), while NTT province is the highest prevalence one (69.23%). For provincial category on low fitness, Banten province is the lowest prevalence (2.38%), while Gorontalo province is the highest prevalence one (17.62%). If we like to know the Cardiorespiratory Fitness level (VO2max) of hajj pilgrims, from which province as the highest one? So, the answer is from Moluccas Province, due to they in the highest position of prevalence with totally 7 hajj pilgrims (85.71%), while Gorontalo province with totally 32 pilgrims (16.58%). it called the lowest CRF level. See Table 1.

The present study highlight high hajj pilgrims CRF level during Hajj 2016, it was a large descriptive report with 33 provinces distributed in Indonesian archipelago included in this study analysis. This study provides information that will be useful in planning the health care services for Hajj health decision makers. From the results showing good level fitness data on Indonesian Hajj pilgrims 33.43% is different from the prevalence of fitness of the population in Indonesia, the level of physical fitness is 4.07 for the good category and this means more than 95% public health conditions are less good or even very bad (6). Almost all Indonesian Hajj pilgrims have an upper middle economy, so the possibility of Hajj pilgrims has a good level of fitness when compared to the entire population of Indonesia. In addition Jemaah 44.66% Jemaah are employees, who are likely to have good physical activity. According to WHO (2015), in high-income countries there are 26% of men and 35% of women whereas in low-income countries there are 12% of men and 24% of women who are less physically active. From the data above shows that women activity level is lower than men. Cardiorespiratory endurance is the ability of the heart and blood vessels to function optimally in rest and exercise to take oxygen and distribute it to active tissue for use in the process of body metabolism (9).

Table 3 above shown prevalence for obesity was 12.8% and overweigh was 35.46%. The population of Indonesia who are experiencing obesity is now more and more. National Health Research Data (Riskesnas) in 2016 shows adult population aged over 18 years who are overweight or obese by 20.7 percent. That figure shows a rapid increase from 2013 when the overweight population reached 15.4 percent. Table 3 above shown frequency distribution of hajj pilgrims risk factor for hypertension was 71.34%. The prevalence of national hypertension based on National Health Based Research Data (Riskesdas) 2013 was 25.8%, the highest in Bangka Belitung Islands (30.9%), while the lowest in Papua (16.8%).

Table 3 above shown the glucose in categories: hypo (17.01%); normal (39.23%) and hyper (43.76%). Estimated International Diabetes Federation (IDF), there are 382 million people living with Diabetes in the world by 2013. By 2035 that number is expected to rise to 592 million people. According to the World Health Organization (WHO, 2015) the prevalence of DM in adults in 2014 is estimated at 9%, whereas according to International Diabetes Federation (IDF, 2015) the global prevalence of DM in 2014 is 8.3% with 387 million persons (10).

Table 3 above shown risk behavior from smoking habit 13.23% and not smoking 86.77%. The proportion of people aged ≥15 years who smoked and chewed tobacco tended to increase in Riskesdas (34.2%),
Riskesdas 2010 (34.7%) and Riskesdas 2013 (36.3%). The highest proportion of xii in 2013 was East Nusa Tenggara (55.6%). Compared with the Global Adults Tobacco Survey (GATS) study on the population of ≥15 years age group, the proportion of male smokers is 67.0 percent and in Riskesdas 2013 of 64.9 percent, whereas in women according to GATS it is 2.7 percent and 2, 1 percent according to Riskesdas 2013. The proportion of tobacco chewing according to GATS 2011 is for men 1.5 percent and women 2.7 percent, while Riskesdas 2013 shows the proportion of men 3.9 percent and 4.8 percent in women.(13)

Table 4 above shown Respiratory diseases was highest (53.20%) as most of hajj pilgrim illness. Promotive and preventive strategy need to be focused to every hajj pilgrim.

Limitation of this Study

All data gathered from as the result of siskohatkes figures related with Hajj pilgrims 2016 year profiles, comprises results from conducting primary health check up in Community Health Centre (Puskesmas), patient visiting to BPHI (Indonesia health central in Saudi Arabia) and Saudi Arabia hospital (in and out patients) during hajj season. From 152,429 pilgrims only 71,686 pilgrims who participated in CRF test, remains of these numbers of pilgrims were noted as not participated in CRF test without clear reason.

Conclusion

The proportion of most fitness status is moderate level (54.79%), age 50-59 (35.55%), Medium Education level (35.46%), civil servant (44.66%), Households (33.27%). Hajj pilgrims with IMT overweight (35.46%), hypertension (71.34%), Anemia (21.53%), hyperglycemia (43.76%), Hajj pilgrims with high cholesterol (58.96%), waist circumference (59.46%), hajj behavior with smoking habit (13.23%). In pre-exixting diseases, circulatory disease was highest (31.94%). For outpatient, respiratory diseases rank was highest ranked (53.20%), while in the case of inpatient, circulatory disease was highest (0.41)

Conflict of Interests: We have no conflict of interest to declare.

Source of Fundings: University of Indonesia has sponsored and given contribution by providing grant to publish this research.

Ethical Approval: This study was approved by the Ethical Committee Public Health Faculty University of Indonesia number: No. 448/UN2.F10/ PPM.00.02 /2017.

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Creating Knowledge Using Seci Model as a Knowledge Management Stage to Improve Nurses’ Ability in Undertaking Parenteral Therapy

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ABSTRACT

Muji Rahayu Hospital is a private hospital with 50 beds. The frequent incidence is phlebitis nosocomial infection in adult in-patient wards at Muji Rahayu Hospital from January to June 2011 as high as 5.19%. According to hospital minimal service standard, in-patient service indicator on the incidence of phlebitis must be below 2%. The result of this study reveals that on the factor of individual nurses: (a) The education level of some respondents (management and nursing staff) is nursing academy; (b) The level of knowledge on nursing care with parenteral therapy, parenteral therapy nursing documentation, correct and safe hand-washing, and standard operating procedure before the training is inadequate and after the training is very good; (c) The nurses’ skills in undertaking the nursing documentation with parenteral therapy and parenteral therapy treatment before the training is inadequate and after the training is very good. As for the process of creating knowledge using SECI model, the result reveals that: (a) 70% of the respondents have implemented socialization activities; (b) 30% of the respondents have not implemented the externalization activities; (c) as many as 40% of the respondents have not implemented the combination activities; (d) whereas 40% of the respondents have not implemented the internalization activity. Therefore, the recommendation is to encourage individuals or nurses to learn and share knowledge, to document their experiences and expertise, and to give communication trainings.

Keywords: Hospital, Nursing Care, SECI Model, Knowledge Management.

Introduction

Knowledge plays an important role in achieving competitive advantages. Companies that are able to create new knowledge, in particular have an advantage in innovation. Innovation is the result of the accumulation of knowledge from outside the company which is then shared widely into the company, stored part of the company’s knowledge base and implemented in the development of new technologies, products and methods. It is precisely said that these internal and external forces become a force for continuous innovation within the enterprise and in turn will result in competitiveness for the company. When companies innovate, the company is actually creating new knowledge and information from within the company in an effort to define the problems and solutions. Creation of organizational knowledge in question is the ability of the company as a whole to create new knowledge which is the result of the conversion between tacit knowledge and explicit knowledge realized through the process of socialization, externalization, combination and internalization (SECI model).

The tacit knowledge of the individual is very personal and difficult to formulate because it is subjective and attached to the expertise and experience of each individual. In this case, it is often the case that a company loses its lead because the valuable knowledge that is inherent as the experience and individuality of the employee is carried out along with the discharge of the employee. Therefore, it is necessary to change the culture to always create new knowledge through learning and sharing knowledge among members of the organization. Individual knowledge is then converted with explicit knowledge through the SECI model so that the knowledge organization that is then applied to generate creativity and innovation.

Therefore, looking at the importance of knowledge creation for the improvement of the performance and success of the organization in a series of knowledge
management systems, research is undertaken to try to express the application of such knowledge creation. Research on the creation of such knowledge is done at Muji Rahayu Hospital which is one of the private hospital located in West Surabaya area. The total number of nurses in Muji Rahayu hospital is 30 nurses, consist of Diploma Program in Nursing 21 people (70%), Diploma Program in midwifery 6 people (20%) and Senior High School in Health Specialist of 3 people (10%). Based on data obtained from the monthly report at the inpatient unit of Muji Rahayu Hospital obtained information that there are still many incidences of phlebitis nosocomial infection in Muji Rahayu Hospital adult ward. Table 1 illustrates the incidence of phlebitis nosocomial infections in the Muji Rahayu Hospital adult ward from January to June 2011.

Table 1: Nosocomial Phlebitis Infection Occurrence Rate in Inpatient of Adults in Muji Rahayu Hospital January-June 2011

<table>
<thead>
<tr>
<th>Month</th>
<th>Patients (n)</th>
<th>Cases (n)</th>
<th>Nosocomial (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>January</td>
<td>241</td>
<td>13</td>
<td>5.39</td>
</tr>
<tr>
<td>February</td>
<td>196</td>
<td>11</td>
<td>5.61</td>
</tr>
<tr>
<td>March</td>
<td>232</td>
<td>12</td>
<td>5.17</td>
</tr>
<tr>
<td>April</td>
<td>225</td>
<td>11</td>
<td>4.89</td>
</tr>
<tr>
<td>May</td>
<td>242</td>
<td>17</td>
<td>7.02</td>
</tr>
<tr>
<td>June</td>
<td>229</td>
<td>7</td>
<td>3.05</td>
</tr>
<tr>
<td>Mean</td>
<td>228</td>
<td>11.83</td>
<td>5.19</td>
</tr>
</tbody>
</table>

Table 1 shows the number of incidence of phlebitis nosocomial infections in the Muji Rahayu Hospital adult ward. For six months, from January to June 2011, the average number of phlebitis cases per month 12 cases of 228 patients or 5.19%. According to the hospital minimum service standards, on the inpatient service indicators the phlebitis incidence rate should be less than 2%. The event can actually be avoided by performing nursing care in accordance with procedures or parenteral standard operating procedure therapy. The purpose of this research is to make recommendation to increase the knowledge and skill of the nurses in the inpatient ward of Muji Rahayu Hospital in carrying out parenteral therapy based on the SECI model.

Method

This research is an operational research because of intervention or treatment on population. In this study also conducted observations or observations using descriptive data from the results of checklist, focus group discussion in the inpatient room and indepth interview with the management of Muji Rahayu Hospital. The place of this research is in Muji Rahayu Hospital in inpatient unit especially VIP room and Class II room. This study was conducted from 1 April to 7 July 2011. The population in this study is the management and nurses in the inpatient room Muji Rahayu Hospital. The sampling technique used purposive sampling, with criteria for sample from management consist of Head of Medical Service, Nursing Coordinator and Inpatient Coordinator while for sample of nurse with education criterion of Diploma Program in Nursing and assigned to install infusion in adult inpatient room of VIP class and class II amounted to 10 people.

For the process of knowledge creation carried out the following stages. First, socialization (socialization), which is the process of socialization to nurses in the inpatient room. The result of the measurement is the change of knowledge and skill after being given socialization. Second, externalization (externalization), which is analyzing the process of externalization by measuring the presence or absence of dialogue to create an explicit new from the hidden tacit knowledge. Third, the combination (combination), namely by exchanging, adding or mengsortir new knowledge in the form of nursing process either in the assessment process by individual nurses or in cooperation with patients. Simultaneously analyze whether the new knowledge has been applied in performing parenteral therapy measures. Fourth, internalization (internalization), which is the process of internalization by looking at the new standard operating procedure formed and has been done by all nurses so that through this mechanism can expand and deepen tacit knowledge already owned by members of the organization.

Findings and Discussion

Socialization Process: According to Nonaka and Takeuchi socialization is a tacit knowledge conversion activity into tacit knowledge through the process of sharing experiences and social interaction between individuals within the organization. To be a conversion process requires a stimulus. Training is one form of stimulus for the socialization process can run. The management should hold regular and periodic training. The change of nursing knowledge and skills after
training is an indicator that this socialization has been running even though in fact there are still nurses who have not done this socialization. Based on the research on this socialization activity that has been implemented, it can be indicated that the nurse is in a work environment that succeeded in nurse awareness raising about the importance of dialogue, discussion and sharing of tacit knowledge among nurses to support the smooth implementation of the task.

Socialization has an important role because in accordance with the duties that must be done by nurses in implementing nursing care which is the backbone of integrated services in health services in hospitals. The quality of nursing service is determined by the nurses who are competent in their field, therefore the duty of the nurses relies heavily on the tacit knowledge possessed by the individual or the nurse. This is because the formation of tacit knowledge is based more on nurses’ experience and know-how in implementing nursing actions. Through discussions, sharing of on-the-job experiences and on-the-job training will occur the dissemination of tacit knowledge to other nurses. Management should facilitate this socialization process to work. In addition, leaders play an important role in this socialization process in order to run well. According Suarli leaders should be able to provide inspiration to others in order to cooperate with others so as to create a communication among nurses. This can support the activity or sharing process among fellow nurses.

However, exchanging ideas with other nurses who have different skills, dialogue to discuss the completion of the work needs to be given attention so that the conversion of tacit knowledge can be a culture for sharing knowledge. Based on the research results obtained information that there are still nurses who have not conducted socialization activities. The reason is there is no policy that requires the nurse to do sharing if new knowledge gets. In addition, the nurse is still affected by the old pattern, if it gets or uses the knowledge just kept private or put in the room only and the lack of awareness to learn and share knowledge.

**Process Externalization:** Externalization is the process of converting tacit knowledge into explicit knowledge that is more real or can be articulated. According to Nonaka and Takeuchi externalization plays an important role in the process of knowledge creation because it creates a new concept that explicit of tacit knowledge. Without the externalization of tacit knowledge will not be much benefit to the organization if not codified more real or explicit to be more easily communicated. In this case it is the duty of the leader to document the experience and capabilities in each individual, in order to be disseminated to other individuals and made as knowledge of the organization. And also for this process to be done well, it is necessary to have a clear and defined procedure so that nurses can formulate their knowledge.

Based on research on externalization activities, there are still individuals who do not express their ideas into a more explicit form, so that what is obtained in practice is still stored in individual minds. The role of leader or leader is crucial in order for individuals to put their ideas or ideas into an explicit form. So for nurses who still store the knowledge in their minds need to get support from the leadership or management to be motivated to express ideas to other individuals in a form that can be seen and read other individuals. For nurses who already carry out externalization activities, it can be indicated that the nurse is in a working environment that nurses awareness of the nurse about the importance of articulating experience, ability, knowledge, opinions or ideas that belong to the record and the concept of explicit knowledge that can be read and understood by other nurses and distributed to all nurses in Muji Rahayu Hospital to be the knowledge of the organization.

Nevertheless, against some of the execution of externalization activities that have not been implemented such as the submission of ideas in writing, make a personal note of something that is considered important from the discussion should be given attention to the conversion of tacit knowledge into explicit knowledge more often or even done to support the process creation of organizational knowledge. Based on the research results obtained information that there are still nurses who have not done externalization activities. The cause is lack of motivation and facilities or infrastructure, has not created a good communication between staff or between rooms, and not all nurses want to share knowledge.

**Combination Process:** According to Nonaka and Takeuchi, the combination is the activity of converting explicit knowledge into new explicit knowledge as a process of conceptualizing into the knowledge system. Conducted by interchanging, combining and categorizing different explicit knowledge through the discussions,
meetings, telephone conversations to generate new knowledge\textsuperscript{6}. In this case the coordinator or leader plays an important role in the combination process. Based on the result of research on conversion of knowledge of combination form at Muji Rahayu Hospital, which has been implemented by nurse, it can be indicated that the nurse is in a working environment that has grown the nurse awareness about the importance of using new information and knowledge in Muji Rahayu Hospital.

Based on the observation that individuals or nurses who do not perform the combination activities, indicate that the motivation to do this activity is still lacking, in addition if the individual experience is still lacking, the combination activities are also not running. In the process of knowledge creation, the combination form also has an important role besides externalization. Combination is a broader activity that is to combine information and knowledge both from within and outside the organization, while externalization is more internal and is a translation of ideas that exist in members of the organization\textsuperscript{7}. This externalization and combination of information and knowledge will then generate new knowledge which is then implemented in a better and more complete work. Based on the research results obtained information that there are still nurses who have not done a combination of activities. The cause is lack of experience, knowledge, communication and limitations of authority\textsuperscript{8}.

**Internalization Process:** Internalization is the process of realizing existing explicit knowledge into a new tacit part of the individual. According to Nonaka and Takeuchi, the form of internalization is done by altering, deepening and expanding the tacit knowledge possessed by the individual\textsuperscript{2}. When experience through socialization, externalization, and combinations is internalized into individual tacit knowledge base through sharing experiences, technical knowledge, these individuals become valuable assets for the organization. Knowledge that is embedded in each individual is further socialized to other individuals resulting in a new spiral in the process of knowledge creation\textsuperscript{9}.

Based on the research on the internalization process that has been frequently implemented, it can be indicated that the nurse is in a working environment that has grown the nurse awareness about the importance of using standard operating procedure, provisions, documents and current information owned by the organization as a means to expand their knowledge base and improve the quality of their work. In the process of knowledge creation, internalization has an important role because it is the deepening of knowledge that has been created by the organization. The successful internalization process of transforming, deepening, and expanding tacit knowledge into each individual nurse will be an invaluable intellectual asset for the organization\textsuperscript{10}.

However, the internalization indicators whose implementation has not been implemented, namely the use of work guidelines that have been mutually agreed upon, learning by doing should receive special attention. This is so that the tacit knowledge of the nurse develops and becomes a valuable intellectual capital for the organization. Based on the results of the study obtained information that nurses who have not done internalization activities. The reason is lack of communication so that new information is only known by the staff of the room only. In addition, although already submitted but still do the previous habit.

**Conclusion**

The result of knowledge creation using SECI model in Muji Rahayu Hospital room is as follows. At the socialization stage, 30\% of respondents have not yet shared knowledge, so the knowledge gained after training is still stored in the minds of individuals. At the externalization stage, 30\% of respondents are not actively involved in externalization activities (in terms of delivering ideas) and have not implemented standard operating procedure that have been made during the training. In the combination stage, 40\% of respondents have not done a combination activity that is adding, reducing and combining standard operating procedure that has been made into new standard operating procedure of combination result, respondent just follow it. At the internalization stage, 40\% of respondents have not implemented standard operating procedure maximally.

**Conflict of Interest:** The authors whose names are listed immediately below certify that they have NO affiliations with or involvement in any organization or entity with any financial and non-financial interest.

**Source of Funding:** All sources of research funding, including financial support, supply of equipment or materials, and manuscript submission from author.

**Ethical Clearance:** This study get the ethical approval from ethical committee in Faculty of Public Health, Airlangga University.
REFERENCES


MicroRNA-146a Gene Polymorphism is Associated with an Increased Susceptibility to Lung Cancer Disease: A Case-control Study

Jamsheed Javid¹, Rashid Mir¹, Abu-Duhier F M¹

¹Department of Medical Lab Technology, Faculty of Applied Medical Sciences, Prince Fahd Bin Sultan Research Chair, University of Tabuk, Kingdom of Saudi Arabia

ABSTRACT

Background: Genetic variability in miRNA-146a (rs2910164C>G) has a significant influence on the expression and secondary structures of the miRNA-146a. Presently, very limited evidences are available to associate the miRNA-146a (rs2910164C>G) polymorphism and susceptibility to lung cancer. In the present study, we aimed to find out the association of miRNA-146a (rs2910164C>G) polymorphism with the susceptibility to develop lung cancer.

Material and Method: Present case-control study included histopathologically confirmed lung cancer patients (n=80) and healthy controls (n=80). Genotyping of miRNA-146a (rs2910164C>G) polymorphism was done by allele specific PCR technique.

Results: It was observed that there was a statistically significant difference in the frequency of miRNA-146a (rs2910164 GG, CG and CC) genotypes between lung cancer patients and healthy controls (p=0.0097). Among the two groups, homozygous miRNA-146a CC genotype was overrepresented by lung cancer patients than healthy controls (40 % vs. 18.75% respectively). Compared to miRNA-146a GG genotype, odds ratios of 4.3 (95%CI=1.24-14.69, p=0.036) was observed for the homozygous miRNA-146a CC genotypes. In addition, it was observed that all the lung cancer stages (I to IV) and histological grades (Grades 1 to 3) represented higher miRNA-146a C allele frequency. Squamous cell carcinoma patients represented much higher frequency of miRNA-146a C allele than adenocarcinoma patients (SCC=0.78 & ADC= 0.63).

Conclusion: In conclusion, the genetic variability in miRNA-146a gene may be associated with the susceptibility to lung cancer disease. The risk of developing lung cancer disease was 4.3 times more in association with the CC genotype of the miR-146a (rs2910164C>G) polymorphism.

Keywords: Lung Cancer, susceptibility and miRNA-146a gene polymorphism.

Introduction

Lung cancer is one the most common malignancies worldwide and despite recent advances made in early diagnosis and treatment, lung cancer patients still remain the disease with poor prognosis¹,². Lung cancer is majorly classified into two types; Non small cell lung cancer, which constitutes 85 percent and small cell lung cancer, which constitutes the remaining 15 percent of lung cancer cases ³. Exposure to smoke is the major established risk factor for lung cancer; however only a small fraction of smokers develop the disease of lung cancer, indicating the involvement of individual’s genetic susceptibility to develop lung cancer.

Recent studies had observed the involvement of some small, non-coding RNA molecules known as microRNAs in the development and progression of various malignancies including lung cancer ⁴,⁵. These microRNAs are encoded by specific microRNA genes and function in regulation of gene expression at the post-transcriptional level. Dysregulation of miRNAs has been
observed in a number of diseases, including malignancies such as lung cancer\(^6\). Single nucleotide polymorphisms (SNPs) among miRNA genes have been recently shown to significantly alter the functionality of the respective miRNAs either by influencing the expression and/or secondary structures of the miRNAs\(^7-9\).

Micro RNA-146a have been observed to regulate the functionality of several important genes such as TNF receptor-associated factor 6 (TRAF6), IL-1 receptor associated kinase (IRAK1), nuclear factor kB (NFkB) genes and epidermal growth factor receptor (EGFR) etc. that play an important role in lung cancer development\(^10\). It has been observed that the genetic variability in miRNA-146a (rs2910164 C>G) has a significant influence on the expression and secondary structures of the miRNA-146a\(^10\). Presently, very limited evidences are available to associate miRNA-146a (rs2910164 C>G) polymorphism and susceptibility to develop lung cancer. In the present study, we aimed to find out the association of miRNA-146a (rs2910164 C>G) polymorphism and the susceptibility to develop lung cancer disease.

### Material and Method

**Study population:** The present study was approved by the Research Ethics committee at the University of Tabuk, Ministry of Health, Kingdom of Saudi Arabia and the Institutional Review Board (IRB) of King Hussein Cancer Center, Jordan. The study included histopathologically confirmed Lung cancer patients and healthy controls. Study subjects were collected from King Fahd specialist hospital, Tabuk, Saudi Arabia, and King Hussein Cancer Center, Jordan. Blood samples were withdrawn from each participant after obtaining the written informed consent.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Lung Cancer patients (%)</th>
<th>Healthy Controls (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total No.</td>
<td>80</td>
<td>80</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Males</td>
<td>58 (72.5)</td>
<td>69 (69.0)</td>
</tr>
<tr>
<td>Females</td>
<td>22 (27.5)</td>
<td>31 (31.0)</td>
</tr>
</tbody>
</table>

### Table 1: Distribution of selected characteristics among lung cancer patients and healthy controls

<table>
<thead>
<tr>
<th>Age at diagnosis (Years)</th>
<th>Lung Cancer patients (%)</th>
<th>Healthy Controls (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean ±SD age (Y)</td>
<td>57.6 ± 11.49 (range, 28-87 Years)</td>
<td>27.3 ± 4.16 (range, 21-40 Years)</td>
</tr>
</tbody>
</table>

**Histological Type**

<table>
<thead>
<tr>
<th></th>
<th>ADC(^*)</th>
<th>SCC(^**)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>60 (75.0)</td>
<td>20 (25.0)</td>
</tr>
</tbody>
</table>

**TNM Stage**

<table>
<thead>
<tr>
<th>TNM Stage</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>2 (2.5)</td>
<td></td>
</tr>
<tr>
<td>II</td>
<td>7 (8.75)</td>
<td></td>
</tr>
<tr>
<td>III</td>
<td>26 (32.5)</td>
<td></td>
</tr>
<tr>
<td>IV</td>
<td>46 (57.5)</td>
<td></td>
</tr>
</tbody>
</table>

**Distant metastases**

<table>
<thead>
<tr>
<th>Distant metastases</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>No</td>
<td>35 (43.75)</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>45 (56.25)</td>
<td></td>
</tr>
</tbody>
</table>

**Histological Grade**

<table>
<thead>
<tr>
<th>Histological Grade</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Grade 1</td>
<td>2 (2.5)</td>
<td></td>
</tr>
<tr>
<td>Grade 2</td>
<td>33 (41.25)</td>
<td></td>
</tr>
<tr>
<td>Grade 3</td>
<td>23 (28.75)</td>
<td></td>
</tr>
</tbody>
</table>

\(^*\)ADC- adenocarcinoma, \(^**\)SCC-squamous cell carcinoma

**Genotype analysis:** Genomic DNA was extracted from peripheral blood samples from each participant by following manufacturer’s protocol of DNeasy Blood kits (Qiagen,USA). The quantity and quality of the extracted DNA was measured by using Nanodrop 8000 spectrophotometer (Thermo scientific, USA). miRNA-146a gene (rs2910164 G>C) polymorphism was analyzed by using Allele-specific polymerase chain reaction. PCR was performed in a reaction volume of 25uL containing 12.5 uL of GoTaq® Green Master Mix, 2X (Promaga,USA), 2.5 uL of 50 ng of genomic DNA and 0.25 uL of 25 pmol/L of primers (forward and reverse) and the final volume was adjusted by nuclease free ddH\(_2\)O. Allele specific primers used for miRNA-146a rs2910164 G>C polymorphism are described in table 2. PCR program included an initial denaturation at 95\(^\circ\)C for 10 minutes, followed by 40 cycles (denaturation at 95\(^\circ\)C for 45s, annealing at 62\(^\circ\)C for 45s, extension at 72\(^\circ\)C for 45s) and a final elongation step of 72\(^\circ\)C for 10 minutes. PCR products obtained were analyzed on 2.0% agarose gel (Figure 1), stained with ethidium bromide and visualized under Gel Doc XR\(^+\) (Bio-Rad USA) system.
Table 2: Allele specific PCR primer sequence for miRNA-146a gene (rs2910164 G>C) polymorphism

<table>
<thead>
<tr>
<th>Genotype</th>
<th>Primer sequences</th>
<th>Band product size</th>
</tr>
</thead>
<tbody>
<tr>
<td>CC genotype</td>
<td>F1 = 5'-GGCCTGGTCTTCCTCCAGATGGTTAT-3' R1= 5'-GATATCCAGCTGAAGAATTTTGAC-3'</td>
<td>168 bp</td>
</tr>
<tr>
<td>GG genotype</td>
<td>F2= 5'-ATGGGTTGTGTCAGTGACGTC-3' R2= 5'-ATACCTTCAGAGCCTGAGACTCTGCC-3'</td>
<td>249 bp</td>
</tr>
</tbody>
</table>

Statistical analysis: Graph Pad version 6.0 and SPSS version 16 statistical software’s were used to analyze the data. Hardy-Weinberg equilibrium tests and Chi-square/Fisher Exact were used for genotype analysis. miRNA-146a (rs2910164 G>C) gene variants and risk of lung cancer were estimated by computing the odds ratios (OR) with 95% confidence intervals (CIs). A p value < 0.05 was considered significant.

Results

Study population: A summary of the baseline characteristics of the lung cancer patients and healthy controls are presented in Table 1. Present study included 80 lung cancer patients and 80 healthy controls. Among the patient group, 60 were adenocarcinoma and 20 were squamous cell carcinoma. Lung cancer patients were diagnosed in different stages (Stage I=2.5%, Stage II=8.75%, Stage III=32.5% and Stage IV=57.5%) with varying histological grades (Grade 1=2.5%, Grade 2=41.25% and Grade 3=28.75%). Majority of the lung cancer patients were males (72.5%) and the overall mean age for the patient group was 57.6 years in the range of 28 to 87 years.

Genotype distribution: Compared to healthy controls it was observed that there was a statistically significant difference between the frequency of miRNA-146a (rs2910164 GG, CG and CC) genotypes of lung cancer patients (p=0.0097). Among the two study groups miRNA-146a CC homozygous genotype was significantly overrepresented by lung cancer patients than healthy controls (40% vs. 18.75% respectively). Upon estimating the allele frequency, it was observed that lung cancer patients represented higher miRNA-146a C allele (0.67) frequency than the miRNA-146a G allele (0.33) frequency (Table 3).

Table 3: Frequency of miRNA-146a (rs2910164 G>C) gene polymorphism

<table>
<thead>
<tr>
<th>Genotype</th>
<th>Healthy controls (n = 80)</th>
<th>Lung cancer patients (n = 80)</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>GG genotype</td>
<td>10(12.50)</td>
<td>5(6.25)</td>
<td></td>
</tr>
<tr>
<td>GC genotype</td>
<td>55(68.75)</td>
<td>43(53.75)</td>
<td></td>
</tr>
<tr>
<td>CC genotype</td>
<td>15(18.75)</td>
<td>32(40.00)</td>
<td>0.0097</td>
</tr>
<tr>
<td>G allele frequency</td>
<td>0.47</td>
<td>0.33</td>
<td></td>
</tr>
<tr>
<td>C allele frequency</td>
<td>0.47</td>
<td>0.67</td>
<td></td>
</tr>
</tbody>
</table>
Genotype and risk of developing Lung cancer: Odds ratios (OR) with 95% confidence intervals (CIs) was used to estimate the risk of developing lung cancer in association with different miRNA-146a (rs2910164 G>C) gene variants. Compared to miRNA-146a (rs2910164 GG) genotype, Odds ratios of 4.3 (1.24-14.69, p=0.036) for the homozygous CC genotypes was observed, suggesting a possible dominant effect of the miRNA-146a (rs2910164 CC) genotype in the risk of developing lung cancer (Table 4).

<table>
<thead>
<tr>
<th>Genotypes</th>
<th>Control (n = 80)</th>
<th>Cases (n=80)</th>
<th>OR (95% CI)</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>GG (ref)</td>
<td>10</td>
<td>5</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>GC</td>
<td>55</td>
<td>43</td>
<td>1.56 (0.49-4.91)</td>
<td>0.624</td>
</tr>
<tr>
<td>CC</td>
<td>15</td>
<td>32</td>
<td>4.3 (1.24-14.69)</td>
<td>0.036</td>
</tr>
</tbody>
</table>

Genotype distribution among clinical parameters: It was observed that the all the lung cancer stages (I to IV) represented higher frequency of miRNA-146a C allele. In the advanced stage with distant metastasis (stage IV), the frequency of miRNA-146a C allele was 0.64 and the frequency of miRNA-146a G allele was only 0.36. Both the histological types showed higher frequency of miRNA-146a C allele; however, the squamous cell carcinoma patients represented much higher frequency of miRNA-146a C allele than adenocarcinoma patients (SCC=0.78 & ADC= 0.63). With respect to the histological grades of lung cancer patients (Grade 1, 2 & 3), all showed higher frequency of miRNA-146a C allele compared to that of miRNA-146a G allele frequency (Table 5).

Table 4: Risk of developing Lung cancer in associated with miRNA-146a (rs2910164 G>C) genotypes

<table>
<thead>
<tr>
<th>Gender</th>
<th>GG (%)</th>
<th>GC (%)</th>
<th>CC (%)</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>3 (5.2)</td>
<td>27(46.6)</td>
<td>28(48.3)</td>
<td>0.048</td>
</tr>
<tr>
<td>Female</td>
<td>2(6.2)</td>
<td>16(53.8)</td>
<td>4(40.0)</td>
<td></td>
</tr>
</tbody>
</table>

Table 5: MiRNA-146a (rs2910164 G>C) polymorphism with respect to the clinical parameters of lung cancer patients

<table>
<thead>
<tr>
<th>Variables</th>
<th>MiRNA-146a genotypes</th>
<th>p value</th>
<th>Allele Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>GG (%)</td>
<td>GC (%)</td>
<td>CC (%)</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>3 (5.2)</td>
<td>27(46.6)</td>
<td>28(48.3)</td>
</tr>
<tr>
<td>Female</td>
<td>2(6.2)</td>
<td>16(53.8)</td>
<td>4(40.0)</td>
</tr>
<tr>
<td>TNM Stage</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I</td>
<td>0(0.0)</td>
<td>1(50.0)</td>
<td>1(50.0)</td>
</tr>
<tr>
<td>II</td>
<td>0(0.0)</td>
<td>4(57.1)</td>
<td>3(42.9)</td>
</tr>
<tr>
<td>III</td>
<td>2(7.7)</td>
<td>12(46.2)</td>
<td>12(46.2)</td>
</tr>
<tr>
<td>IV</td>
<td>3(6.7)</td>
<td>26(57.8)</td>
<td>16(35.6)</td>
</tr>
<tr>
<td>Distant Metastases</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M0</td>
<td>2(5.7)</td>
<td>17(48.6)</td>
<td>16(45.7)</td>
</tr>
<tr>
<td>M1</td>
<td>3(6.7)</td>
<td>26(57.8)</td>
<td>16(35.6)</td>
</tr>
<tr>
<td>Histological type</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ADC</td>
<td>5 (8.3)</td>
<td>34(56.7)</td>
<td>21(35.0)</td>
</tr>
<tr>
<td>SCC</td>
<td>0(0.0)</td>
<td>9(45.0)</td>
<td>11(55.0)</td>
</tr>
<tr>
<td>Histological Grades</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grade 1</td>
<td>0(0.0)</td>
<td>1(50.0)</td>
<td>1(50.0)</td>
</tr>
<tr>
<td>Grade 2</td>
<td>3(9.1)</td>
<td>12(36.4)</td>
<td>18(54.5)</td>
</tr>
<tr>
<td>Grade 3</td>
<td>2(8.7)</td>
<td>13(56.5)</td>
<td>8(34.8)</td>
</tr>
</tbody>
</table>
Discussion

MicroRNA 146a has been observed to regulate the functionality of several important genes which are involved in cancer development, such as TNF receptor-associated factor 6 (TRAF6), IL-1 receptor associated kinase (IRAK1) and nuclear factor kB (NFkB)\(^{(10)}\). MicroRNA-146a act as tumor suppresser gene and play an important role in reducing cell proliferation, increasing apoptosis, and enhancing chemosensitivity\(^{(11)}\). Increased miRNA-146a expression has been shown to negatively regulate the release of the proinflammatory chemokines IL-8 and RANTES among human lung alveolar epithelial cells\(^{(12)}\). MicroRNA-146a targets FADD mRNA thereby plays an anti-apoptotic role during T-Cell activation \(^{(12)}\). A considerable reduction in epidermal growth factor receptor (EGFR) protein has been observed in the MDA-MB-231 cell line on transduction with miRNA-146a\(^{(13)}\). In-vitro analysis studies had observed a significant role of miRNA-146a in suppression of breast cancer metastasis \(^{(13)}\). MicroRNA-146a targets insulin receptor substrate 2 (IRS2) thereby inhibits epithelial mesenchymal transition in non-small cell lung cancer \(^{(14)}\). Jia Y et al observed that the expression of miRNA-146a was significantly decreased among lung cancer patients \(^{(15)}\). It has been observed that the genetic variability in miRNA-146a (rs2910164C>G) has a significant influence on the expression and secondary structures of the miRNA-146a \(^{(7)}\). In the present study, we aimed to find out the association of miRNA-146a gene polymorphism with the risk of developing lung cancer disease.

Present study provides the evidence that the genetic variability in miRNA-146a gene is associated with the susceptibility to develop lung cancer disease. Lung cancer patients represented significantly higher percentage of miRNA-146a CC homozygous genotype as compared to that of healthy controls. It was observed that the risk of developing lung cancer disease was 4.3 times more in association with miRNA-146a CC genotype. Interestingly, it was observed that all the lung cancer stages (I to IV) and histological grades (Grades 1 to 3) represented higher frequency of miRNA-146a C allele. Squamous cell carcinoma patients represented much higher frequency of miRNA-146a C allele than adenocarcinoma patients. Our results are consistent with the findings of Zhihua Yin et al \(^{(7)}\); it was observed that the individuals carrying miRNA-146a CC genotype had more risk of developing lung cancer compared to that of individuals carrying miRNA-146a CG or GG genotypes\(^{(7)}\).

In conclusion, it was observed that the genetic variability in miRNA-146a gene may be associated with the susceptibility of lung cancer disease. In order to confirm our findings, large studies with different ethnic populations are required.

Acknowledgments: We are grateful to the patients with whose cooperation this study was possible. The authors acknowledge Deanship of Scientific Research, University of Tabuk, Saudi Arabia for the financial support of the study.

Conflict of Interest: The authors declare that there is no conflict of interest in relation to this article.

REFERENCES


Potential Impact of TP53 Gene Polymorphism rs1042522 G>C in Leukemia Patients of Saudi Arabia

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ABSTRACT

Background: The TP53 protein functions by regulating cell cycle arrest, DNA repair, apoptosis, and gene transcription to mediate cellular responses to DNA damage. Many studies have reported that the p53 codon 72 polymorphism is associated with Leukemia susceptibility; however, the conclusions are inconsistent. Therefore this study was aimed to investigate the association of TP53 Arg72Pro gene variations with leukemia susceptibility in Saudi Arabia.

Methodology: This population-based case–control study was done on 68 clinically confirmed Leukemia patients and 102 matched healthy controls with no history of any type of cancer. The TP53 (rs1042522 G/C) genotyping was detected by using Allele specific PCR.

Results: We observed a statistically significant difference in the frequencies of TP53 GG, GC and CC genotypes among patients and healthy controls (p=0.004). The higher frequencies of GG (26, 50%), CC (13.20%) genotypes were reported in leukemia patients than the health controls GG (22.54%) and CC (01%) whereas the higher frequencies of GC genotypes (76.47%) was reported in healthy controls compared to cases GC genotypes (60.30%). Our findings showed that the TP53 (rs1042522 G/C) variant was associated with an increased risk of leukemia in codominant inheritance model (OR=11.50, 95%CI= (1.33-99.3); RR=5.60 (0.85-36.7), P=0.020 GG vs CC and in recessive inheritance model (OR=15.5, 95%CI= (1.92-125.8), RR (6.33(0.98-40.8) P=0.010 (GC+ CC) vs CC. There was no significant difference in dominant inheritance model (OR=0.80, 95% CI= (0.39-1.64); RR=0.91(0.67-1.24),P=0.55 (GC+ CC) VS GG. This study indicates that TP53 CC the GG+GC combination may be risk factors for Leukemia patients in our Saudi population.

Conclusion: Our findings indicated that TP53 CC and (GC+CC) genotype are associated with an increased susceptibility to leukemia in Saudi Arabian population. It can be used as a predisposing genetic marker for Leukemia. Further studies with larger sample sizes are necessary to confirm our findings.

Keywords: SNP- Single-nucleotide polymorphism, Arg72Pro TP53 (rs1042522 G/C), Leukemia, OR-Odds ratio, CI-Confidence interval.

Introduction

The leukemia was present in 2.3 million people and caused 353,500 deaths in 2015⁽¹⁾. The Leukemia was diagnosed among new cases of about 352,000 (2). In Saudi Arabia the age-standardized incidence rate (ASIR) for leukemia was 3.0 per 100,000 populations as reported by The International Agency for Research on Cancer (IARC) (2008) whereas the age-standardized mortality rate (ASMR) was 2.6 per 100,000 populations⁽⁴⁾. From

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1975 to 2011 the registry of King Faisal Specialist Hospital and Research Center recorded 6216 cases of leukemia admitted to the hospital. The Saudi Cancer Registry (SCR) reported that leukemia ranked third in cancer incidence among the male population, and fifth among females\(^5\). The ASIR of leukemia in Saudi Arabia is slightly low in comparison with other Arabian Gulf countries in 2008.

The TP53 is a tumor suppressor gene and is located on chromosome 17p13. TP53 plays a pivotal role in the maintenance of genomic stability through encoding of the TP53 protein.\(^6\) This gene encodes a tumor suppressor protein containing transcriptional activation, DNA binding, and oligomerization domains. The encoded protein responds to diverse cellular stresses to regulate expression of target genes, thereby inducing cell cycle arrest, apoptosis, senescence, DNA repair, or changes in metabolism.\(^7\) Mutations in this gene are associated with a variety of human cancers, including hereditary cancers such as Li-Fraumeni syndrome\(^8\). Additional isoforms have also been shown to result from the use of alternate translation initiation codons from identical transcript variants\(^9\). The TP53 protein functions by regulating cell cycle arrest, DNA repair, apoptosis, and gene transcription to mediate cellular responses to DNA damage\(^10\). Frequent mutations and differential expression of TP53 in various cancers highlight the significance role of p53 in carcinogenesis and tumor progression\(^11\).

A functional single-nucleotide polymorphism (SNP) at codon 72 of TP53 gene (rs1042522), encoding a transversion of G to C (Arg to Pro), has been demonstrated to be associated with interindividual differences of TP53 expression to malignant tumors, including leukemia\(^12\). In addition, it has been reported that the Arg72 variant induces apoptosis markedly better compared to the Pro72 variant\(^13\). Thus, this genetic polymorphism holds promise as a potential biomarker for leukemia. The tumor protein p53 (TP53) plays a key role in preventing tumor formation through orchestrating a diversity of pathways such as DNA repair, regulation of cell cycle progression and activation of cell signaling transduction responses and apoptosis.\(^14-15\) Generally, TP53 mutations are thought to be associated with carcinogenesis\(^16-17\). Many studies have found that the TP53 played an important role during the development of leukemia.\(^18\) Among known TP53 polymorphisms, Arg72Pro (rs1042522), an amino acid substitution of arginine (Arg) to proline (Pro) at position 72, is one of the most widely studied polymorphisms.\(^19\) It was reported that the allele A1 (proline residue, Pro72) was more frequent in patients with leukemia than in controls, and among leukemia patients who had no cytogenetic response than among responders\(^20\).

However, subsequent studies showed different results about TP53 Arg72Pro polymorphism and leukemia susceptibility. To date, numerous studies have investigated the relationship between the TP53 Arg72Pro polymorphism and predisposition to leukemia, but the impact of TP53 Arg72Pro polymorphism on leukemia was still conflicting due to inconsistent findings in individual studies therefore this study was aimed to investigate the association of TP53 Arg72Pro gene variations with leukemia susceptibility in Saudi Arabia.

**Materials and Method**

**Sample collection:** This population-based case–control study was done on 68 clinically confirmed Leukemia patients and 102 matched healthy controls with no history of any types of cancer and not related to the patients. After assessing the clinicopathological findings, a 4ml sample of peripheral blood was collected by venipuncture in EDTA tubes from each patient and healthy control.

**DNA extraction:** The DNA was extracted by using DNeasy Blood Kit (cat 69506) from Qiagen (Germany) as per the manufactures instructions. The extracted DNA was dissolved in nuclease-free water and stored at 4°C until use. Quality and integrity of DNA were checked by NanoDrop™ (Thermo Scientific, USA).

**Genotyping for TP53 Arg72Pro or G/C allele (rs1042522 C) polymorphism:** The TP53 Arg72Pro or G/C genotyping was detected by using Allele specific-PCR. The or AS-PCR primers were designed by using Primer3 software as depicted in Table 1.
Table 1: Allele specific-PCR primers used for analysis of TP53 (rs1042522 G/C) gene variation

<table>
<thead>
<tr>
<th>TP53 polymorphism</th>
<th>Exon 4 (Codon 72) Arg&gt;Pro</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>TP53</td>
<td>(rs1042522 G/C)</td>
<td></td>
</tr>
<tr>
<td>Nucleotide change</td>
<td>CGC/CCC (G&gt;C)</td>
<td>CGC-Arginine CCC-Proline</td>
</tr>
<tr>
<td>Amino acid change</td>
<td>R [Arg]/P [Pro]</td>
<td></td>
</tr>
</tbody>
</table>

**AS-PCR Primer sequence for TP53 GG or Arg/Arg genotype**

<table>
<thead>
<tr>
<th>Direction</th>
<th>Primer sequence</th>
<th>Annealing Tempt</th>
<th>Product size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arg72 allele F1</td>
<td>5’-AGGGCTGGGGACCTGGAGG-3’</td>
<td>230bp</td>
<td>58°C</td>
</tr>
<tr>
<td>Reverse primer R1</td>
<td>5’-AGCCCAGAGCGAAACCGTAGC-3’</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**AS-PCR Primer sequence for TP53 CC or Pro/Pro genotype**

<table>
<thead>
<tr>
<th>Direction</th>
<th>Primer Sequence</th>
<th>Annealing Tempt</th>
<th>Product size</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pro72 allele F2</td>
<td>5’-ATGCCAGAGGCTGCTCCCCC-3’</td>
<td>178bp</td>
<td>65°C</td>
</tr>
<tr>
<td>Reverse primer R2</td>
<td>5’-CTGTTGACGGGGCCACGC-3’</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The AS-PCR was performed in a reaction volume of 25uL containing template DNA (50ng), F1 -0.20uL , R1 -0.20uL , F2-0.20uL , R2 -0.20uL of 25pmol of each primers and 10uL from GoTaq® Green Master Mix (cat no M7122) (Promega, USA). The final volume of 25 uL was adjusted by adding nuclease free ddH2O .Finally 2ul of DNA was added from each patient. The AS –PCR was converted to AS-PCR.

**Thermocycling conditions:** The amplification conditions used were at 95°C for 10 minutes followed by 40 cycles of 94°C for 35sec, 58°C for 40 sec for Proline and 65°C for 40 sec for arginine, 72°C for 40 sec followed by the final extension at 72°C for 10 minutes. The amplification products were separated by electrophoresis through 2% agarose gel stained with 0.5μg/mL ethidium bromide and visualized on a UV transilluminator. Primers F1 and R1 amplify a wild-type allele (G allele), generating a band of 238 bp, and primers F2 and R2 generate a band of 178bp from the mutant allele (C allele) as depicted in figure 2.
**Statistical analysis:** Differences in the TP53 (rs1042522 G/C) allele and genotype frequencies between groups were evaluated using Chi-square test. The associations between TP53 (rs1042522 G/C) gene and risk of Leukemia were estimated by computing the odds ratios (ORs), risk ratios (RRs) and risk differences (RDs) with 95% confidence intervals (CIs). All statistical analyses were performed using Graph Pad Prism 6.0 or SPSS 16.0.

**Results**

**Study population:** This population-based case–control study was done on 68 clinically confirmed Leukemia patients and 102 matched healthy controls. This research study was approved by the Research ethics committee, University of Tabuk and written informed consent was obtained from all the subjects before enrollment.

**Genotype distribution of TP53 G/C gene variation in Case-control:** We observed a statistically significant difference in the frequencies of TP53 GG, GC and CC genotypes among patients and healthy controls (p=0.004) as summarized in Table 2.

<table>
<thead>
<tr>
<th>Subjects</th>
<th>N =</th>
<th>GG</th>
<th>GC</th>
<th>CC</th>
<th>X2</th>
<th>DF</th>
<th>P value</th>
<th>G</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leukemia cases</td>
<td>68</td>
<td>18 (26.50%)</td>
<td>41</td>
<td>09</td>
<td>10.77</td>
<td>2</td>
<td>0.004</td>
<td>0.57</td>
<td>0.43</td>
</tr>
<tr>
<td>Controls</td>
<td>102</td>
<td>23 (22.54%)</td>
<td>78</td>
<td>01</td>
<td>0.61</td>
<td>0.39</td>
<td></td>
<td>0.61</td>
<td>0.39</td>
</tr>
</tbody>
</table>

This study reported significantly higher percentage of GG (26.50%), GC (60.30%) and CC (13.20%) genotypes in patients compared to controls GG (22.54%), GC (76.47%) and CC (01%) as depicted in figure 3. The higher percentage of CC genotype (13.20%) was reported in patients compared to healthy controls (1%) as depicted in table 2.

**Allelic distribution of TP53 (rs1042522 G/C) gene variation in Cases-controls:** The frequency of C allele (fC) was found to be higher among the leukemia patients (0.43) than the healthy controls (0.39) whereas, the higher frequency of G allele (fG) (0.61) was observed among the controls than the leukemia patients than (0.57) as depicted in table 2.

**Risk of Leukemia patients with TP53 (rs1042522 G/C) gene polymorphism:** A multivariate analysis based on logistic regression like odds ratio, risk ratio and risk difference with 95% confidence intervals were calculated for each group to estimate the association between the TP53 (rs1042522 G/C) variant and risk of Leukemia patients in Saudi patients as depicted in table 3. Our findings showed that the TP53 (rs1042522 G/C) variant was associated with an increased risk of leukemia in codominant inheritance model (OR=11.50, 95%CI= (1.33-99.3); RR=5.60 (0.85-36.7), P=0.020 GG vs CC and in case of and recessive inheritance model (OR=15.5, 95%CI= (1.92-125.8), RR (6.33(0.98-40.8) P=0.010 (GC+ CC) vs CC .There was no significant difference in dominant inheritance model.
(OR=0.80, 95% CI= (0.39-1.64); RR=0.91(0.67-1.24), P=0.55 (GC+ CC) VS GG However, we did not find any relationships among tumor grade and metastasis status and this polymorphism. This study indicates that the TP53 (rs1042522 G/C) polymorphism CC genotype and the GG+GC combination may be risk factors for Leukemia patients in our Saudi population.

Table 3: Association of TP53 (rs1042522 G/C) gene variation with in leukemia

<table>
<thead>
<tr>
<th>Genotypes</th>
<th>Healthy controls (N = 102)</th>
<th>Leuk patients (N = 68)</th>
<th>OR (95% CI)</th>
<th>Risk Ratio(RR)</th>
<th>P-Val</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Codominant</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TP53-GG</td>
<td>23</td>
<td>18</td>
<td>1(ref.)</td>
<td>1(ref.)</td>
<td></td>
</tr>
<tr>
<td>TP53-GC</td>
<td>78</td>
<td>41</td>
<td>0.67 (0.32-1.38)</td>
<td>0.85(0.63-1.15)</td>
<td>0.30</td>
</tr>
<tr>
<td>TP53-CC</td>
<td>01</td>
<td>09</td>
<td>11.50(1.33-99.3)</td>
<td>5.60(0.85-36.7)</td>
<td>&lt;0.020</td>
</tr>
<tr>
<td><strong>Dominant</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TP53-GG</td>
<td>23</td>
<td>18</td>
<td>1(ref.)</td>
<td>1(ref.)</td>
<td></td>
</tr>
<tr>
<td>TP53 (GC + CC)</td>
<td>79</td>
<td>50</td>
<td>0.80(0.39-1.64)</td>
<td>0.91(0.67-1.24)</td>
<td>&lt;0.55</td>
</tr>
<tr>
<td><strong>Recessive</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TP53(GG + GC)</td>
<td>102</td>
<td>59</td>
<td>1(ref.)</td>
<td>1(ref.)</td>
<td></td>
</tr>
<tr>
<td>TP53-CC</td>
<td>01</td>
<td>09</td>
<td>15.5(1.92-125.8)</td>
<td>6.33(0.98-40.8)</td>
<td>0.010</td>
</tr>
<tr>
<td><strong>Allele</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TP53 - G</td>
<td>125</td>
<td>77</td>
<td>1(ref.)</td>
<td>1(ref.)</td>
<td></td>
</tr>
<tr>
<td>TP53 - C</td>
<td>80</td>
<td>59</td>
<td>1.19(0.77-1.85)</td>
<td>1.08(0.90-1.29)</td>
<td>&lt;0.42</td>
</tr>
</tbody>
</table>

**Discussion**

Disruption of the p53 tumor suppressor pathway is a primary cause of tumorigenesis. There is clear discrepancies between ethnicity and geographic area regarding the peak age incidence and mortality of Leukemia. Underlying variances include genetic, environmental, and socioeconomic factors. The wild-type p53 codon has two common polymorphic variants from a single-base-pair substitution at codon 72, where either C-C-C encodes proline (p53-p72) or C-G-C encodes arginine (p53-R72). The TP53 codon 72 polymorphism Arg72Pro (rs1042522), an amino acid substitution of arginine (Arg) to proline (Pro) at position 72, is one of the most investigated polymorphisms. Bergamaschi et al.\(^{[20]}\) reported that allele A1 (proline residue, Pro72) was more frequent in patients with CML than in controls, and among CML patients who had no cytogenetic response than among responders. However, the subsequent studies did not achieve the same or similar results, and the association between TP53 Arg72Pro polymorphism and AML susceptibility is still controversial. Our results indicated that the higher percentage of GG (26.50%) and CC (01%) as depicted whereas the higher percentage GC (76.47%) heterozygosity was reported in leukemia patients than the healthy controls GC (60.30%). When stratified by ethnicities, a protective effect of the TP53 codon 72 Pro allele was found in Asians even with a small number of studies (331 cases and 437 controls). The association was calculated for each group by multivariate analysis. The significant correlation was reported between the TP53 genotypes and risk of Leukemia patients in our population. The TP53 genotypes was associated with an increased risk of leukemia in codominant inheritance model (OR=11.50, 95%CI= (1.33-99.3); RR=5.60 (0.85-36.7), P=0.020 GG vs CC and in case of recessive inheritance model (OR=15.5, 95%CI= (1.92-125.8), RR (6.33(0.98-40.8) P=0.010 (GC+ CC) vs CC. The current study confirmed the relationship of TP53 (rs1042522 G/C) gene polymorphisms and the risk of Leukemia in the Saudi Arabian population. Similar results were also found in stratified analysis according to ethnicity and source of controls. Lastly, since the leukemia onset involves multiple genetic and environmental factors, although TP53 Arg72Pro polymorphism showed no independent significant association with the susceptibility of this disease, it may have influence on leukemia susceptibility in combination with other elements.
Conclusion: Our findings indicated that TP53 CC and (GC+CC) genotype are associated with an increased susceptibility to leukemia in our Saudi Arabian population. It can be used as a predisposing genetic marker for Leukemia. Further studies with larger sample sizes are necessary to confirm our findings.

Acknowledgement: We acknowledge the support from the Deanship of Scientific Research for funding this research. We are grateful to the patients with whose cooperation this study was possible.

Ethical Clearance: The study was ethically approved from ethics committee, University of Tabuk.

Conflict of Interest: Nil

REFERENCES
Analysis of Human Resources Performance Measurement by Human Resources Scorecard Method at Hospital in Surabaya

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ABSTRACT

Numerous of hospitals in Surabaya have not yet implemented systematic employee performance measurements. So the hospitals have not yet able to know the success rate of the human resources division strategy in realizing the company’s vision, mission, and strategy. The Human Resources Scorecard (HRSC) is a form of human resource measurement that correlating people-strategies-performance to be measured the extent to which they contribute to the achievement of the company’s vision, mission and strategy. The strategy of mixed methods in this research is the sequence of qualitative and quantitative analysis. The objective of this strategy is to design the strategy map of human resource and identify success indicators of each strategy objectives through qualitative data analysis, and further quantitative data analysis to find out the process of HR performance measurement by Human Resources Scorecard method based on Analytical Hierarchy Process (AHP) and Traffic Light System.

Keywords: Performance Measurement, Human Resources Scorecard, AHP, Traffic Light System

Introduction

Human resources are one of the main factors that determine the level of a company’s performance in achieving the objectives, and they are one of the important tangible assets in the company. The companies are need employees who are fostered and educated to serve a good performance. By having qualified and capable employees will improve the company’s performance. A company that loses all its equipment but still has the skills and knowledge of its employees will be able to get back into business competition in a relatively quick time while a company that loses its skilled employees but retains its equipment will be difficult to recover². It can be seen from these situations that human resources is very important assets in a company, especially in a hospital. So it is necessary to measure the performance of human resources in order to know the success rate of the hospital.

Performance measurement is an assessment process of the work progress on goals and objectives in the management of human resources to produce goods and services, including information on the efficiency and effectiveness of actions in achieving organizational goals¹¹. Measurements on performance need to be performed to determine whether during the performance execution there were deviations from predetermined plans, or whether the performance can be performed within the specified time schedule, or whether the performance results have been achieved as expected.

Robert S. Kaplan and David P. Norton in 1992 introduced performance measurement techniques involving measurement of financial and nonfinancial aspects, known as Balanced Scorecard. The Balanced Scorecard translates missions and strategies into different objectives and measures, which were prepared into four perspectives: financial perspective, customer perspective, internal business process perspective, and learning and growth perspective. Based on the Balanced Scorecard model introduced by Kaplan and Norton, it was developed a new tool in human resource management and employee performance measurement, i.e. the Human Resources Scorecard. This model was introduced by

DOI Number: 10.5958/0976-5506.2019.01304.4
Brian E. Becker, Mark A. Huselid, and Dave Ulrich in 2001. Human Resources Scorecard tries to measure HR by correlating people-strategy-performance to create excellent companies, and also outlines vision, mission, and strategy, into human resources action that their contribution can be measured. The target achievement will depend on the other resources (machine, material, method, and finance), where the resources will be moving if the human is moving. To assess the effectiveness of employees contribution is not only seeing the lagging indicator, but it is also necessary to consider the leading indicator as well. Lagging indicator is the result of company performance, while leading indicator is the performance expected to achieve a final result to be achieved by the company.

Performance measurement system that conducted at Hospital in Surabaya mostly do not use standard format as KPI or Scorecard. In this research, human resource performance analysis is performed in hospitals that focus on human resources by using Human Resource Scorecard. So in this research, the design will be conducted on human resources performance measurement system by Human Resources Scorecard approach.

Material and Method

This study used a sample of employees at Emergency Unit at one hospital in Surabaya. The study was conducted in three stages, which are preliminary survey, data collection, processing and analysis. Data collection is an important part of the research that will be used as the material for preparing the research report. Sources of data obtained in this research are primary data and secondary data source. Primary data was obtained directly from the hospital by conducting observations and interviews on hospital employees. The interviews were explained the implementation of company’s vision, mission and strategy, strategic objectives, employee’s behaviors that support strategy, company systems, performance indicators, strategic goals and initiatives. And the questionnaires were distributed to the expert respondents, those are the Head of Human Resources and the Head of Emergency Unit to get the priority weight. Secondary data was collected in the processed form. In this case the secondary data includes documents and reports, such as company’s mission, vision, strategic objectives, employee turnover, employee’s performance score, employee’s productivity, etc.

Findings

1. Strategy Map: In HRSC measurement it is important to firstly make a strategy map of human resource division. Developing a strategic map should define clear, measurable, and achievable targets that lead to improvements in company efficiency. In each of HRSC perspective, the goals should be determined from human resource behavior.

The company’s targets are the preferred company, cost optimization, improve profitability, and customer-oriented. These are in line with hospital’s vision and mission that are committed to optimize the life quality of the people with loving, trustworthy and customer-focused services. Based on the vision and mission, the strategic goals of this hospital are to provide trusted and customer-focused service, increase profits, and minimize the work risks.

The successful of strategic goals achievement is greatly influenced by the role of human resources as the driving wheel. Therefore the strategy must be appropriate on target, and the following is the strategic map of human resources that shown in Figure 1.

![Figure 1: Strategic map of hospital](image)

2. Key Performance Indicator: Each strategy objective has a success indicator. KPI is a set of quantitative measures that companies used to measure performance in accomplish their strategic and operational objectives. Identification of strategy objective KPI of Human Resource Division on Emergency Unit is shown in Table 1.
Table 1: Identification of strategy objective KPI of Human Resource Division on Emergency Unit

<table>
<thead>
<tr>
<th>No.</th>
<th>Strategic goals</th>
<th>Lagging indicator (measurement of result)</th>
<th>Leading indicator (measurement of performance trigger)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Financial Perspective</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>F1: Improving efficiency of HR cost</td>
<td>F11a: Improving hospital’s operational cost</td>
<td>F11b: Company’s productivity</td>
</tr>
<tr>
<td></td>
<td></td>
<td>F12a: Percentage of employees turnover</td>
<td>F12b: Recruiting cost</td>
</tr>
<tr>
<td></td>
<td>F2: Improving employee productivity</td>
<td>F2a: Improving employee productivity</td>
<td>F2b: Growth rate of income</td>
</tr>
<tr>
<td>2.</td>
<td>Employee Perspective</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>C1: Improving employee responsibility</td>
<td>C11a: Rate of employee’s presence</td>
<td>C11b: Recapitulation of employee’s absenteeism</td>
</tr>
<tr>
<td></td>
<td></td>
<td>C12a: Percentage of sanctioned employees</td>
<td>C12b: Intensity of manager supervision to employee</td>
</tr>
<tr>
<td></td>
<td>C2: Improving employee relationship</td>
<td>C2a: Rate of employee’s job accomplishment</td>
<td>C2b: Employee who accomplished job target</td>
</tr>
<tr>
<td></td>
<td>C3: Improving employee satisfaction</td>
<td>C3a: Score of employee satisfaction</td>
<td>C3b: Number of employee’s complain</td>
</tr>
<tr>
<td>3.</td>
<td>Internal Business Process Perspective</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>I1: Improving team work</td>
<td>I11a: Intensity of formal meeting</td>
<td>I11b: Working coordination between manager and employee, presence of employees</td>
</tr>
<tr>
<td></td>
<td></td>
<td>I12a: Intensity of informal meeting</td>
<td>in the meeting</td>
</tr>
<tr>
<td></td>
<td>I2: Improving hospital EHS</td>
<td>I2a: Number of working accident</td>
<td>I2b: Supporting facility of working safety</td>
</tr>
<tr>
<td></td>
<td>I3: Improving employee’s skill and competence</td>
<td>I3a: Score of employee’s competence</td>
<td>I3b: Employee’s skill</td>
</tr>
<tr>
<td></td>
<td>I4: Improving service quality</td>
<td>I4a: Score of SPM</td>
<td>I4b: Improving service quality</td>
</tr>
<tr>
<td>4.</td>
<td>Learning and growth perspective</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>L1: Improving career development system</td>
<td>L1a: Total career development system</td>
<td>L1b: Number of employees who get career improvement</td>
</tr>
<tr>
<td></td>
<td>L2: Employee's training</td>
<td>L2a: Number of conducted training</td>
<td>L2b: Number of employees who pass the training</td>
</tr>
<tr>
<td></td>
<td>L3: Improving soft skill</td>
<td>L3a: Number of soft skill training</td>
<td>L3b: Number of employees who able to communicate effectively</td>
</tr>
</tbody>
</table>

3. Weighting by AHP Method: Analytical Hierarchy Process (AHP) is a weighting method introduced by Thomas L. Saaty. The first step is spreading the weighting questionnaires to resource persons. This weighting is perception or opinion in nature, so it must be done by people who understand the vision, mission, condition and strategy of the hospital. After that the second step is giving weight based on the importance of each strategy objective. Weighting results are shown in Table 2.

Table 2: Weighting result by AHP method

<table>
<thead>
<tr>
<th>Code</th>
<th>Lagging indicator (measurement of result)</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>F11a</td>
<td>Improving hospital’s operational cost</td>
<td>0.524</td>
</tr>
<tr>
<td>F12a</td>
<td>Percentage of employees turnover</td>
<td>0.142</td>
</tr>
<tr>
<td>F2a</td>
<td>Improving employee productivity</td>
<td>0.334</td>
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</tbody>
</table>
Conted…

<table>
<thead>
<tr>
<th>Employee Perspective</th>
<th>C11a</th>
<th>Rate of employee’s presence</th>
<th>0.096</th>
</tr>
</thead>
<tbody>
<tr>
<td>C12a</td>
<td>Percentage of sanctioned employees</td>
<td>0.161</td>
<td></td>
</tr>
<tr>
<td>C2a</td>
<td>Rate of employee’s job accomplishment</td>
<td>0.277</td>
<td></td>
</tr>
<tr>
<td>C3a</td>
<td>Score of employee satisfaction</td>
<td>0.466</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Internal Business Process Perspective</th>
</tr>
</thead>
<tbody>
<tr>
<td>I11a</td>
</tr>
<tr>
<td>I12a</td>
</tr>
<tr>
<td>I2a</td>
</tr>
<tr>
<td>I3a</td>
</tr>
<tr>
<td>I4a</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Learning and growth perspective</th>
</tr>
</thead>
<tbody>
<tr>
<td>L1a</td>
</tr>
<tr>
<td>L2a</td>
</tr>
<tr>
<td>L3a</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Financial Perspective</th>
</tr>
</thead>
<tbody>
<tr>
<td>F11a</td>
</tr>
<tr>
<td>F12a</td>
</tr>
<tr>
<td>F2a</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Code</th>
<th>Lagging indicator (measurement of result)</th>
<th>Target Max</th>
<th>Target Min</th>
<th>2016</th>
<th>2017</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Financial Perspective</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>F11a</td>
<td>Improving hospital’s operational cost</td>
<td>50%</td>
<td>10%</td>
<td>24.8%</td>
<td>48%</td>
</tr>
<tr>
<td>F12a</td>
<td>Percentage of employees turnover</td>
<td>5%</td>
<td>10%</td>
<td>9.7%</td>
<td>21%</td>
</tr>
<tr>
<td>F2a</td>
<td>Improving employee productivity</td>
<td>50%</td>
<td>5%</td>
<td>48%</td>
<td>135%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Employee Perspective</th>
</tr>
</thead>
<tbody>
<tr>
<td>C11a</td>
</tr>
<tr>
<td>C12a</td>
</tr>
<tr>
<td>C2a</td>
</tr>
<tr>
<td>C3a</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Code</th>
<th>Leading indicator (measurement of performance trigger)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Financial Perspective</strong></td>
<td></td>
</tr>
<tr>
<td>F11b</td>
<td>Company’s productivity</td>
</tr>
<tr>
<td>F12b</td>
<td>Recruiting cost</td>
</tr>
<tr>
<td>F2b</td>
<td>Growth rate of income</td>
</tr>
</tbody>
</table>

4. **Score Calculation**: The performance calculation is performed after the KPI is made and the weighting has been given. The first step is to determine the maximum and minimum score of each indicator. Then enter the reality score that occurs in the field, so it can be seen how the position of the reality score and the targeted score.

| Table 3: Target and Reality Score of Lagging and Leading Indicator |

```markdown
<table>
<thead>
<tr>
<th>Code</th>
<th>Lagging indicator (measurement of result)</th>
<th>Target Max</th>
<th>Target Min</th>
<th>2016</th>
<th>2017</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Financial Perspective</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>F11a</td>
<td>Improving hospital’s operational cost</td>
<td>50%</td>
<td>10%</td>
<td>24.8%</td>
<td>48%</td>
</tr>
<tr>
<td>F12a</td>
<td>Percentage of employees turnover</td>
<td>5%</td>
<td>10%</td>
<td>9.7%</td>
<td>21%</td>
</tr>
<tr>
<td>F2a</td>
<td>Improving employee productivity</td>
<td>50%</td>
<td>5%</td>
<td>48%</td>
<td>135%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Employee Perspective</th>
</tr>
</thead>
<tbody>
<tr>
<td>C11a</td>
</tr>
<tr>
<td>C12a</td>
</tr>
<tr>
<td>C2a</td>
</tr>
<tr>
<td>C3a</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Code</th>
<th>Leading indicator (measurement of performance trigger)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Financial Perspective</strong></td>
<td></td>
</tr>
<tr>
<td>F11b</td>
<td>Company’s productivity</td>
</tr>
<tr>
<td>F12b</td>
<td>Recruiting cost</td>
</tr>
<tr>
<td>F2b</td>
<td>Growth rate of income</td>
</tr>
</tbody>
</table>
Conted…

<table>
<thead>
<tr>
<th>Employee Perspective</th>
<th>Sickness rate</th>
<th>10%</th>
<th>20%</th>
<th>4.7%</th>
<th>23.5%</th>
</tr>
</thead>
<tbody>
<tr>
<td>C11b</td>
<td>Intensity of manager supervision to employee</td>
<td>50%</td>
<td>25%</td>
<td>30%</td>
<td>40%</td>
</tr>
<tr>
<td>C2b</td>
<td>Employee who accomplished job target</td>
<td>100%</td>
<td>80%</td>
<td>65%</td>
<td>80%</td>
</tr>
<tr>
<td>C3b</td>
<td>Number of employee’s complain</td>
<td>0%</td>
<td>20%</td>
<td>22%</td>
<td>29%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Internal Business Process Perspective</th>
<th>Working coordination between manager and employee, presence of employees in the meeting</th>
<th>100%</th>
<th>80%</th>
<th>81%</th>
<th>88%</th>
</tr>
</thead>
<tbody>
<tr>
<td>I11b</td>
<td>Employee’s involvement in gathering</td>
<td>100%</td>
<td>80%</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>I12b</td>
<td>Supporting facility of working safety</td>
<td>100%</td>
<td>80%</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>I2b</td>
<td>Employee’s skill</td>
<td>80%</td>
<td>70%</td>
<td>73%</td>
<td>79%</td>
</tr>
<tr>
<td>I4b</td>
<td>Improving service quality</td>
<td>100%</td>
<td>90%</td>
<td>70%</td>
<td>80%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Learning and growth perspective</th>
<th>Number of employees who get career improvement</th>
<th>10%</th>
<th>5%</th>
<th>0%</th>
<th>5.8%</th>
</tr>
</thead>
<tbody>
<tr>
<td>L1b</td>
<td>Number of employees who pass the training</td>
<td>100%</td>
<td>90%</td>
<td>85%</td>
<td>90%</td>
</tr>
<tr>
<td>L3b</td>
<td>Number of employees who able to communicate effectively</td>
<td>100%</td>
<td>80%</td>
<td>95.2%</td>
<td>100%</td>
</tr>
</tbody>
</table>

Analysis of Performance Calculation Result: Analysis of the KPI data table is using Traffic Light System. Traffic Light System is closely related to Scoring System. Traffic Light System is functioned as a sign whether the score of a performance indicator requires improvement or not and it will be presented by three colors, these are:

a. **Green color**: It is interpreted that the achievement of a performance indicator has been achieved and it is given for the performance score at the level of eight to ten.

b. **Yellow color**: It is interpreted that the achievement of a performance indicator has not yet achieved, although the score is closely to the target. The yellow color is given for the performance score at the levels of four to seven. So the management must be careful with each possibility that will arise.

c. **Red color**: It is interpreted that the achievement of a performance indicator is really under of the target set and it is requires immediately improvement. The red color is given for the performance score at the level of zero to three.

The followings are the result of analysis using traffic light system:

| Table 4: KPI’s Traffic Light System of Lagging Indicator |
|----------------------------------|-------------------------------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| KPI                              | Performance F | Performance F | Performance F | Performance F | Performance F | Performance F | Performance F | Performance F | Performance F | Performance F | Performance F | Performance F | Performance F |
|----------------------------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|
|                                  | 1.1a | 1.2a | 2a | C | 1.1a | C | 1.2a | C | 1.3a | I | 1.1a | I | 1.2a | I | 1.3a | I | 1.4a | L | 1a | L | 2a | L | 3a |
| 10 | 50 | 5 | 50 | 100 | 0 | 100 | 80 | 12 | 8 | 0 | 100 | 100 | 10 | 60 | 4 |
| 9  | 46.6 | 5.6 | 49.7 | 99.3 | 2.8 | 95 | 76.8 | 10.9 | - | 0.6 | 96.6 | - | 8.4 | 56.4 | 3.8 |
| 8  | 42.8 | 6.2 | 49.5 | 98.7 | 5.1 | 90 | 74 | 10.1 | - | 1.2 | 93 | - | 7 | 52.8 | 3.5 |
| 7  | 39.2 | 6.9 | 49.2 | 98 | 7.4 | 85 | 71.2 | 9.2 | - | 1.9 | 89.4 | - | 5.6 | 49.2 | 3.2 |
| 6  | 35.6 | 7.6 | 48.9 | 97.3 | 9.7 | 80 | 68.4 | 8.4 | - | 2.6 | 85.8 | - | 4.2 | 45.6 | 2.9 |
| 5  | 32.8 | 8.3 | 48.6 | 96.6 | 12 | 75 | 65.6 | 7.6 | - | 3.3 | 82.2 | - | 2.8 | 42 | 2.6 |
| 4  | 28.4 | 9 | 48.3 | 95.9 | 14.3 | 70 | 62.8 | 6.8 | - | 4 | 78.6 | - | 1.4 | 38.4 | 2.3 |
| 3  | 24.8 | 9.7 | 48 | 95.2 | 16.6 | 65 | 60 | 6 | 1 | 4.7 | 75 | 100 | 0 | 54.8 | 2 |
| 2  | 22.1 | 13.4 | 38.6 | 93.4 | 18.9 | 61.4 | 58 | 4.6 | - | - | 73.2 | - | 0 | 33.2 | 1.7 |
| 1  | 18.8 | 17.2 | 29.3 | 91.7 | 21.2 | 57.7 | 56 | 3.3 | - | - | 71.6 | - | 0 | 31.6 | 1.3 |
| 0  | 15 | 21 | 20 | 90 | 23.5 | 54 | 54 | 2 | 1 | 4.7 | 70 | 100 | 0 | 30 | 1 |
| Score | 9 | 0 | 10 | 2 | 0 | 6 | 4 | 5 | 10 | 10 | 4 | 10 | 6 | 3 | 6 |
| Weight | 0.524 | 0.142 | 0.334 | 0.096 | 0.161 | 0.277 | 0.466 | 0.141 | 0.082 | 0.254 | 0.113 | 0.430 | 0.137 | 0.239 | 0.824 |
| Value | 4.716 | 0 | 3.34 | 0.192 | 0 | 1.662 | 1.864 | 0.705 | 0.620 | 2.54 | 0.452 | 4.300 | 0.528 | 0.717 | 3.744 |
The results of performance measurement of lagging indicator are greater than the leading indicator. However, this is not a problem because the formed performance balance is close to balanced conditions and both of them are in the green category. Lagging indicator got 8 score and leading indicator got 8.18 score.

If the performance of lagging indicators are much better than the performance of leading indicators it is indicates that the achievement of lagging indicator is more based on luck or coincidence factors, because that achievement is not accompanied by good achievement of performance leading indicator. While, the companies cannot depend continually on the luck factor, because it wouldn’t accompany them in each time and each efforts. Therefore, if this condition was occurred then the company must improve the performance process to support the outcomes of expected results by the company.

If the performance of leading indicators are much better than the performance of lagging indicator it is indicates that the process to achieve the expected results of the company has not yet appropriated on target, because the achievement of lagging indicators is bad or under of the target. The conditions like this is too injuring the company, because this means that the process undertaken by the company to achieve the company’s target is feels vainly because the end result that expected by the company cannot be achieved. Therefore, if this condition is experienced by the company then the company must think about the appropriated process of target to be done so that the end result is achieved.

**Conclusion**

The results of this study indicate the hospital strategy map in conducting human resource management activities to achieve strategic goals is a description of the vision and mission of the hospital. The causing and the effect factors of this hospital has been running in balance so that the company has made the appropriated process in achieving the targets to be achieved. It is needs the improvement in some indicators that still provide red results on HRSC analysis results.

**Ethical Clearance:** Taken from ethic committee of the hospital

**Source of Funding:** Self Funding

**Conflict of Interest:** There aren’t any relevant conflict of interest

**REFERENCES**


Modeling the Number of Cases of Tuberculosis Sensitive Drugs (TBSD) in East Java using Geographically Weighted Poisson Regression (GWPR)

Linda Augustien Makalew¹,², Kuntoro³, Bambang Widjanarko Otok⁴, Soenarnatalina M., Semuel Layuk²

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ABSTRACT

Tuberculosis lungs attacked the most productive age group (15-50 years), social economy is weak and low education. Estimated a patient TB adult will lose the average time it works 3-4 months. This resulted in the loss of annual revenue run their house around 20-30%. In addition to harm economically, TB also provides other negative impact socially, even excluded by the community. In this research will be discussed about the factors that were supposed to affect many cases for TBSD which occurred in East Java with Poisson regression. But because they found the existence of the case of overdispersi so that need to pay attention to the factors location from the point of observation and used GWPR. From the results of the analysis and discussion, obtained the result that GWPR model more appropriate to analyze the patients TBSD in East Java because it has smaller AIC value. The dominant factor in influencing TBSD in all districts in East Java is the percentage of poor families (X1), except in Ngawi district and Magetan. For bTA+ (X2), the number of HIV/AIDS (X3), numbers genesis diabetes mellitus (X4), the percentage of the population density (X5) and rasio health workers (X6) affect TBSD patients in 7 groups of districts in East Java.

Keywords: TBSD, Poisson Regression, GWPR

Introduction

The Disease TB lungs is the cause of the death of three number after cardiovascular disease and respiratory disease in all age groups and the number one from the infectious diseases. Roughly estimated each 100,000 inhabitants of Indonesia there are 115 new patients TB positive lung. The Disease TB lungs attacked the most productive age group (15-50 years), social economy is weak and low education¹. Estimated a patient TB adult will lose the average time it works 3-4 months. This resulted in the loss of annual revenue run their house around 20-30%. In addition to harm economically, TB also provides other negative impact socially, even excluded by the community. The main cause of increasing the burden of the problem of TB among others is poverty on various community groups such as in the countries of developing, changes it conveys demographics due to the rising world population and changes in the structure of the age of population; the impact of the HIV pandemic.

The problem of treatment TB become an important public health problem and need to be solved soon. The incidence of drug resistance increased since the introduction of the treatment of TB that first time in 1943. Tuberculosis Case Sensitive drugs continues to increase. Mok, et al² write that from 378 respondents with TB of Internally throughout the year 2010 with 7 Hospital Education in Korea, obtained 57.1% patients with TB of primary SD. Clinical managements TB uses drugs anti-TB lini I and II causing the problem of tolerance and side effects. Patients with TB that have undergone treatment for the first time, feel himself back healthy, they really very infeksius until they assigned no longer as patients through a number of test.
The results of research done in West Nusa Tenggara (NTb) by Erawatyningsih, et al, The type of the work of patients with TBSD that on the move, make the desperate patients continued treatment, which impact with the prolonged especially more resistensnya against *Mycobacterium tuberculosis* so that patients become very infeksius source.

The status of the economy very closely also with contracting TB, because the small income make people could not live worthy to meet the conditions of health. Patients with TB of internally with low economic level, find difficulties in the requirements of healthy house or balanced nutrition, this is in line with the research, Who wrote as much as 34.4 percent of respondents with BTA+ and resistant to Drugs Anti Tuberculosis, is derived from the economic level below.

Kizito, et al in The Journal of Tuberculosis and Lung Disease, wrote in Kampala, Uganda, there are patients with TB of Internally that “limits been notified and waiting treatment” in 2013 as much as 100 people who are all located living in a shantytown and densely populated with personal hygiene bad, which is the source of infection *Mycobacterium tuberculosis*.

Patients with HIV/AIDS vulnerable to continued for 2 nd shot TB of the Lung directly in stages TB of Internally supported this research (*MDR). Similarly with Diabetes Mellitus, backer DM will experience of the weakness of the immune system that is causing the sufferers have the possibility of 3 times higher to suffer TB, this written by Laurentia, et al. Which in the period of ten years obtained screening result DM (*Diabetes Mellitus*) in patients with TB shows a high prevalence of around 5.4 % - 44.0 %, instead of diabetes mellitus as a risk factor makes TB resistant (OR:1.5 - 8.9). So that patients with HIV-AIDS and disabilities DM if to patients with TB is very infeksius. So in this research, want to obtained the relationship between the number of cases of patients with TB of internally in East Java with the variables predictors which allegedly influence with how to get the best relationship model using poisson regression analysis.

**Material and Method**

This research using secondary data obtained from the profile data the health of the province of East Java 2015 and Reporting Data P2TB East Java Provincial Health Office 2015. The variable data is examined in the form of the address and the date the enactment of respondents as patients with TB of internally in East Java Province. The variables used in this research consists of one response variable (Y), the number of patients with TBSD and 6 predictors variables, the percentage of poor families (X₁), BTA+ (X₂), the number of HIV/AIDS (X₃), numbers Genesis Diabetes Mellitus (X₄), the percentage of the population density of (X₅) and the ratio of health workers (X₆) and the layout of the latitude south (ui) and East longitude layout (vi).

The steps done in the analysis of the data to achieve the goal of research covers

1. Do multikolinieritas detection against the variables predictors
2. Get the best model Poisson Regression on the number of patients with TBSD modeling in East Java
3. Get the best model GWPR on the modeling the number of patients with TBSD in East Java with some analysis phase

**Results**

Before done multiple regression analysis which contains more than 1 free variable test needs to be done in the variable multikolinearitas predictors. Multicolinearity check on this research based on based on the correlation between and the value of VIF each of which is shown in table 1.

<table>
<thead>
<tr>
<th>Correlation coefficient (P-value)</th>
<th>TBSD</th>
<th>X₁</th>
<th>X₂</th>
<th>X₃</th>
<th>X₄</th>
<th>X₅</th>
<th>X₆</th>
</tr>
</thead>
<tbody>
<tr>
<td>X₁</td>
<td>-0.005</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td></td>
<td>0.978</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td>X₂</td>
<td>0.965</td>
<td>0.016</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td></td>
<td>0.000</td>
<td>0.923</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td>X₃</td>
<td>0.782</td>
<td>-0.369</td>
<td>0.785</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td></td>
<td>0.000</td>
<td>0.023</td>
<td>0.000</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td>X₄</td>
<td>0.656</td>
<td>0.233</td>
<td>0.629</td>
<td>0.507</td>
<td>*</td>
<td>*</td>
<td>*</td>
</tr>
<tr>
<td></td>
<td>0.000</td>
<td>0.159</td>
<td>0.000</td>
<td>0.001</td>
<td>*</td>
<td>*</td>
<td>*</td>
</tr>
</tbody>
</table>

Table 1: Matrix of the correlation between the variables Predictors
Conted…

<table>
<thead>
<tr>
<th>( X_4 )</th>
<th>( X_5 )</th>
<th>( X_6 )</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.834</td>
<td>0.057</td>
<td>0.000</td>
</tr>
<tr>
<td>-0.389</td>
<td>-0.404</td>
<td>-0.404</td>
</tr>
</tbody>
</table>

Other criteria that can be seen is the value of VIF multikolinearitas cases. To view this condition multikolinearitas then can use VIF value (Variance Inflation Factor). VIF values in each of the variables predictors can be seen in the table 2

Table 2: The value of the Variance Inflation Factor on TBSD

<table>
<thead>
<tr>
<th>The variables</th>
<th>VIF</th>
</tr>
</thead>
<tbody>
<tr>
<td>The percentage of poor families ( (X_1) )</td>
<td>2.002</td>
</tr>
<tr>
<td>BTA* ( (X_2) )</td>
<td>4.684</td>
</tr>
<tr>
<td>Number of HIV/AIDS ( (X_3) )</td>
<td>5.183</td>
</tr>
<tr>
<td>The number of Diabetes Mellitus ( (X_4) )</td>
<td>3.028</td>
</tr>
<tr>
<td>The percentage of the population density of ( (X_5) )</td>
<td>7.721</td>
</tr>
<tr>
<td>The ratio of health workers ( (X_6) )</td>
<td>2.112</td>
</tr>
</tbody>
</table>

The results of the parameter estimation value reached convergence after iteration 4. Next, test is done simultaneously parameters to know is whether or not the influence of the independent variables against the dependent variables with the hypothesis as follows:

H0 : \( \beta_1 = \beta_2 = \beta_3 = \beta_4 = \beta_5 = 0 \)

H1 : most no one \( \beta_j \neq 0, J = 1, 2, 3, 4, 5, 6 \)

The value of the deviance on this analysis of 3023.5 and \( \chi^2_{(31; 0.05)} = 44.9853 \), Then reject H0 because \( \hat{D}(\hat{\beta}) \text{hitung} > \chi^2(v; \alpha) \) So it can be concluded that there are at least one independent variables that affect the significant impact on the dependent variables. Then the test is done partially parameters to know the influence of each independent variables.

H0 : \( \beta_i = 0 \) (Variables to-I do not affect significant)

H1 : \( \beta_i \neq 0 \) (Variables to-i give significant influence)

Using the MLE method obtained the estimation of parameters as follows:

Table 3: Partial test Poisson Regression Parameters on TBSD

<table>
<thead>
<tr>
<th>The Parameters</th>
<th>The estimation</th>
<th>Standard Error</th>
<th>Z</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>( \beta_0 )</td>
<td>595.600</td>
<td>0.0325900</td>
<td>182.736</td>
<td>0.000</td>
</tr>
<tr>
<td>( \beta_1 )</td>
<td>0.00247</td>
<td>0.0016940</td>
<td>1.459</td>
<td>0.144</td>
</tr>
<tr>
<td>( \beta_2 )</td>
<td>0.00080</td>
<td>0.0000222</td>
<td>35.912</td>
<td>0.000</td>
</tr>
<tr>
<td>( \beta_3 )</td>
<td>-0.00057</td>
<td>0.0000634</td>
<td>-8.936</td>
<td>0.000</td>
</tr>
<tr>
<td>( \beta_4 )</td>
<td>0.00008</td>
<td>0.000067</td>
<td>11.210</td>
<td>0.000</td>
</tr>
<tr>
<td>( \beta_5 )</td>
<td>0.04966</td>
<td>0.0086770</td>
<td>5.723</td>
<td>0.000</td>
</tr>
<tr>
<td>( \beta_6 )</td>
<td>-0.00125</td>
<td>0.0002716</td>
<td>-4.595</td>
<td>0.000</td>
</tr>
</tbody>
</table>

Table 3. Show that \( |Z_{\text{hitung}}| > Z_{(0.025)} \), Where \( Z_{(0.025)} \) By 1.96, so that on a significant level 5 percent decline H0 which means a variable BTA*, the number of HIV/AIDS, numbers Genesis Diabetes Mellitus, the percentage of the population density and the ratio of health workers influential significant on the number of patients with TB of contraction 2015. While for the variable the percentage of poor families is not significant in affecting the number of patients with TBSD 2015, because the value of Z smaller than 1.96 or p-value = 0.144 greater than 0.05, in get the poisson regression model obtained is as follows:

\[
\hat{\mu} = \exp(5.956 + 0.00247 \times X_1 + 0.00080 \times X_2 - 0.00057 \times X_3 + 0.00008 \times X_4 + 0.04966 \times X_5 - 0.00125 \times X_6)
\]

Increase or decrease the number of patients with TB contraction each district in East Java 2015 depending of the value of the coefficient of each variable
that influence. Furthermore done overdispersi case examination on poisson regression model is Value of Deviance 3023.5, Db 31, is 97.532 greater than 1 so that it can be concluded on poisson regression model number of patients with TBSD each district in East Java 2015 happened overdispersi.

The analysis using the GWPR method aims to know the variables that affect the prevalence of TB Disease occurrence in each of the location of the observation in Regency/City of East Java Province. Following the modeling the number of patients with TB using GWPR method.

The first step is done to get GWPR model is to determine the coordinates of the point latitude and longitude on each location to count the distance euclidean, and determine the optimum bandwidth values based on the criteria AICc. The next step is to determine the matrix pembobot with kernel function.

The matrix weights obtained for each location and then used to form a model, so that obtained the model vary in each location of observation. The estimation of model parameters GWPR served in table 4 below

<table>
<thead>
<tr>
<th>The Parameters</th>
<th>Minimum</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\beta_1$</td>
<td>48.571</td>
<td>105.096</td>
</tr>
<tr>
<td>$\beta_2$</td>
<td>-12.877</td>
<td>21.924</td>
</tr>
<tr>
<td>$\beta_3$</td>
<td>-22.601</td>
<td>66.571</td>
</tr>
<tr>
<td>$\beta_4$</td>
<td>-55.040</td>
<td>39.825</td>
</tr>
<tr>
<td>$\beta_5$</td>
<td>-58.488</td>
<td>172.953</td>
</tr>
<tr>
<td>$\beta_6$</td>
<td>-158.257</td>
<td>79.939</td>
</tr>
</tbody>
</table>

Modeling the number of patients with TB in Regency/City of the province of East Java using Geographically Weighted Poisson Regression approach to while is a model that better if compared with the poisson regression model.

Testing the hypothesis GWPR model consists of two test, namely suitability test GWPR model and test the significance of the parameters GWPR model. The following is the results of the hypothesis testing GWPR model:

$H_0 : \beta_k(u, v) = \beta_k, K = 1, 2, ..., 12$ (there is no significant difference between the poisson regression model (global) and GWPR model)

$H_1 : \beta_k(u, v) \neq \beta_k$ (no difference between significant poisson regression model (global) and GWPR model)

Table 5: Test the suitability of the GWPR Model

<table>
<thead>
<tr>
<th>Source</th>
<th>Deviance</th>
<th>DOF</th>
<th>Deviance/DOF</th>
</tr>
</thead>
<tbody>
<tr>
<td>The Model Global</td>
<td>3.023.533</td>
<td>31</td>
<td>97.533</td>
</tr>
<tr>
<td>Model GWR</td>
<td>5.035</td>
<td>0.067</td>
<td>75.344</td>
</tr>
<tr>
<td>Difference</td>
<td>3.018.497</td>
<td>30.933</td>
<td>97.581</td>
</tr>
</tbody>
</table>

Table 5 shows that the value of deviance/DOF difference of 97.533 and , Then Reject $H_0$ because $B(\hat{\beta}^2)_{hitung} > \chi^2(v; \alpha)$so it can be concluded that on the model of the number of patients with TB of Internally each district in East Java 2015 is GWPR

The next step is testing the significance of model parameters GWPR partially to know any parameters that affect the number of patients with TB in each location of observation. The hypothesis that is used is as follows:

$H_0 : \beta_k(u, v) = 0$

$H_1 : \beta_k(u, v) \neq 0; I = 1, 2, ..., 31; k = 1.2, ...., 12$

With equal significance ($\alpha$) of 5%, value $t_{0.025;32} = 2.037$. The following variables predictors which affect significantly on each observation location that is served on the table 6

Table 6: The value of T-statistic on the variables in each District Using Adaptive Guassian

<table>
<thead>
<tr>
<th>Regency/City</th>
<th>$X_1$</th>
<th>$X_2$</th>
<th>$X_3$</th>
<th>$X_4$</th>
<th>$X_5$</th>
<th>$X_6$</th>
</tr>
</thead>
<tbody>
<tr>
<td>1&quot;Pati. Pacitan&quot;</td>
<td>-54.447</td>
<td>223.337</td>
<td>-38.801</td>
<td>-24.748</td>
<td>56.666</td>
<td>52.772</td>
</tr>
<tr>
<td>2&quot;Pati. Ponorogo&quot;</td>
<td>-27.904</td>
<td>218.396</td>
<td>18.701</td>
<td>77.947</td>
<td>87.791</td>
<td>86.750</td>
</tr>
<tr>
<td>District</td>
<td>Population</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>------------------------</td>
<td>------------</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4&quot;Pati. Tulungagung&quot;</td>
<td>32.974</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5&quot;Pati. Blitar&quot;</td>
<td>82.888</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6&quot;Pati. Kediri&quot;</td>
<td>46.568</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7&quot;Pati. Malang&quot;</td>
<td>-0.1104</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8&quot;Pati. Lumajang&quot;</td>
<td>96.700</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9&quot;Pati. Jember&quot;</td>
<td>29.281</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10&quot;Pati. Banyuwangi&quot;</td>
<td>43.475</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11&quot;Pati. Bondowoso&quot;</td>
<td>34.774</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12&quot;Pati. Situbondo&quot;</td>
<td>74.222</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>13&quot;Pati. Pasuruan&quot;</td>
<td>95.406</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>14&quot;Pati. Probolinggo&quot;</td>
<td>-106.145</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15&quot;Pati. Sidoarjo&quot;</td>
<td>171.795</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>16&quot;Pati. Mojokerto&quot;</td>
<td>229.918</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17&quot;Pati. Jombang&quot;</td>
<td>86.042</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>18&quot;Pati. Nganjuk&quot;</td>
<td>-30.979</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>19&quot;Pati. Madiun&quot;</td>
<td>56.514</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20&quot;Pati. Magetan&quot;</td>
<td>72.870</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>21&quot;Pati. Ngawi&quot;</td>
<td>58.407</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>22&quot;Pati. Bojonegoro&quot;</td>
<td>-0.7205</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>23&quot;Pati. Tuban&quot;</td>
<td>-23.838</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>24&quot;Pati. Lamongan&quot;</td>
<td>-16.649</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>25&quot;Pati. Gresik&quot;</td>
<td>119.483</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>26&quot;Pati. Bangkalan&quot;</td>
<td>115.961</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>27&quot;Pati. Sampang&quot;</td>
<td>-14.329</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>28&quot;Pati. Pamekasan&quot;</td>
<td>-50.710</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>29&quot;Pati. Sumenep&quot;</td>
<td>42.327</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>30&quot;Kediri City&quot;</td>
<td>41.334</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>31&quot;City of Blitar&quot;</td>
<td>86.603</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>32&quot;Malang city&quot;</td>
<td>-90.807</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>33&quot;Probolinggo town&quot;</td>
<td>0.7149</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>34&quot;Pasuruan&quot;</td>
<td>165.061</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>35&quot;City Mojokerto&quot;</td>
<td>62.252</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>36&quot;Madiun&quot;</td>
<td>46.913</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>37&quot;Surabaya City&quot;</td>
<td>206.871</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>38&quot;Batu&quot;</td>
<td>-19.297</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Discussion

There are several variables that indicate the relationship of almost no correlation that meets the requirements of poisson regression and 2 predictor variables assessing VIFs over 10 percentage of poor people in each district in East Java and the average of school population variables in each district in East Java.

Based on table 6, with bandwidth size = 9 it can be seen that all observation locations identify variables that significantly influence in all districts in East Java province to group 7. Being the reference of handling pulmonary tuberculosis disease.
Conclusions

Based on the results of the analysis and discussion, can be concluded that the model of the GWPR more appropriate to analyze the patients TBSD in East Java because it has smaller AIC value. The dominant factor in influencing TBSD in all districts in East Java is the percentage of poor families, except in Ngawi district and Magetan for BTA+, the number of HIV/AIDS, numbers genesis diabetes mellitus, the percentage of the population density and rasio health workers affect TBSD patients in 7 groups of districts in East Java.

Conflict of Interest: There is no conflict of interest for authors.

Source of Funding: This research funded by the authors themselves. No other financial support received.

Ethical Clearance: Ethical reviewed has been done at the ethical standards of the Health Research Ethics Committee Faculty of Public Health Airlangga University.

REFERENCES

Determination of Platelets Count and Platelets Indices in Neonatal Sepsis at Khartoum State

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ABSTRACT

Aims and Objective: The present study aims to investigate the changes in platelets count, Mean platelet volume (MPV) and Platelet Distribution Width (PDW) in preterm and full term proven diagnosed as septic neonates and their correlations with birth weight and gestational age.

Material and Method: After taking approval from ethical committee of Ministry of Health (Sudan). The attending nurse collected peripheral blood samples under aseptic precautions in EDTA blood container at bedside in the period from June 2016 to March 2017. A complete hemogram was performed using ABX Micros ES60 haematology analyser.

Results: 200 cases included in this study, 113 (56.5%) males and 87 (43.5%) females. Full term babies account for 78 (39%) while premature babies account for 122 (61%). Thrombocytopenia was present in 115 (57.5%) cases, in which 83 (72.2%) had mild and moderate thrombocytopenia, and just 32 (27.8%) had developed severe. 76 (66.1%) of the cases of thrombocytopenia are premature babies and 39 (33.9%) are full term babies. There was significant difference in platelets count between full term and preterm p value 0.008. In platelet indices, MPV and PDW were significantly increased in all cases, but there was insignificant difference in platelets indices between the preterm and full term babies p value 0.125 and 0.958 respectively.

Conclusion: Variation in the degree of thrombocytopenia and platelet indices was seen in neonatal sepsis. Severe degree of thrombocytopenia associated with proven sepsis. MPV and PDW was significantly increased in in all cases with sepsis.

Keywords: Sepsis, Mean Platelet Volume (MPV), Platelet Distribution Width (PDW), Platelets Count

Introduction

Platelets are only about 20% of the red blood cells diameter, the most numerous cell of the blood. The normal platelet count is about 150,000-450,000 per micro liter of blood, because of the platelets are so small, they make up just a tiny fraction of the blood volume and the principal function of platelets is to prevent bleeding. They stimulate the shape change and platelets then aggregate onto the fibers, providing the primary plug to prevent bleeding, the leak of red blood cells and plasma through the vessel injury.

The various Platelet indices are- Mean Platelet Volume (MPV), Platelet Distribution Width (PDW) and Plateletcrit (MPV× platelet count). The values of MPV and PDW were studied in relation to sepsis in all three categories. The findings of investigations were entered in preform. The data were analyzed using standard statistical software. Automated analyzer provide platelets count and generate the MPV and measure of their size variability (PDW). The great dispersion of platelet volume (log-normal distribution) depends on the process of platelet formation by fragmentation of plasma megakaryocyte and pro platelet formation. Platelet volume appears to be correlated with megakaryocyte ploidy, although the

DOI Number: 10.5958/0976-5506.2019.01306.8
exact mechanism is not completely known. The increase of MPV in conditions with increased platelet turnover is probably mediated by several cytokines (interleukins 6&11 and thrombopoietin) that affect megakaryocyte ploidy and result in the production of larger and more reactive platelets. Platelet indices are very useful markers for the early diagnosis of thromboembolic diseases. An increase in both mean platelet volume (MPV) and platelet distribution width (PDW) due to platelet activation, due to platelet swelling and pseudopodia formation.

The MPV reference intervals should therefore be expressed as a function of platelet concentration. In the differential diagnosis of acquired thrombocytopenia, we can recognize forms with increased MPV (of peripheral origin with increased platelet production and normal megakaryocyte function: immunologic thrombocytopenic purpura and disseminated intravascular coagulation) from those with normal or decreased MPV (in which there is a defect in platelet production such acute leukemia, bone marrow aplasia and chemotherapy or radiation therapy).

Increased MPV might be associated with neonatal sepsis, Platelets considered active participants in the host defense, and the thrombocytopenia seen during sepsis episodes may be caused, in part, by the consumption of platelets directly in these processes. Activate platelet volume is related to platelet function and activation as well. Generally, platelet production increases as platelet count decreases. An increased number of young platelets is also functionally more active than older platelet. The PDW can also be useful in differentiating reactive thrombocytosis from the essential type, especially when it is combined mathematically with the MPV and platelet count to obtain a discriminant function. The recommended anticoagulant for a complete blood count (CBC) determination including platelet indices is K2 or K3- EDTA. When blood is exposed to EDTA, platelets immediately change their shape from disks to spheroids covered with filamentous extensions. The platelet spherical transformation is initially is volumetric, but within 1 or 2 hours the volume is progressively changes to reach equilibrium condition even if not definitive. As a consequence of this the MPV increases (from 7.9% within 30 minutes to 13.4% over 24 hours). Various attempts to correct this phenomenon have failed owing to the unpredictable behavior of individual samples in terms of intensity and time to equilibrium. With the use of EDTA, the MPV is therefore, not a very reliable index.

Neonatal sepsis:

Neonatal sepsis is defined as the presence of symptoms of sepsis in the neonatal period combined with bacteriological isolation of an infectious agent from blood or cerebrospinal fluid (CSF). Neonatal sepsis is a clinical syndrome characterized by signs and symptoms of infection with or without bacteremia in the first month of life. It encompasses various systemic infections of the newborn such as septicemia, meningitis, pneumonia, arthritis, osteomyelitis, and urinary tract infections. Superficial infections like conjunctivitis and oral thrush are not usually considered under neonatal sepsis. Sepsis is a prevalent complication in the neonatal intensive care unit and is a major cause of infants’ mortality. Neonatal sepsis may be classified according to the time of onset of the disease: early onset (EOS) and late onset (LOS). A few papers distinguish between very early onset (within 24 hours), EOS (24 hours to six days), and LOS (more than six days) sepsis. In EOS the transplacental and hematogenous transmission of bacteria is an uncommon route of EOS and occurs mainly with Listeria (L. monocytogenes). The most common route of EOS in preterm and term infants is via an ascending amniotic infection. Members of the maternal genital flora, like Group B Streptococcus (GBS) and Escherichia coli (E. coli), the organisms responsible for the most cases of EOS, may ascend through the birth channel to the amniotic fluid either through intact amniotic membranes or, more commonly, after rupture of membranes. Once infected amniotic fluid is aspirated by the fetus, pathogens may infiltrate through immature mucosal barriers, causing the pneumonia and bacteremia, and may penetrate the blood-brain barrier, leading to meningitis. Bacteria have been implicated as a major cause of premature rupture of membranes and, consequently, of premature labor and delivery. In LOS is mostly occurs via horizontal or nosocomial transmission, but it may occur via vertical transmission at birth, resulting in colonization and, later, to infection. Skin or mucosal colonization with potential pathogens may be occurred from the hands of health care workers or family members, from water used in incubator or ventilator humidification systems, or may be from contaminated fomites like stethoscopes, which may carry organisms directly from one patient to another. In LOS most common clinical manifestations are meningitis (30-40%), bacteremia (40%), and septic arthritis (5-10%). Sepsis is the commonest cause of neonatal mortality, and it is a common complication in the neonatal intensive care unit. Hemostatic system
is adversely affected by sepsis, Thrombocytopenia is a very common hematological abnormality found in newborns. No previous study was published in Sudan concerning this subject.

**Materials and Method**

**Case control study:** This study was hospital and laboratory-based case study, has done in 200 cases of preterm and full term babies had proven diagnosed as septic neonates. About 2.5 ml of peripheral blood samples were collected under aseptic precautions in EDTA. The samples analyzed for platelet count, MPV, PDW and Platelet crit within 2 hours from venipuncture to minimize changes by using ABX Micros ES60 hematology analyzer (Horiba ABX - India).

**Statistical analysis:** Data analysis was performed using Statistical Package for Social Science (SPSS16.0) computer program. T Test was used to determine the statistical differences between these tests. All reported values were considered significant at a level of p <0.05.

**Results**

The study was done in 200 Sudanese neonates previously diagnosed and proven with sepsis or had symptoms of sepsis (male ,female) their age range from (1 to 30 days ) demitted to El Sewedy Paediatric Charity Hospital – Sudan that specialized in neonates’ intensive care unit (ICU) , samples are analyzed to estimate platelet count, mean platelet volume, platelet distribution width.

**Study population:** Two hundred 200 cases included in this study, 113(56.5%) males and 87 (43.5%) females. Full term babies account for 78 (39%) while premature babies account for 122 (61%) figure (1). None of the cases included in this study had fungal infection on presentation.

**Thrombocytopenia:** Thrombocytopenia defined as platelets count < 150000/mm3. Thrombocytosis defined as platelet count above 450000/mm3. Thrombocytopenia was present in 115 (57.5%) cases mean value 87.5×(10) 9/L, 83 (41.5%) had the normal platelet count mean value 235×(10)9/L and 3 (2.4%) had thrombocytosis mean value 515.5×(10)9/L figure (2), the most of thrombocytopenia 50 (41.4%) had mild thrombocytopenia mean value 125.9×(10)9/L,37(32.1%) had moderate thrombocytopenia mean value 72.5×(10)9/L, and 30 (26.5%) had developed severe thrombocytopenia mean value 25.5×(10)9/L figure (5), thrombocytopenia most common in premature babies.
The percentage of patient with thrombocytopenia defined as platelets count <1500/mm3 during sepsis episode, is shown for two groups.
The 76 (62.2%) of the cases of thrombocytopenia are premature babies mean value 75.6×(10)9/L, {30(39.4%) had mild decreased mean 121.4×(10)9/L, 24(31.6%) had moderate decreased mean 64.4×(10)9/L, 22(29%) had severe decreased mean 22×(10)9/L} and 39 (50%) are full term babies mean value 99.5×(10)9/L, 20(46.2%) had mild decreased mean 130.4×(10)9/L, 13(33.3%) had moderate decreased mean 80.7×(10)9/L and 8(20.5%) had severe decreased 29×(10)9/L} figure (2) Figure (3).

45 (36.8%) of cases of normal platelets are premature babies mean 252 × (10)9/L and 37 (47.4%) are full term babies mean 232 × (10)9/L figure (2), and Figure (3). 1 (0.8%) of cases of thrombocytosis are premature mean value 558× (10)9/L and 2(2.5%) of cases of thrombocytosis are full term mean value 474× (10)9/L.

There was significant difference in platelets count between full term and preterm (p value 0.008). MPV and PDW in the most the cases included in study increased, there was insignificant difference in platelets indices between the preterm and full term babies p value 0.125, 0.958, respectively. Mean value for MPV of all the cases included in this study was 9.30 fL. Mean MPV of the cases full term and full term were 9.20 fL and 9.45 fL respectively, the difference between the MPV values of the full term and preterm term was found to be insignificant (p=0.125, Table 1). Mean PDW value was 12.30. Mean PDW value for the cases full term and preterm were 12.25 and 12.50 respectively. The difference between the PDW values of the full term and full term was found to be non-significant (p=0.958, Table 1).

<table>
<thead>
<tr>
<th>Platelets parameters</th>
<th>Mean value of platelets parameters in full term</th>
<th>Mean value of platelets parameters in preterm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low platelets × (10)9/L</td>
<td>99.5</td>
<td>75.6</td>
</tr>
<tr>
<td>Mild decreased × (10)9/L</td>
<td>130.4</td>
<td>121.4</td>
</tr>
<tr>
<td>Moderate decreased × (10)9/L</td>
<td>80.7</td>
<td>64.4</td>
</tr>
<tr>
<td>Severe decreased × (10)9/L</td>
<td>29</td>
<td>22</td>
</tr>
<tr>
<td>Normal platelets × (10)9/L</td>
<td>232</td>
<td>238</td>
</tr>
<tr>
<td>Raised platelets × (10)9/L</td>
<td>473</td>
<td>558</td>
</tr>
<tr>
<td>Normal MPV (FL)</td>
<td>8.2</td>
<td>8.0</td>
</tr>
<tr>
<td>Increased MPV (FL)</td>
<td>10.3</td>
<td>10.5</td>
</tr>
<tr>
<td>Normal PDW(%)</td>
<td>14.5</td>
<td>15.0</td>
</tr>
<tr>
<td>Increased PDW(%)</td>
<td>18.1</td>
<td>18.5</td>
</tr>
</tbody>
</table>
Discussion

In the study there was thrombocytopenia with significant difference in platelets count between full term and preterm p value 0.008 which agreed with other studies done by (Guclu E et al in 2013), (Ahmad in 2012), (Eslami Z et al in 2011), (Kim JY et al in 2010), and (Abdalla et al in 2008). In addition, there was no statistical significance difference in MPV and PDW in premature and full term babies p value 0.125, 0.958 respectively.

Thrombocytopenia is a common complication of neonatal sepsis, and common in preterm neonates. Another finding of the study revealed insignificant difference in MPV and PDW between the preterm and full term babies p value 0.125 and 0.958 respectively, MPV and PDW were higher in tow agreed with (Guclu E et al in 2013), (Kim JY et al in 2010), and (Abdallah et al in 2008).

In study done by (Tripti K. Karne1, Deepa D. Joshi1 et al. 2017) reported that 45 out of 103 cases (43.69%) of proven and probable sepsis showed increased PDW value.

Conclusion

The study concluded that there was Thrombocytopenia was present in nearly quarter of septic neonates and increased both mean platelets volume and platelets distribution width. There was significant difference in platelets count between full term and preterm and there was no statistical significance difference in MPV and PDW between the preterm and full term babies p value 0.125 and 0.958 respectively, MPV and PDW were higher in tow agreed with (Guclu E et al in 2013), (Kim JY et al in 2010), and (Abdallah et al in 2008).

Ethical Clearance: The ethical approval has been taken from ethical committee of Ministry of Health (Sudan). Authors declare no conflict of interest.

Source of Funding: Self-funded

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Analysis of Correlation between Toluene Exposure and Health Risk Characterization on Printing Worker of Plastic Bags Industry

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ABSTRACT

The production process of plastic bag industry have always hazards and risks. Chemicals is one of the hazard that used in this industry. That is toluene, one of chemicals used in printing process. Toluene can cause several occupation health risk and effect. This study aimed to determine the correlation of toluene exposure and health risk characterization (RQ) in printing workers PT X Sidoarjo. This study was an observational study with cross-sectional approach. The sample in this study was a total of 32 respondent. The concentration of toluene measured by using gas chromatography as the instrument. The health risk characterization (RQ) calculated by dividing intake dose value with reference concentration. The result showed the concentration of toluene in location 2 was 31.54 ppm and above threshold limit value based on ACGIH (2011). There was 40,6% printing workers had RQ ≥ 1 and there was a significant correlation between toluene exposure and health risk characterization (RQ).

Keyword: toluene, health risk characterization, printing worker, plastic bag industry

Introduction

The production process of plastic bag industry have always hazards and risks. Chemicals is one of the hazard that used in this industry. One of the hazardous chemicals used in the plastic bags industry is toluene. Toluene is usually used as a solvent of paint on the printing process of plastic bags. Toluene is a volatile, colorless and commonly used as a paint solvent, a mixture of gasoline, nail polish, and as a solvent in the printing business. Workers using toluene as a solvent could have health problems, such as dizziness, vertigo, eye irritation, skin irritation, respiratory problems, liver, kidney, and central nervous system disorders. 1,2

Toluene entry into the body can be through 3 paths, in addition to the main path of inhalation, toluene can enter the body through the path of ingestion and skin contact. Toluene is declared safe for the environment and health if it does not cross the threshold. According to ACGIH (2011) the threshold limit value of toluene is 20 ppm for 8 hours/day 40 hours per week.3,4

Some cases of toluene exposure recorded in ATSDR (2015) include study by Yin et al (1987) reported by 44 men and 57 women exposed to TWA concentrations of 46 and 41 ppm toluene repetitively, during shoe-making, printing and audio equipment increased complaints headaches, dizziness and difficulty sleeping compared with 127 control groups. Similarly, the study by Ukai et al (1993) reported an increase in subjective complaints against neurologic symptoms both during and after work in 452 workers exposed toluene (geometric mean 24.7 ppm) compared with 517 control groups.1

This study aimed to determine the correlation of toluene exposure and health risk characterization (RQ) in printing workers to see if toluene exposure has a health effect on the worker’s body.
Material and Method

This study aimed to determine the correlation of toluene exposure and health risk characterization (RQ) in printing workers PT X Sidoarjo. This study was an observational study with cross-sectional approach. The sample in this study was a total of 32 printing workers. The concentration of toluene measured by using gas chromatography as the instrument. The health risk characterization (RQ) calculated by dividing intake dose value with reference concentration.

FINDINGS

The Concentration of Toluene

<table>
<thead>
<tr>
<th>Location</th>
<th>The Concentration of Toluene (ppm)</th>
<th>Printing Workers</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Location 1</td>
<td>8.930</td>
<td>8</td>
<td>25,0</td>
</tr>
<tr>
<td>Location 2</td>
<td>31.546</td>
<td>11</td>
<td>34,4</td>
</tr>
<tr>
<td>Location 3</td>
<td>9.677</td>
<td>6</td>
<td>18,8</td>
</tr>
<tr>
<td>Location 4</td>
<td>9.530</td>
<td>7</td>
<td>21,9</td>
</tr>
<tr>
<td>Mean</td>
<td>14.92</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Min - Max</td>
<td>8.93 – 31.54</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 1 showed the concentration of toluene in 4 location. The lowest concentration of toluene is 8.93 ppm and the highest concentration of toluene is 31.54 ppm. This highest concentration can caused by some pile of toluene cans at Location 2 while measuring the concentration of toluene.

The Health Risk Characterization (RQ)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Category</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Risk</td>
<td>RQ ≥ 1</td>
<td>40,6%</td>
</tr>
<tr>
<td></td>
<td>RQ &lt; 1</td>
<td>59,4%</td>
</tr>
</tbody>
</table>

The results of Risk Quotients (RQ) calculations show the level of health risk due to exposure to toluene in the work environment. If RQ ≥ 1, this means the printing workers exposed to toluene exposure has health risk effects and if RQ < 1, this means the printing workers exposed to toluene exposure has no health risk effects. Table 2 showed that 40,6% printing workers has health risk effects caused by toluene exposure and 59,4% printing workers has no health risk effects.

The Correlation Between Toluene Exposure and Health Risk Characterization

<table>
<thead>
<tr>
<th>Toluene Concentration (ppm)</th>
<th>Percentage</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>RQ ≥ 1</td>
<td>RQ &lt; 1</td>
</tr>
<tr>
<td>8.93</td>
<td>0%</td>
<td>100%</td>
</tr>
<tr>
<td>31.54</td>
<td>90,9%</td>
<td>9,1%</td>
</tr>
<tr>
<td>9.53</td>
<td>14,3%</td>
<td>85,7%</td>
</tr>
<tr>
<td>9.67</td>
<td>33,3%</td>
<td>66,7%</td>
</tr>
</tbody>
</table>

Table 3 showed the highest percentage 90,9% printing workers in Location 2 (31,54ppm) has RQ ≥ 1. The correlation between toluene exposure and RQ has a significant correlation with the p-value is 0,00.

Discussion

The Concentration of Toluene: The result showed one of all printing locations has the concentration of toluene above the TLV. The result of study in informal workshop Karasak showed that the average of toluene concentration is 71,29 ppm. Study in paint industry in Iran showed the concentration of toluene is 105,82 ppm. Another study in printing company in Jakarta showed that the concentration of toluene is 100,38 ppm.

The amount of exposure to toluene vapor depends on the workplace (opened or closed), and physical factors, such as wind direction, temperature, humidity, and air pressure. Based on the observation in the workplace, the location of printing process is a closed hall and has 12 blowers near all printing location. With the temperature about 30°C toluene will more easily evaporate in the air.

Workers who use toluene as a solvent may have health problems, such as dizziness, vertigo, eye irritation, skin irritation, respiratory problems, liver, kidney, and central nervous system disorders. Toluene exposure can lead to acute and chronic poisoning symptoms. The early acute poisoning symptoms have been observed in experimental study conducted volunteers with the concentration of toluene about 750 mg/m³ for 8 hours or 1.125 mg/m³ for 20 minutes may cause respiratory irritation and eye irritation.
Furthermore the chronic poisoning symptoms may appear with the concentration levels about 200-400 mg/m³ continuously for 8 hours every day or 40 hours a week. The concentrations of toluene above the threshold limit value may cause neuropsychological symptoms, as the study by Darwati (2004) the results showed that workers exposed to toluene exposure have a 7.12 times higher neuropsychological symptoms compared with workers not exposed to toluene exposure.1,11

The Health Risk Characterization: The results of Risk Quotients (RQ) calculations showed 40.6% printing workers have RQ ≥ 1 which means the printing workers have health risk effects due to toluene exposure. Another study by Prihartini (2010) showed 8% of respondents in finishing process have RQ ≥ 1, this may caused by the finishing location has the concentration of toluene higher than other location.12

Based on the result, every location has its own health risk effects depends on the level of toluene concentration, the result of calculations showed that the higher toluene concentration the higher health risk effects in the work environment.

1. Location 1: Location 1 has RQ < 1 which means printing workers has no health risk effects due to toluene exposure. Several factors influence the RQ value such as the concentration of toluene, worker’s weight and worker’s working period. The concentration of toluene at location 1 is lower than that of other sites, that is 8.93 ppm.

Based on observation, most of printing workers in Location 1 is not wearing protection equipment such as mask and gloves, in view of the most absorption of toluene is through respiration then skin contact and oral, printing workers may have more risk to have health effects caused by toluene exposure when they are not wearing standard personal protective equipment.

2. Location 2: Location 2 has RQ ≥ 1 which means printing workers have health risk effects due to toluene exposure. This result showed that toluene exposure may cause adverse health effect which needs risk control to reduce the health effects. Near to location 2 there are some pile of toluene cans for production process, to reduce the concentration of toluene in location 2, it needs to rearrange it. Moreover, it needs to have ventilation for air exchanges. There was 9.1% printing worker have RQ <1 this can be caused by working period that only about a year until the study.

3. Location 3: There were 85.7% printing workers have RQ < 1 which means printing workers have no health risk effects due to toluene exposure and 14.3% printing workers have RQ ≥ 1 which means printing workers have health risk effects due to toluene exposure. Working period of 14.3% printing workers influence the value of RQ. Study by Lundberg in Gamble (2000) workers with at least 10 years of work with high levels of organic solvent exposure have an adverse health risk. Lundberg also believes a 10-year work period with organic solvent exposure is considered a criterion for diagnosing chronic toxic encephalopathy. 13 Furthermore one printing worker in this category has excess body weight. Toluene compounds are lipophilic (fat soluble) the fat will bind toluene into residue in the body. In other words, the more obese respondents exposed toluene it will have a health risk higher due to toluene exposure.

4. Location 4: There were 66.7% printing workers hav RQ < 1 which means printing workers have no health risk effects due to toluene exposure and 33.3% printing workers have RQ ≥ 1 which means printing workers have health risk effects due to toluene exposure. Working period of 14.3% printing workers influence the value of RQ. By this condition, not only the concentration of toluene, weight and working period influence the RQ value, but there are some factors such foods (some foods may influence the absorption of toluene), life style and others.

The Correlation Between Toluene Exposure and Risk Characterization: The result showed that there was significant relationship between toluene exposure and risk characterization. Study in shoe craftsmans worker showed that the workers exposed to toluene exposure have health risk effects, 20% workers have headache, 18.2% workers fatigue and 18.8% workers caugh.14 Other study in gas station in Thailand showed that the workers have RQ ≥ 1, 61% workers have headache, 29% workers fatigue and 11 % workers throat irritation.15 Study by Martha (2012) on sole shoe worker at Cibaduyut Bandung, where the most content of glue compound contained is toluene, many workers have
health complaints synonymous with toluene exposure symptoms, including dizziness, nausea, weakness and shortness of breath.\textsuperscript{16}

Based on interview 31.3\% printing workers have headache and 37.5\% workers fatigue. At exposure close to 50 ppm will occur symptoms of drowsiness and headache. At concentrations of 50-100 ppm will occur irritation of the nose, throat and respiratory tract. At concentration of about 100 ppm may cause fatigue (fatigue) and dizziness.\textsuperscript{1}

One effort that can be done to reduce health risk effects is to reduce the concentration of toluene in the air. Thus, the toluene vapor inhaled by the workers will also decrease its concentration so as to minimize the health risk effects due to toluene exposure. To minimize the health risk effects caused by toluene exposure, the management can make a good ventilation system so that toluene vapor can be distributed with the air outside the production area. Toluene is a volatile compound, with a good ventilation the concentration of toluene in the printing location can be reduced. And the last thing can be done is to wear standard personal protective equipment, management must have the standard personal protective equipment and give it free to the workers. Beside that, management have to inform the workers about the hazard of toluene and advise the workers to wear personal protective equipment during work.

**Conclusion**

1. From the four location of toluene measurement obtained the lowest concentration of toluene is 8.93 ppm and the highest concentration of toluene is 31.54. The level of concentration in each location causes different levels of risk for the workers

2. The results of Risk Quotients (RQ) calculations 40.6\% printing workers have health risk effects caused by toluene exposure and 59.4\% printing workers have no health risk effects

3. There was a significant correlation between toluene exposure and health risk characterization

**Conflict of Interest:** None

**Source of Funding:** Self funding

**Ethical Clearance:** This study was approved by Health Research Ethics Committee, Faculty of Public Health, Airlangga University

**REFERENCES**


Nutrition Contents and Sensory Characteristics of the Instant Papeda Enrich with Laor (*Polychaeta*) as Supplementary food for Pregnant Woman

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**ABSTRACT**

Papeda is a traditional Maluku food made from sago flour and is usually consumed with fish and yellow sauce. The addition of laor flour (*Polychaeta*), one of the most distinctive biota of Maluku water which is greatly demanded by the people, will enrich the nutritional value of papeda. This study aims to analyze the effect of adding laor (*Polychaeta*) on papeda toward the nutrition content and evaluation of sensory. Skipjack tuna is substituted by Laor (*Polychaeta*) with a ratio of 100%:0% (PI); 80%:20% (PIKL1); 70%:30% (PIKL2) and 60%:40% (PIKL3). Parameters measured are protein, carbohydrate, fat, energy, iron and zinc. Sensory evaluation (hedonic) performed by untrained panelists. Statistical analysis of nutrition content by One Way Anova test 95% CI and Friedman for sensory evaluation. A significant addition of laor (*Polychaeta*) in papeda increases the energy, protein, Fe and Zn as well as sensory evaluation toward the flavor and aroma. Papeda with 40% laor substitution gives the highest energy, protein, Fe and Zn distinguished from color, flavor, aroma and texture. Papeda with laor (*Polychaeta*) substitution meets the requirements of supplementary food for the pregnant women so it can be used as an supplementary food for them with local food-based.

**Keywords:** Papeda, laor, supplementary food, the pregnant women

**Introduction**

*Scaling Up Nutrition* (SUN) Program in Indonesia or called as National Nutrition Movement is a program to accelerate the improvement of the nutrition in The First 1000 Days of Life (The First 1000 Days of Life Movement). This program begins with focusing on the nutritional status of the pregnant women, since the child’s life begins in the womb of a mother (¹). Providing the supplementary food or iron tablets to the pregnant women is the national program of malnutrition prevention to decrease the number of low birth weight babies. The manifestation of distributing Supplementary Food Feeding to the pregnant women can be in the form of supplementary food manufacturer or local food based (²).

Sago, Skipjack Tuna and Laor (*Polychaeta*) as the energy and protein sources are the local food from Maluku Province. In 2015, Maluku Province has the potential area of sago approximately 36,723 hectares with a large amount of production of 9,683 tons (³). Sago is a potential source of carbohydrate which calories are not much different from rice (⁴). Skipjack tuna is a source of protein produced in Maluku Province. In 2012 the total of skipjack tuna amounted to 51.318,6 tons, in 2013 it amounted to 51.237,4 tons and in 2014 it amounted to 51.705,2 tons. Laor is a typical biota of Maluku waters, which in March or April, on a full moon or a few days later, *swarming* in abundance around the water surface (⁵). Laor contains high protein and also contains Fe and Zn which is required for the fetal growth (⁶).

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The research aims to develop instant papeda formula enriched with laor (*Polychaeta*), analyze the protein, fat, carbohydrate, energy, Zn, Fe and analyze the sensory evaluation of instant papeda with laor koya (*Polychaeta*).

**Materials and Method**

Formulation of instant papeda with laor koya (*Polychaeta*) used the experimental design CDR (Completely Randomized Design) consisting of four treatments and four repetitions. The materials used were skipjack tuna and laor (*Polychaeta*). Previously, the materials were examined to check the proximate assessing and metal contamination in the Laboratory of Nutrition, Department of Nutrition, Faculty of Public Health, Airlangga University, Surabaya. Laor (*Polychaeta*) was formulated as koya by washing, drying in a temperature of 60 °C for 12 hours, roasting, grinding and sifting. The skipjack tuna with yellow sauce was produced by cutting the fish into pieces, cleaning, boiling with the spices, and then pasteurizing and sterilizing.

The instant papeda with laor koya was produced by mixing sago with 60 ml of boiled water while stirring, then adding slowly 450 ml of boiled water while stirring to form Papeda porridge and setting aside. After that, 200 ml of water was boiled and added by the skipjack tuna along with the ingredients, simmer for 3 minutes. Then the fish with yellow sauce was served with papeda porridge and sprinkled by the laor koya.

<table>
<thead>
<tr>
<th>Ingredients</th>
<th>PI (100% : 0%)</th>
<th>PIKL1 (80% : 20%)</th>
<th>PIKL2 (70% : 30%)</th>
<th>PIKL3 (60% : 40%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sago (g)</td>
<td>70</td>
<td>70</td>
<td>70</td>
<td>70</td>
</tr>
<tr>
<td>Skipjack tuna (g)</td>
<td>100</td>
<td>80</td>
<td>70</td>
<td>60</td>
</tr>
<tr>
<td>Laor koya (g)</td>
<td>0</td>
<td>20</td>
<td>30</td>
<td>40</td>
</tr>
</tbody>
</table>

PI : Instan Papeda (100% : 0%)
PIKL 1 : Instan Papeda Laor Koya 1 (80% ;20%)
PIKL 2 : Instan Papeda Laor Koya 2 (70% : 30%)
PIKL 3 : Instan Papeda Laor Koya 3 (60% : 40%)

The protein was determined by the method of Kjedahl (7), carbohydrates was determined by Luff Schoorl method(8), fat was determined by Soxhlet(9) method, energy was determined by atwater factor (10). Fe and Zn was determined by atomic absorption spectrophotometry (AAS). Sensory evaluation (hedonic) was conducted to determine the level of consumers’ acceptance to the color, texture, aroma and taste of instant papeda with laor koya by 30 untrained panelists. Assessment given was as follows: score 1: dislike; score 2: rather like; score 3: like and scores 4: really like.

Statistical analysis was examined to check the nutritional content with One Way Anova test CI 95% while the sensory evaluation was analyzed by Friedman.

**Results**

The use of locally available food needs to be generated especially in the developing countries where nutrition problems are mostly triggered by the inability of parents and families to get adequate and proper food (especially food originating from animals). Choosing and combining the right food can be used to formulate multi-mixed meal which can be used as home-based supplementary food (11).

Papeda is the traditional food of the people of Maluku and Papua made from sago flour and fish with yellow sauce. The production of Papeda added by laor (*Polychaeta*) flour to escalate the protein and mineral turns to be an alternative.
meal for the pregnant women. The use of locally available food to formulate supplementary meals especially for the pregnant women is highly recommended provided that perhaps, it is accepted by the pregnant women(12).

**Nutritional Value Papeda Laor Koya**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>PI</th>
<th>PIKL1</th>
<th>PIKL2</th>
<th>PIKL3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Energy (kcal)</td>
<td>383.66 ± 5.77&lt;sup&gt;ab&lt;/sup&gt;</td>
<td>379.51 ± 1.09&lt;sup&gt;a&lt;/sup&gt;</td>
<td>385.85 ± 4.92&lt;sup&gt;bc&lt;/sup&gt;</td>
<td>390.66 ± 4.78&lt;sup&gt;c&lt;/sup&gt;</td>
</tr>
<tr>
<td>Protein (g)</td>
<td>18.98 ± 0.59&lt;sup&gt;a&lt;/sup&gt;</td>
<td>19.74 ± 1.06&lt;sup&gt;ab&lt;/sup&gt;</td>
<td>20.38 ± 0.64&lt;sup&gt;bc&lt;/sup&gt;</td>
<td>21.11 ± 0.29&lt;sup&gt;c&lt;/sup&gt;</td>
</tr>
<tr>
<td>Carbohydrate (g)</td>
<td>48.35 ± 0.83&lt;sup&gt;b&lt;/sup&gt;</td>
<td>47.42 ± 0.63&lt;sup&gt;ab&lt;/sup&gt;</td>
<td>48.05 ± 0.44&lt;sup&gt;b&lt;/sup&gt;</td>
<td>46.76 ± 0.58&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td>Fat (g)</td>
<td>12.70 ± 0.32&lt;sup&gt;ab&lt;/sup&gt;</td>
<td>12.32 ± 0.22&lt;sup&gt;a&lt;/sup&gt;</td>
<td>12.45 ± 0.29&lt;sup&gt;bc&lt;/sup&gt;</td>
<td>13.24 ± 0.35&lt;sup&gt;c&lt;/sup&gt;</td>
</tr>
<tr>
<td>Iron (mg)</td>
<td>2.938 ± 0.50&lt;sup&gt;b&lt;/sup&gt;</td>
<td>4.498 ± 0.47&lt;sup&gt;a&lt;/sup&gt;</td>
<td>4.643 ± 0.36&lt;sup&gt;a&lt;/sup&gt;</td>
<td>3.396 ± 0.89&lt;sup&gt;bc&lt;/sup&gt;</td>
</tr>
<tr>
<td>Zinc (mg)</td>
<td>1.853 ± 0.84&lt;sup&gt;a&lt;/sup&gt;</td>
<td>2.906 ± 0.58&lt;sup&gt;ab&lt;/sup&gt;</td>
<td>3.396 ± 0.89&lt;sup&gt;bc&lt;/sup&gt;</td>
<td>3.703 ± 0.90&lt;sup&gt;bc&lt;/sup&gt;</td>
</tr>
</tbody>
</table>

Values are shown as mean ± standard deviation. Different superscript letters in the same row indicate significant differences between groups (p<0.05).

Table 2 shows that PIKL 3 group contains the highest energy level equally 390.66 kcal. PIKL 2 group averages out 385.85 kcal, PI group averages out 383.66 kcal and the lowest energy level is showed by PIKL1 group of 379.51 kcal. Furthermore, PIKL 3 group contains the highest protein equally 21.11 g. PIKL 2 group averages out 20.38 g and the lowest is the control group (PI) equally 18.98 g. The highest carbohydrate rate is showed by the control group (PI) equally 48, 35 g and the lowest is PIKL 3 group of 46.76 g. The highest fat rate showed by PIKL group 3 of 13.24 g and the lowest is the PI group of 12.30 g. The highest Fe rate is showed by PIKL group 3 of 5,343 mg. PIKL 2 group averages out 4,643 mg and the lowest is control group (PI) of 2.938 mg. The highest Zn rate is PIKL group 3 equally 3.703 mg and the lowest is control group (PI) of 1.853 mg. Based on the analysis of One-Way Anova, it is showed that there are significant differences in energy, protein, carbohydrate, fat, Fe and Zn containing in papeda formula.

The substitution of laor with Skipjack tuna can increase the level of energy, protein, Fe and Zn in papeda. The greater the concentration of laor the higher level of energy, protein, Fe and Zn could be achieved. The proportion of energy, protein, carbohydrate, fat, Fe and Zn in instant papeda with laor koya meets the requirements of food supplementary needs of pregnant women (10-15% RDA), it is feasible to be consumed by pregnant women. Additional energy is required for pregnancy to support the needs of metabolism in pregnancy and fetal growth. 15% of metabolism increases in pregnancy. The amount of energy consumption for pregnant women is the most important nutritional factor regarding the birth weight of the baby (13).

High protein in papeda instant with laor koya comes from skipjack tuna and laor. Protein content in dried laor averages out 48, 86 % and skipjack tuna averages out 24, 5%. Fish and laor are high quality and complete food originating form animals by reason of the essential amino acid sequence, easily digested and absorbed. In addition, it is also a great source of minerals (14)(15). The needs of additional protein is required by the pregnant women for fetal growth, placental growth, producing amniotic fluid, increasing maternal blood volume and supporting maternal and fetal tissue synthesis. Protein needs is increased during pregnancy and maximally needed during third trimester of pregnancy (13)(16).

The main carbohydrate source of the instant papeda formula is from carbohydrate of sago starch. Carbohydrate in sago is higher than rice as well as sago starch contains 3, 69 – 5, 96% food fiber (17). The main role of carbohydrates for the body is to provide glucose for body’s cells, which are then converted into energy. The crucial role of carbohydrates role determines the calorie due to its highest amount (18).

Fat is an important part of the nutrition obtained from food. Fat is the source of energy, essential fatty acids, and fat soluble vitamins (A, D, E, and K). In addition, diet fat has a major role in promoting good health and improving the sensory quality of food (19).

During pregnancy the need for absorbed Fe increases gradually from 0, 8 mg/day in the first trimester of pregnancy to 7.5 mg/day in the third trimester. Most
absorbed Fe is utilized to replace the Fe loss, increase red blood cell mass, provide Fe for fetus and placenta and replace blood loss when delivering the baby\textsuperscript{(16)(20)}.

Zn plays a crucial role during pregnancy including embryogenesis, growth and development of the fetus. It is estimated that the need of Zn increases twice during the third trimester rather than the women who are not pregnant\textsuperscript{(21)(22)}. The increase of Zn is crucial to prevent the premature birth and for growth of brain for the fetus\textsuperscript{(16)}.

### Sensory Characteristics

Table 3: Sensory evaluation hedonic ratings for Instan Papeda Laor Koya

<table>
<thead>
<tr>
<th>Formula</th>
<th>Color</th>
<th>Taste</th>
<th>Aroma</th>
<th>Texture</th>
<th>Overall</th>
</tr>
</thead>
<tbody>
<tr>
<td>PI</td>
<td>3.50 ± 0.51\textsuperscript{c}</td>
<td>3.63 ± 0.49\textsuperscript{ab}</td>
<td>3.03 ± 0.49\textsuperscript{a}</td>
<td>3.33 ± 0.48</td>
<td>13.5 ± 1.22\textsuperscript{ab}</td>
</tr>
<tr>
<td>PIKL 1</td>
<td>3.23 ± 0.43\textsuperscript{ab}</td>
<td>3.07 ± 0.52\textsuperscript{c}</td>
<td>3.17 ± 0.38\textsuperscript{a}</td>
<td>3.07 ± 0.37</td>
<td>12.53 ± 0.97\textsuperscript{c}</td>
</tr>
<tr>
<td>PIKL 2</td>
<td>3.17 ± 0.38\textsuperscript{ab}</td>
<td>3.43 ± 0.57\textsuperscript{a}</td>
<td>3.43 ± 0.50\textsuperscript{b}</td>
<td>3.23 ± 0.50</td>
<td>13.27 ± 0.78\textsuperscript{a}</td>
</tr>
<tr>
<td>PIKL 3</td>
<td>3.13 ± 0.35\textsuperscript{a}</td>
<td>3.67 ± 0.48\textsuperscript{ab}</td>
<td>3.63 ± 0.56\textsuperscript{b}</td>
<td>3.33 ± 0.55</td>
<td>13.77 ± 0.94\textsuperscript{b}</td>
</tr>
<tr>
<td>P</td>
<td>0.003*</td>
<td>0.000*</td>
<td>0.000*</td>
<td>0.068</td>
<td>0.000*</td>
</tr>
</tbody>
</table>

Values are shown as mean ± standard deviation. Different superscript letters in the same column indicate significant differences between groups (p<0.05).

Sensory evaluation of instant papeda is considered as one of the crucial tests affected most of the admissions\textsuperscript{(23)}. Table 2 displays the average of instant hedonic papeda sensory values. In food products, consumers often assess the initial quality products by the color and appearance. Appearance and the color of this product is a key indicator of perceived quality\textsuperscript{(24)}. The lowest assessment toward the highest color in the group of PI (3,50) in the category between likes and dislikes is PIKL group 3 (3,13) in the category of likes.

Flavor is a crucial parameter in evaluating the sensory of a food product. An attractive food product contains high energy on the other hand, it is tasteless. There is the possibility which the products are unacceptable\textsuperscript{(25)}. The highest rate of the taste is displayed by the PIKL group 3 (3,67) followed by PI (3,63) in the category between likes and very likes. Laor flour adds a savory taste to instant papeda.

Aroma is an integral part of the taste and is a general acceptance of a food before it is eaten. Therefore, this parameter plays a crucial role when testing the formula of the meal\textsuperscript{(25)}. The highest average value of sensory of aroma is displayed in the PIKL 3 group, 3.63 in the category between likes and dislikes. The distribution of laor presents a significant difference to the instant papeda aroma. The average value of sensory of instant papeda texture between the PI and PIKL 3 groups is similar, (3,33) in the category of likes. Based on the result there was no significant difference to instant papeda texture in all four groups. The addition of a laor does not affect the texture of instant papeda.

The total score of panelist reception on color, flavor, aroma and taste is highly perceived in PIKL 3 group amounted to 13.77, followed by the control group amounted to 13.5. PIKL2 group amounted to 13.27 and the lowest is PIKL 1 group amounted to 12.53

### Conclusion

The substitution of laor (Polychaeta) in papeda increases the energy, protein, Fe and Zn. Papeda with 40\% (PIKL3) laor substitution provides the highest energy, protein, Fe and Zn meets the requirements of supplementary food for the pregnant women.

The results of the sensory evaluation show that instant papeda with laor koya (PIKL 3) is obtained in color, flavor, aroma and texture. Consequently, it can be used as an alternative food supplement for the pregnant women with the local food-based.

Conflict of Interest: There is no conflict of interest for both authors.

Source of Funding: This research funded by Ministry of Health Republic Indonesia.

Ethical Clearance: All procedures performed in studies were in accordance with the ethical standards of Animal Care and Use Committee Faculty of of veterinary medicine Airlangga University number 762.
REFERENCES


Analysis of Internal Factor Characteristics Influencing the Safety Driving Behavior among Inter-City Bus Drivers in East Java–Indonesia

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ABSTRACT

Background and Aims: The objective of this present research is to evaluate internal characteristic factors coming from an individual consisting of age, level of education, work period as bus driver, marital status, the number of the dependents, wife’s job, ethnic group, how to get a driving license, how to get driving competence, experiences of accidents in last one year, condition of accidents in the last one year. They can be used to predict the safety driving behaviors of the inter-city bus research to take the buses entering into the terminal each here where the data on the drivers were determined as the sample.

Finding: If the internal characteristics of the bus drivers interact with the factors of the engine and the road environment, it will contribute to the safety driving behavior that may cause accidents.

Results: A systemic random sampling was employed in this present research to take the buses entering into the terminal each here where the data on the drivers were determined as the sample. The criteria of the drivers who had been taken as the sample would be substituted by the bus drivers with the order of the fifth interval for the next sample.

Conclusion: From the results an analysis, it is known that the variables of age, ethnic group, and experiences of 3-4 accidents in the last one year contribute to the safety driving behavior.

Keywords: Internal characteristics, safety driving, inter-city bus, driver

Introduction

The global mortality rate reaches 1.24 million per year. It is estimated that the mortality rate will increase three times, namely 3.6 millions per year in 2030. According to the data from Global Status Report on Road Safety, at present, Indonesia occupies the first rank in the increase of road accidents with the death rate of 40,000 persons per year.

Such a high death rate in road accidents happens because of the automatic driving behavior caused by repetitive driving actions. It means that a single driving action such as changing the gear or navigation is decided unconsciously. Changing driving behavior, from disobedience to obedience to rules, needs a great effort since drivers should change their unconscious behavior into conscious and controlled behavior. For example, they usually do not use their safety belt when they drive their vehicles in the road, but they use it when they drive in the protocol road. Besides external factors such as the condition of the vehicles and the environment of the road, individual characteristics play important roles in causing road accidents. This present research would describe individual characteristics of inter-city bus drivers in East Java that may be used as the predictors of road accidents.

Material and Method

A systemic random sampling was employed in this present research to take the buses entering into the terminal each here where the data on the drivers were determined as the sample.
determined as the sample. The criteria of the drivers who had been taken as the sample would be substituted by the bus drivers with the order of the fifth interval for the next sample. The questionnaires returned and analyzed were 204 drivers from the total population of 516 drivers.

**Results and Discussion**

Cross tabulation of age showed that safety driving under good category existed at the adult age range namely 36-45 years (18.5%) and it decreased with the increasing age. It means that the older the drivers, the lower their safety driving would be. Dealing with relation between the level of education and safety driving, the drivers in a high category are those who did not finish their elementary school (23.9%), those in less category are those who passed their Senior High School (13.8%).

High safety driving action tended to be made by respondents with work period of 25-30 years (26.9%), because the longer the work period, the higher the experiences and competences the drivers posses to avoid road accidents than those with shorter work period where they usually do not know much about how to drive safely\(^{[5,7,11]}\). According to Mulen, one of the reasons why ones behave safely is that they should fulfill their families’ needs and also they are afraid of losing their jobs\(^{[12]}\). The results of this present research is different with those made by Machado et all. That drivers with higher incomes did not pay attention to the speed limit, did not respect the safe distance and the prevailing regulations\(^{[6]}\).

In Indonesia there are 1,340 tribes that may be grouped into 31 ethnic groups. Respondents in this present research were divided into Java, Sumatera, Madura and other ethnic groups (Bali, Kalimantan, Sunda). The research results showed that respondents from Sumatera ethnic group had the high category (66.7%) in their safety driving behavior than those from Java and Madura, who dominated the Inter-City bus drivers in East Java. As a whole, no certain pattern was found between the ethnic group and the safety driving behavior.

The drivers who got their driving license for the first time through official processes tended to show good safety driving (15.94%) than those getting their driving licenses through unofficial process, namely through brokers. It happens because the drivers with driving licenses obtained through formal process felt that they should work very hard to get the licenses.

Inter-city bus drivers experiencing 3-4 accidents in the past one year tended to show their safety driving under good category and this category reduced in other experiences. It may happen because the experiences may result in traumatic feelings. For complete information, see Table 1.

### Table 1: Cross Tabulation Respondent Characteristics with Safety Driving

<table>
<thead>
<tr>
<th>Safety Driving</th>
<th>Well</th>
<th>Enough</th>
<th>Less</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>No.</td>
<td>n</td>
<td>%</td>
<td>n</td>
<td>%</td>
</tr>
<tr>
<td>1. Age (Years)</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>17-25</td>
<td>1</td>
<td>4.8</td>
<td>6</td>
<td>3.9</td>
</tr>
<tr>
<td>26-35</td>
<td>2</td>
<td>9.5</td>
<td>35</td>
<td>23</td>
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<tr>
<td>36-45</td>
<td>11</td>
<td>52.4</td>
<td>55</td>
<td>36.2</td>
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<tr>
<td>46-55</td>
<td>7</td>
<td>33.3</td>
<td>46</td>
<td>30.3</td>
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<td>56-65</td>
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<td>0</td>
<td>10</td>
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<td>Total</td>
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<td>10.3</td>
<td>152</td>
<td>74.5</td>
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<tr>
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<td>Finish primary school</td>
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<td>12</td>
<td>65</td>
<td>78.3</td>
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<tr>
<td>Finished senior high school</td>
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<td>Total</td>
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<td>152</td>
<td>74.5</td>
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### Work period

<table>
<thead>
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<th>Frequency</th>
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<th>Frequency</th>
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<th>Frequency</th>
<th>Percentage</th>
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<td>74.5</td>
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<td>10.3</td>
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### Marital status

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<th>Status</th>
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<th>Frequency</th>
<th>Percentage</th>
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<th>Percentage</th>
<th>Frequency</th>
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<td>Widower</td>
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<td>15</td>
<td>68.2</td>
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<td>10.78</td>
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<td>74.4</td>
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<td>7.7</td>
<td>117</td>
<td>57.35</td>
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<td></td>
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<td>76.9</td>
<td>9</td>
<td>13.8</td>
<td>65</td>
<td>31.86</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>31</td>
<td>15.2</td>
<td>152</td>
<td>74.5</td>
<td>21</td>
<td>10.3</td>
<td>204</td>
<td>100</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### The number of the dependent driver

<table>
<thead>
<tr>
<th>Number</th>
<th>Frequency</th>
<th>Percentage</th>
<th>Frequency</th>
<th>Percentage</th>
<th>Frequency</th>
<th>Percentage</th>
<th>Frequency</th>
<th>Percentage</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-3 people</td>
<td>11</td>
<td>13.8</td>
<td>56</td>
<td>70</td>
<td>13</td>
<td>16.3</td>
<td>80</td>
<td>39.21</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4-6 people</td>
<td>16</td>
<td>15.8</td>
<td>78</td>
<td>77.2</td>
<td>7</td>
<td>6.9</td>
<td>96</td>
<td>47.05</td>
<td></td>
<td></td>
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<tr>
<td>7-9 people</td>
<td>4</td>
<td>18.2</td>
<td>18</td>
<td>81.8</td>
<td>0</td>
<td>0</td>
<td>22</td>
<td>10.78</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10 people</td>
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<td>0</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>100</td>
<td>1</td>
<td>0.29</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>31</td>
<td>15.2</td>
<td>152</td>
<td>74.5</td>
<td>21</td>
<td>10.3</td>
<td>204</td>
<td>100</td>
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<td></td>
</tr>
</tbody>
</table>

### Wife’s job

<table>
<thead>
<tr>
<th>Job Type</th>
<th>Frequency</th>
<th>Percentage</th>
<th>Frequency</th>
<th>Percentage</th>
<th>Frequency</th>
<th>Percentage</th>
<th>Frequency</th>
<th>Percentage</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not working</td>
<td>14</td>
<td>16.28</td>
<td>73</td>
<td>84.89</td>
<td>9</td>
<td>10.46</td>
<td>86</td>
<td>42.15</td>
<td></td>
<td></td>
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<tr>
<td>Household assistants</td>
<td>11</td>
<td>23.4</td>
<td>31</td>
<td>66</td>
<td>5</td>
<td>10.64</td>
<td>47</td>
<td>23.03</td>
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<td></td>
</tr>
<tr>
<td>Trading</td>
<td>6</td>
<td>11.8</td>
<td>41</td>
<td>80.4</td>
<td>4</td>
<td>7.8</td>
<td>51</td>
<td>25</td>
<td></td>
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<tr>
<td>Private</td>
<td>0</td>
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<td>7</td>
<td>70</td>
<td>3</td>
<td>30</td>
<td>10</td>
<td>4.90</td>
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</tr>
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<td>31</td>
<td>15.2</td>
<td>152</td>
<td>74.5</td>
<td>21</td>
<td>10.3</td>
<td>204</td>
<td>100</td>
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<td></td>
</tr>
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</table>

### Ethnic group

<table>
<thead>
<tr>
<th>Ethnicity</th>
<th>Frequency</th>
<th>Percentage</th>
<th>Frequency</th>
<th>Percentage</th>
<th>Frequency</th>
<th>Percentage</th>
<th>Frequency</th>
<th>Percentage</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Java</td>
<td>20</td>
<td>13.7</td>
<td>111</td>
<td>76.7</td>
<td>14</td>
<td>9.6</td>
<td>145</td>
<td>71.07</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sumatera</td>
<td>2</td>
<td>66.7</td>
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<td>33.3</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>1.47</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Madura</td>
<td>8</td>
<td>19.04</td>
<td>29</td>
<td>69.05</td>
<td>5</td>
<td>11.91</td>
<td>42</td>
<td>20.58</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other Etnic</td>
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<td>7.14</td>
<td>11</td>
<td>78.6</td>
<td>2</td>
<td>14.3</td>
<td>14</td>
<td>6.86</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>31</td>
<td>15.2</td>
<td>152</td>
<td>74.5</td>
<td>21</td>
<td>10.3</td>
<td>204</td>
<td>100</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### How to get driving competence

<table>
<thead>
<tr>
<th>Method</th>
<th>Frequency</th>
<th>Percentage</th>
<th>Frequency</th>
<th>Percentage</th>
<th>Frequency</th>
<th>Percentage</th>
<th>Frequency</th>
<th>Percentage</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Through brokers</td>
<td>20</td>
<td>14.81</td>
<td>100</td>
<td>74.07</td>
<td>15</td>
<td>11.1</td>
<td>135</td>
<td>66.17</td>
<td></td>
<td></td>
</tr>
<tr>
<td>With official tests</td>
<td>11</td>
<td>15.94</td>
<td>52</td>
<td>75.36</td>
<td>6</td>
<td>8.7</td>
<td>69</td>
<td>33.82</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>31</td>
<td>15.2</td>
<td>152</td>
<td>74.5</td>
<td>21</td>
<td>10.3</td>
<td>204</td>
<td>100</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### How to get licenses for the first time

<table>
<thead>
<tr>
<th>Method</th>
<th>Frequency</th>
<th>Percentage</th>
<th>Frequency</th>
<th>Percentage</th>
<th>Frequency</th>
<th>Percentage</th>
<th>Frequency</th>
<th>Percentage</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Through brokers</td>
<td>20</td>
<td>14.81</td>
<td>100</td>
<td>74.07</td>
<td>15</td>
<td>11.1</td>
<td>135</td>
<td>66.17</td>
<td></td>
<td></td>
</tr>
<tr>
<td>With official tests</td>
<td>11</td>
<td>15.94</td>
<td>52</td>
<td>75.36</td>
<td>6</td>
<td>8.7</td>
<td>69</td>
<td>33.82</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>31</td>
<td>15.2</td>
<td>152</td>
<td>74.5</td>
<td>21</td>
<td>10.3</td>
<td>204</td>
<td>100</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Experience of accident during the past one year

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Percentage</th>
<th>Frequency</th>
<th>Percentage</th>
<th>Frequency</th>
<th>Percentage</th>
<th>Frequency</th>
<th>Percentage</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>No answer</td>
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<td>15</td>
<td>14</td>
<td>70</td>
<td>3</td>
<td>15</td>
<td>20</td>
<td>9.80</td>
<td></td>
</tr>
<tr>
<td>Never</td>
<td>5</td>
<td>13.51</td>
<td>27</td>
<td>73.8</td>
<td>5</td>
<td>13.5</td>
<td>37</td>
<td>18.13</td>
<td></td>
</tr>
<tr>
<td>1-2 times</td>
<td>21</td>
<td>14.8</td>
<td>109</td>
<td>76.7</td>
<td>12</td>
<td>8.5</td>
<td>142</td>
<td>69.60</td>
<td></td>
</tr>
<tr>
<td>3-4 times</td>
<td>2</td>
<td>40</td>
<td>2</td>
<td>40</td>
<td>1</td>
<td>20</td>
<td>5</td>
<td>2.45</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>31</td>
<td>15.2</td>
<td>152</td>
<td>74.5</td>
<td>21</td>
<td>10.3</td>
<td>204</td>
<td>100</td>
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</table>
The condition of accidents experienced during the past one year

<table>
<thead>
<tr>
<th>Category</th>
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<th>22,2</th>
<th>7</th>
<th>77,8</th>
<th>0</th>
<th>0</th>
<th>9</th>
<th>4,41</th>
</tr>
</thead>
<tbody>
<tr>
<td>All condition</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>There are victims other than passengers</td>
<td>3</td>
<td>11,1</td>
<td>22</td>
<td>81,5</td>
<td>2</td>
<td>7,4</td>
<td>27</td>
<td>13,23</td>
</tr>
<tr>
<td>There were passengers</td>
<td>14</td>
<td>15,4</td>
<td>67</td>
<td>73,6</td>
<td>10</td>
<td>11</td>
<td>91</td>
<td>44,60</td>
</tr>
<tr>
<td>Broken car</td>
<td>11</td>
<td>15,9</td>
<td>50</td>
<td>72,5</td>
<td>8</td>
<td>11</td>
<td>69</td>
<td>33,82</td>
</tr>
<tr>
<td>Never</td>
<td>1</td>
<td>12,5</td>
<td>6</td>
<td>75</td>
<td>1</td>
<td>12</td>
<td>5</td>
<td>3,92</td>
</tr>
<tr>
<td>Total</td>
<td>31</td>
<td>15,2</td>
<td>152</td>
<td>74,5</td>
<td>21</td>
<td>10</td>
<td>204</td>
<td>100</td>
</tr>
</tbody>
</table>

The categorization of age in this present research is made in accordance with the categorization of age of the Department of Health of the Republic of Indonesia year of 2009. Dealing with safety driving behavior, the low category was mostly made by the respondents under the age category of late mature (36-45 years) and this driving safety driving tended to decrease in line with the respondents’ increasing age. Hobs’s, who divides age in line with WHO, states age is divided into three namely adulthood, old age and the elderly. It can be stated that productive age (18-40 years) has a lower risk than unproductive age (>40) for accidents [2,13]. It is because at unproductive age, one will experience the decrease in sight and hearing and in reactions than the productive age. Bus drivers with mature ages have more capability in controlling the emotions when driving buses so that it is expected to give effects on their safety driving. It is in line with the results of the research in Tehran, Iran that there is a negative correlation between age and accidents of bus drivers. The older the drivers, the lower their safety driving would be, therefore the higher the number of accidents occur [8]. These various patterns of tendency show that the age indicators did not influence the safety driving behavior.

The respondents who obtained the driving licenses for the first time through official test showed a high category in their safety driving behavior. This also applied for those getting driving competences by joining in official driving courses. When joining in driving courses, ones would be taught a good driving technique by experienced instructors, as a result the candidate drivers will have more knowledge in safety driving behavior. The results from the unstructured interviews showed that there were many drivers who got their driving competences by serving as sopir kain lap. (Sopir kain lap is the driver who at first worked as bus washer in the terminals or in bus garages). During their work they should drive forward or backward the buses, so that at last they may be able to drive buses and become bus drivers after getting driving licenses illegally (through brokers). In this case, special requirements such as theoretical and practical tests as stipulated in the Law No. 22 year of 2009 regarding Land Transportation and Traffic Rules, article 77 is not fulfilled [9]. The driving license ownership is the evidence of registration and identification made by the police to someone who has fulfilled administrative requirements, has been healthy mentally and physically, has understood traffic regulations and skills in driving motor vehicles. These requirements indicate that one driving a motor vehicle has experienced a series of tests conducted by the Police and is stated to pass the test, so that he or she has right to drive the motor. This sentence itself has been stipulated in the Law No. 22 year of 2009 in Article 1 word 23 that a driver is the one who drives a motor vehicle on the road who has had a driving license. The test itself consists of general and traffic knowledge aspects as the basic knowledge standard such as traffic signs, age as the psychological control and the level of one’s self control ability, the health aspect and passing the practice test to confirm the readiness of a candidate driver [9]. Based on the Government Regulation No.43 in the year of 1993 on the traffic infrastructures and facility,
a traffic accident is an accidental and unintentional event on the street that involves a vehicle with or without other road users, resulting human victims or property losses [10]. The accidents a respondent has experienced during the past one year is the number of accidents a bus driver has experience. The respondents identified to have 3-4 accidents in the past one year showed the safety driving behavior under high category, meaning that their safety driving behavior is better. It means that accidents may give effects on the City Transport bus drivers’ driving behavior.

Actually in his first career, each bus driver drives his bus well, meaning that he is trying to obey traffic regulations. He drives his bus everyday and finds much traffic violations, so that he often becomes “victims” of the violations. It is this at last that changes his behavior, and he also shows bad behavior in the street. It is conducted as a mechanism of his self-defense as a bus driver.

Conclusion

From the descriptions above, it be concluded that the percentages of the good internal characteristic factors City Transport bus drivers in East Java in safety driving are as follows: age (36-45); elementary school; work period (25-30 year); marital status (widower); the number of the dependent; Sumatera ethnic group; the way in obtaining driving competence officially; the way in obtaining the the driving license through legal process; the 3-4 accidents experienced in the past one year; and the condition of accidents experienced in the past one year with the victims from the passenger, other drivers and car damages.

Conflict of Interest: None

Source of Funding: This research funded by Ministry of Research, Technology and Higher Education of the Republic of Indonesia

Ethical Clearance: The study was approved by the institutional Ethical Board of the Public Health, Airlangga University number 146-KEPK.

REFERENCES


10. Government Republik Indonesia Regulation No.43 in the year of 1993 on the traffic infrastructures and facility, a traffic accident is an accidental and unintentional event on the street hubdat.dephub.go.id/uu/uu-no.2004-tentang-jalan


The Analysis on Dental and Oral Health Services Based on “Rater” Service Quality Dimension to Patient Satisfaction at Natural Esthetic Clinic Makassar

Badai Septa Wahyudadi¹, Setya Haksama²
¹Department of Dental Health, Polytechnic of Health, Makassar; ²Social Security Study Center
Universitas Airlangga

ABSTRACT

The growth of Clinic of Dental Health Service is currently increasing rapidly in the City of Makassar South Sulawesi Province. Quality is a dynamic condition associated with products, services, human resources, processes, and environments that meet or exceed expectations, where the relationship between products and services or services provided to consumers can meet their expectations and satisfaction. The purpose of this research is to analyze the dimension of service quality that consist of reliability, assurance, tangible, empathy, and responsiveness, frequently abbreviated as RATER, to patient’s satisfaction level in Natural Esthetic Clinic (NEC) Makassar. This research is a survey of cross sectional study approach with the number of samples as many as 74 visiting patients. The result shows that the total value of patient satisfaction (gap) obtained in the analysis is -0.44 on the average and belongs to Medium category, It means that the quality of services in NEC Makassar is ordinary classified and has not met patient’s satisfaction. The result of statistical analysis shows that the dimensions of reliability (0.000) assurance (0.004), tangible (0.001), and responsiveness (0.000) have significant effect on patient satisfaction, except empathy (0.060) which does not give significant difference to influence patient satisfaction level. The possible advices are the need for increasing attention and communication; giving a high sense of care; and establishing a clinical management information system (CMIS) to provide efficient, effective, and accurate services.

Keywords: Dimension of Quality, Satisfaction, Dental Clinic, City of Makassar

Introduction

The growth of dental health clinic is currently increasing rapidly in The City of Makassar South Sulawesi Province so it benefits people because of various options for them to obtain high quality of dental and oral health services. Tjiptono (2008) reveals that quality can be interpreted as “dynamic conditions associated with products, services, human resources, processes, and environments that meet or exceed expectations”, it means that the relationship between products and services or services provided to consumers can meet their expectation and satisfaction.¹ While Gaspersz (2002) mentions that quality is often interpreted as everything that satisfies customer or conformity to requirements or needs. The quality of totality of characteristics of goods and service products that support the ability to meet the specified needs.²

Zeithaml in Yamit (2005) states that five dimensions of characteristics used by customers in evaluating the quality of services are 1). Reliability, namely the ability to provide satisfied and immediate services as promised; 2). Assurance, It is the ability, courtesy and credibility of the doctor/staff, free of danger, risk or uncertainty/doubt; 3). Tangibles (direct evidence), which includes physical facilities, equipment, employees, and means of communication. 4). Empathy, it is the ease of doing relationships, good communication, and sincere attention to the needs of patients; and 5). Responsiveness, It is the desire of nurses /dentists to help patients and provide responsive services.³ It is also stated by Parasuraman as quoted by Tjiptono (2007) revealing that service quality includes the five dimensions mentioned above.⁴

Customer satisfaction is a condition to meet customer’s desires, expectations and needs. If the customer is not satisfied with a service provided, then
the service must be ineffective and inefficient. This is especially important for public services. The purpose of this research is to analyze service quality dimensions which include reliability, assurance, tangible, empathy, and responsiveness which is often abbreviated as RATER to patient satisfaction level in Natural Esthetic Clinic (NEC) Makassar.

**Material and Method**

This research is a survey with cross sectional study approach. The sample size obtained in this research are 74 respondents by implementing accidental sampling. The data is collected by observation, interview, and documentation study. Research instrument takes the form of questionnaire. Measurement of indicators in each variable of clinical service quality based on the perception of patient satisfaction using the likert scale. To test the validity of the questionnaire, it is used the Product Moment Pearson correlation test, and test the reliability with Alpha Cronbach. The statistical analysis used in this study is multiple linear regression analysis which is conducted on dependent and independent variables with the test model as follows:

\[
Y = b_0 + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + e
\]

Where \( Y \) = patient satisfaction; \( X_1 \) = reliability; \( X_2 \) = assurance; \( X_3 \) = tangible (physical evidence); \( X_4 \) = empathy; \( X_5 \) = responsiveness; \( b_0 \) = constant (intercept); \( b_1 - b_5 \) = regression coefficient; and \( e \) = Error random.

**Findings**

**Perception of Patient Satisfaction on Service Quality at NEC Makassar:** The level of patient satisfaction to the quality of services provided in NEC Makassar can be described as follows.

**Table 1: Perception of Patient Satisfaction on Service Quality**

<table>
<thead>
<tr>
<th>Dimension of Quality Service</th>
<th>Perception of Patient Satisfaction</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Belief</td>
</tr>
<tr>
<td>Reliability (X₁)</td>
<td>3.70</td>
</tr>
<tr>
<td>Assurance (X₂)</td>
<td>3.72</td>
</tr>
<tr>
<td>Tangible (X₃)</td>
<td>3.91</td>
</tr>
<tr>
<td>Emphaty (X₄)</td>
<td>3.63</td>
</tr>
<tr>
<td>Responsiveness (X₅)</td>
<td>3.78</td>
</tr>
<tr>
<td>Average</td>
<td>3.75</td>
</tr>
</tbody>
</table>

For the perception of patient satisfaction above, there are categories with value intervals as follows: <1.8 Very Low; 1.8-2.6 Low; > 2.6-3.4 Medium; > 3.4-4.2 High; and > 4.2 Very High. Based on these criteria, patients who visited NEC Makassar gave good assessment to the health services provided, but the confidence perception score compared to patients’ expectations perceptions are still below expectations. The gap between the perceptions of belief and expectation explains the level of patient satisfaction.

The average perception of patient satisfaction based on the patient confidence perception is 3.75 (3.63 - 3.91), the perception of patient expectation has a value of 4.19 (4.10 - 4.23). As for the overall average assessment of patient satisfaction use the category of Rahmulyono (2008) as follows: -4.0 to -2.4 Very Low; <-2.4 to -0.8 Low; <-0.8 to 0.8 Medium; > 0.8 to 2.4 Height; and> 2.4 to 4.0 Very High. The total value of patient satisfaction (gap) obtained in the analysis with an average of -0.44 (-0.53 s / d -0.28), can be categorized as the Medium category of patient perception. This shows that the quality of service in NEC Makassar is quite common and has not given maximum satisfaction to the patient.

**Statistic Analysis**

The result of statistical analysis for service quality dimension to patient satisfaction are described as follows.
Table 2: Statistical Analysis For Service Quality Dimension To Patient Satisfaction

<table>
<thead>
<tr>
<th>Model</th>
<th>Coefficient of regression correlation (R)</th>
<th>Coefficient of determination (R²)</th>
<th>Improved coefficient of determination (R² Improved)</th>
<th>Durbin-Watson</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0.784</td>
<td>0.615</td>
<td>0.587</td>
<td>1.950</td>
</tr>
</tbody>
</table>

Table 2 informs that the dimension of service quality has a strong positive correlation to the level of satisfaction of patients who visit NEC Makassar. This is reflected from the correlation value (R² corrected) of 0.587 which means that the change in the level of patient satisfaction is caused by the service quality dimension of 58.7%, while other changes (41.3%) caused by other variables outside the research analysis.

The result of multiple linear regression (F test) of the influence of service quality dimension to patient satisfaction level in the table below shows that F test result obtained by F count value equal to 21.742 and significance equal to 0.000. If the significance value obtained is compared with the 1.0% confidence level, then the significance (0.000) <0.01, which means that the variable dimension of service quality has a significant effect on patient satisfaction. Therefore, it can be concluded that the dimensions of service quality in the form of reliability, assurance, tangible, empathy, and responsiveness simultaneously provide a very significant influence on the level of patient satisfaction.

Table 3: The Result of Multiple Linear Regression (F Test) of The Influence of Service Quality Dimension To Patient Satisfaction Level

<table>
<thead>
<tr>
<th>Model</th>
<th>Free Level</th>
<th>∑ Square</th>
<th>Middle squares</th>
<th>F count</th>
<th>Signification</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Residual Regression Total</td>
<td>5</td>
<td>83.001</td>
<td>16.600</td>
<td>21.742</td>
<td>0.000</td>
</tr>
<tr>
<td>68</td>
<td>51.919</td>
<td>0.764</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>73</td>
<td>134.920</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The result of T test on each research variable of service quality dimension has significance value (0.000). < 0.05 level of trust indicates the existence of significant influence of service quality dimension variable to patient satisfaction.

Table 4: The Result of Partial Test (T Test) on Each Research Variable on Service Quality Dimension

<table>
<thead>
<tr>
<th>Model</th>
<th>Variable</th>
<th>B</th>
<th>t</th>
<th>Sig</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Konstanta</td>
<td>-18,512</td>
<td>-10,273</td>
<td>0.000</td>
</tr>
<tr>
<td></td>
<td>X1 Reliability</td>
<td>1.019</td>
<td>4.777</td>
<td>0.000</td>
</tr>
<tr>
<td></td>
<td>X2 Assurance</td>
<td>0.748</td>
<td>2.991</td>
<td>0.004</td>
</tr>
<tr>
<td></td>
<td>X3 Tangibel</td>
<td>0.772</td>
<td>3.522</td>
<td>0.001</td>
</tr>
<tr>
<td></td>
<td>X4 Emphaty</td>
<td>0.464</td>
<td>1.911</td>
<td>0.060</td>
</tr>
<tr>
<td></td>
<td>X5 Responsiveness</td>
<td>1.133</td>
<td>5.788</td>
<td>0.000</td>
</tr>
</tbody>
</table>

The result of partial test between service quality dimension shows the significance and tcount value respectively on the dimensions of (4.777 and 0.000), assurance (2.991 and 0.004), tangible (3.522 and 0.001), empathy (1.911 and 0.060), and responsiveness (5.788 and 0.000), while in t table, it is obtained the value of t tabel = 1.966 for df = 68 and confidence level 5 %. On the dimensions of reliability, assurance, tangible, and responsiveness, it was obtained tcount value between 2.991 - 5.788 and significance between 0.000-0.004. If compared to the result of t count and significance with the t table and confidence level of 5 %, the four dimensions obtain t count (2.991-5.777)> t table (1.966) and significance (0.000-0.004) <5%, it is concluded that the acceptance of dimensions of reliability, assurance, tangible, and responsiveness in service quality have a significant effect to patient satisfaction. Meanwhile empathy dimension has t count < t table and significance> 5%, so it has no a significant effect to patient satisfaction. It means that statistically the empathy dimension does not give significant difference to affect the level of patient satisfaction.
Based on the statistical results, it is obtained the result that the dimensions of reliability and responsiveness are more dominant to provide significant differences to influence the level of patient satisfaction than other service quality dimensions. From the test results is obtained equation model as follows:

\[ Y = -18.512 + 1.019X_1 + 0.748X_2 + 0.772X_3 + 0.464X_4 + 1.133X_5 \]

The above equation shows that the level of patient satisfaction is directly proportional to all dimensions of service quality. This means that the ability of each service quality dimension gives positive influence of 1.019 (reliability), 0.748 (assurance), 0.772 (tangible), 0.464 (empathy), and 1.133 (responsiveness), so on the condition the dimension increases 1 score, it causes patient satisfaction for each constant.

**Discussion**

Measuring customer satisfaction is an important element in public services to provide better, more efficient and more effective services. Such as the measurement of service quality in NEC Makassar simultaneously has a strong positive correlation and significant effect on the level of patient satisfaction. The accumulation of added-value provided in the service dimension at NEC Makassar is a reinforcing factor of beliefs and expectations of patients so that the patient will give a satisfied perception. The results of this study support Rahmulyono’s finding (2008) and Marsuli et al. (2005) which states that the value of patient satisfaction is triggered by the accumulated value of conformity that can meet the wishes or expectations of patients in obtaining a service. Rahmulyono (2008) explained that the value of satisfaction as a sense of satisfaction is a fact of perception of patient confidence that maximally meet the expected value of patients in service, so on the condition that the services provided by NEC Makassar can create an accumulated value of satisfaction in the implementation of reliability, assurance, tangible, empathy, and responsiveness, it will have an impact on the fulfillment of the expected value or the value of patient satisfaction in the acceptance of service in order that the perception of patient satisfaction will increase.

**The Influence of Service Reliability to Patient Satisfaction:** Service reliability dimension simultaneously and partially give significant influence to patient satisfaction level in NEC Makassar with p-value = 0.000 in F test and T test smaller than \( \alpha = 0.005 \). The quality of service on the dimension of reliability shows a moderate value based on the patient’s perception of - 0.53. This indicates that the service provided by NEC Makassar to patient is still not maximal due to such factors as the accuracy of implementing promise, reliability and accuracy in recording the patient’s documents, although this dimension gives the dominant influence on patient satisfaction level.

**Influence of Assurance Service to Patient Satisfaction:** Service assurance dimension simultaneously and partially give significant influence to patient satisfaction level in NEC Makassar with p-value = 0.000 F test and p-value = 0.004 in T test smaller than \( \alpha = 0.005 \). The dimension of service assurance provided by NEC Makassar has a significant effect on patient satisfaction. This is because during service, dentists and dental nurses act in accordance with Standard Operating Procedures (SOPs) in handling patients such as wearing masks, disposable gloves, disposable syringes and sterile tool kits. In addition, the physician at the of the action always provides anti-pain medication (analgesic) and informs the patient; if you still feel pain after returning home you can contact your dentist or clinic phone number for consultation, and if the clinic is still open you can go to the clinic immediately. The action of dentist and dental nurse at NEC Makassar is to meet the wishes and expectations of patients so that it raises the patient’s satisfaction to the services provided. The results are in accordance with the research of Rahmulyono (2008) which explains that the health services provided at the Puskesmas Depok I Sleman Yogyakarta in the hope that the patient still has a gap on the level of satisfaction, because it has not fully meet the expectations of patients even though the service provided is good enough.

**Effect of Physical Evidence (Tangible) on Patient Satisfaction:** The physical service dimension simultaneously and partially give significant influence to patient satisfaction level in NEC Makassar with p-value = 0.000 F test and p-value = 0.001 T test, where both values are smaller than \( \alpha = 0.005 \). This is revealed by Gronroos ang quoted by Tjiptono (2007) who states that service is a process consisting of a series of intangible activities which usually but not necessarily occur in the interaction between consumer and service employee, physical resources, goods, or a service provider system provided as a solution to consumer problems. From this definition, it can be said that service is an activity
given to the consumer and is essentially intangible. It is provided as a solution or a consumer problem. In order that patients can assess the embodiment, it needs to show various means and equipment so that patients can see directly the tangible ones.

**Influence of Concern (Empathy) Service to Patient Satisfaction:** Based on statistical analysis with F test, it shows that the dimension of concern (empathy) gives significant effect to patient satisfaction at NEC Makassar $p$-value $= 0.000$ smaller than $\alpha = 0.005$. Nevertheless from T test, it shows that the partial caring dimension has no significant effect where $p$-value $= 0.060$ is greater than $\alpha = 0.005$. The results of this study are also in line with Hennig-Thurau et al. (2002) that satisfaction significantly affects commitment. With the high level of satisfaction customers will get the power back to make a purchase that will create a commitment and shows the existence of an emotional bond. Boonajsevee (2005) also found that there is a positive correlation between satisfaction and commitment.

**The Influence of Responsiveness (Responsiveness) Service to Patient Satisfaction:** Based on statistical analysis with multiple linear regression test (F test) and partial test (T test) showed that the service responsiveness dimension simultaneously and partially give significant influence to patient satisfaction level in NEC Makassar where each $p$-value $= 0.000$ is smaller from $\alpha = 0.005$. From the quality of services provided by NEC Makassar, it describes the significant influence of dimension of responsiveness to patient satisfaction. This is because dentists and dental nurses act swiftly in dealing with patients who need quick treatment to ease the pain of patients by maintaining a sense of justice and togetherness. This is in line with the research of Padma, et.al (2009) which reveals that the assessment of service quality is reflected as an overall patient assessment of the quality of service provided with specific thing specific is patient satisfaction which assesses the process and outcome, without ignoring the cognitive and emotional factors.

**Conclusion**

This research can be concluded as follows:

1. The dimensions of quality of service reliability, assurance, tangible, and responsiveness have a positive correlation and simultaneously and partially give significant effect on patient satisfaction level in dental health services at NEC Makassar.

2. The Dimension of quality of service care (empathy) has a positive correlation and simultaneously has a significant effect, while partially has no significant effect on the level of patient satisfaction in dental health services at NEC Makassar.

3. The Oral and dental health services provided at NEC Makassar are in moderate or medium condition.

**Conflict of Interest:** None

**Source of Funding:** Self

**Ethical Clearance:** This study was approved by Polytechnic of Health, Makassar

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Interleukin-8 (IL-8) Role in Children with Dengue Hemorrhagic Fever

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ABSTRACT

Background: Dengue hemorrhagic fever (DHF) is an infectious disease caused by dengue virus and still become a health problem in Indonesia. Interleukin-8 (IL-8) has been widely accepted as a factor correlated with severity of DHF. However, its role in Dengue Haemmorhagic Shock Syndrome (DHSS) was still poorly understood. This study was conducted to elucidate correlation of IL-8 and DHSS in children.

Objective: To determine the correlation between IL-8 and DHF in children.

Methods: We conducted across sectional study in pediatric ward general hospital of Prof.Dr.R.D.Kandou Manado in March until August 2011. Fourty children aged 1-13 years old was conducted consecutively and divided in to shock and without shock DHF. IL-8 was examined in each group and the correlation with DHF was analyzed with Spearman rho test using SPSS software with P<0.05.

Result: The mean of IL-8 level in DHF children without shock was 45.63 (95% CI 31.88 to 59.37) ng/ml and in DHF with shock was 411.13 (95% CI 311.46 to 510.80) ng/ml. The correlation between IL-8 and DHF was statiticaly significant (r_s = 0.774 , p<0.001).

Conclusions: The IL-8 level in DHF in these two groups were increase, and higher in severe DHF (with shock). Higher level of IL-8 correlated with increasing severity of DHF.

Keywords: IL-8; DHF; children, interleukin, hemorrhagic fever

Introduction

Dengue hemorrhagic fever (DHF) is an infectious disease caused by dengue virus and still become a health problem in Indonesia including North Sulawesi. All of Indonesian region has a risk infected by DHF from mild until severe Dengue Hemmorhagic Shock Syndrome (DHSS) which tends to bring about shock and death.(1-3) According to clinical manifestation and laboratorial examination, DHF classified into four grade from unsymptomatic into the most sever DHSS. However its pathogenesis of DHSS was still clearly unknown. Many theories had tried to explain DHF pathogenesis but the main determinant not clearly known.(4-6)

The dengue virus is a single-stranded RNA virus with the primary target being monocyte or macrophage cells. Dengue virus envelope proteins are capable of binding endothelial cells, thus endothelium is also a target for dengue virus.(7-9)

Recent research has reported that disharmony of immune system seems has role in the pathogenesis of DHF. Many immunological mechanism has been considered involved in tis pathomchanism. Interleukin 8 (IL-8) as poten immunologic cytokine has been proposed have a role in pathogenesis of DHF and severity of DHF as previous studies in adult.(3,10-12) Then, many symptom base therapy has been tried to applied in DHSS treatmet, however DHSS is still a dangerous situtation problem in children and it maignt be IL-8 suspected as a main...
factor that contribute in DHSS severity. This study was conducted to explain the correlation of IL-8 and DHF in children.

**Method**

This study was an observational analytic with cross-sectional approach. The sample of 40 children aged 1-13 years with the diagnosis of DHF without shock on the degree I and II and DHF with shock in degrees III and IV treated in the nursery / Irina E at BLU. RSUP Prof. Dr.R.D. Kandou Manado. The diagnosis of DHF was confirmed by WHO criteria 1997 and confirmed by Dengue NS1 examination for hot ≤ 3 days or rapid test anti-dengue IgG and IgM in heat >3 days.

The inclusion criteria was included age of 1-13 years, diagnosed as dengue hemorrhagic fever based on WHO 1997 criteria and confirmed with serological examination, parents approved and filled out the study form. Exclusion criteria suffered from viral infections rather than dengue or acute bacterial infections, received treatment with corticosteroids, and received blood transfusions, suffered from pneumonia, sepsis, bronchiolitis, and typhoid fever. The study was conducted by examining blood samples including hemoglobin, hematocrit, leucocytes, platelets, Dengue NS1 or IgM IgM anti-dengue and IL-8 levels.

This study had obtained the approval of ethical clearance from the ethical committee of RSUP Prof. Dr.R.D. Kandou Manado. Data analysis used hypothesis test correlation coefficient analysis Spearman rho. Statistical analysis was found to be significant if p <0.05. The data collected had processed by using SPSS program version 17. (SPSS.Inc. Chicago, IL)

**Result**

**Characteristics of Respondents:** Sex distribution of the respondents was 14 (35%) boys and 26 (65%) girls suffering from DHF. Where in dengue without shock was 10 (71,43%) boys and 19 (73,08%) girls, whereas in dengue fever with 4 (28,57%) boys and 7 (26, (Table 1) The age range of 29 children with unobtrusive DHF ranges from 2.0 years to 13.0 years with mean age of children of 7.6 years and standard deviation (SD) of 3.1 years. The age range of 11 dengue fever children ranged from 3.0 years to 12.0 years with mean age of children 6.8 years and SD 3.3 years. (Table 2)

<table>
<thead>
<tr>
<th>Sexuality n (%)</th>
<th>DHF without Shock n (%)</th>
<th>DHF with Shock n (%)</th>
<th>Total n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boy</td>
<td>10 (71,43%)</td>
<td>4 (28,57%)</td>
<td>14 (100,00%)</td>
</tr>
<tr>
<td>Girl</td>
<td>19 (73,08%)</td>
<td>7 (26,92%)</td>
<td>26 (100,00%)</td>
</tr>
<tr>
<td>Total</td>
<td>29 (72,50%)</td>
<td>11 (27,50%)</td>
<td>40 (100,00%)</td>
</tr>
</tbody>
</table>

**Table 2: Descriptive distribution of children’s age with dengue hemorrhagic fever**

<table>
<thead>
<tr>
<th>DHF</th>
<th>n</th>
<th>Mean (tahun)</th>
<th>SD (tahun)</th>
<th>Mean for 95% KI</th>
<th>Minimum (Year)</th>
<th>Maximum (Year)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>LB (Year)</td>
<td>UB(Year)</td>
<td></td>
</tr>
<tr>
<td>Without Shock</td>
<td>29</td>
<td>7,6</td>
<td>3,1</td>
<td>6,4</td>
<td>8,8</td>
<td>2,0</td>
</tr>
<tr>
<td>With Shock</td>
<td>11</td>
<td>6,8</td>
<td>3,3</td>
<td>4,6</td>
<td>9,0</td>
<td>3,0</td>
</tr>
<tr>
<td>Total</td>
<td>40</td>
<td>7,4</td>
<td>3,1</td>
<td>6,4</td>
<td>8,4</td>
<td>2,0</td>
</tr>
</tbody>
</table>

The physical examination was indicated RL (Rumple Leede)/positive tooth-proof test was found at 28 (70.0%), petechial at 8 (20%), epistaxis at 6 (15.4%), hematemesis at 4 (10%) and melena at 7 (17.5%). In non-shock dengue fever a positive RL test was found in 26 (89.7%), petechial 6 (20.7%), epistaxis 5 (17.9%), hematemesis 2 (6.9%), and melena at 3 (10.3%). Whereas in dengue fever patients, there were 2 (18.2%) positive RL test, 2 petechial (18.2%), epistaxis 1 (9.1%), 2 hematemesis (18.2%), and Melena counted 4 (36.4%). (Table 3)
Table 3: Manifestation of child bleeding with dengue hemorrhagic fever

<table>
<thead>
<tr>
<th>Manifestation of Bleeding</th>
<th>Without Shock</th>
<th>With Shock</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>RL/torniket test</td>
<td>26 (89.7%)</td>
<td>2 (18.2%)</td>
<td>28 (70.0%)</td>
</tr>
<tr>
<td>Petechial</td>
<td>6 (20.7%)</td>
<td>2 (18.2%)</td>
<td>8 (20.0%)</td>
</tr>
<tr>
<td>Epistaxis</td>
<td>5 (17.9%)</td>
<td>1 (9.1%)</td>
<td>6 (15.4%)</td>
</tr>
<tr>
<td>Hematemesis</td>
<td>2 (6.9%)</td>
<td>2 (18.2%)</td>
<td>4 (10.0%)</td>
</tr>
<tr>
<td>Melena</td>
<td>3 (10.3%)</td>
<td>4 (36.4%)</td>
<td>7 (17.5%)</td>
</tr>
</tbody>
</table>

DHF patients who have hepatic enlargement had a range of 1-1 centimeters (cm) below the arcus costae (bac) to 4-4 cm in the bac. In dengue fever patients there were 11 (37.9%) felt liver 1-1 cm in bac, there were 16 (55.2%) 2-2 cm in bac and 2 (6.9%) with 3-3 cm in bac. In dengue hemorrhoids there was 1 (9.1%) felt liver 1-1 cm in bac, 5 (45.5%) at 2-2 cm in bac, 4 (36.4%) at 3-3 cm in bac and 1 (9.1%) at 4-4 cm in bac.

A description of routine blood laboratory results beside the WHO 1997 criteria of hematocrit and platelets. The hematocrit in children with DHF without shock had the lowest value of 30.50% and the highest value of 45.30% with mean of 39.13%, whereas DBD with shock the lowest hematocrit value of 34.30% and the highest value is 55.60% with average 45.20%. Thrombocyte picture of children with dengue fever dengue DBD 22,000/mm³ and highest 218,000/mm³ with platelet average 90.482.76/mm³, while for dengue fever with the lowest value 16,000/mm³ and highest value 167,000/mm³ with platelet average 52,000/mm³.

Interleukin-8 levels in children with dengue hemorrhagic fever: The results of the examination on 40 children with DHF such as the lowest IL-8 levels were 7.00 ng/ml and the highest IL-8 level of 674.50 ng/ml, with mean IL-8 concentration of 146.14 ng/ml. Examination of 29 children with unobtrusive DHF where the lowest IL-8 score range was 7.00 ng/ml and highest 168.20 ng/ml with mean of 45,63 ng/ml, while 11 children with dengue fever were found in IL-8 lowest 211.80 ng/ml and highest of 674,50 ng/ml and average 411,13 ng/ml. (Table 4) The relationship between IL-8 with dengue hemorrhagic fever in children was analyzed by Spearman rho correlation analysis. Based on this test, the correlation coefficient is obtained by rs = 0.774 with p <0.001.

Table 4: Interleukin-8 levels in children with dengue hemorrhagic fever

<table>
<thead>
<tr>
<th>DHF</th>
<th>n</th>
<th>Average (ng/ml)</th>
<th>SD (ng/ml)</th>
<th>Everage for 95% KI</th>
<th>Minimum (ng/ml)</th>
<th>Maximum (ng/ml)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Without Shock</td>
<td>29</td>
<td>45.63</td>
<td>36.13</td>
<td>31.88</td>
<td>7,00</td>
<td>168.20</td>
</tr>
<tr>
<td>With Shock</td>
<td>11</td>
<td>411,13</td>
<td>148,36</td>
<td>311.46</td>
<td>211,80</td>
<td>674,50</td>
</tr>
<tr>
<td>Total</td>
<td>40</td>
<td>146,14</td>
<td>184,12</td>
<td>87.26</td>
<td>7,00</td>
<td>674,50</td>
</tr>
</tbody>
</table>

Discussion

Dengue hemorrhagic fever was still become a health problem in Indonesia including North Sulawesi. All of Indonesian region has a risk infected by DHF from mild until severe grading which tends to bring about shock as well as death. Dysregulation of immune system seemed to constitute the pathogenesis of DHF. Variates mechanism considered involved, i.e. virus virulence, antigen-antibody, complement and its products, all mediator soluble including IL-8 as cytokine which was suggested a role in pathogenesis of DHF.

The distribution of dengue fever shown that girls were more than boys, 26 (65%) girls and 14 (35%) boys. But overall there was no difference between the sexes in DHF patients, although deaths were more common in girls than boys.
In established the diagnosis of DHF based on the WHO (1997) criteria of sudden and persistent high fever for 2 to 7 days. Dengue hemorrhagic fever was preceded by sudden fever accompanied by non-specific clinical symptoms, this fever was the main symptom in all cases. A sudden high fever was an early clinical symptom of DHF and this was found in all the cases studied. In this study, the heat in diagnosing dengue fever treated in the hospital had a range in dengue fever without shock minimal day second and maximum fifth day with the average value of day to 3.76. In DHF with shock ranged from a minimum of fourth day and maximum of fifth day with the average value of day to 4.64. In general, this study was hot in the diagnosis of DHF ranging from 2-5 days with the average day to 4.20.\(^{(17, 19, 20)}\)

Hepatomegaly as one of the benchmarks for clinical diagnosis of DHF in WHO criteria was reported to vary. In this study all subjects had hepatomegaly with a range of 1-1 centimeters (cm) below the arcus costae (bac) to 4-4 cm in bac. In dengue sufferers without shock hepatomegaly at least 1-1 cm in bac and maximum 3-3 cm in bac. In DHF with hepatomegaly shock was palpable at least 1-1 cm in bac and max 4-4 cm in bac.\(^{(4, 19, 21)}\)

Hematocrit and thrombocyte examination were a very helpful examination in the diagnosis of DHF. The value of hematocrit usually was begin to increase on the third day of illness and reaches the highest value during the shock or shock phase. In this study, hematocrit in patients with DHF without shock had the highest value of 45.30% with mean of 39.13%, while dengue hematocrit with shock was 55.60% with mean of 45.20%. This was in accordance with other studies that have been conducted in several countries.\(^{(21-23)}\)

The number of DHF thrombocyte was the lowest dengue fever with 22,000/mm\(^3\) and the highest 218,000/mm\(^3\) with the mean of platelet 90482.76/mm\(^3\), while for the DBD with shock had the lowest value 16,000 / mm\(^3\) and the highest value 167,000/mm\(^3\) with platelet average of 52,000/mm\(^3\). The decrease in platelet counted in dengue hemorrhagic fever might be below 100000/mm\(^3\) usually found on the third and eighth day, often before or simultaneously with a change in hematocrit.\(^{(4)}\) The lowest platelet value to watch out for was 20,000-50,000/mm\(^3\). The lowest platelet was value less than that range tended to be more shocked than in other cases. Platelets were secretory cells that have granules containing various mediators. Endothelial dysfunction would result in aggregation of activated platelets and thrombocytes that release histamine like substance and 5-hydroxytryptamine which may lead to increased capillary permeability.\(^{(16)}\) Research conducted in Manado states there was a significant relationship between low platelet values and DHF remediation.\(^{(24, 25)}\)

This study showed that there was an significant correlation between IL-8 and DHF in children analyzed with Spearman rho test used SPSS 17 \((r_s=0.774, p<0.001)\) Thus, it conceivable that high levels of IL-8 in DHF children may correlate with risk of DHF severity. Similar result from previous study of Wihandani in 2009 concluded IL-8 level was correlated with severity of dengue virus infections. This study concluded too that there was a significant difference of IL-8 level in health patient as control with mild and severe DHF.\(^{(26)}\)

Interleukin-8 is a cytokine with potential proinflammatory effect and a chemotactic molecule with chemoattractant activity, is able to activate eosinophil, neutrophil and naive T cells to the surface of the endothelium.\(^{(11, 27)}\) Similar with previous study held by Juffrie in 2000 found IL-8 are increased in most patients with dengue virus infection and correlate with degranulation of neutrophyl as well as with some clinical and hemodynamic variables.\(^{(27)}\) Talavera in 2004 stated IL-8 modulates endothelial cells permeability and play an important role in immunopathogenesis and severity of DHF by tight junction and actin cytoskeleton functional and neutrophil degranulation.\(^{(28)}\)

**Conclusion**

There was an increase in IL-8 levels in children with DHF. Patients with dengue fever without shock had a lower value range of IL-8 levels than dengue without shock. There was a statistically significant relationship between IL-8 levels and dengue hemorrhagic fever in this study which means that the higher the IL-8 the more severe the dengue.

**Conflic of Interest:** The authors declare that they have no competing interests

**Source of Funding:** The authors declare that this study have self-funding
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Correlation between Waiting Time of Pharmaceutical Service and Patient Satisfaction in Hospital

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¹Student, ²Lecturer, Health Policy Administration Program Study, Faculty of Public Health, Airlangga University, Indonesia

ABSTRACT

The waiting time for prescription service is still a problem in hospital which ultimately leads to dissatisfaction to the quality of health service. According to the Minister of Health Regulation no. 129 of 2008, the prescribed waiting time for drug concoctions is 60 minutes and for prescription of finished drugs is 30 minutes. Based on the data from Gotong Royong Hospital Surabaya, related to the waiting time of pharmaceutical service, there were 2.3% of drug concoctions that exceeded the standard of pharmaceutical service (> 60 minutes) and 1.8% of finished-drugs prescription that exceeded the standard of pharmaceutical service (> 30 minutes). It led to patient dissatisfaction which could be seen from the number of incoming complaints. This research aims to analyze the correlation between the waiting time of pharmaceutical service and patient satisfaction. The research was conducted at the Outpatient Pharmacy Installation of Gotong Royong Hospital. This research is an observational research using cross-sectional approach. Samples were taken randomly as many as 54 outpatients who received pharmaceutical service at Gotong Royong Hospital Surabaya. The data were analyzed by univariate and bivariate analysis using chi-square test. The findings of the research indicated that 83.3% of the waiting time for pharmaceutical service had been standardized and 66.7% indicated patient dissatisfaction. The conclusion of this research is that there is no significant correlation between the waiting time of pharmaceutical service and patient satisfaction to pharmaceutical service at Gotong Royong Hospital.

Keywords: waiting time of pharmaceutical service, patient satisfaction

Introduction

Currently, hospitals are required to meet the needs and satisfaction of patients as their customers. Improving the quality of the service is a top priority for hospital management, one of which is a service marked by fast patient waiting time¹. Waiting time of service is a common problem and is the cause of patient dissatisfaction. The aspect of patient waiting time in obtaining health services is one of the important things that determines the quality of health services and can reflect how a hospital manages service components according to the patient’s situation and expectations. The length of service waiting time can degrade service quality and is considered unprofessional which ultimately leads to patient dissatisfaction¹.

The amount of time patients spend queuing can affect their satisfaction and result in long-term loss of profits due to the decrease of customer retention and visits². Reducing waiting times are proven and are important to consider in order providing excellent service.

At Gotong Royong Hospital, there are still patients that are waiting long to get outpatient pharmaceutical service. It can be seen from some patients who make some complaints. This kind of issue will have an impact on patient dissatisfaction.

According to the research that has been conducted previously, it mentions that the majority of patient’s dissatisfaction in pharmacy units is caused by long waiting time³. Another research reveals that there is a correlation between waiting time and the value of outpatient satisfaction. Time spent with doctors is a better way to satisfy the patients than the time spent in the waiting room⁴.

The formulation of the research problem is “How is the correlation between waiting time of outpatient pharmaceutical service and patient satisfaction at Gotong Royong Hospital”. The objective of the research is to analyze the correlation between waiting time of outpatient pharmaceutical service and patient satisfaction level at Gotong Royong Hospital.
Pharmaceutical service is a direct and responsible service to patients related to the availability of pharmacy in order to achieve a definite result to improve the quality of patient’s life. Pharmaceutical services of hospitals must comply with the applicable standards according to the Minister of Health Regulation of the Republic of Indonesia. The Minister of Health Regulation of the Republic of Indonesia states that the standard of pharmaceutical services is a benchmark that is used as a guide for pharmaceutical personnel in carrying out the pharmaceutical services.

In addition, pharmaceutical services are also associated with the Minimum Service Standards in hospitals according to the Minister of Health Decree of the Republic of Indonesia, which explains that:

1. Minimum Service Standards are provisions on the type and quality of basic services which are mandatory regional affairs that are entitled to be obtained minimally by every citizen. It is also a technical specification of the minimum service benchmarks provided by the Public Service Board to the public.

2. The waiting time of pharmaceutical service is the period to get pharmaceutical services starting from the incoming recipes to delivering the drug to the patients; i.e. waiting time of drug service < 30 minutes and drug concoction < 60 minutes.

Customer satisfaction is the level of one’s feelings after comparing performance or perceived results based on the expectation. The level of satisfaction is a function of the difference between the perceived performance and expectation. If the performance is below the expectation, the customers will be very disappointed. If the performance is in line with the expectation, the customers will be satisfied. If the performance exceeds the expectation, the customers will be very satisfied. Customer expectations can be formed by past experience, comments from relatives, and promises and information from various media.

Aspects that may affect hospital outpatient satisfaction include the appearance of the building, clean, comfortable and orderly hospital environment, beautiful gardening, the availability of parking spaces, clear directions and room names, the appearance of medical and non-medical personnel that is neat and clean, and deit attitude in providing help, and so on.

Assessment of satisfaction on 5 dimensions of service quality includes tangibility, reliability, responsiveness, assurance, and empathy.

There are four aspects of patient satisfaction including:

1. **Convenience**: It is about the aspect of enjoyable thing in all conditions, hospital location, cleanliness, the convenience of the room, layout, electricity, cleanliness of the bathroom, landfills, freshness of the room, and so forth. Convenience is the aspect of patient satisfaction that is not directly related to clinical effectiveness but is related to obtaining subsequent services.

2. **Patient relationship with hospital personnel**: It is about the aspect of the personnel who have good personalities that can support the service including the hospitality, information provided, the level of communication support, personnel responses, ease of contacting the personnel, and so forth relating to the interaction between the hospital personnel and the patient.

3. **Technical competence of the personnel**: It deals with the skills, knowledge, and qualifications of good hospital personnel such as the speed of the service, skills in the use of technology, the experience of the personnel, and so on.

4. **Cost**: It relates to the price to be paid for the services that have been obtained such as the fairness of the cost, the clarity of cost components, the cost of services, the comparison with other similar hospitals, and the availability of relief for the underprivileged.

Patient satisfaction is a subjective value of the patients that is affected by patient’s past experience, education, current psychological situation, and family and environmental influences.

**Material and Method**

This research is an analytic observational research using cross-sectional approach. The population of this research is all customers of outpatient pharmacy unit in December 2017 at Gotong Royong Hospital Surabaya. Samples were taken using accidental sampling with a large sample of 54 respondents.
The data of this research are primary data obtained using the instrument of observation of prescription waiting time and questionnaire which contains questions related to patient satisfaction. Patient satisfaction was assessed based on the aspects of satisfaction assessment on 5 dimensions of service quality consisting of tangible, reliability, responsiveness, assurance, and empathy.

The data obtained would be processed using SPSS. After getting the score of each dimension, the scores would be tested by using chi-square test.

**Results and Discussion**

**Results**

**Characteristics of the Respondents:** Based on the data obtained from the questionnaire distribution to 54 respondents, the findings on characteristic showed that the majority of the respondents were female as many as 34 people (63%), aged 27-30 years and above 30 years, respectively as many as 17 people (31.5%), last educational background of high school or equivalent as many as 26 people (48.1%), and occupation other than self-employed and civil servants as many as 43 people (79.6%). This data can be seen in Table 1.

<table>
<thead>
<tr>
<th>Characteristics of the Respondents</th>
<th>Total N = 54 %</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Sex</strong></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>34 63.0</td>
</tr>
<tr>
<td>Male</td>
<td>20 37.0</td>
</tr>
<tr>
<td><strong>Age</strong></td>
<td></td>
</tr>
<tr>
<td>&lt;15 years</td>
<td>2 3.7</td>
</tr>
<tr>
<td>15-18 years</td>
<td>5 9.3</td>
</tr>
<tr>
<td>19-22 years</td>
<td>5 9.3</td>
</tr>
<tr>
<td>23-26 years</td>
<td>8 14.8</td>
</tr>
<tr>
<td>27-30 years</td>
<td>17 31.5</td>
</tr>
<tr>
<td>&gt;30 years</td>
<td>17 31.5</td>
</tr>
<tr>
<td><strong>Last Educational Background</strong></td>
<td></td>
</tr>
<tr>
<td>Elementary/equivalent</td>
<td>2 3.7</td>
</tr>
<tr>
<td>Junior high/equivalent</td>
<td>3 5.6</td>
</tr>
<tr>
<td>Senior high/equivalent</td>
<td>26 48.1</td>
</tr>
<tr>
<td>Bachelor’s degree</td>
<td>12 22.2</td>
</tr>
<tr>
<td>Master’s degree</td>
<td>0 0.0</td>
</tr>
<tr>
<td>Etc.</td>
<td>11 20.4</td>
</tr>
<tr>
<td><strong>Occupation</strong></td>
<td></td>
</tr>
<tr>
<td>Self-employed</td>
<td>8 14.8</td>
</tr>
<tr>
<td>Civil servant</td>
<td>3 5.6</td>
</tr>
<tr>
<td>Etc.</td>
<td>43 79.6</td>
</tr>
</tbody>
</table>

**Pharmaceutical Waiting Time of Outpatient Service**

<table>
<thead>
<tr>
<th>Table 2: Waiting Time Frequency of Pharmaceutical Services at Pharmacy Unit of Gotong Royong Hospital Surabaya</th>
</tr>
</thead>
<tbody>
<tr>
<td>Category</td>
</tr>
<tr>
<td>Standard waiting time</td>
</tr>
<tr>
<td>Non-standard waiting time</td>
</tr>
<tr>
<td>Total</td>
</tr>
</tbody>
</table>

Based on Table 2, it can be seen that the waiting time of the standard pharmaceutical service is 83.3%. The waiting time of the pharmaceutical service is the waiting time of pharmaceutical service for concoction and finished medicine. According to the Minister of Health Regulation, the prescribed waiting time for prescription is <30 minutes and for drug concoctions is 60 minutes.

**Level of Outpatient Satisfaction on Pharmaceutical Services in Outpatient Unit:** Measurement of satisfaction level was performed on patient or their family in outpatient pharmacy unit based on questionnaire distribution containing 25 items of questions that have been collected, tabulated and conducted by using statistical analysis.

The majority of respondents, as many as 66.7%, stated that they were not satisfied with the pharmaceutical services in the Outpatient Pharmacy Unit of Gotong Royong Hospital Surabaya. Based on the average value of outpatient satisfaction on pharmaceutical services in Outpatient Pharmacy Unit, 61% of the results were found to be included in not-satisfied category. It can be seen in Table 3.

<table>
<thead>
<tr>
<th>Table 3: Frequency of Outpatient Satisfaction Level in Pharmacy Unit of Gotong Royong Hospital Surabaya</th>
</tr>
</thead>
<tbody>
<tr>
<td>Category of Satisfaction</td>
</tr>
<tr>
<td>Very not satisfied</td>
</tr>
<tr>
<td>Not satisfied</td>
</tr>
<tr>
<td>Satisfied</td>
</tr>
<tr>
<td>Very satisfied</td>
</tr>
<tr>
<td>Total</td>
</tr>
<tr>
<td>Average</td>
</tr>
</tbody>
</table>
Table 4: Frequency of Satisfaction Level and Waiting Time of Outpatients in Pharmacy Unit of Gotong Royong Hospital Surabaya

<table>
<thead>
<tr>
<th>Total &amp; Percentage</th>
<th>Very not satisfied</th>
<th>Not satisfied</th>
<th>Satisfied</th>
<th>Very satisfied</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-standard waiting time</td>
<td>1 (1.9%)</td>
<td>5 (9.3%)</td>
<td>3 (5.6%)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>9 (16.7%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Standard waiting time</td>
<td>0 (0.0%)</td>
<td>31 (57.4%)</td>
<td>12 (22.2%)</td>
<td>2 (3.7%)</td>
</tr>
<tr>
<td>45 (83.3%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>1 (1.9%)</td>
<td>36 (66.7%)</td>
<td>15 (27.8%)</td>
<td>2 (3.7%)</td>
</tr>
<tr>
<td>54 (100.0%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Discussion

Correlation between Waiting Time and Satisfaction Level of Pharmaceutical Service in Outpatient Unit:

Based on the results of statistical test analysis using chi-square, it was obtained asymp. sign value or p value of 0.126. It showed that p>0.05 then Ha is accepted. Thus, the result of decision making of this research was that there is no significant correlation between waiting time of pharmaceutical service and patient satisfaction to pharmaceutical service in Pharmacy Unit of Gotong Royong Hospital Surabaya.

The distribution on correlation between waiting time and satisfaction level of pharmaceutical service can be seen in Table 5. Based on table 5, the majority of respondents stated that they were not satisfied (57.4%) although the waiting time of pharmaceutical service is in accordance with predetermined standard.

Based on the research findings, it could be concluded that the waiting time according to the standard of Minister of Health Regulation was <30 minutes for the finished drug and <60 minutes for drug concoction as many as 83.3%. Meanwhile, the waiting time that should be within the standard was 100%.

Based on the findings of this research, it was found that the majority of respondents, as many as 66.7%, expressed dissatisfaction to pharmaceutical services in the Outpatient Pharmacy Unit of Gotong Royong Hospital Surabaya. It indicated that it is necessary to improve the quality of pharmaceutical services in the Outpatient Pharmacy Unit of Gotong Royong Hospital Surabaya.

Based on statistical tests by using chi-square, it was found that there was no significant correlation between waiting time of pharmaceutical service and patient satisfaction. The findings of this research were not in line with the findings of the previous research conducted by other researchers which mentioned that there is a correlation between the waiting time of pharmaceutical service and patient satisfaction.

The majority of the respondents mentioned that they were not satisfied even though the waiting time of pharmaceutical service had been in accordance with the standard that had been previously determined. It proved that patient satisfaction to pharmaceutical service was not influenced by waiting time of pharmaceutical service, but was influenced from other supporting aspects perceived or experienced by the patient while waiting for the completion of pharmaceutical service. Other supporting aspects that might influence patient satisfaction are in 5 dimensions of service quality. These dimensions consist of tangible, reliability, responsiveness, assurance, and empathy.

Another more effective way of reducing waiting times is by simplifying some procedures. It is like what has been mentioned by the previous research conducted by other researchers where different employees perform the same task (for instance: processing drug prescription) with a variety of ways.

Other research has shown that interpersonal relationships between patients and service providers are also important in influencing patient satisfaction.

Conclusion

The conclusions of this study are:

1. There is no correlation between waiting time of pharmaceutical service and outpatient satisfaction receiving pharmaceutical service at Gotong Royong Hospital Surabaya.

2. Patient satisfaction on pharmaceutical service is not influenced by the waiting time of pharmaceutical service but by other aspect.

Ethical Clearance: Related departments should be assured about the confidentiality of the results of questionnaires.
Conflict of Interest: The authors report no conflict of interest.

Source of Funding: Self

REFERENCES


The effect of Sodium Chloride and Trehalose Sugar in Some Chemical Characteristics of Date Palm *Phoenix dactylifera* L. cv. Um-Aldehine *in vitro*

Ahmed D. Khaleaf Al-Asadi¹, Batool H. Falih Al-Zubaidy¹

¹Department of Horticulture and Land Escaping, College of Agriculture and Marshes, University of Thi-Qar, Iraq

**ABSTRACT**

The salinity is one of the most important problems facing agriculture in the world, especially Iraq. This study is concerned with examining the effect of four sodium chloride concentrations (0, 25, 50 and 75 mM) and four trehalose sugar concentrations (0, 5, 10 and 15 gm. L⁻¹) in some chemical characteristics of somatic embryos of date palm c.v Um – Aldehine in vitro. The results showed: That the increasing in sodium chloride concentration in culture media had a significant increase in the concentrations of carbohydrates and proline. In addition, the treatment (75 mM) of sodium chloride achieved the highest averages, also it has led to a significant decrease in proteins percentage. The effects of increasing trehalose sugar concentration in culture media has significantly increased the carbohydrates, proline and proteins. However, the treatment of (15 g. L⁻¹) resulted the highest averages. The interaction treatment between sodium chloride (75 mM) and trehalose sugar (15 g.L⁻¹) has significantly increased the carbohydrates and proline. The added concentrations of trehalose sugar to the culture media contributed to decreased the effects of salt stress, therefore, increased the tolerance of somatic embryos of date palm to the salt stress.

**Keywords:** Sodium chloride, Trehalose sugar, Somatic embryos, Date palm, In vitro.

**Introduction**

Date palm *Phoenix dactylifera* L. a monocotyledonous dioecious plant is one of the most cultivated palms around the world¹. Date palm trees are cultivated in different regions worldwide, especially in the Middle East, North and South America, North Africa, Southern Europe, Pakistan and India²³⁴⁵. One of the most environmental stress (abiotic) is salt stress which appears when increasing the concentrations of soil salts solution about (2.5 ds. m⁻¹). This concentration is considered the optimal concentration of salts that required to growth tropical crops⁶. There are two kinds of salt stress effects, primary effects (reduction of medium water potential and ion disequilibrium) and secondary effects (reduction of cell expansion, photosynthesis, inhibition of cell metabolism, production of reactive oxygen species, hormonal imbalance and protein metabolism)⁷⁸⁹¹⁰. Carbohydrates, in addition to its role in metabolism and plant structure, contribute significantly and effectively in regulation growth, development of plant, and plant responses to conditions of salt stress¹¹. The role of carbohydrates in plant engage many researchers to study this sugars as the pathway of biosynthesis and response to trehalose sugar knowing as mycose or tremalose¹². Trehalose sugar reduces protein accumulation through stress conditions and it is considered a source of energy and protect the proteins membranes¹³¹⁴. The vast majority of plants contain a little amount of trehalose sugar so that, its role in prevention or reduction the stress is unlikely in such plants¹⁵, while plants that contain a large amount from trehalose sugar, it seems to has a role to play in protecting environmental stress (abiotic stress) by prevention of denaturation cellular proteins¹⁶. However, many strategies and methods followed to improve plant salt tolerance, one of this methods breeding and genetic engineering of plants¹⁷. On the other hand, tissue culture was used to improving or increasing salt tolerance of plant, as the
exposure of cells or plant tissues to different levels of salt stress maybe useful in selecting cells tolerance of saline stress from cells originally sensitive to saline stress that means the genetic information which is necessary to growth in salt environmental maybe existent in sensitive plant cells by it is none gene expression by plant. In addition, selecting tolerance cells by tissue culture will increase our information about plant salinity tolerance on cellular level. Because of the few studies about addition trehalose sugar to nutrient mediums in tissue culture, and it’s important to improve the tolerance saline stress of plants especially date palms, this study was conducted to known the effect of sodium chloride and trehalose sugar and their interactions in some chemical characteristics of somatic embryos of date palm c.v. Um-Aldehine in vitro to achieve the purpose of this study to improve plant salt tolerance.

Materials and Method

The present investigation was carried out at the plant tissue culture laboratories, Date palm research center, Basra University, Iraq. This study was implemented by using somatic embryos which formed of embryogenic callus with three months old for date palm um Aldehine growing on nutrient medium. The nutrient media was known as MS salts which support by the following materials on basic g. L⁻¹(30 Sucrose, 0.200 Sodium hydrogen ortho phosphates, 0.0005 Thiamine -HCl, 0.040 adenine Sulphates, 0.030 NAA, 0.003 Isopentenyl adenine (2-ip) and 7 Agar). For execution this study nutrient medium (MS) and the above materials were used except the addition of activated charcoal. The treatments were four concentration of each of sodium chloride (0, 25, 50, 75 mM) and trehalose sugar (0, 5, 10, 15 g. L⁻¹). After adding the components of the nutrient medium regulated acidity (pH) on 5.7 and adding the agar and then heated by magnetic starrier on 95°. The nutrient medium is distributed by 25 ml in measuring tubes 2.5 x20 cm and blocked by cotton and Aluminum foils. The tubes and culture tools sterilized evaporated in steam sterilization using auto clave (121°C, 1.05 Kg.cm²) for twenty minutes. Then, the tubes shake for the purpose of harmonizing the nutrient medium and left to cool and kept in the refrigerator until the culture, 50 mg from somatic embryos culture in each tube, the cultivated tubes were placed at 27 ± 1 °c and light intensity 3000 Lux and then reculture was implemented one time every month. The period of the experiment was 8 months. The experimental measurements were studied as follow:

**Total Soluble Carbohydrates:** The method of phenol-Sulfuric acid used to measure soluble carbohydrates as mentioned by.

**Free Proline Content:** Free proline content was measured according to.

**Proteins:** The micro Kjeldhal was used to measure proteins as proteinases nitrogen by steam distillation method.

Statistical analysis of the results was done for a factorial experiment with two factors in completely randomized design and each treatment was replicated 10 time. The means scores were tested according to the Least Significant Difference (LSD), and the probability level (0.05), the GenStat 12 was used to analyze the results.

**Result and Discussion**

**Carbohydrate:** Results presented in table 1. showed that the effect of sodium chloride and trehalose sugar in total soluble carbohydrates of somatic embryos for date palm c.v. Um-Aldehine In vitro. The increasing of Sodium chloride Concentration in media increased significantly the carbohydrates concentration. In addition, the treatment 75 mM of sodium chloride achieved the highest averages of carbohydrates concentration which was (31.42 mg. g⁻¹) compared to control treatment (26.56 mg. g⁻¹).

**Table 1: Effect of Sodium Chloride and trehalose sugar and interaction between them on total soluble carbohydrate ( mg. g⁻¹) of somatic embryos of date palm Um-Aldehine in vitro.**

<table>
<thead>
<tr>
<th>NaCl (mM)</th>
<th>Trehalose sugar (g. L⁻¹)</th>
<th>NaCl average</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>23.59</td>
</tr>
<tr>
<td>5</td>
<td>0</td>
<td>23.62</td>
</tr>
<tr>
<td>10</td>
<td>0</td>
<td>28.75</td>
</tr>
<tr>
<td>15</td>
<td>0</td>
<td>30.29</td>
</tr>
<tr>
<td>0</td>
<td>25</td>
<td>25.53</td>
</tr>
<tr>
<td>5</td>
<td>25</td>
<td>26.50</td>
</tr>
<tr>
<td>10</td>
<td>25</td>
<td>29.69</td>
</tr>
<tr>
<td>15</td>
<td>25</td>
<td>31.36</td>
</tr>
<tr>
<td>0</td>
<td>50</td>
<td>27.33</td>
</tr>
<tr>
<td>5</td>
<td>50</td>
<td>30.76</td>
</tr>
<tr>
<td>10</td>
<td>50</td>
<td>31.65</td>
</tr>
<tr>
<td>15</td>
<td>50</td>
<td>33.25</td>
</tr>
<tr>
<td>0</td>
<td>75</td>
<td>28.52</td>
</tr>
<tr>
<td>5</td>
<td>75</td>
<td>31.36</td>
</tr>
<tr>
<td>10</td>
<td>75</td>
<td>32.08</td>
</tr>
<tr>
<td>15</td>
<td>75</td>
<td>33.70</td>
</tr>
<tr>
<td>0</td>
<td></td>
<td>26.56</td>
</tr>
<tr>
<td>5</td>
<td></td>
<td>28.27</td>
</tr>
<tr>
<td>10</td>
<td></td>
<td>30.75</td>
</tr>
<tr>
<td>15</td>
<td></td>
<td>31.42</td>
</tr>
</tbody>
</table>
The effects of increasing the trehalose sugar concentrations in media were increased the carbohydrates a significantly, and the treatment of 15 g·L⁻¹ resulted the highest average (32.15 mg·g⁻¹) compared to control treatment (26.24 mg·g⁻¹). Interaction results showed a significant effects in carbohydrates concentration, and the treatment of 75 mM with trehalose sugar 15 g·L⁻¹ achieved the highest averages (33.70 mg·L⁻¹), while the treatment of interaction between (0 mM) of sodium chloride and trehalose sugar (0 g·L⁻¹) achieved the lowest averages (23.59 mg·L⁻¹). The increase in carbohydrates under salt stress condition might be related to the cell undergoes many changes and adaptations that occur under salt stress conditions, which are reflected to increasing the process of carbohydrates synthesis and other compounds. The increasing in carbohydrate concentration due to increase trehalose sugar concentration in the culture media and its interaction with sodium chloride, as a result of absorption by cells and accumulating on it, thus increasing the carbohydrate concentrations in cells as well as trehalose role as osmoprotectant for proteins and cellular membrane structures, which contributing effectively to increasing cell tolerance of salt stress.

**Proline:** The results table 2. appeared indicated that an increasing in sodium chloride concentration in culture media increased a significantly the proline concentration of somatic embryos especially the treatment of sodium chloride (75 mM) achieved the highest averages (8.55 mg·g⁻¹) compared to control treatment (5.28 mg·g⁻¹). The effects of increasing trehalose sugar concentration has a significant increase of proline concentration by the treatment (15 g·L⁻¹) resulted the highest averages (7.41 g·L⁻¹) compared to control treatment which gave the lowest averages (5.84 mg·g⁻¹). The interaction treatment of (75 mM) and (15 g·L⁻¹) appeared the highest averages (8.97 mg·g⁻¹), compared to the (0 mM) by (0 g·L⁻¹) which resulted the lowest level (3.54 mg·g⁻¹). The increasing in proline with increase in sodium chloride concentration in culture media might be related to the salt stress reduced protein synthesis which caused ammonium accumulation because of enzyme activity (Nitrate reductase). Nitrate reductase is reduced nitrate to ammonium, therefore, ammonium is used to proline synthesis to reduce its toxic effect on cells. In addition, lack in enzyme activity (proline oxidase) when the plant is exposed to salt stress maybe as a reason of proline accumulation.

**Table 2:** Effect of sodium chloride and trehalose sugar and interaction between them on proline (mg·g⁻¹) of somatic embryos of date palm Um-Aldehine *in vitro*

<table>
<thead>
<tr>
<th>NaCl (mM)</th>
<th>Trehalose sugar (g·L⁻¹)</th>
<th>NaCl average</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>3.54 5.30 5.94 6.35</td>
<td>5.28</td>
</tr>
<tr>
<td>25</td>
<td>5.27 5.96 6.25 6.89</td>
<td>6.09</td>
</tr>
<tr>
<td>50</td>
<td>6.42 6.89 6.97 7.43</td>
<td>6.99</td>
</tr>
<tr>
<td>75</td>
<td>8.12 8.34 8.78 8.97</td>
<td>8.55</td>
</tr>
<tr>
<td>Trehalose average</td>
<td>5.84 6.62 6.99 7.41</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>L.S.D.₀⁰⁵</th>
<th>NaCl</th>
<th>Trehalose</th>
<th>interaction</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.30</td>
<td>0.30</td>
<td>0.59</td>
<td></td>
</tr>
</tbody>
</table>

The increasing in proline concentration of somatic embryos because of increasing the trehalose sugar and the interactions of sodium chloride due to trehalose accumulation in cells response to salt stress conditions in many plants. This fact led to increase somatic embryos tolerance to salt stress. One of the most important indicators of cells tolerance to salt stress is increasing the proline concentration because of its physiological roles in the process of adjustable osmotic and the protection of cellular organelles from the harmful effects of salt. Besides, its contribution in the damage of free radicals which regard the response of the initial defense by the cells to maintain the water potential on cells.
Proteins: Results presented in table 3. showed that the effect of sodium chloride and trehalose sugar in proteins of somatic embryos. The increase in sodium chloride concentration in culture media decreased proteins percentage a significantly. In addition, the treatment 75 mM of sodium chloride achieved the lowest averages (7.19 %) compared to control treatment (10.08 %). The effects of increasing the trehalose sugar concentration in culture media has a significantly increased the proteins percentage, and the treatment (15 g. L⁻¹) resulted the highest averages (9.57 %) compared to control treatment (7.41 %).

Table 3: Effect of sodium chloride and trehalose sugar and interaction between them on protein percentage (%) of somatic embryos of date palm Um- Aldehine in vitro

<table>
<thead>
<tr>
<th>NaCl average</th>
<th>Trehalose sugar ( g. L⁻¹ ) NaCl</th>
<th>Trehalose average</th>
<th>L.S.D ₀.₀５</th>
</tr>
</thead>
<tbody>
<tr>
<td>mM</td>
<td>0</td>
<td>5</td>
<td>10</td>
</tr>
<tr>
<td>0</td>
<td>8.83</td>
<td>9.59</td>
<td>10.71</td>
</tr>
<tr>
<td>25</td>
<td>7.78</td>
<td>8.41</td>
<td>9.89</td>
</tr>
<tr>
<td>50</td>
<td>6.94</td>
<td>7.64</td>
<td>8.60</td>
</tr>
<tr>
<td>75</td>
<td>6.08</td>
<td>6.61</td>
<td>7.74</td>
</tr>
</tbody>
</table>

Interaction results showed a significant effects in protein percentage and the treatment of (0 mM) with trehalose sugar (15 g. L⁻¹) achieved the highest averages (11.17 %), while the interaction between sodium chloride (75 mM) and trehalose sugar (0 g. L⁻¹) achieved the lowest averages (6.08 %). The decrease in protein percentage of somatic embryos under salt stress might be related to a reduction in protein synthesis and further degradation. The protein degradation due to salinity led to the accumulation of the amino acids especially, proline as demonstrated by the current study in table 2. The reason for the increased concentration of protein percentage by increasing the concentration of trehalose sugar in the culture media and its interactions with sodium chloride may be attributed to its role as an osmoprotectant of proteins and membranes structures.

Conflict of Interest: None

Source of Funding: Self

Ethical Clearance: Not required

REFERENCES


Evaluation of Healing Process of Periapical Defect Filled by Platelet Rich Fibrin Using Cone Beam Computed Tomography–Comparative Clinical Study

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1Ministry of Health, Al-Hilla Teaching Hospital, Babil, Iraq; 2College of Dentistry, University of Baghdad, Baghdad, Iraq

ABSTRACT

Objective: evaluate the efficacy of PRF on bone density after enucleation of periapical lesions, and to compare the degree of bone density value without the use of PRF postoperatively after 4 months using cone beam CT scan.

Method: 32 patients included in this study from October 2017 to October 2018, they undergo periapical surgery for periapical pathosis in the maxillary anterior teeth. After surgical removal of periapical pathosis, the participants divided into two groups, the study group was treated with PRF in the bone defect after surgical removal of the periapical lesion while the control group conducted without PRF. After 4 months, we measured and compared the bone density formed in the defect after surgical removal of the periapical lesion in both groups using CBCT.

Results: The value of the Bone density of PRF group collected postoperatively after 4 months was significantly high at superior limit 680.2 ± 137.56, middle limit 452.1 ± 143.14, inferior limit 629.6 ± 82.11 and average density 587.3 ± 57.47 as compare to control group, 470.8 ± 78.99 for the superior limit, 313.2 ± 57.21 for the middle limit, 449.6 ± 84.94 for the inferior limit and 411.2 ± 55.50 for the average bone density.

Conclusions: The usage of PRF in the treatment of bone defect post-operative removal of periapical pathosis seems to be an innovative therapeutic method promoting faster bone regeneration within 4 months.

Keywords: platelet, bone density, teeth, periapical pathosis, fibrin

Introduction

The aim of any surgical procedure is maintenance of optimum health, comfort, function and esthetics of the patient. Repair and regeneration are two aspects of healing after any uncompromised surgery. Repair is defined as the wound healing by tissue that has not fully restored the architecture or function of the part. While, Regeneration is defined as the reproduction and reconstitution of a missing or injured part to restore the architecture and function of the tissue.

Periapical pathology occurs as a sequelae of microbial insults from the root canal. When the infection within the canal remains, it progresses to the periapical region, leading into excessive osteoclastic bone resorption circumscribing the root. This is evident radiographically, as a radiolucent lesion and determined histologically, as a cyst or granuloma.

The initial treatment for such pathology is root canal treatment. If the treatment fails to resolve the pathology, surgical intervention needs to be delivered. The apical surgical procedure removes the pathology and the granulation tissues surrounding the tooth. This procedure creates a surgical defect in the area. Platelet-rich fibrin (PRF) has been used to accelerate the healing of the bony defect. PRF protocols require neither the use of anticoagulants nor bovine thrombin. It is simply the centrifuged blood that contains fibrin clots; where
growth factors and cytokines are abundantly trapped in a fibrin meshwork. The growth factors present in PRF are biologically active substances that are involved in the mechanisms of tissue repair such as chemotaxis, cell proliferation, angiogenesis, extracellular matrix deposition, and remodeling.

According to histomorphometric investigation and histological analysis conducted by Tatullo et al., the good osteoconductive capacity of PRF leads to the production of new bone. Also, The histological analysis shown the use of PRF formed a significant neoangiogenesis acting as a good support to the newly-formed bone tissue. Lately CBCT which provides three-dimensional images of dental and maxillofacial structures, started being announced for the evaluation of periapical bone lesions, and their repair after surgical endodontic treatment. The hypothesis of this study is based on the ability of local application of PRF to improve the bone healing after surgical removal of periapical lesion.

**Method**

**Setting:** A prospective clinical study was conducted from December 2017 to October 2018 at the Department of Oral & Maxillofacial Surgery, college of dentistry Teaching Hospital, Baghdad University; and Al-Sadr Specialized Health Center for radiographic work.

A total of 32 Iraqi patients aged 18-53 years, 20 females & 12 males diagnosed with periapical pathosis based on clinical and radiographic findings who met the eligibility criteria participated in this clinical study for surgical removal of periapical pathosis. These were selected randomly and allocated in two groups, Study group in which the periapical pathosis was removed surgically and PRF was applied in the defect and Control group in which the periapical pathosis was removed without application of PRF.

**Data Collection:** A case sheet form was filled containing the following data:

1. General information including name, age, gender, occupation, address and mobile number.
2. Chief complaint.
3. History of present illness.
4. Medical history.
5. Extra oral examination.
6. Intra oral examination.
   - Oral hygiene.
   - Presence of swelling, infection and sinus tract.
   - Periodontal status of the concerned tooth/teeth if any pocket is present and mobility grade.
7. Radiographic examination is provided by a periapical radiograph.

**Inclusion Criteria:**

1. Maxillary anterior teeth with radiographic periapical pathosis.
2. Failed RCF or failed previous apicectomy.
3. Age ≥ 18 years

**Exclusion Criteria:**

1. Nonrestorable tooth.
2. Unsatisfactory periodontal health (mobility more than grade 2 or pocket depth more than 5 mm).
3. Medically compromised patients with blood disease or those who take any medication that affect blood coagulation, uncontrolled systemic disease that affecting normal tissue healing like uncontrolled diabetes mellitus, autoimmune diseases, or patients on corticosteroid therapy.
4. Patient with Systemic disease that effect on bone metabolism which include hyperparathyroidism, thyrotoxicosis, liver and renal disease and long-term use of bisphosphonate medications.
5. Smoking.
7. Patient with a history of take chemotherapy or radiotherapy.

**Study Design:** Prospective randomized clinical study, the steps are summarized in the following sequential flow chart (Figure 1).
PRF Preparation and Application: In the study group, blood collected to prepare the PRF initiated. Rubbing the puncture site with a gauze sprayed by medical alcohol after identifying the appropriate vein for venipuncture by palpation (mostly the median cubital vein in the antecubital fossa and in the absence of this vein, the cephalic or basilic vein were utilized). Five-ml of the collected blood used as a standardized amount for each patient, the venous blood was collected using 10 mL disposable syringe with needle gauge 21. The obtained blood was immediately transferred to a plain 10 mL blood collecting tube and centrifuged at 3000 rpm for 10 minutes. A tube filled with normal saline about 5 mL or identical weight to the blood was placed in an opposite direction for the purpose of balancing during centrifugation. At the end of this process, the yellow shiny gelatinous part in the middle of the tube was the PRF. Using tweezers gently the PRF were pulled out and placed in a sterile wet gauze mesh, scraping the bulk of RBC layer carefully by surgical scalpel leaving the buffy coat intact. When the centrifuge rotation nearly reach its ending, the bone was smoothed and the defect was irrigated to receive the PRF. The PRF was compressed gently inside the defect, then the flap closed by simple interrupted suture using 3/0 non-absorbable black silk suture.

Bone Density: Bone density among the area of the defect was measured and measurement represent the mean of density as shown in figure 2. This study was conducted to assess bone density values formed in the defect postoperative removal of periapical lesions by using CBCT. To standardize the study, we enrolled patients with lesions measuring 8–15 mm in diameter. All of the bone density values were performed and measured by the same radiologist.
Statistical Analysis

Discrete variables presented using their number and percentage, chi square test used to analyze the discrete variable. Two independent samples t test used to analyze the differences in means between two groups. SPSS 22.0.0 (Chicago, IL), GraphPad Prism version 8.00 for Windows (GraphPad Software, San Diego, California USA), software package used to make the statistical analysis, p value considered when appropriate to be significant if less than 0.05.

Result

There was no significant difference between control and study group in their age and gender, additionally total mean age for the subjects was 28.8 ± 12.2 years, as illustrated in table 1.

Table 1: Assessment of demographic data

<table>
<thead>
<tr>
<th>Variables</th>
<th>Control</th>
<th>Study</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number</td>
<td>16</td>
<td>16</td>
<td>-</td>
</tr>
<tr>
<td>Age (years), mean ± SD</td>
<td>27.8 ± 12.88</td>
<td>29.9 ± 11.83</td>
<td>0.640</td>
</tr>
<tr>
<td>Age group, n (%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;30 years</td>
<td>10 (62.5%)</td>
<td>9 (56.3%)</td>
<td>0.969</td>
</tr>
<tr>
<td>30–39 years</td>
<td>2 (12.5%)</td>
<td>3 (18.8%)</td>
<td></td>
</tr>
<tr>
<td>40–49 years</td>
<td>2 (12.5%)</td>
<td>2 (12.5%)</td>
<td></td>
</tr>
<tr>
<td>50–59 years</td>
<td>2 (12.5%)</td>
<td>2 (12.5%)</td>
<td></td>
</tr>
<tr>
<td>Gender, n (%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>11 (68.8%)</td>
<td>9 (56.3%)</td>
<td>0.465</td>
</tr>
<tr>
<td>Male</td>
<td>5 (31.3%)</td>
<td>7 (43.8%)</td>
<td></td>
</tr>
</tbody>
</table>

Bone density in superior, middle and inferior limits was significantly higher in study group compared to control in female patients, as illustrated in table 3.

Table 3: Assessment of bone density in female patients

<table>
<thead>
<tr>
<th>Bone density</th>
<th>Control</th>
<th>Study</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number</td>
<td>11</td>
<td>9</td>
<td>-</td>
</tr>
<tr>
<td>Superior limit, mean ± SD</td>
<td>485.2 ± 85.59</td>
<td>722.0 ± 130.39</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Middle limit, mean ± SD</td>
<td>326.9 ± 52.57</td>
<td>456.0 ± 179.20</td>
<td>0.042</td>
</tr>
<tr>
<td>Inferior limit, mean ± SD</td>
<td>469.4 ± 93.10</td>
<td>610.8 ± 100.69</td>
<td>0.004</td>
</tr>
<tr>
<td>Average, mean ± SD</td>
<td>427.2 ± 57.86</td>
<td>594.4 ± 105.19</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

Bone density in superior, middle and inferior limits was significantly higher in study group compared to control in male patients, as illustrated in table 4.

Table 4: Assessment of bone density in male patients

<table>
<thead>
<tr>
<th>Bone density</th>
<th>Control</th>
<th>Study</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number</td>
<td>5</td>
<td>7</td>
<td>-</td>
</tr>
<tr>
<td>Superior limit, mean ± SD</td>
<td>439.0 ± 57.03</td>
<td>626.4 ± 136.55</td>
<td>0.017</td>
</tr>
<tr>
<td>Middle limit, mean ± SD</td>
<td>283.0 ± 60.88</td>
<td>454.0 ± 91.63</td>
<td>0.005</td>
</tr>
<tr>
<td>Inferior limit, mean ± SD</td>
<td>406.0 ± 44.02</td>
<td>653.9 ± 46.05</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Average, mean ± SD</td>
<td>376.0 ± 30.49</td>
<td>578.1 ± 85.92</td>
<td>0.001</td>
</tr>
</tbody>
</table>

Discussion

Periapical inflammatory lesions are local bone responses around the apex of a tooth that occur after necrosis of the pulp tissue caused by dental caries, mechanical or thermal trauma and chemical agents. Recent periapical surgery aims to remove periapical lesions to achieve complete wound healing and aid regeneration of bone and periodontal tissue. Since natural healing takes a relatively long period of time for the bone to fill the residual cavity, regenerative methods that help restore missing tissue and speed up regeneration have been announced. Regeneration is the procedure of reproduction or reconstitution of a missing or injured part of the body in such a way that
the architecture and function of the missing or injured tissues are completely reestablished, and it is a natural procedure of wound healing. The ultimate objective of reconstructive surgical techniques in the treatment of intra-bone defects is a regeneration of missing bone tissue. Many regenerative procedures, applying bone grafts and barrier membranes, were introduced to help the optimum healing of the residual defects after the removal of intra-bone lesions, especially large cysts. Recently, the use of platelet-rich fibrin (PRF) presented favorable results in regenerative surgical procedures.

Clinical studies have revealed that PRF promotes soft tissue and bone regeneration, in addition to periodontal tissue regeneration. Together, these studies have established PRF as a highly biocompatible and inductive scaffold useful for a wide range of tissue engineering uses.

PRF contains a large variety of growth factors and some of them play an important role in osteoblast activity, modulating their response. Through this complex process, it could be explained the effectiveness of PRF in improving bone healing.

Radiographic analysis of the bone defect after 4 months revealed that the defect filled with the PRF showed more bone density than the defect without PRF, and that the quality and quantity of the regenerated bone was superior when PRF were used postoperatively which is evaluated by CBCT because of the mean density in the superior limit of the defect was significantly higher in the study group (680.2 ± 137.56) compared to control group (470.8 ± 78.99), the mean density in the middle limit of the defect was significantly higher in the study group (452.1 ± 143.14) compared to control group (313.2 ± 57.21), the mean density in the inferior limit of the defect was significantly higher in the study group (629.6 ± 82.11) compared to control group (449.6 ± 84.94), also the mean for average bone density of the defect was significantly higher in the study group (587.3 ± 94.47) compared to control group (411.2 ± 55.50).

In this prospective clinical study, 16 patients were treated using PRF after surgical removal of periradicular lesions to evaluate the efficacy of PRF in osseous regeneration of defects left after enucleation, which showed promising, progressive, predictable, and significant radiographic osseous regeneration in all the cases, as was reported by Meshram et al. Also, this was in agreement to the result obtained in previous study in which fifteen patients aged between 20 to 50 years, were selected for the study. The patients had been diagnosed with periradicular lesion of endodontic origin based on clinical signs and symptoms, radiographically all patients showed complete bone regeneration at the end of six months.

In another study, 20 cases of cystic lesions were treated using PRF after cystic enucleation. Follow-up radiographs (orthopantomogram) were taken 1st, 3rd, and 6th months postoperatively. Bone density was measured with grayscale histogram using Adobe Photoshop 7.0 software. The subsequent follow-up examinations revealed progressive, predictable, and significant radiographic osseous regeneration.

Conclusions

The usage of PRF in the treatment of bone defect post-operative removal of periradicular pathososis seems to be an innovative therapeutic method promoting faster bone regeneration within 4 months.

Conflict of Interest: None

Ethical Clearance: Informed written consent was obtained from all the participants in the study, and the study and all its procedure were done in accordance with the Helsinki Declaration of 1975, as revised in 2000. The study was approved by the Department of Oral & Maxillofacial Surgery, college of dentistry teaching Hospital, Baghdad University.

Source of Funding: The study supported by authors only

REFERENCES


Association between Female Breast Cancer and Different ABO Blood Groups & Rh Factor in the Sulaymaniyah Province of Iraqi Kurdistan

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¹Hematology, Oncology Department, Al- Hussein Medical City, Karbala, Iraq; ²Sulaymaniyah College of Medicine; ³Gynecology and Obstetrics Teaching Hospital, Karbala, Iraq

ABSTRACT

Background: Worldwide, breast cancer is the most frequent malignant tumor in women. Many factors are known to have important roles in this high incidence, ABO Blood groups has emerged recently as another risk factor and its association with breast cancer has been validated. In this study we tried to find out if this relationship could be validated in cancer patients of the Sulaymaniyah province of Iraqi Kurdistan.

Patients and Method: This study was conducted at the Hiwa hematology/oncology hospital in Sulaymaniyah province. Blood groups of all breast cancer patients were retrospectively documented from the charts of all patients that had been registered with the hospital from the opening of the center at around mid 2007 until August 2015. As for the control ABO blood group status data was obtained from 500 age-matched females.

Results: Data obtained were correlated and comparison was made between the 500 evaluable breast cancer patients and the 500 available control blood groups. Association between ABO blood groups & breast cancer was found to be highly significant statistically ($p < 0.001$). There was also a significant association between blood groups & and histopathological status, ER & PR.

Conclusions: We found that there is a statistical association between female breast cancer and ABO blood groups & Rh factor.

Keywords: Breast cancer, ABO blood groups, Sulaymaniyah, Iraq.

Introduction

Breast cancer is the most commonly diagnosed cancer among women and second only to lung cancer as the leading cause of cancer-related deaths in women. Worldwide 1.5 million women will get a diagnosis of breast cancer and about half a million will die globally from breast cancer.¹² Family history of breast cancer, age of menarche, duration of lactation, parity, age of menopause, diet and hormonal levels are known risk factors for the development of breast cancer.³⁴

ABO blood group system, identified in 1900, classifies human blood based on the presence or absence of the antigens A and B carried on the surface of erythrocytes. As an easily accessible factor in an individual’s genetic makeup, ABO blood groups have been statistically associated with many diseases.⁵⁻⁹

The frequency of the common ABO phenotypes varies among different populations. Populations with a high frequency of the A phenotype are found mainly in Northern and Central Europe. The B phenotype is most frequent in Central Asia. Blood group O is the most frequent phenotype globally, with parts of Africa and Australia showing highest frequencies. The reasons for the observed differences among populations are not well understood, although several theories have been proposed.¹⁰
Blood group antigens represent the major antigens in humans which are present on the surface of red blood cells and different epithelial cells; alteration of these blood group antigens is associated with variant types of cancers.\textsuperscript{11, 12} During the past several decades, numerous studies have shed light on the relationship between ABO blood groups and risk of cancer at different sites including gastric cancer, pancreatic cancer, and breast cancer. On other hand, blood groups antigens on the surface of cancer cells can be used as useful prognostic markers in different types of human cancers.\textsuperscript{13-17}

**Patients and Method**

This case control study had been performed on 500 patients who were diagnosed as breast cancer according to histopathological diagnosis. All the materials and information were collected from the Hiwa Hematology/Oncology hospital in Sulaymaniyah, Iraqi Kurdistan. The control sample was 500 age-matched healthy females. Our attempt was to choose the controls in which they can be the representatives of the population from which the patients were drawn. The percentage of ABO blood group frequencies has been estimated in both cancer patients and healthy control samples to explain the correlation of ABO blood group with breast cancer. This study lasted from December 2014 till August 2015. Each patient was interviewed separately during their routine visit to hospital for treatment and follow up.

Blood groups of all breast cancer patients were retrospectively documented from the charts of all patients that had been registered with the hospital from the opening of the center at around mid-2007 until March 2015. The collected patients data also included clinicopathological assessment. Control subjects were selected among healthy people (volunteers, medical students, paramedical and health workers) with no history of cardiovascular disease, cancer, chronic degenerative neurologic disease, chronic obstructive pulmonary disease, and hepatitis or alcohol abuse.

**Data Analysis:** The data were analyzed for descriptive statistics using SPSS(Statistical Package for Social Science) software. A series of comparisons undertaken to reveal possible statistically significant relations between those variables. Probability of less than P 0.05 was considered statistically significant.

**Results**

Five hundred cancer patients and 500 healthy controls were enrolled. The mean age of studied sample was 47.37 years old, with minimum 24 years and maximum 77 years old. The mean age in healthy control was 48.5 years old with maximum 78 years and minimum 20 years as shown in (Tables 1).

![Table 1: Age Distribution in Cases & Controls](image)

When we compared the distribution of blood group among the patients with breast cancer and the healthy control the result was highly significant P value < 0.001. There was a proportional rise of blood group (O+) which was 31.8% in normal subjects and 48.8% in cancer patients, while (O-) was higher in control 2.8% than normal subject 2.2%. Also we found that there is proportional reduction of blood group (A+) from 38.6% in normal subject to 24.8% in cancer patients. Interestingly (AB-) blood group was representing 80% of cases while only representing 20% of healthy control as shown in (Table 2).

![Table 2: Distribution of Blood Groups in Cases & Controls](image)
Blood groups significantly associated with histopathological status (P value<0.001). Invasive ductal carcinoma is commonly observed in patients with blood group (O+) & (A+), while all cases of (A-) & (AB-) are invasive ductal carcinoma. Among lobular carcinoma blood group (O+) represents the majority of cases while blood group (B+) represents more than quarter of cases (Table 3).

### Table 3: Histopathological Status of Breast Cancer in Relation to Blood Groups

<table>
<thead>
<tr>
<th>Blood group</th>
<th>Invasive ductal carcinoma</th>
<th>Invasive lobular carcinoma</th>
<th>Ductal carcinoma in-situ</th>
<th>Metastatic carcinoma</th>
<th>Total</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No.</td>
<td>%</td>
<td>No.</td>
<td>%</td>
<td>No.</td>
<td>%</td>
</tr>
<tr>
<td>A-</td>
<td>12</td>
<td>2.6</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>A+</td>
<td>119</td>
<td>25.9</td>
<td>4</td>
<td>11.4</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>AB-</td>
<td>4</td>
<td>0.9</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>AB+</td>
<td>32</td>
<td>7</td>
<td>2</td>
<td>5.7</td>
<td>1</td>
<td>25</td>
</tr>
<tr>
<td>B-</td>
<td>4</td>
<td>0.9</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>B+</td>
<td>53</td>
<td>11.5</td>
<td>10</td>
<td>28.6</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>O-</td>
<td>10</td>
<td>2.2</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>25</td>
</tr>
<tr>
<td>O+</td>
<td>225</td>
<td>49</td>
<td>17</td>
<td>48.6</td>
<td>2</td>
<td>50</td>
</tr>
<tr>
<td>Total</td>
<td>459</td>
<td>100</td>
<td>35</td>
<td>100</td>
<td>4</td>
<td>100</td>
</tr>
</tbody>
</table>

On other hand ABO blood group are significantly associated with ER status (P value =0.04). ER positive is commonly observed in patients with blood group (O+) while all patients with (AB-) blood group were ER negative (Table 4).

### Table 4: ER in Relation to Blood Groups

<table>
<thead>
<tr>
<th>Blood group</th>
<th>Positive ER</th>
<th>Negative ER</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>A-</td>
<td>8</td>
<td>2.1</td>
<td>4</td>
<td>3.3</td>
</tr>
<tr>
<td>A+</td>
<td>87</td>
<td>23</td>
<td>37</td>
<td>30.6</td>
</tr>
<tr>
<td>AB-</td>
<td>0</td>
<td>0</td>
<td>4</td>
<td>3.3</td>
</tr>
<tr>
<td>AB+</td>
<td>25</td>
<td>6.5</td>
<td>10</td>
<td>8.3</td>
</tr>
<tr>
<td>B-</td>
<td>4</td>
<td>1.1</td>
<td>3</td>
<td>2.5</td>
</tr>
<tr>
<td>B+</td>
<td>53</td>
<td>14</td>
<td>10</td>
<td>8.3</td>
</tr>
<tr>
<td>O-</td>
<td>8</td>
<td>2.1</td>
<td>3</td>
<td>2.5</td>
</tr>
<tr>
<td>O+</td>
<td>194</td>
<td>51.2</td>
<td>50</td>
<td>41.3</td>
</tr>
<tr>
<td>Total</td>
<td>379</td>
<td>100</td>
<td>121</td>
<td>100</td>
</tr>
</tbody>
</table>

There is also significant relation between PR & ABO blood groups & Rh (P value 0.026). Positive PR is commonly observed in patients with blood group (O+) and all patients with (AB-) blood group were PR negative (Table 5).
Table 5: PR in Relation to Blood Groups

<table>
<thead>
<tr>
<th>Blood group</th>
<th>Positive PR</th>
<th>Negative PR</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No. (% )</td>
<td>No. (% )</td>
<td></td>
</tr>
<tr>
<td>A-</td>
<td>7 (1.9)</td>
<td>5 (3.6)</td>
<td>12</td>
</tr>
<tr>
<td>A+</td>
<td>85 (23.6)</td>
<td>39 (27.9)</td>
<td>124</td>
</tr>
<tr>
<td>AB-</td>
<td>0 (0)</td>
<td>4 (2.9)</td>
<td>4</td>
</tr>
<tr>
<td>AB+</td>
<td>24 (6.7)</td>
<td>11 (7.9)</td>
<td>35</td>
</tr>
<tr>
<td>B-</td>
<td>4 (1.1)</td>
<td>3 (2.1)</td>
<td>7</td>
</tr>
<tr>
<td>B+</td>
<td>50 (13.9)</td>
<td>13 (9.3)</td>
<td>63</td>
</tr>
<tr>
<td>O-</td>
<td>9 (2.5)</td>
<td>2 (1.4)</td>
<td>11</td>
</tr>
<tr>
<td>O+</td>
<td>181 (50.3)</td>
<td>63 (45)</td>
<td>244</td>
</tr>
<tr>
<td>Total</td>
<td>360 (100)</td>
<td>140 (100)</td>
<td>500</td>
</tr>
</tbody>
</table>

Discussion

The association of breast cancer and the blood type has had different degrees in various studies although some previous studies have reported significant associations between ABO blood group or Rh factor and breast cancer risk; overall the literature is inconsistent. The result of this study showed that association between ABO blood group and breast cancer was highly significant statistically (p< 0.001).

Blood group O showed highest rates, compared to the control group. That result is consistent with studies done by Majupuria KC, et al. and Adam A, et al, both of them showed a positive association between type O and breast cancer risk. But study done by Haswani L, et al suggested majority of breast cancer patients belonged to group O and group B.

Two studies reported from Kirkuk governorate by Zaki S, et al and AL-Nassyria governorate by Mehdi L, et al, suggested that A blood group was more susceptible to have breast cancer.

There are other studies that suggested positive associations between blood group A and breast cancer done in Egypt, Tunisia, Malaysia and in Punjab India. While many other studies in Iran, India and United States suggested no association between blood groups and breast cancer. So this topic seems to remain unresolved.

Stamatakos et al suggested that in Rh (+) patients; ductal breast cancer is differentially distributed and is commonly observed in patients with blood group A. But in our study invasive ductal carcinoma is commonly observed in patients with blood group (O) & (A+).

The results of our study suggested significant association between blood group (O+) and ER, PR positive status. ER positive and PR positive cases were commonly distributed in blood group (O+) patients. But in study done by Gates M, et al suggested that there is no relationship between ABO blood group and hormonal status.

Conclusion

ABO blood group could provide a genetic susceptibility to develop breast cancer. The identification of genetic and environmental factors among racial and ethnic groups should offer some insights into the observed epidemiological data and advanced opportunities to better understand the control and development of cancer.

Conflict of Interest: Nil.

Source of Funding: Self source.

Ethical Consideration: Selected topic was accepted by scientific committee; official acceptance was taken from health authorities to conduct this study. Aim of study was clarified to participants, and collected information was kept confidential.

REFERENCES


The Role of Laparoscopic Drilling in the Treatment of Polycystic Ovarian Syndrome

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1College of Medicine, University of Al-Qadisiyah, Iraq

ABSTRACT

PCOS patients diagnose by having two of the following criteria: first oligo- and/or anovulation, second hyperandrogenism (by clinical picture with or without biochemical features), and lastly ultrasound findings of polycystic disease. The underlying cause of PCOS is unknown. Theories about cause may include genetic predisposition. The role laparoscopic drilling for ovaries show advancing in treatment of PCOD in form of restore ovulation specially those patients in whom there is resistant to clomiphene citrate or incompliant for long term therapy. The current study was aimed to describe the role of laparoscopic ovarian drilling (LOD) as an effective and successful treatment for infertility in those patients with PCOD in whom medical treatment fail.

This study includes 50 patient’s female, age between (22-35) years old. Inclusion criteria including period of infertility of 1–10-year duration, body weight increase with (BMI 29–35 Kg/m2), gynecological problems with abnormal menstruation, clinical pictures go with high level of androgen hormone like acne vulgaris and hirsutism. The results revealed that 50 patients were studied here. In 40 patients (80%), they show no menstrual cycle changes. Follow up period was 12 months. 30 of patient (60%) had pregnancy; the mean time for the first pregnancy was 3.5 months after operation. As a second line treatment for infertility treatment in patients with PCOD, LOD has good and successful results that lead to increase using specially for patients with failure of medical treatment and poor compliance. It’s beneficial as less pelvic adhesion and minimal ovarian trauma making it with fewer side effects. The results postoperatively in regarding hormone assay and conception rate are favorable.

Keywords: laparoscopic drilling; polycystic ovarian syndrome; hyperandrogenism

Introduction

There is a great development in understanding the pathology and physiology of polycystic ovary syndrome and this knowledge has a progression especially in the last century. The incidence of PCOD in many studies range from 5% to 14% in women within the years of fertility, 1 this prevalence makes the PCOD as one of the important and common endocrine disorder that affect women in their reproductive life.2 The main and important features of PCOD include first high level of androgen (hyperandrogenism) with abnormal cycle and irregularity, and this will eventually result in infertility.3 PCOD is a disease of exclusion so that other causes of oligo or anovulation should be excluded such as congenital adrenal hyperplasia, tumors secreting excess androgen, and hyperprolactinemia.4 The abnormality of the CYP11a gene in patients with PCOS may has a major effect in the progression of the disease as this suggested by many studies that perform in vitro on selected theca cells from human ovaries. The CYP11 thought to be responsible for the encoding the cleavage enzyme of the cholesterol side chain which play a significant role in the steroid production as a rate limiting step.7 The menstrual abnormalities in PCOS characterized by multiple abnormalities that ranged between irregularity, sometimes absent or infrequent. These disturbances usually has history since the first postmenarchal bleeding and the monthly cycle never stable.8 Inappropriate secretion of gonadotropin-releasing hormone (GnRH)
causing increase level of luteinizing hormone (LH) compared with follicle-stimulating hormone (FSH). The presence of hyperinsulinemia now becomes well documented in patient with PCOD this is due to insulin resistance. The incidence of hyperinsulinemia due to insulin resistance range between 25% to 45%. The prevalence of insulin resistance is mostly found in obese patient making this wide incidence range. Insulin resistance represent low glucose absorption in related to a given amount of insulin. Insulin and LH will play a significant role in stimulating ovarian theca cell to secrete more androgen and causes the ovaries to secrete high levels of testosterone and androstenedione. The obesity in many studies was found I around 50% of cases with PCOD. The increase in body fat was mainly in upper part of body or in the center that will lead to increase the ratio between waist and hip in comparison to women with obesity without PCOD. The distribution of fat in this pattern is regarding as android type of obesity and similar picture can be seen in states with hyperandrogen, patients with diabetic and in cases of hyperlipidemia.

This distribution of peripheral fat may be associated with visceral fat that may causing increase in insulin resistance in those patients. While women with gynecoid type of obesity will have increase in amount of normal fat in thighs, buttocks and hip areas. At early times of discovery the PCOS around 1935, the treatment in many centers was the wedge resection in the hope to resume the ovulation. The effect of this procedure was to excise the thick and hyperplastic central ovarian stroma. This method was used in the treatment of infertility due to anovulation until the time were the medical treatment that casing stimulation of ovulation was discovered (clomiphene citrate, gonadotropins). These drugs and inspire of its effectiveness, but they may have associated with significant problems including the risk of hyperstimulation syndrome of ovary and risk of multiple pregnancies. The first use of electrocautery in PCOD treatment was in 1984, that were during laparoscopic surgery by cauterezation of ovarian capsule and this result in a high rate of ovulation and also increase the likelihood of pregnancy. For penetration of capsule of ovary is done either by cautery or sometimes laser, the laser associated with less risk of adhesion on pelvis postoperatively. The procedure includes develop multiple punctures in ovarian capsules by using electrocuttary or by laser the number of puncture usually 3-6 and their depth about 5-10 mm. Usually the procedure performs on both ovaries even in many studies may show the drilling has the same rate of ovulation in both unilateral and bilateral ovarian. What is the exact mechanism by which the LOD causes induction of ovulation is still unknown. Many theories and authors suggest that a falling in androgen level and steroids during the procedure and this will cause disturbance in negative feedback mechanism of estrogen hormone on gonadotropin pituitary and this will lead to decrease of intraovarian level of androgens and this will inhibit the development of follicle, or stimulation of growth factors in ovary which eventually cause follicle growth. The aim in this study is to describe the role of laparoscopic ovarian drilling (LOD) as an effective and successful treatment for infertility in those patients with PCOD in whom medical treatment fail.

Patients and Method

This study includes 50 patient’s female, age between (22-35) years old. Diagnosis of PCOD based on ultrasound findings of PCOD, elevated levels of androgenic hormones and oligo or anovulation (Rotterdam criteria). Clinical features included infertility of 1–8 years’ duration, abnormalities in menstruation (oligo/amenorrhea), increase in body weight (BMI 29–36 Kg/m2), pictures of acne and hirsutism indicating high levels of androgens. The assay of hormonal levels showing low level serum FSH and an elevation in LH hormone level with LH/FSH ratio >2. All investigation was done for those patients include thyroid function test, ovarian hormone assay, ultrasound examination in order to exclude other secondary causes for infertility than the PCOD. In addition, seminal fluid analysis was done for their husbands to exclude male causes. All patients were on medical treatment for period between (6months to one year), treatment include clomiphene citrate dose of 100mg/day starting from day 2-day five of the cycle. The normal values in this study for biochemical assay show as follow: glucose 80–115 mg/dl; FSH - 3-12.4 mUI/ml; LH - 2.3-12 mUI/ml; total testosterone - 0.1-1.2 ng/ml; free testosterone - 0.6-6.8 pg/ml. The procedure was done in our laparoscopic department under general anesthesia, three port using for camera and two working ports. The procedures include punctures of ovarian capsules using eclectocutary hook for perform 5-8 holes in each ovary with a contact time between 3-5 seconds. All patients were discharged the hospital on second day.
postoperatively and follow up period was one year for regular ovulation and pregnancy.

**Statistical Analysis:** SPSS version 16 and Microsoft Office Excel 2007 was used as an analysis of these data, the Chi-square test, and Fisher exact test was used to study the association between any two nominal variables. P-value of less than or equal to 0.05 was considered significant.

**Results**

Fifty patients were studied here. In 40 patients (80%), they had regular menstrual cycles. Follow up period was 12 months. Thirty of patient (60%) had pregnancy; the mean time of the first pregnancy was 3.5 months. From those thirty pregnancies 4 ended in abortion (mean period was 2.5 month) and one case diagnose as ectopic pregnancy. No significant change was noted regarding the weight and body mass index after the procedure. The changes in hormone assay and a clinical picture was reordered before and after doing the laparoscopic ovarian drilling. There are significant changes in the levels of FSH, LH, the LH/FSH ratio and testosterone.

Abnormalities of menstruation in the form of oligo or amenorrhea which is most frequent symptoms showing improvement in about 40 cases (80%), as shown in table 1.

<table>
<thead>
<tr>
<th>Table 1: The hormonal changes, menstruation and pregnancy results of LOD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parameter</td>
</tr>
<tr>
<td>----------------</td>
</tr>
<tr>
<td>Serum FSH</td>
</tr>
<tr>
<td>Serum LH</td>
</tr>
<tr>
<td>LH/FSH</td>
</tr>
<tr>
<td>Free testosterone</td>
</tr>
<tr>
<td>Total testosterone</td>
</tr>
<tr>
<td>Glucose</td>
</tr>
<tr>
<td>Regular cycle</td>
</tr>
<tr>
<td>Pregnancy rate</td>
</tr>
</tbody>
</table>

**Discussion**

There is great change in the definition of polycystic ovary syndrome that evolved along decades but it is always refers to a multi-system reproductive metabolic disorder. In patients with PCOD, the ovaries have a certain specific shape and texture that can be detected by ultrasonography even this appearance may be found in women without clear clinical picture. Metabolic disorders that may associated with the disease include resistance to insulin, obesity (with a high incidence in the United States) and dyslipidemia. Several studies show that there is family tendency in PCOD mainly in first-degree relatives. The menstrual abnormality in PCOD is mainly characterized by irregularity with infrequency and sometimes absent. The complete absence of the menses may reach 20% in some women while 5-10% of cases may show normal ovulation. Women with PCOS classically show increase in ovarian size with multiple small antral follicles on periphery with increase stromal thickness in the center. The exact mechanism that cause this specific morphological change is still vague, the possible explanation that the normal cycle of follicles development may progress until the midantral stage, then the growth will cease and after that the main numbers of follicles end with atresia.

The incidence of miscarriage shows increase frequency in women with PCOD, the exact explanation is still unclear. In some series the percentage of recurrent abortion in women with PCOD may reach 55%. Some studies show high incidence of endometrial carcinoma in PCOD patients this may be related to long period of anovulation and chronic effect of unopposed estrogen. The relation between levels of androgen hormone and gonadotropin with obesity now is understudy mainly in adolescents. McCartney and colleagues in 2001 had a cross sectional study of obese girls at puberty, the study had showed a significant elevation in the level of testosterone hormone in comparison with none obese girls also there is decrease in the level of LH hormone. Also there increase in insulin level in obese compared to normal controls. The effect of hyperinsulinemia and resistance to insulin as a major cause for PCOD is still not well documented. There may be evidence that high insulin levels may cause alteration in the normal metabolic and reproductive physiology of this syndrome. Some studies had shown that hyperinsulinemia lead to stimulate androgen production, by effect of LH hormone, from ovarian normal theca cells. The first notice for the effect of LOD was reported in 1984 when using elecrocattary on the capsule of ovary during laparoscopic surgery which result in induce ovulation and pregnancy. The resulting ovulation after LOD has
variable duration, in some studies show that spontaneous ovulation after LOD may persist for multiple years. The penetration of ovarian capsule was done by using either the elecrocuttary or laser which associated with less complication post operatively. Nowadays the introduction of harmonic device also improve result and decrease post-operative complication in LOD. Farquhar et al. study discusses the difference between LOD and medical treatment with gonadotropin therapy in patient diagnose with PCOD and infertility. Study shows no significant difference between surgery and medical therapy except that LOD show lower rate of multiple pregnancy. we assume that LOD has the benefit on medical therapy from the economic view and in those patients in whom the drug compliance is weak and can’t withstand long term treatment in addition to the side effect of drug from the pharmacological view. LOD has a role in stimulate ovulation when we decide that clomiphene citrate therapy show failure of ovulation rate may reach 75-80% and pregnancy rate may, therefore reach 60-70%. As summary, the laparoscopic drilling is indicated in patients with young age group, poor compliant to CC therapy, resist treatment, elevated levels of LH hormone and abnormal response to gonadotropins with excessive side effects.

**Conclusion**

As a second line treatment for infertility treatment in patients with PCOD, LOD has good and successful results that lead to increase using specially for patients with failure of medical treatment and poor compliance. It’s beneficial as less pelvic adhesion and minimal ovarian trauma making it with fewer side effects. The results postoperatively in regarding hormone assay and conception rate are favourable.

**Conflict of Interest:** The author declares no conflict of interest.

**Source of Funding:** This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

**Ethical Clearance:** Each patient included in this plan signed an informed consent form, detail of the method and agent used with the possible failure of this option and approved by the Ethics Committee of the Medical Research Institute (ECMRI).

**REFERENCES**


18. Amer SA, Li TC, Cooke ID. Repeated laparoscopic ovarian diathermy is effective in women with anovulatory infertility due to polycystic ovary syndrome. Fertil Steril 2003;79(5):1211-5


Evaluation of the Performance of Sports Management According to a Standard Scale for Teachers of Physical Education in Najaf Governorate

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ABSTRACT

The weakness in the administrative aspects reflected on the teacher within the school and during the participation in the competitions and tournaments which are within the curriculum of the Directorate of sports activity, and this also reflected on the ability of effective leadership in coordinating the work and follow-up and direct supervision and organization of the efforts of the workers, which gave the impression of the lack of effectiveness and which rises to the level And the extent required for the Directorate of sports activity, which in turn leads to the failure to achieve the objectives of the administrative performance of the Directorate, and hence the researcher to prepare a study for specialists in those departments and schools to see the extent to achieve these goals that correspond to the changes and interact with the community.

The objective of the research is to build and standardize the performance measure of sports administration for the teachers of physical education in Najaf Governorate. The research community determines the (280) physical education teachers of the secondary schools in Najaf Governorate. After collecting the data, they were processed statistically to obtain the results through which the conclusions were built.

Keywords: Evaluation, standard scale and physical education.

Introduction

The scientific progress witnessed in the modern era has cast its shadow on the various fields of work and the most recent changes and developments. The main focus of this work is the scientific progress and development in human beings with the enormous potential and unlimited potential if they have the means to progress and modern development.

Physical education and sports sciences are one of the fields that have received a large share of this development because of its progress and effective renewal in development in various distances. The teacher of sports education is one of the most important axes through which the educational goals are achieved for its great influence in the formation of students and others in a way that makes them able to serve their country with love, dedication, sincerity and high spirits.¹

The weakness in the administrative aspects reflected on the teacher within the school and during the participation in the competitions and tournaments which are within the curriculum of the directorate of sports activity, and this also reflected on the ability of effective leadership in coordinating the work and follow-up and direct supervision and organization of the efforts of the workers, which gave the impression of the lack of effectiveness and which rises to the level And the extent required for the directorate of sports activity, which in turn leads to the failure to achieve the objectives of the administrative performance of the Directorate, and hence the researcher to prepare a study for specialists in those departments and schools to see the extent to achieve these goals that correspond to the changes and interact with the community.²

Today’s administration is an essential aspiration for any progress for people and nations all over the world regardless of their share of natural resources, geographical area or population. Success or failure at the state or institution level is due to the extent to which the Department can use and the more the society has progressed and developed, the greater the responsibility for management. Accordingly, management is in fact an
influential factor in modern life and a means of achieving a better life for the peoples.

Research Methodology and Field Procedures

Research Methodology: The researcher used the descriptive method in the survey method and the normative studies, due to its relevance and the nature of the current study.

Research Community and Samples: The research community determined the teachers of physical education for secondary schools in Najaf Governorate (280) teachers distributed in schools of education in Najaf governorate. The sample of the research was randomly selected. The sample of building the scale was (100) teachers working in secondary schools. (150) teachers.

Tools, Devices and Devices Used in Research: In order to solve the research problem and achieve its objectives, the researcher used the following tools and devices:

Means of Data Collection:
- Questionnaire
- Observation.
- Test and measurement.
- Sources and references.
- Dry pens, leaves.
- Electronic Calculator Type Pentium 4 Number (1).
- Study halls.

Field Research Procedures:

Performance Management Procedures:
1. Determination of the objective of the scale: a measure of the performance of sports management for teachers of physical education in the province of Najaf.

2. Determine the scale areas: (Planning, organization, decision-making, coordination, communication, supervision and guidance), and was approved by agreement (100%).

3. Preparation of the preliminary version of the performance measure of sports management:

A. Preparation of the paragraphs of the measure of the performance of sports management the researcher reviewed the previous standards and related studies, as well as the researcher’s personal experience and agencies: Standards and related studies

1. The measure of the administrative behavior of the heads of sports clubs in Iraq. 3

2. The administrative performance of the deans of the faculties. 4

3. Administrative processes for schools of sports activities. 5

B. Determination of the method of drafting the paragraphs of the scale: was based on the method (Light) developer in the formulation of alternatives to the paragraphs of the scale

C. Formulation of the paragraphs of the scale: The paragraphs of the sport management scale were formulated according to their field in its initial form, with a total of 84 paragraphs, measuring five areas in the form of positive paragraphs and negative paragraphs, and three alternatives to answer the scale (always, Weights (3-2-1) were given positive paragraphs respectively and vice versa for negative paragraphs and Table (1) shows this.

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Fields</th>
<th>Positive Points</th>
<th>Negative Points</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Planning and organization</td>
<td>15</td>
<td>4</td>
<td>19</td>
</tr>
<tr>
<td>2.</td>
<td>Make decision</td>
<td>11</td>
<td>5</td>
<td>16</td>
</tr>
<tr>
<td>3.</td>
<td>Coordination and liaison</td>
<td>11</td>
<td>5</td>
<td>16</td>
</tr>
<tr>
<td>4.</td>
<td>Supervision and guidance</td>
<td>13</td>
<td>3</td>
<td>16</td>
</tr>
<tr>
<td>5.</td>
<td>Leadership</td>
<td>15</td>
<td>2</td>
<td>17</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>65</td>
<td>19</td>
<td>84</td>
</tr>
</tbody>
</table>

D. Determination of the validity of paragraphs of the scale: Presented to the experts and specialists to indicate their validity and identify the positive and negative paragraphs, as well as if they need to be amended and after the analysis of the views of experts and specialists statistically excluded (23) paragraphs for lack of statistical significance and maintain (61) paragraph, In Table (2). Experts also agreed on the alternatives and their weights.
Table 2: Shows the opinions of experts and specialists in the sport management scales and the values of the (Chi square) for the approvers and non-approvers

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Fields</th>
<th>Paragraph numbers in the field</th>
<th>Number of paragraphs</th>
<th>Number of experts</th>
<th>Chi square value</th>
<th>Statistical significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Planning and organization</td>
<td>1-2-5-6-7-8-9-10-11-12-13-14-16-18-19</td>
<td>15</td>
<td>12</td>
<td>100%</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3-4-15-17</td>
<td>4</td>
<td>8</td>
<td>16.666%</td>
<td>4</td>
</tr>
<tr>
<td>2</td>
<td>Make decision</td>
<td>1-2-4-6-7-8-9-10-11-12-13-14</td>
<td>12</td>
<td>10</td>
<td>83.333%</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3-5-15-16</td>
<td>4</td>
<td>9</td>
<td>75%</td>
<td>3</td>
</tr>
<tr>
<td>3</td>
<td>Coordination and liaison</td>
<td>1-2-4-5-6-7-11-12-13-14-15</td>
<td>11</td>
<td>11</td>
<td>91.666%</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3-8-9-10-16</td>
<td>5</td>
<td>7</td>
<td>58.333%</td>
<td>5</td>
</tr>
<tr>
<td>4</td>
<td>Supervision and guidance</td>
<td>1-2-5-6-7-8-9-10-12-13-14</td>
<td>11</td>
<td>12</td>
<td>100%</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3-4-11-15-16</td>
<td>5</td>
<td>7</td>
<td>58.333%</td>
<td>5</td>
</tr>
<tr>
<td>5</td>
<td>Leadership</td>
<td>1-3-4-6-7-8-9-10-11-12-13-14</td>
<td>12</td>
<td>11</td>
<td>91.666%</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2-5-15-16-17</td>
<td>5</td>
<td>8</td>
<td>66.666%</td>
<td>4</td>
</tr>
</tbody>
</table>

Value (T) Tabular = 3.84 degrees Freedom = 1 Level of significance = 0.05

Pilot Study: The scale was applied to a sample of (10) teachers who are outside the sample of the research on Thursday and Friday, 3-4/2/2017. It has been shown from the exploratory experiment that the instructions and paragraphs of the scale are clear and understandable from the sample and the average time taken the answer to the scale is (18) minutes.

Basic Experiment of the Scale: The scale was applied to the sample of the building (127) teachers. The basic experiment was carried out through the application of the scale (Appendix 5) on the purpose of conducting statistical analysis of the scale in the period from 1/3/2017 to 1/4/2017.

Correction of the Measure of Sports Management: Be the highest score obtained by the player in the scale (183) degree and the lowest degree (61) the higher the degree obtained by the player, the higher the higher the level of sports management.

Statistical Analysis of the Paragraphs of the Sport Management Measure:

A. The Discriminatory Power of the Paragraphs:
The researchers verified the ability of the paragraph to excel using the two groups of terminals through the sample statistical analysis of (120) teachers, and for the purpose of calculating the strength of the parity of the paragraphs have followed the following steps:
1. Ranking the players on the scale from the highest degree to the lowest degree.
2. 27% of the forms with the highest grades and 27% of the forms that have the lowest grades, and each party has (32) teachers
3. To identify the distinct ability of each paragraph by using the t-test for two independent samples to test the differences between the upper and
lower group scores in each paragraph, and (10) paragraphs were rejected because they were not distinctive. The value of $t$ is calculated below the tabular value. Thus, the number of valid paragraphs after this step (31) paragraph.

### B. Internal Consistency Coefficient:
Internal consistency has been ascertained by calculating the following:

**First, the relation of the paragraph to the total degree of the scale:** The TR test was used. It was found that all the paragraphs were significant except for four paragraphs bearing the numbers (54,47,45,44) because their $T$ value is less than the tabular value of (1.980) (0.05) and the degree of freedom (118), thus the number of paragraphs accepted (27) paragraph,

**Second, Relationship of the degree of the paragraph to the degree of the field:** The significance of the correlation was determined using the TR test, as all the paragraphs were statistically significant because the calculated value was greater than the tabular value of (1.980) at the level of significance (0.05) and the degree of freedom (118).

The correlation coefficient of Pearson was calculated between the total score of the scale and the field. The significance of the correlation was determined using the (t) test. It was found that all correlation coefficients were statistically significant because the correlation coefficients were greater of the value of (1.980) at the level of significance (0.05) and the degree of freedom (118).

### The Standard Characteristics (Psychometric) of the Scale:

**First, The validity of the content:** The researcher used this kind of honesty when taking the opinions of experts and specialists in the validity of the fields and paragraphs of the scale.

**Second, Structural honesty:** This was ascertained when the discriminatory power of the paragraphs was calculated in the style of the two terminal groups, as well as the internal consistency calculation.

### Regulation:

**Apply the Metric:** (150) teachers representing the physical education teachers at the Najaf Secondary Education Directorate during the period between (15/4/2017 - 15/5/2017).

The total score of the teachers was found on the scale. (46-81), with mean (70.293), and a standard deviation (7.062). Table (22) shows the repetitive distributions of teachers’ grades on the sport scale and table (4).

### Table 4: Shows the frequency categories for the standardization sample of the sport management measure

<table>
<thead>
<tr>
<th>Categories of Grades</th>
<th>Duplicates</th>
</tr>
</thead>
<tbody>
<tr>
<td>46-48</td>
<td>7</td>
</tr>
<tr>
<td>49-51</td>
<td>11</td>
</tr>
<tr>
<td>52-54</td>
<td>11</td>
</tr>
<tr>
<td>55-57</td>
<td>12</td>
</tr>
<tr>
<td>58-60</td>
<td>11</td>
</tr>
<tr>
<td>61-63</td>
<td>12</td>
</tr>
<tr>
<td>64-66</td>
<td>16</td>
</tr>
<tr>
<td>67-69</td>
<td>13</td>
</tr>
<tr>
<td>70-72</td>
<td>12</td>
</tr>
<tr>
<td>73-75</td>
<td>15</td>
</tr>
<tr>
<td>76-78</td>
<td>15</td>
</tr>
<tr>
<td>79-81</td>
<td>12</td>
</tr>
<tr>
<td>Total</td>
<td>147</td>
</tr>
<tr>
<td>Mean</td>
<td>70.293</td>
</tr>
<tr>
<td>standard deviation</td>
<td>7.062</td>
</tr>
<tr>
<td>Standard error</td>
<td>0.388</td>
</tr>
<tr>
<td>Skewness</td>
<td>- 0.182</td>
</tr>
</tbody>
</table>

### Derivation of Standards for the Sport Management Scale:
Thus, the raw grades obtained by applying the scale were converted to a sample of 147 teachers. The standard score of the scale was extracted using the following equation, and Table (5) shows its results.
Table 5: Shows the raw grade of the standardization, frequency and (t) grade sample corresponding to the sport management scale

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Raw grade</th>
<th>Repetition</th>
<th>Standard Score</th>
<th>S. No.</th>
<th>Raw grade</th>
<th>Repetition</th>
<th>Standard Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>46</td>
<td>1</td>
<td>1.560</td>
<td>19.</td>
<td>69</td>
<td>12</td>
<td>4.816</td>
</tr>
<tr>
<td>2.</td>
<td>49</td>
<td>1</td>
<td>1.984</td>
<td>20.</td>
<td>70</td>
<td>28</td>
<td>4.958</td>
</tr>
<tr>
<td>3.</td>
<td>51</td>
<td>1</td>
<td>2.268</td>
<td>21.</td>
<td>71</td>
<td>17</td>
<td>5.100</td>
</tr>
<tr>
<td>4.</td>
<td>53</td>
<td>2</td>
<td>2.551</td>
<td>22.</td>
<td>72</td>
<td>28</td>
<td>5.241</td>
</tr>
<tr>
<td>5.</td>
<td>54</td>
<td>1</td>
<td>2.692</td>
<td>23.</td>
<td>73</td>
<td>11</td>
<td>5.383</td>
</tr>
<tr>
<td>6.</td>
<td>56</td>
<td>2</td>
<td>2.976</td>
<td>24.</td>
<td>74</td>
<td>11</td>
<td>5.524</td>
</tr>
<tr>
<td>7.</td>
<td>57</td>
<td>1</td>
<td>3.117</td>
<td>25.</td>
<td>75</td>
<td>20</td>
<td>5.666</td>
</tr>
<tr>
<td>8.</td>
<td>58</td>
<td>5</td>
<td>3.259</td>
<td>26.</td>
<td>76</td>
<td>17</td>
<td>5.808</td>
</tr>
<tr>
<td>9.</td>
<td>59</td>
<td>6</td>
<td>3.400</td>
<td>27.</td>
<td>77</td>
<td>10</td>
<td>5.949</td>
</tr>
<tr>
<td>15.</td>
<td>65</td>
<td>10</td>
<td>4.250</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16.</td>
<td>66</td>
<td>13</td>
<td>4.392</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17.</td>
<td>67</td>
<td>17</td>
<td>4.533</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18.</td>
<td>68</td>
<td>18</td>
<td>4.675</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Determine the levels of the sports management scale:
In order to achieve the required research, the researcher determined the levels of the measure for the sample of the sample of rationing (147) teachers, and so the levels were determined is based on the real extent of the scale, and the measure consists of (27) paragraph and alternatives to answer triple, the highest value can get The teacher is assigned a grade of 81 and a minimum score of (27).10 The upper value of the minimum value divided by the number of levels is extracted by the length of the class. Thus, three levels, as shown in Table (6).

Table 6: Shows the range and level labels for the administrative performance measure

<table>
<thead>
<tr>
<th>Range</th>
<th>Levels</th>
<th>Number verified</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>27-44</td>
<td>Low level</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>45-62</td>
<td>Intermediate level</td>
<td>49</td>
<td>33.33</td>
</tr>
<tr>
<td>63-81</td>
<td>High level</td>
<td>98</td>
<td>66.66</td>
</tr>
</tbody>
</table>

Results and Discussions

View, analyze and discuss search results:

Table 7: Shows the level, extent, frequency and percentage of the search sample on the sport management scale of the research sample

<table>
<thead>
<tr>
<th>Number of teachers</th>
<th>Number of levels</th>
<th>Range</th>
<th>Repetition</th>
<th>Percentage</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>147</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Low level</td>
<td>27-44</td>
<td>0</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Intermediate level</td>
<td>45-62</td>
<td>49</td>
<td>33.33</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>High level</td>
<td>63-81</td>
<td>98</td>
<td>66.66</td>
<td>68.416</td>
<td>8.661</td>
</tr>
</tbody>
</table>

Table 7 shows the importance of the teacher of physical education in achieving balanced overall growth among students, Its objectives are to follow the scientific method in organizing its activities, and use the method of planning, organization, direction and follow-up through decisions and procedures put in place, which defines the general framework of the work to achieve the goals, the teacher of physical education, which achieves the objectives of the curriculum will be able to correct planning, In order to achieve the objectives, the process of planning and organization facilitates the teacher to achieve the objectives, and also helps to determine the stages of the implementation of the work easily and move from one stage to another without the emergence of unexpected problems resulting from the absence of planning and organization, does not meet the abundance
of material potential to achieve the establishment of its objectives unless.\textsuperscript{11}

The administrative individual is able to define the objectives of the organization and the best way to access it and distribute the students in the work and coordination between different efforts and the good exploitation of the material and human resources available to achieve the goals set and here we note the sample of the research has achieved its objectives through the process of This is in line with the Yunus study (1991) that “the teacher of physical education is the man of relationships who organizes the various interactions and communication processes, and makes the students understand their practical needs and help them satisfy them, so as to lead to the growth of a pure, Their competence increases and their ability to develop themselves increases, or through the teacher, so that their achievements and achievements will be transferred from good to better, which makes them understand their responsibilities and duties”.\textsuperscript{12}

Ethical Clearance: Taken from Al-Najaf education directorate

Source of Funding: Self

Conflict of Interest: None

Conclusions

Through the results produced by the researcher to the conclusions of the machines:

1. The teachers of physical education appeared at the level of high administrative performance, which increased their level of ambition in the administrative process.
2. The teachers of physical education appeared at the level of administrative performance average, which increased the level of ambition in the administrative process.
3. Setting three standard levels for teachers of physical education working in secondary schools.

References

Effect of Adding *Cinnamon Cassia* in Diet on Productive Performance and Some Blood Measurements for Broiler ROSS308

Ammar Qahtan shanoon1, Osama Ahmed latif2, Qana H Amin1

1College of Agriculture, University of Kirkuk; 2College of Agriculture, University of Dayala, Iraq

**ABSTRACT**

This experiment was conducted to study the effect of different levels of cinnamon (*Cinnamomum cassia*) Powder Supplementation in productive performance and some blood Characteristics for broiler chicken. Three hundred and sixty unsexed broiler chicks one day old Rose 308. The chicks were given a ration without any additive for the first week and at the beginning of the second week of age chicks were feed one of four level of cinnamon powder 0, 0.4, 0.8 and 1.2% it’s represents T1, T2, T3 and T4 which was distributed by the chicks randomly and three replicates per treatment (30 chicks/treatment). Results of the experiment showed that the addition of cinnamon to the diet has led to a significant increase (P <0.05) for body weights and feed conversion efficiency and production index compared with control treatment. Significant differences did not appear in the feed intake, mortality percentage, dressing percentage and carcass between experimental treatments. The treatment showed Add cinnamon significant decrease in both the percentage and the level of abdominal fat and cholesterol in the blood serum compared with the control treatment, while its impact was not significant to the total protein and uric acid level in serum of birds.

**Keywords:** Broiler, Cinnamon cassia, Productivity, Blood Characteristics

**Introduction**

The using of medicine rejected now by many countries because the present study improves a relationship between some kinds of cancer and using of antibiotic in poultry industry, therefor the resent researches try to found a natural additives to keep a good health of chicken and to avoid diseases and now have more attention in feeding and breeding of poultry (1,2). Cinnamon consider from the important herbal medicine because it content 4% oil called Cinnamon aldehyde which have a many biological effects, also its contents eugenol, Cinnamylacetate, Cinnamyl alcohol, Methoyl cinnamal dehyde and have an acid called cinnamic acid (3,4). It content a Chemical compound has in effect like insulin called Insulin Potentiating Factors (IPF). Some studies in cinnamon showed in effect on blood cholesterol by reduced it and take place as antioxidants by break down free radical (5).

**Material and Method**

The experiment was conducted by using of 360 chicks ross308 one day old and 40gm average of body weight. The bird were randomly classified in bens distinction 2*1.5 m. the treatments were treatment 1 without any additive as control, treatment 2, 3 and 4 feed diet with cinnamon cassia 0.4, 0.8 and 1.2 %. The performance characteristics were study and it the end of experiment 6 birds were slaughter after individual weighting and carcass characteristics were measured. The blood sample were collected from jugular vein by tube and the sample but in centrifuge in speed 3000 rpm/m for 15 mints and the serum used to calculate total cholesterol, total protein and uric acid (6). The experiment was design as complete random design CRD and the data was analyses by (6) and the different was tested by using Duncan’s multiple range test(7).

**Results and Discussion**

The results in table 1 show the effects of cinnamon cassia in body weight, it seen that the effect was a very clearly in 3 weeks after addition and have a significant differences (P<0.05) in age 4 and 5 week, the best result give by T4, T3 and T2, the occur 2238, 2150 and 2100 gm respectively compared to 2068 for T1. The weekly gain curve was similar to weight results in table 1 and the T4,
T3 and T2 give the highest results and have a significant differences in total gain compared with control (table 2). Feed consume wasn’t effect by treatments and there were just a numeric different (table 3).

**Table 1: Effect of adding cinnamon cassia in diet on body weight gm.**

<table>
<thead>
<tr>
<th>Age Wk.</th>
<th>Treatment*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>T1</td>
</tr>
<tr>
<td>2</td>
<td>4.58 ± 398</td>
</tr>
<tr>
<td>3</td>
<td>769 ± 4.53</td>
</tr>
<tr>
<td>4</td>
<td>1383 ± 3.33</td>
</tr>
<tr>
<td>5</td>
<td>2086 ± 4.16</td>
</tr>
</tbody>
</table>

* T1 control without any additive

*T2, T3, T4 and T5 diet with cinnamon cassia 0.4, 0.8 and 1.2%

* The different letter a, b, c refer to significant different (P<0.05)

**Table 2: Effect of adding cinnamon cassia in diet on weekly gain gm.**

<table>
<thead>
<tr>
<th>Age Wk.</th>
<th>Treatment*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>T1</td>
</tr>
<tr>
<td>2</td>
<td>237 ± 6.51</td>
</tr>
<tr>
<td>3</td>
<td>371 ± 9.35</td>
</tr>
<tr>
<td>4</td>
<td>614 ± 3.46</td>
</tr>
<tr>
<td>5</td>
<td>685 ± 5.33</td>
</tr>
<tr>
<td>2-5</td>
<td>1907 ± 22.51</td>
</tr>
</tbody>
</table>

* T1 control without any additive

*T2, T3, T4 and T5 diet with cinnamon cassia 0.4, 0.8 and 1.2%

* The different letter a, b, c refer to significant different (P<0.05)

**Table 3: Effect of adding cinnamon cassia in diet on feed consumption gm.**

<table>
<thead>
<tr>
<th>Age Wk.</th>
<th>Treatment*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>T1</td>
</tr>
<tr>
<td>2</td>
<td>319 ± 7.15</td>
</tr>
<tr>
<td>3</td>
<td>588 ± 8.67</td>
</tr>
<tr>
<td>4</td>
<td>1132 ± 11.45</td>
</tr>
<tr>
<td>5</td>
<td>1437 ± 16.87</td>
</tr>
<tr>
<td>2-5</td>
<td>3476 ± 33.22</td>
</tr>
</tbody>
</table>

* T1 control without any additive

*T2, T3, T4 and T5 diet with cinnamon cassia 0.4, 0.8 and 1.2%

From table 4 we showed the effect of treatments on feed conversation, the significant differences were begin from the end of week 3 to end of experiment and these results showed there effect clearly in total feed conversation and the negative effects continuous compared to control group (table 4).

**Table 4: Effect of adding cinnamon cassia in diet on feed conversation**

<table>
<thead>
<tr>
<th>Age Wk.</th>
<th>Treatment*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>T1</td>
</tr>
<tr>
<td>2</td>
<td>1.34 ± 0.04</td>
</tr>
<tr>
<td>3</td>
<td>1.58 ± 0.06</td>
</tr>
<tr>
<td>4</td>
<td>1.84 ± 0.02</td>
</tr>
<tr>
<td>5</td>
<td>2.96 ± 0.04</td>
</tr>
<tr>
<td>2-5</td>
<td>1.82 ± 0.04</td>
</tr>
</tbody>
</table>

* T1 control without any additive

*T2, T3, T4 and T5 diet with cinnamon cassia 0.4, 0.8 and 1.2%

* The different letter a, b, c refer to significant different (P<0.05)
The motility percentage wasn’t effect but T2 recorded a lowest percentage and these results have significant differences in production index, T4 and T3 results have the best result 302 and 292 compared to 279 for control (table 5).

**Table 5: Effect of adding cinnamon cassia in diet on mortality % and production index**

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Treatment*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>T1</td>
</tr>
<tr>
<td>Mortality%</td>
<td>1.07 ± 0.01</td>
</tr>
<tr>
<td>Production index</td>
<td>279 ± 3.48 b*</td>
</tr>
</tbody>
</table>

* T1 control without any additive
* T2, T3, T4 and T5 diet with cinnamon cassia 0.4, 0.8 and 1.2%
* The different letter a, b, c refer to significant different (P<0.05)

The result in table 6 refer to significant differences in abdominal fat for all treatments compared to control while liver, heart and gizzard weight haven’t effect by addition of cinnamon cassia compared with control.

**Table 6: Effect of adding cinnamon cassia in diet on abdominal fat, liver, heart and gizzard weight gm.**

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Treatment*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>T1</td>
</tr>
<tr>
<td>Abdominal fat</td>
<td>1.37 ± 0.04 a*</td>
</tr>
<tr>
<td>Liver</td>
<td>2.68 ± 0.12</td>
</tr>
<tr>
<td>Heart</td>
<td>0.54 ± 0.03</td>
</tr>
<tr>
<td>Gizzard</td>
<td>2.77 ± 0.06</td>
</tr>
</tbody>
</table>

* T1 control without any additive
* T2, T3, T4 and T5 diet with cinnamon cassia 0.4, 0.8 and 1.2%
* The different letter a, b, c refer to significant different (P<0.05)

In the table 7 we showed that treatments weren’t effect by adding cinnamon cassia in carcass percentage compared with control and for primary and secondary cats.

**Table 7: Effect of adding cinnamon cassia in diet in carcass percentage**

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Treatment*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>T1</td>
</tr>
<tr>
<td>Refinement ratio</td>
<td>72.16 ± 2.12</td>
</tr>
<tr>
<td>Chest</td>
<td>32.44 ± 0.90</td>
</tr>
<tr>
<td>Thigh</td>
<td>27.54 ± 1.17</td>
</tr>
<tr>
<td>Back</td>
<td>19.57 ± 0.80</td>
</tr>
<tr>
<td>Wings</td>
<td>11.46 ± 0.55</td>
</tr>
<tr>
<td>Neck</td>
<td>6.44 ± 0.57</td>
</tr>
</tbody>
</table>

* T1 control without any additive
* T2, T3, T4 and T5 diet with cinnamon cassia 0.4, 0.8 and 1.2%
* The different letter a, b, c refer to significant different (P<0.05)

The biochemistry characteristics of blood serum (cholesterol, total protein and uric acid) showed in table 8, it refer to that treatments have a significant effects on cholesterol for T3 and T4 compared with T2 and T1 which record the highest value. In total protein and uric acid there were no significant differences (table 8).
Table 7: Effect of adding cinnamon cassia in diet in Cholesterol, Uric acid and Total protein

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Treatment*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>T1</td>
</tr>
<tr>
<td>Cholesterol (mg/dL)</td>
<td>144.33 ± 3.23a*</td>
</tr>
<tr>
<td>Uric acid (mg/dL)</td>
<td>5.43 ± 0.56</td>
</tr>
<tr>
<td>Total protein (g/dL)</td>
<td>2.5 ± 0.13</td>
</tr>
</tbody>
</table>

* T1 control without any additive
*T2, T3, T4 and T5 diet with cinnamon cassia 0.4, 0.8 and 1.2%
* The different letter a, b, c refer to significant different (P<0.05)

Discussion

Effects of adding cinnamon cassia to broiler diet can by explain by knowing the theory of choice it. Cinnamon have a very variety of natural chemical in it composition which give a different result in body of bird, therefore we see the different in body weight as outcome for the improvement of other characteristics and when the treatments improve in feed consumption and feed conversation the body weight must become heaver\(^{(9, 4)}\) and the results of feed conversation refer to that, the enhance maybe came from the cinnamon have a polyphenol called insulin like effect factor and it caused Appetite to feed and the essential oils especially Cinnamaldehyde (4%) the body use it as source of energy and it Contains substances improve appetite, digestion, absorption and immunity in poultry and the evidence that the treatments have significant differences in abdominal fat compared with control\(^{(2,9)}\) and This was reflected in the percentage of mortality and production index especially for T3 and T4 this results maybe came from the Cinnamon inhibiting free radicals and reduce cell damage and give a better health performance \(^{(3,5)}\) and that was clearly in serum analysis especially for cholesterol and that mean cinnamon cassia have ability to reduced it and linked with triglyceride and prevent it from being free in blood vessels \(^{(11,9,2)}\).

Conflict of Interest: None of the authors have any conflicts of interest to declare.

Source of Funding: The research was performed independently, there is no funding, influence over study design, analyses, manuscript preparation, or scientific publication.

Ethical Clearance: The project was approved by the local ethical committee in University of Kirkuk.

REFERENCES

Azadirachta indica leaf powder supplementation on broiler performance. Indian Veterinary Journal. 84: 159-162.


Comparison of the Risk of Type 2 Diabetes Mellitus in Men and Women with Obesity in Indonesia

Andini Wisdhanorita¹, Syahrizal Syarif²
¹Master of Epidemiology, ²Departement of Epidemiology, Faculty of Public Health, University of Indonesia, Depok, Indonesia

ABSTRACT

Background: The prevalence of type 2 diabetes mellitus continues to increase. Obesity as one of the risk factors also continues to increase. This study aims to look at a comparison of the risk of type 2 diabetes mellitus in obese men and women.

Method: This study uses a cross-sectional design whose data is taken from the Indonesia Family Life Survey (IFLS) 5. The number of samples in this study was 5,763 respondents. The analysis in this study used logistic regression.

Results: BMI was associated positively with type 2 diabetes mellitus. The highest risk was found in BMI which was included in the obesity category (POR 3.483, 95% CI 2.774 - 4.373). Obese men have a higher risk (POR 4.441, 95% CI 3.163 - 6.235) than obese women (POR 3.112, 95% CI 2.266 - 4.274).

Conclusion: There are differences in the risk of type 2 diabetes mellitus between obese men and women. Efforts to reduce weight in men can be a priority in prevention and control programs for type 2 diabetes mellitus.

Keywords: Type 2 diabetes mellitus, body mass index, sex, gender

Introduction

The global prevalence of diabetes in adults over 18 years increased from 4.7% in 1980 to 8.5% in 2014.¹ According to IDF estimates in 2017, more than 424 million people worldwide have diabetes mellitus and 4 million die from this disease. While in Southeast Asia, the estimated prevalence of diabetes in 2017 is 10.1%.² Meanwhile, based on the results of the 2013 Basic Health Research (Riskesdas) it was found that the prevalence of diagnosed diabetes or diabetes mellitus was 2.1 percent in 2013. Compared to the results of the 2007 Riskesdas, the prevalence of diabetes mellitus increased from 1.1 percent (2007) to 2.1 percent (2013).³

Obesity is one of the risk factors of diabetes mellitus.⁴⁻⁶ According to WHO, in 2016 there were 39% of the population aged 18 years and over are overweight and 13% were obese. Meanwhile, the results of the 2013 Riskesdas stated that the prevalence of obesity in men aged > 18 years increased by 30.2% from 13.9% in 2007 to 19.7% in 2013, while the prevalence of obesity in women age > 18 years increased by 41.7% from 13.9% in 2007 to 18.1% in 2013.³

Type 2 diabetes mellitus is a result from a combination of low amounts of insulin produced by pancreatic β cells and insulin resistance. Insulin resistance causes an increase in fatty acids, thereby reducing glucose transportation to muscle cells and also increasing fat production which leads to increased glucose production. A person who is overweight or obese is likely to experience insulin resistance, but diabetes only occurs if a person also has a lack of insulin.⁷

Case-control studies in the United States found that there was a relationship between body mass index (BMI) and the risk of type 2 diabetes mellitus, the higher the BMI
the higher the risk for type 2 diabetes. Cohort studies in India also found a positive association between BMI and fasting blood glucose. In the UK a cohort study focused on women with results that overweight and obesity are risk factors for type 2 diabetes mellitus.

Several studies have shown that there is a relationship between obesity and the incidence of diabetes mellitus, but there are still few studies that try to compare the differences in risk in men and women who have the same BMI values. Therefore, researchers want to see whether there are differences in risk for type 2 diabetes mellitus between obese men and women.

**Method**

**Study Population:** This study uses a cross-sectional study design drawn from data from the Indonesia Family Life Survey (IFLS) 5 which was conducted in 2014/2015. IFLS is a survey conducted in collaboration between RAND and Survey Meter. IFLS has been carried out since 1993/1994. There were 7,524 respondents aged 0-110 years who were examined for glycosylated hemoglobin levels (HbA1c). The researcher then excluded 98 pregnant women so that the number of respondents became 7,426. Then restriction was carried out at the age of ≥ 18 years, so the number of samples became 6,259. After being combined with BMI data and physical activity, the total number of samples was 5,763, so the number of samples used in this study was 5,763 respondents.

**Type 2 Diabetes Mellitus:** The prevalence of type 2 diabetes mellitus in this study was obtained through the examination of glycosylated hemoglobin (HbA1c). HbA1c was obtained through blood collection which was then examined in a clinical pathology laboratory, Gadjah Mada University. HbA1c was one of the ways to diagnose diabetes mellitus recommended by WHO. Respondents were classified as people with type 2 diabetes mellitus if HbA1c levels were 6.5% or more, and were classified as not diabetics if HbA1c was less than 6.5%.

**Body Mass Index (BMI):** Body Mass Index (BMI) is obtained from the results of the calculation of body weight divided by the results of the square of the height (kg/m2). Respondents’ body weight and height were obtained through anthropometric measurements. Height measurements using SECA plastic board model 213 which can measure up to the nearest millimeter.

Measurement of body weight was carried out using the Camry model EB1003 which can measure up to 0.1 kg. Body Mass Index is categorized using WHO criteria for Asia, which is underweight (<18.5), normal (18.5 - 22.9), overweight (23-24.9), and obese (≥ 25).

**Statistic Analysis**

This study was analyzed using logistic regression with risk measures using prevalence odds ratio (POR) with a confidence level of 95%. The analysis was stratified by sex and controlled by potential confounder. Confounding tests were carried out by comparing POR crude with adjusted POR. If the difference between the two PORs is more than 10%, then the variable is considered confounding and included in the multivariate analysis. The variable that is suspected as potential confounder is age and physical activity. Age is divided into 2 categories, namely > 45 years and ≤ 45 years. While physical activity is divided into 3 categories based on IPAQ namely less (<600 MET minutes/week), moderate (600-3000 MET minutes/week) and high (>3000 MET minutes/week).

**Results**

The prevalence of diabetes mellitus is 8.7% with a proportion of 69.4% at the age of more than 45 years. The proportion of diabetes mellitus in men and women is not too much different, 42.3% in men and 57.7% in women. Respondents with moderate physical activity were having the highest proportion compared to other physical activity categories (43.5%). Obese respondents also had the largest proportion among other BMI categories at 58.1%. The complete proportion can be seen in Table 1.

**Table 1: Proportion of Type 2 Diabetes Mellitus Based on Respondents Characteristic**

<table>
<thead>
<tr>
<th>Variables</th>
<th>DM</th>
<th>NO DM</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n = 503</td>
<td>%</td>
</tr>
<tr>
<td><strong>Age (year)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;45</td>
<td>349</td>
<td>69.4</td>
</tr>
<tr>
<td>≤45</td>
<td>154</td>
<td>30.6</td>
</tr>
<tr>
<td><strong>Sex</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Men</td>
<td>213</td>
<td>42.3</td>
</tr>
<tr>
<td>Women</td>
<td>290</td>
<td>57.7</td>
</tr>
</tbody>
</table>
Multivariate analysis was carried out by controlling the variables of age and physical activity for respondents with underweight, excess, and obesity, each compared to normal body weight. The results of the analysis obtained a POR value of 0.726 (95% CI 0.475 - 1.110), 1.434 (95% CI 1.045 - 1.968), and 3.483 (95% CI 2.774 - 4.373). The results of the analysis show that obesity has the highest risk of causing type 2 diabetes mellitus (Table 2).

### Table 2: Adjusted POR of Type 2 Diabetes Mellitus in Both Men and Women

<table>
<thead>
<tr>
<th>Variable</th>
<th>Type 2 Diabetes Mellitus</th>
<th>POR (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td><strong>BMI</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Underweight (&lt; 18,5)</td>
<td>28</td>
<td>684</td>
</tr>
<tr>
<td>Normal (18, 5 – 22,9)</td>
<td>117</td>
<td>2216</td>
</tr>
<tr>
<td>Overweight (23 – 24,9)</td>
<td>66</td>
<td>810</td>
</tr>
<tr>
<td>Obese (≥ 25)</td>
<td>292</td>
<td>1550</td>
</tr>
</tbody>
</table>

A stratification analysis conducted to compare the risks in each sex. Obese men have a POR value of 4.441 (95% CI 3.163 - 6.235), while obese women have a POR value of 3.112 (95% CI 2.266 - 4.274). This means that obese men have a higher risk of developing type 2 diabetes mellitus compared to obese women (Table 3 and Table 4).

### Tabel 3: Adjusted POR of Type 2 Diabetes Mellitus in Women

<table>
<thead>
<tr>
<th>Variable</th>
<th>Type 2 Diabetes Mellitus</th>
<th>POR (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td><strong>IMT</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Underweight (&lt; 18,5)</td>
<td>55</td>
<td>1014</td>
</tr>
<tr>
<td>Normal (18, 5 – 22,9)</td>
<td>10</td>
<td>293</td>
</tr>
<tr>
<td>Overweight (23 – 24,9)</td>
<td>37</td>
<td>447</td>
</tr>
<tr>
<td>Obese (≥ 25)</td>
<td>188</td>
<td>1082</td>
</tr>
</tbody>
</table>

### Tabel 4: Adjusted POR of Type 2 Diabetes Mellitus in Men

<table>
<thead>
<tr>
<th>Variable</th>
<th>Type 2 Diabetes Mellitus</th>
<th>POR (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td><strong>IMT</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Underweight (&lt; 18,5)</td>
<td>62</td>
<td>1201</td>
</tr>
<tr>
<td>Normal (18, 5 – 22,9)</td>
<td>18</td>
<td>391</td>
</tr>
<tr>
<td>Overweight (23 – 24,9)</td>
<td>29</td>
<td>363</td>
</tr>
<tr>
<td>Obese (≥ 25)</td>
<td>104</td>
<td>468</td>
</tr>
</tbody>
</table>
Discussion

The results of this study indicate that BMI is associated positively with type 2 diabetes mellitus. The higher the BMI, the higher the risk of type 2 diabetes mellitus. This is because BMI has a strong relationship with diabetes and insulin resistance. Someone who is obese, the number of non esterified fatty acids (NEFAs), glycerol, hormones, cytokines, and other substances that cause insulin resistance, increases. Diabetes can also occur if the β-islet cells in the pancreas are disrupted, causing reduced control of blood glucose. The development of diabetes cannot be avoided if the failure of β-islet cell function in the pancreas together with the occurrence of insulin resistance occurs. The results of this study are also in accordance with the results of other studies that have been done before. The meta-analysis conducted in India found that there was a significant relationship between obesity and type 2 diabetes mellitus (OR = 1.14, 95% CI: 1.04 to 1.24). H E Bays, R H Chapman, and S Grandy in their research in America found that the higher the BMI, the higher the prevalence of type 2 diabetes mellitus.

This study also revealed that there were differences in risk between men and women in respondents who were obese. Men have a greater risk than women. This is due to biological differences, culture, lifestyle, environment, and socio-economic status. The genetic effects and epigenetic mechanisms, nutrition, and lifestyle also affect risk in both sexes. In addition, hormones also affect energy metabolism, body composition, vascular function, and inflammatory reactions. Both biological and psychosocial factors influence differences in diabetes risk in men and women. Research in the United Kingdom found that the prevalence of type 2 diabetes mellitus in obese men was higher than in obese women. Despite the overall proportion of women who suffer from diabetes more than men, when seen only in respondents who are obese, men have a greater risk than women.

The prevalence of pre diabetes syndrome, such as impaired fasting glucose (IFG) and impaired glucose tolerance (IGT), is different for men and women. IFG is more in men, while IGT is more in women. The cause of this difference is not yet clear, but it is likely that this occurs because of smaller muscle mass or physical conditions in women that can reduce insulin function to stimulate glucose removal and cause IGT to be higher. The prevalence and pathophysiology of diabetes are also different. In the case of idiopathic diabetes, a type 2 type of diabetes mellitus with a tendency towards acute insulin deficiency, it was found that 75% of sufferers were men. Women will be protected in this type of diabetes except in women who are deficient in estrogen.

The limitation in this study is that this study uses a cross sectional study design, so that temporality is unknown. In addition, not all potential confounders are included in the analysis, so the results obtained may still be influenced by confounders. However, because the results of this study have a quite narrow of confidence interval, the role of chance in this study is quite small. In addition, this study is also consistent with the findings of other studies and the results can be explained biologically, so according to researchers the results of this study are still acceptable.

Conclusion

The existence of a positive relationship between BMI and the risk of type 2 diabetes mellitus, shows that intervention is needed to reduce weight in an effort to prevent type 2 diabetes mellitus. However, there are differences in risk in obese men and women, indicating that different interventions are needed in efforts to reduce weight in men and women so that the results are more optimal. Reducing the prevalence of obesity in men can be a priority program in preventing the occurrence of type 2 diabetes mellitus.

Ethical Clearance: This Study used data from Indonesia Family Life Survey (IFLS) 5. IFLS 5 has been approved by IRBs (Institutional Review Boards) in the United States (RAND) and Gadjah Mada University (UGM) in Indonesia. All informed consent was also approved by the IRBs before the survey was carried out.

Source of Funding: The research is at its own expense.

Conflict of Interest: Both author declared that no conflict of interest.

REFERENCE


15. WHO Western Pacific Region. Redefining Obesity and Its Treatment-WHO. 2000 pp. 17-20


ABSTRACT

Data from the Sangurara Health Center in Palu city at 2017 the number of participants was primigravida 42 and multigravida 149. Primigravida pregnant women feel a concern about the labor that will be passed because this is the first labor. The method to relieve and help pregnant women in preparation for labor is to do the Yoga Prenatal Program. Analysis the effectiveness of prenatal yoga programs on primigravida trimester III in reducing complaints in the first stage of labor and self-efficacy. This study was an experimental study with two group design randomized controlled trial. The study was conducted from July to October 2018 in the Class of Pregnant Women at the Sangurara Health Center. Subject were taken based on consecutive samples, samples were 36 primigravida Trimester III: 18 controls, 18 interventions. The average value of complaints of labor in the first stage of 4cm cervical opening was 6.55. The Mann-Whitney test results obtained a significance value of p = 0.00, at 8cm cervical opening obtained a mean number of 7.19 and value of p=0.00, self-efficacy in 4cm cervical opening obtained 110 self-efficacy rate with value of p=0.00, the average self-efficacy of labor opening at 8cm 107 and p value<0.05. Prenatal Yoga Program is effective for primigravida trimester III in reducing first stage complaints and self-efficacy at the first stage of labor. Prenatal Yoga Program is standard in Antenatal Care.

Keywords: Prenatal Yoga, First Stage, Complaints, Self efficacy
before prenatal yoga namely frequent urination of 31 (91.1%), while excretion that is not felt after yoga prenatal is 0% muscle spasm. Yoga pregnancy exercise is effective in reducing the abundance of third trimester pregnant women.10

Multipara had higher self-efficacy than those who gave birth for the first time. Several studies have found that yoga practices during pregnancy can facilitate self-efficacy during the first active phase and second stage of labor.11 Yoga during pregnancy can increase the mother’s expectation in preparing the birth of a baby so that the mother becomes more skilled in relaxation and learns to be confident in facing childbirth.12

During the Prenatal period primigravida pregnant women need preparation in the face of labor so that labor can take place well, mother and baby are healthy.

**Method**

This study was an experimental study with a randomized controlled trial, single blind, two group design.13, 14 The sample consisted of 36 primigravida Trimester III pregnant women consisting of 18 treatment groups and 18 control groups, taking samples with the consecutive sample technique. Prenatal Yoga is done in the treatment group for 8 times every week 2 times. When prenatal yoga is performed in one session 60-minute, divided by: Meditation, Warming up, Prenatal Yoga Movement (Restorative posture, standing posture, Pelvic Rocking) and relaxation. And then during labor interviews were conducted at the opening cervix of 4cm and 8cm in the intervention group and the control group during the relaxation phase. Univariate analysis use mean, frequency distribution. Bivariate analysis of the Wilcoxon test and Mann Whitney statistical test with a 95% confidence interval.

**Results**

1. Characteristics of respondents

**Table 1: Respondents Characteristic Distribution**

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Control Group</th>
<th>Intervention Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>f</td>
<td>%</td>
</tr>
<tr>
<td>&lt;20</td>
<td>2</td>
<td>11.1</td>
</tr>
<tr>
<td>20-34</td>
<td>10</td>
<td>55.6</td>
</tr>
<tr>
<td>&gt;=35</td>
<td>6</td>
<td>33.3</td>
</tr>
<tr>
<td>Education</td>
<td>f</td>
<td>%</td>
</tr>
<tr>
<td>Elementary</td>
<td>5</td>
<td>27.7</td>
</tr>
<tr>
<td>Middle Class</td>
<td>13</td>
<td>72.2</td>
</tr>
<tr>
<td>Occupation</td>
<td>f</td>
<td>%</td>
</tr>
<tr>
<td>Housewife</td>
<td>18</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Table 1 explains that the majority of the age of the control group and the intervention group in the age period of healthy reproduction, the control and intervention group education is mostly middle education while the work of housewives.

2. First Stage Complaints

**Table 2: Distribution of First Stage Complaints of 4cm Cervical Opening**

<table>
<thead>
<tr>
<th>Complaints</th>
<th>4cm Cervical Opening</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Control group</td>
</tr>
<tr>
<td></td>
<td>f</td>
</tr>
<tr>
<td>Shaking Legs</td>
<td>13</td>
</tr>
<tr>
<td>Creaking Teeth</td>
<td>10</td>
</tr>
<tr>
<td>Buttocks Cramps</td>
<td>8</td>
</tr>
<tr>
<td>Hiccups</td>
<td>3</td>
</tr>
<tr>
<td>Belch</td>
<td>3</td>
</tr>
<tr>
<td>Thirsty</td>
<td>14</td>
</tr>
<tr>
<td>Anorexia</td>
<td>4</td>
</tr>
<tr>
<td>Nausea</td>
<td>1</td>
</tr>
<tr>
<td>Breathless</td>
<td>4</td>
</tr>
</tbody>
</table>
Conted…

<table>
<thead>
<tr>
<th>Complaints</th>
<th>Control Group</th>
<th>Intervention Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pain</td>
<td>18</td>
<td>100.0</td>
</tr>
<tr>
<td>Restless</td>
<td>17</td>
<td>94.4</td>
</tr>
<tr>
<td>Afraid</td>
<td>14</td>
<td>77.8</td>
</tr>
<tr>
<td>Comfort Sense Disorders</td>
<td>18</td>
<td>100.0</td>
</tr>
<tr>
<td>Stomach ache goes backwards</td>
<td>18</td>
<td>100.0</td>
</tr>
<tr>
<td>Inner pelvic pain</td>
<td>11</td>
<td>61.1</td>
</tr>
</tbody>
</table>

Table 2 describes that the first stage of labor in the 4cm cervical opening in the control group of 16 labor complaints all complaints were felt. Complaints that were not felt in the intervention group.

Table 3: Distribution Complaints of First Stage in 8cm Cervical Opening

<table>
<thead>
<tr>
<th>Complaints</th>
<th>8cm Cervical Opening</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Group Control</td>
</tr>
<tr>
<td></td>
<td>f</td>
</tr>
<tr>
<td>Shaking Legs</td>
<td>17</td>
</tr>
<tr>
<td>creaking teeth</td>
<td>3</td>
</tr>
<tr>
<td>Buttocks cramps</td>
<td>13</td>
</tr>
<tr>
<td>Hiccup</td>
<td>4</td>
</tr>
<tr>
<td>Belch</td>
<td>4</td>
</tr>
<tr>
<td>Thirsty</td>
<td>15</td>
</tr>
<tr>
<td>Anorexia</td>
<td>10</td>
</tr>
<tr>
<td>Nausea</td>
<td>10</td>
</tr>
<tr>
<td>Vomiting</td>
<td>1</td>
</tr>
<tr>
<td>out of breath</td>
<td>4</td>
</tr>
<tr>
<td>Pain</td>
<td>18</td>
</tr>
<tr>
<td>Restless</td>
<td>17</td>
</tr>
<tr>
<td>Afraid</td>
<td>14</td>
</tr>
<tr>
<td>Comfort Sense Disorders</td>
<td>18</td>
</tr>
<tr>
<td>Stomach ache goes to backward</td>
<td>18</td>
</tr>
<tr>
<td>Inner Pelvic Pain</td>
<td>18</td>
</tr>
</tbody>
</table>

Table 3 shows that is a difference in complaints when the 8cm cervical opening in the intervention group and control.

Table 4: Distribution Efficacy of Labor at The First Stage of 4cm and 8cm Cervix Opening

<table>
<thead>
<tr>
<th>Self- Efficacy</th>
<th>4 cm Opening</th>
<th>8 cm Opening</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Control Group</td>
<td>Intervensi Group</td>
</tr>
<tr>
<td></td>
<td>f</td>
<td>%</td>
</tr>
<tr>
<td>Low</td>
<td>11</td>
<td>61.1</td>
</tr>
<tr>
<td>High</td>
<td>7</td>
<td>38.9</td>
</tr>
<tr>
<td>Total</td>
<td>18</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Table 4 explains that labor self-efficacy in the first 4cm cervical opening was different, in the control group the majority was low and the intervention group was mostly high. Based on table 5, At the opening of the cervix the 8 cm most control groups was low self-efficacy, the highest intervention group was high self-efficacy.
Table 5: Differences in Maternal Complaints of First Stage at 4cm and 8cm Cervical Opening

<table>
<thead>
<tr>
<th>Complaints of First Stage</th>
<th>Mean</th>
<th>SD</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>4cm cervical opening</td>
<td>6.55</td>
<td>3.73</td>
<td>0.00</td>
</tr>
<tr>
<td>Control-Intervention Group</td>
<td>7.19</td>
<td>3.73</td>
<td>0.00</td>
</tr>
</tbody>
</table>

Base on Table 6, It can be concluded that Prenatal yoga program is effective in reducing complaints of labor when first stage in 4cm cervical opening and the statistical analysis that it can be concluded that the Prenatal Yoga Program is effective in reducing complaints of labor at the time of the 8cm cervical opening.

Table 6: Efficacy Differences first-Stage labor in 4cm cervical opening and 8cm cervical opening

<table>
<thead>
<tr>
<th>Self-efficacy</th>
<th>Mean</th>
<th>SD</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>4cm cervical opening</td>
<td>110</td>
<td>17.2</td>
<td>0.00</td>
</tr>
<tr>
<td>Control-Intervention Group</td>
<td>107</td>
<td>17.6</td>
<td>0.00</td>
</tr>
</tbody>
</table>

The results of the statistical test in table 6 it can be conclude that The Prenatal Yoga Program is effective in first-stage self-efficacy of 4cm cervical opening. And self-efficacy at the opening cervical of the first 8cm were significant differences between the control group and the intervention group. Prenatal yoga is effective in labor self-efficacy.

Discussion

1. Effectiveness of Prenatal Yoga Program on Primigravida Trimester III in Reducing Complaints in the First Stage Labor: Age can determine the physical readiness of primigravida women facing labor. In the opinion of Rochjatithe young or old primigravida is one of the risk factors that can cause harm and the possibility of complications during labor and thus require preparation in the prenatal period.

Research Rafika that more pregnant women with low education, underlie respondents not yet aware of prenatal yoga because previously they were not exposed to information given health services, especially prenatal classes. Respondents who work outside the home are the most housewife. This is a burden of increasing physical complaints because of the many burdens of work done at home, while the condition of his body is getting heavier with increasing gestational age and body position (mechanical body) of pregnant women when working improperly.

The results of this study are consistent with the research of Chuntharapat et. al., yoga can improve comfort during labor. The duration of the first stage of labor becomes shorter than the total time period I. Research Thakur, Sharmaeena and Masand, regular yoga during pregnancy can help pregnant women to be healthy during pregnancy and prepare for labor, avoid improper posture during pregnancy. The technique of breathing and meditation can make a pregnant woman healthy and relaxed to prepare her mentally in facing labor.

The results of a review from Stillman, yoga are comprehensive, holistic and have long been used to reduce stress, pain, and negative results from high-risk pregnancies. Another study conducted by Beddoe, that every pregnant woman is recommended to start pregnancy in the second trimester to do yoga and is significant in decreasing physical pain. In the third trimester, there is a decreased stress and anxiety reaction after yoga. Yoga improves the metabolism of the body and helps relaxation of the nervous system, regulates diaphragm contractions and relaxation that are used to improve blood circulation and are very helpful when waiting for the birth of a baby.

Prenatal Yoga very effective role to prepare in reducing labor pain, the location of muscles in the vaginal area, uterine cavity, rectum bearing heavy burden during pregnancy, contraction and relaxation that increases joint mobility, extends pelvic diameter, maintains circulation throughout the area and labor takes place, experiences pain decreases during labor, this is related to the pelvic floor muscles. In the intervention group, pain decreased compared to the control group. The control group feels pain during labor.

Hawrelak and Stephen, agrees with this point, if pregnant women practice 30 minutes of yoga, three times a week starting at 10-12 weeks of pregnancy, reducing pain during pregnancy, effective in facilitating comfort during labor and
after childbirth. The duration of labor is shorter\(^2\). Yoga reduces labor pain and reduces the need for analgesia\(^2\). Labor pain is felt if pregnant women are afraid and inadequate labor preparation\(^2\).

2. Effectiveness of Prenatal Yoga Programs on Third Trimester Primigravida Self-Efficacy: Age greatly affects women in facing pregnancy and childbirth both physically and psychologically. According to Sriwenda and Yulinda, women <20 years old are not psychologically prepared to face pregnancy or childbirth. Labor readiness is influenced by 3 factors, namely physical, mental, economic readiness\(^2\).

According to the theory that at the opening of 4 contractions it starts every 10-20 minutes lasting 15-20 seconds with light intensity\(^2\). Uterine contractions in labor are unique, physiological muscle contractions that cause pain in the body. Contractions are under the influence of intrinsic nerves so that women do not have physiological control over the frequency and duration of contractions\(^2\)

Chuntharapat, et. al., research that yoga during pregnancy can facilitate self-efficacy during labor when active phase and second stage of labor. Yoga during pregnancy can increase the mother’s expectation in preparing the birth of a baby so that the mother becomes more skilled in relaxation and learns confidence in facing labor\(^2\). Self-efficacy can also increase trust or the ability to go through labor properly. This is an important factor that influences the motivation of women to give birth normally.

Mothers have good efficacy shown by their ability to adapt to labor pain, appear calm, be able to control themselves, are able to follow the advice of labor helper with their own strength, regulates breathing as long as there are mules (contractions) and can divert attention.

The results of this study are in accordance with Sindhu that practicing yoga during pregnancy is a useful solution as a self-help medium that will reduce discomfort during pregnancy, assist the labor process and even prepare mentally for the early postpartum period and when raising a child\(^2\). According to the Sun et. al., yoga programs can reduce discomfort during pregnancy and increase trust in labor\(^9\).

Conclusion and Advice

Prenatal Yoga programs are effective against Primigravida in reducing complaints of labor in the first stage and Prenatal Yoga Program are effective for Self-efficacy in labor at the first stage.

Sugestion

The Prenatal Yoga Program is the standard for Antenatal care services, The midwife responsible for Prenatal class services activates the Prenatal Yoga Program. Promotion and education of Prenatal Yoga Programs independently at home. Need to do further research on the effectiveness of Yoga on fetal growth and development.

Conflict of Interest: All of the authors contributed to writing this paper and declare no conflict of interest.

Ethical Clearence: Ethical Clearance obtained from the university committee and respondent assignment (Ethical approval number: LB.01.01/KE/0006/III/2018).

Acknowledgments

We would like to acknowledge the cooperation, commitment and kind support of the subjects. We would also like to thank Health Polytechnic of Palu and Ministry of Health of Indonesia for supporting this research.

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Analysis of Chronic Disease Management Program (PROLANIS) for Referral Control on Public Health Center in Bengkulu

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ABSTRACT

Public health is service facility in order to build healthy society by accentuating the promotion and prevention. Most public health center in Indonesia have not yet been effective in curing noncontagious disease. There must be specific treatment in preventing and maintaining it from intervening the national healthcare government program. Puskesmas in Bengkulu have implemented the capital number policy and commitment fulfillment-based capital payment on First Level of healthy Facility. One of indicators is routine prolanis ratio visiting it. The purpose of this study was to understand the effect of Chronic Disease Management Program (prolanis) on referral controlling and chronical disease service efficiency.

Exploratory design on case study was conducted using quantitative method for understanding the implementation of chronic disease management policy. The sample population was taken from participant of prolanis which was held in Public health center in Bengkulu. Sample was obtained by accidental sampling. Data was analyzed by correlation and regression between Prolanis and referral frequency.

This statistical analysis found there was negative correlation between prolanis and referral with r=0.228 and p value= 0.04 on weak correlation. Conversely, there was significant correlation between prolanis implementation and referral on r=-0.135 with weak correlation and p value of 0.167.

Reduction of referral frequency to first healthcare center level (FKTL) can improve the efficiency on cost of healthcare in FKLT. Prolanis also improves people awareness, willing and capability to behave healthier including controlling hypertension and DM.

Keywords: Prolanis, Referral maintaining, FKTL

Introduction

Public health center (Puskesmas) is the first service facility which provides the healthcare service to the society. There must be specific treatment in preventing and maintaining noncontagious disease from intervening the national healthcare government program1.

Social health Insurance administration organization has tried to improve the efficiency and effectivity in healthcare system by developing quality control system through capital payment pattern and regulation of capital decree also commitment-based fulfillment on First Level of healthy Facility (FKTP). The indicator of it is contact number (AK), referral ration of special treatment nonspecific (RRNS) and routine-visiting prolanis member ratio.

According to the result of capital policy implementation and commitment-based fulfillment in Bengkulu. The number of visitation of a monthly number of sickness in 2017 was ranging from 7.76%-11.86% and 9.56% annually from the number of
application. Healthy visiting in puskesmas monthly was from 10.27% to 14.29% with annual percent of 11.63. Besides, the referral number was slightly higher (13.76%-18.05% monthly and 16.22 annually) based on visiting of sickness. From this value, it indicates that Puskesmas is suggested to develop the management for implementing society endeavor regarding healthy lifestyle in preventing, maintaining, controlling the disease.

Puskesmas is also strived to be able to integrate social healthcare with basic medical service and regulating referral number with people contribution through prolanis. From all things considered, we investigated the analysis of prolanis role for referral controlling. This study was aimed to determine the correlation of prolanis in controlling referral in Bengkulu.

Material and Method

An exploratory design on case study was conducted using quantitative method for understanding the implementation of chronic disease management policy. The sample population was taken from participant of prolanis which was held in Public health center in Bengkulu. Sample was obtained by accidental sampling. Data were analyzed by correlation and regression between Prolanis and referral frequency.

Result

Prolanis Realization: Prolanis is held in every puskesmas in Bengkulu which participated by patient who suffers chronically (Type 2 Diabetes Mellitus and hypertension). Prolanis activity is including medical education, sport, and healthy status observation. According to the patient statement:

There are several activities involved in prolanis including blood tension check, consultation/and hypertension control explanation (Hypertension patient)...

From the patient of type 2 DM, activities are held in prolanis including blood tension check, index glycemic measurement, hypertension control explanation...

Prolanis participants found it useful to take part in prolanist activities organized by the Puskesmas, based on interviews with all participants statement:

Most patients felt the positive effect of prolanis namely feeling healthier, weight body controlling, improve the understanding of disease treatment, and etc

Based on the interview we found that counseling and explanation which has been applying in life from most participants including nutrition intake, healthy diet, physical exercise in 30 minutes at least every day, prescribe consumption right on the proper time, yet most often emotion out of control. More importantly, by joining prolanis can reduce the number of hospitals visiting sickness. The correlation and regression analysis of the positive effect of prolanis is listed in Table 1.

| Table 1: Correlation of Prolanis Realization on Referral from Puskesmas in Bengkulu |
|---------------------------------|------------------|
| Variabel                        | Referral Score Frequency |
| Score of prolanis policy implementation | r = -0.228  
|                                 | p = 0.04  
|                                 | n = 60 |

Table 1, the statistical analysis with r=-0.228 shown negative correlation between prolanis realization and referral frequency with weak correlation on p-value =0.04. interestingly, there was significant correlation between prolanis with the referral.

Attending analysis of prolanis activity with referral to FKTL from Puskesmas in Bengkulu is presented in Table 2.

| Table 2: Correlation Analysis of Prolanis Attending with Referral in Puskesmas Bengkulu |
|---------------------------------|------------------|
| Variabel                        | Referral score |
| Score of prolanis policy implementation | r = -0.135  
|                                 | p = 0.167  
|                                 | n = 60 |

In Table 2, based on statistical analysis with r=-0.135 it was observed that the significant correlation between prolanis and referral with weak correlation, p-value=0.167.

Discussion

Prolanis Implementation: Prolanis has been held it every puskesmas which joined by patient who suffers chronical disease (DM and hypertension). Most
participants felt the positive effects of this activity also applying it to their lifestyle. Based on previous study, the innovation of people contribution showed that when patients take a big apart and able to control their self. According to WHO (2015), integrated healthcare service is health facility which guarantees continual service including health promotion, disease prevention, diagnosis, treatment, disease management, rehabilitation on different level of health system following the requirement.

Prolanis activities are ranging from education of health, medical checkup. Health Belief Model (HBM) suggested that healthy style is based on two cognitions namely disease threatening perception and prevent action evaluation. The most probable person to follow certain healthy treatment once they believe the purpose is bigger than the cost to defeat the health threatening. The active participant who joined the program will able to get knowledge to prevent, maintain and understand the effect of noncontagious disease which in turn will motivate people to behave healthier and avoid DM and hypertension. HBM is a kind of best preventive strategy also cancer and primary hypertension detection relevant to intervention to reduce the risk factor of cardiovascular disease.

Prolanis activity covers many aspects of health including education about hypertension and DM or special concealing for participating who is interested. Additionally, monthly activity was blood tension measurement and education. The purpose of doing these was preventing and controlling hypertension or DM to reduce referral frequency to FKTL. The activeness in following this program was related to insight of nutrition and obedience level of diet on DM patient. The more active the patient is the more obey in doing proper diet. Integrated Health Education Center for Non-communicable Disease (Posbindu PTM) members who suffer from hypertension and actively come every month can control blood pressure down to 74.1% of patients in the fifth month. The role of Posbindu PTM by measuring blood pressure, height, body weight, conducting counseling/education, counseling for members with indicated hypertension can increase knowledge and healthy behavior to control active hypertensive patients. This will be related to lowering the frequency of hospital visiting.

The chronical disease approach predicted from group, the susceptible person around 3-5% patient with chronic condition is requiring special management, 15-27% need treatment management and 70-80% could be controlled with sporting individual curing Jones 2006 in Australian Government 2009. The result has shown the society-based intervention of lifestyle explained by medical apparat might be the potential solution to defeat hypertension and DM in every element of society.

**Service Cost Efficiency:** The goal of prolanis is to control referral by keeping life quality through positive activity including improving knowledge and healthy lifestyle in order to maintain disease. There is the number of promising intervention which capable of improving effectiveness and efficiency of out-patient care, including easy contact, especially for doctor. There must be special strategy to improve the skill primary doctor through either education or consult with patient. Public health service through health promotion may support long-term infestation in healthcare service system which focusing on efficient prevention and controlling. Indonesian nowadays facing the challenge particularly in effective realization from Universal Health Coverage (UHC) in broader scope. These ranging from noncontagious disease and chronic requiring efficient treatment. Promoting health to support in a healthy lifestyle and reduce the number of referral in hospital influencing in service efficiency.

**Prolanis Policy:** Prolanis is one of the indicators from capital payment policy based on Social. Security Agency for Health No 2 the year of 2015 about capital number stipulation and payment of service commitment on FKTP, Ministry of Health and Social Insurance Administration Organization the year of 2017. The prolanis activities including 1) medical consultation, 2) education to prevent disease, 3) reminder through SMS Gateway 4) Home visit.

Service commitment-based capital payment on FKTP is part of the developmental system of quality control to increase the efficiency and effectivity of healthcare service. This can be valued according to indicator achievement, one of the routine participants who get monthly health service everywhere without considering the visiting frequency per month. Perolanis is one of facility which can be able to support healthy lifestyle for people (Germas). This is the systematic and well-organized action by every element in the society based on the awareness, willing and capability to start healthy life. This action should be primarily started from family by doing series of activity namely physical activity improvement, healthy lifestyle, healthy food supply, and nutrition awareness, disease prevention and cure, environmental quality improvement, healthy life education which are also implemented in prolanis.
Puskesmas as the public healthcare service acts like gatekeeper in formal health service and referral control. This can be facility in curing noncontagious disease thereby optimize the prolanis. Primary service of health is important component of health service with costless. Healthcare system which necessary to plan an effective way to strengthen it since most countries are still uneducated about the role and position of primary in-system healthcare service\(^{13}\).

**Conclusion**

Prolanis participant was actively taking part to improve chronical patient to achieve good quality of life and reduce the referral frequency to FKTL. This circumstance could be able to improve the efficiency of health service on FKLT. Prolanis activity can increase the success of Gernas on lifting awareness, willingness, and capability of people to start a healthy life.

**Source of Funding:** Thanks to Human Resources Development and Empowerment Agency (BPPSDM) for the facility provided.

**Ethical Clearance:** Health Research Ethics Committee, Health Polytechnic of Health Ministry Bengkulu.

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

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9. Lim J, Chan MHM, Alsagoff FZ, Duc HD. Innovations in non-communicable diseases management in ASEAN: a case series. Citation: Glob Health Action. 2014.7: 25110


Obesity as a Predictor of Hypertension in Adult Population:
A 14-Years Retrospective Cohort Study

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¹Master Study of Epidemiology, ²Department of Epidemiology, University of Indonesia

ABSTRACT

Background: Hypertension is one of the main health problems due to increasing numbers of incidence and its complications. However, cohort studies that evaluate the risk of hypertension among obese people are very limited. This study objective was to assess the risk of obesity associated with hypertension within 14 years of follow-up period in Indonesia.

Method: Study design was cohort retrospective used a sample of Indonesia Family Life Survey/IFLS wave 3, 4 and 5. A total of 11,167 non-hypertension subjects in the year 2000 were evaluated in the year 2014 to assess the status of their hypertension. Data were collected by interview and blood-pressure measurement. Hypertension was defined using the JNC 7th criteria. The data were analysed by Cox-regression.

Results: The total case number of hypertension in 14 years was 3655 cases, the cumulative incidence was 32.7%, and the hazard rate was 29 per 1000 person-years. The risk of hypertension in subjects with obese was 1.84 times compared with non-obese subjects (95% CI: 1.68 – 2.01) adjusted by other covariates. Based on the degree of obesity, subjects with obese II and obese I increased the risk of hypertension with HR were 2.43 (95% CI: 1.99 – 2.96) and 1.73 (95% CI: 1.57 – 1.91) respectively.

Conclusions: The risk of hypertension in obese people was significantly increased than the non-obese people, with an exposure-response relationship.

Keywords: incidence of hypertension, hazard ratio, Indonesia Family Life Survey (IFLS)

Introduction

Hypertension is one of the health problems at the global and national levels because the incidence and its complications are increasing from year to year. Based on WHO data, by the year of 2015 there was an increased blood pressure (BP) in 1.13 billion people worldwide, 20% in women and 24% in men¹. In the US, one in three adults had hypertension². Whereas in Indonesia, the prevalence of hypertension in 2013 was 25.8%³.

Hypertension becomes the main risk factors for global death as well⁴. In a cohort study about the impact of hypertension, it was found that there was an increased risk of cardiovascular death in the subject with stage-1 hypertension of 1.46 times and stage-2 hypertension of 1.89 times compared to normotensive subjects⁵.

Multicausal factors has stated as the determinant of hypertension. Some factors such as old ages, low education, overweight or obesity, and smoking are associated with the presence of hypertension⁶. Obesity itself can be related to hypertension independently but can also occurred due to unhealthy diets and lack of physical activity. Some studies show that about two-thirds of the incidence of primary hypertension is related to obesity⁷. The risk of hypertension in overweight and obese subjects raised from 1.6 times to more than 4 times compared with non-obese subjects⁸⁻¹¹.

Several studies related to obesity and hypertension have been carried out in some countries. However, those studies have involved a relatively small number of samples (<5000 subjects) and relatively short time of follow-up period (<10 years). Therefore, this study was conducted to assess the role of obesity as a predictor of
hypertension in a larger number of samples and longer
time of follow-up period.

Method

The study design was a retrospective cohort that
analysed data of the Indonesian Family Life Survey
(IFLS) data, from IFLS-3, 4 and 5. The IFLS was a
household survey with a cohort design conducted from
1993 (IFLS-1), then continued in 1997, 2000, 2007 and
2014.12

The study population was Indonesian residents aged ≥
18 years who participated in IFLS-3, then re-participated
in IFLS-4 and 5, or one of this. While the sample was a
hypertensive-free subject at the beginning of the study
(IFLS-3), both obtained from interview results (history
of hypertension and taking medication), or from the
results of BP measurements. The inclusion criteria were
subjects who attended IFLS-3 for interviews, underwent
anthropometric and BP measurement completely. While
the exclusion criteria were subjects diagnosed with
hypertension based on medical history or measurements
in IFLS-3, pregnancy, and subjects who had incomplete
important variables.

As the main exposure in this study was obesity.
Obesity was determined based on the 1998 WHO criteria
for the Asia-Pacific population: the body mass index
(BMI) ≥ 25 kg/m². Obesity consists of two degrees,
obese I which BMI of 25 - 29.9 kg/m², and obese II
which BMI of ≥ 30 kg/m². Some other risk factors
determined in the study were socio-demographics and
behavioral risk factors.

Some sociodemographic and behavioral information
were collected by questionnaire which included
questions on area of residence, educational level, marital
status, working status. The behavioral risk factors were
level of physical activity and smoking habit. Physical
activity was assessed through a modified of International
Physical Activity Questionnaire (IPAQ) questionnaire,
smoking habits and degree of smoking that were
expressed by Brinkman Indexes that calculated the
number of cigarettes smoked every day multiplied by
years of smoking.14

The outcome of the study was hypertension based on
the criteria of the 7th Joint National Committee: an average
of systolic BP ≥140 mmHg or an average of diastolic BP
≥ 90 mmHg. Subjects with raised BP according to the
criteria and subjects with normal BP but they took anti-
hypertension were declared as hypertension subjects. An
analysis was carried out on hypertensive-free subjects at
the start of the study (IFLS-3).

BP measurement was performed one time in the
baseline, and three times with a 5-minute pause on
each examination in follow-up, using Omron digital
tensiometer on the left arm and in a sitting position.
While the anthropometric measurements were carried
out through measurements of the height with the Shorr
board, the weight with scale of the Seca floor model
developed in collaboration with UNICEF, and the
abdominal circumference used a measuring tape. BP
and anthropometric measurements were carried out by
trained nurses.12

Data analysis were carried out with life-table and
Cox regression to obtain the incidence and hazard rate
of hypertension within 14 years of follow-up, and the
risk of obesity in hypertension after controlled by other
covariates that expressed with adjusted hazard ratio and
its 95% CI. Statistical criteria were used to determine
confounders.

Ethical Consideration: The IFLS surveys have
properly reviewed and approved by IRBs (Institutional
Review Boards) in the United States (at RAND) and
by the University of Gadjah Mada for IFLS-3, 4 and 5.
All requirements for consent for subjects were met and
approved by those IRBs before fieldwork could begin.16

Results

The flowchart illustration of sample selection was
shown in figure 1. Total sample of adult subjects aged
18 years and above at a baseline was 15,092. Of these,
subjects who were pregnant, didn’t complete BP or
anthropometric measurement, and had hypertension at
baseline were excluded. During 14 years of follow-up,
subjects experienced loss to follow up were excluded.
Subjects who had incomplete data other than the BP
and anthropometric variables and subjects who only
attended one-time follow-up were still included in the
analysis. The number of subjects to analyse was 11,167,
A total number of hypertension that occurred in 7 years was 2001 cases and occurred until 14 years was 3,655 cases. The cumulative incidence was 32.4%, with the incidence of hypertension in women was higher than men. (figure 2).

<table>
<thead>
<tr>
<th>Interval (years)</th>
<th>Number of cases</th>
<th>Survival (%)</th>
<th>Hazard Rate (per 1000 py)</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>100</td>
<td>0</td>
</tr>
<tr>
<td>7</td>
<td>2001</td>
<td>82</td>
<td>28</td>
</tr>
<tr>
<td>14</td>
<td>3655</td>
<td>69</td>
<td>29</td>
</tr>
</tbody>
</table>

Subject Characteristics: Table 2 showed subject characteristics based on sociodemographic, biological, and behavioural factors. According to region, Kalimantan and Java regions experienced the highest proportion of hypertension. Urban and rural status have almost the same proportion. In the age group, more than 60% of highest age group had hypertension. Female subjects, had a low level of education, worked and currently married, had a
higher proportion of hypertension than the opposite group. Based on biological characteristics, more than 40% of subjects with overweight and obese had hypertension, and almost 60% of subjects with central obesity also had hypertension. Based on behavioural characteristics, subjects with lack of physical activity has a higher proportion of hypertension. Former smokers experienced a higher proportion of hypertension than non-smokers and active smokers. For the degree of smoking stated by the Brinkman Index, the group of heavy smokers had the highest proportion of hypertension than the other groups.

Table 2: Subject characteristics based on Sociodemographic, Biological and Behavioural Factors

<table>
<thead>
<tr>
<th>Variable</th>
<th>Category</th>
<th>Hypertension (n = 3840)</th>
<th>Not hypertension (n = 7512)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>N</td>
<td>%</td>
</tr>
<tr>
<td>Region</td>
<td>Sumatera</td>
<td>672</td>
<td>30.7</td>
</tr>
<tr>
<td></td>
<td>Java</td>
<td>2260</td>
<td>34.4</td>
</tr>
<tr>
<td></td>
<td>Bali, NTB</td>
<td>390</td>
<td>28.6</td>
</tr>
<tr>
<td></td>
<td>Kalimantan</td>
<td>167</td>
<td>35.1</td>
</tr>
<tr>
<td></td>
<td>Sulawesi</td>
<td>166</td>
<td>29.3</td>
</tr>
<tr>
<td>Urban status</td>
<td>Rural</td>
<td>1987</td>
<td>32.6</td>
</tr>
<tr>
<td></td>
<td>Urban</td>
<td>1668</td>
<td>32.9</td>
</tr>
<tr>
<td>Age group</td>
<td>18 - 24 yo</td>
<td>428</td>
<td>15.7</td>
</tr>
<tr>
<td></td>
<td>25 - 34 yo</td>
<td>935</td>
<td>27.2</td>
</tr>
<tr>
<td></td>
<td>35 - 44 yo</td>
<td>1023</td>
<td>38.6</td>
</tr>
<tr>
<td></td>
<td>45 - 54 yo</td>
<td>708</td>
<td>49.8</td>
</tr>
<tr>
<td></td>
<td>55 - 64 yo</td>
<td>409</td>
<td>58.3</td>
</tr>
<tr>
<td></td>
<td>≥ 65 yo</td>
<td>152</td>
<td>64.1</td>
</tr>
<tr>
<td>Gender</td>
<td>Male</td>
<td>1567</td>
<td>30.2</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>2088</td>
<td>34.9</td>
</tr>
<tr>
<td>Educational level</td>
<td>High</td>
<td>218</td>
<td>25.9</td>
</tr>
<tr>
<td></td>
<td>Middle</td>
<td>702</td>
<td>27.0</td>
</tr>
<tr>
<td></td>
<td>Low</td>
<td>2185</td>
<td>33.2</td>
</tr>
<tr>
<td></td>
<td>Others</td>
<td>6</td>
<td>22.2</td>
</tr>
<tr>
<td></td>
<td>Unknown</td>
<td>1120</td>
<td></td>
</tr>
<tr>
<td>Working status</td>
<td>Not working</td>
<td>1141</td>
<td>31.1</td>
</tr>
<tr>
<td></td>
<td>Working</td>
<td>2496</td>
<td>33.5</td>
</tr>
<tr>
<td></td>
<td>Unknown</td>
<td>61</td>
<td></td>
</tr>
<tr>
<td>Marital status</td>
<td>Not married/divorced</td>
<td>2217</td>
<td>31.0</td>
</tr>
<tr>
<td></td>
<td>Married</td>
<td>1438</td>
<td>35.8</td>
</tr>
<tr>
<td>Body mass index</td>
<td>Underweight</td>
<td>462</td>
<td>24.4</td>
</tr>
<tr>
<td></td>
<td>Normal</td>
<td>1892</td>
<td>29.6</td>
</tr>
<tr>
<td></td>
<td>Overweight</td>
<td>579</td>
<td>41.0</td>
</tr>
<tr>
<td></td>
<td>Obese</td>
<td>722</td>
<td>48.8</td>
</tr>
<tr>
<td>Waist circumference</td>
<td>Normal</td>
<td>1334</td>
<td>46.8</td>
</tr>
<tr>
<td></td>
<td>Central obesity</td>
<td>408</td>
<td>59.8</td>
</tr>
<tr>
<td>Physical activity</td>
<td>Adequate</td>
<td>2971</td>
<td>33.8</td>
</tr>
<tr>
<td></td>
<td>Lack</td>
<td>610</td>
<td>37.6</td>
</tr>
<tr>
<td></td>
<td>Unknown</td>
<td>704</td>
<td></td>
</tr>
</tbody>
</table>
**Risk of Hypertension in Obese Group:** In multivariate analysis with Cox regression, the variables included in the analysis were variables that met the statistical criteria as confounders, these were age, gender, education level, marital status, smoking habit and level physical activity. Crude and adjusted hazard ratios were shown in Table 3.

### Table 3: Crude and adjusted HR of Obesity, based on Status and Degree of Obesity

<table>
<thead>
<tr>
<th>Variable</th>
<th>Crude HR</th>
<th>95% CI</th>
<th>Adjusted HR</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Status of obesity</strong>*</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not obese</td>
<td>1</td>
<td></td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Obese</td>
<td>1.75</td>
<td>1.61 - 1.90</td>
<td>1.84</td>
<td>1.68 - 2.01</td>
</tr>
<tr>
<td><strong>Degree of obesity</strong>*</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not obese</td>
<td>1</td>
<td></td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Obese I</td>
<td>1.67</td>
<td>1.52 - 1.83</td>
<td>1.73</td>
<td>1.57 - 1.91</td>
</tr>
<tr>
<td>Obese II</td>
<td>2.27</td>
<td>1.8 - 2.87</td>
<td>2.43</td>
<td>1.99 - 2.96</td>
</tr>
</tbody>
</table>

*adjusted by gender, age, educational level, marital status, smoking habit, and level of physical activity

### Discussion

This study found that the total case number of hypertension in 14 years was 3655 cases, with the cumulative incidence was 32.7% and the hazard rate was 29 per 1000 person-years. The risk of hypertension in subjects with obese was 1.84 times compared with non-obese subjects (95% CI: 1.68 – 2.01) adjusted by other covariates. Based on the degree of obesity, subjects with obese II and obese I increased the risk of hypertension with HR 2.43 (95% CI: 1.99 – 2.96) and 1.73 (95% CI: 1.57 – 1.91) respectively.

This study finding was similar with a study of 1009 young adults 20-45 years old in China, they stated that obesity had increased risk of hypertension with HR 1.83 for obese I and HR, 2.62 for obese II 10. As for some longitudinal studies abroad, for example from the Golestan Cohort Study (2013), it was found that the risk of hypertension in the obese group increased 3 times in rural areas and 2.93 times in the urban area17. Other study in Portugal(2015) stated that the increased risk of hypertension in the obese group was 2.44 times compared with the normal group7. Other results of a recent study in China (2017) based on follow-up for 2 years, found that the increased risk of hypertension occurred significantly in the group of subjects who were overweight/obese without metabolic disorders with OR: 1.78 and in the group of subjects who were overweight/obese accompanied by metabolic abnormalities with OR: 3.35, compared to the normal group8. A meta-analysis results of 2018 in India, found that pooled OR hypertension in the obese group was 3.820 compared to the non-obese group18.
Other risk factors found in this study and considered as confounder were gender, age, educational level, marital status, smoking habit, and level of physical activity. Most of these findings had similar results when compared with other studies, except for gender. In this study, the female has a higher risk of hypertension, it also stated in other paper about prevalence of hypertension on adults over 40 years that using data of IFLS-5. These gender findings were similar to another study in South West Ethiopia but different from other findings in Europe countries and China, which state that male has a higher risk of having hypertension. On the other hand, data from the National Health and Nutrition Examination Survey, 2011–2012 stated that the prevalence of hypertension was similar for men and women at nearly one-third.

Conclusions

This study found that obesity significantly increase the risk of hypertension and there was an exposure-response relationship between obesity and hypertension. These findings can be beneficial for government to make effective weight control programs to prevent and control hypertension. This study also will help the researchers to uncover the critical areas of obesity-related hypertension in a large population-based within long time period of follow-up.

Acknowledgment

We thank the Research and Community Development Centre of the University of Indonesia for the financial support. The preparation of this manuscript was support by the University of Indonesia. We thank the RAND labor and corporation for providing the survey data. We are grateful to the study participants who provided the survey data.

Source of Funding: This study was support by PITTA Grant 2018 by University of Indonesia

Conflict of Interest: Nil.

REFERENCES


Short Term Effect of Spilled Bile & Gallstone During Laproscopic Cholecystectomy on Clinical Outcome

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ABSTRACT

Background: Accidental gallbladder perforation during laparoscopic cholecystectomy is on the rise because of increased attempts at minimally invasive surgery. There have been a number of studies attempting to determine the effect of spilled bile and gallstones on the clinical outcomes, but the results are still conflicting.

Aims: This is a randomized prospective study to evaluate the short term effect of spilled bile and gallstones on clinical outcome in patients who sustained a gallbladder perforation.

Method: This study was carried out in Department of General Surgery at Alsader Teaching Hospital and Al-Fayhaa General Hospital in Basrah, Iraq from September 2015 to October 2017 included 396 patients of either gender and different age groups who underwent laparoscopic cholecystectomy.

Results: Sixty-six patients sustained a gallbladder perforation (16.7%), and it primarily occurred during dissection of the hepatic fossa in 42 patients (63.6%). The mean operative time and duration of postoperative hospitalization were longer in the perforated group (P=0.015 and P=0.001). Visual analog scale scores for pain on the first and second postoperative days were higher in the perforated group (P=0.009 and P=0.034). Complications such as ileus and port site infection developed more frequently in patients with a gallbladder perforation (P=0.001 and P=0.004).

Conclusion: Accidental gallbladder perforation can cause more postoperative pain, increase operative time, ileus, and port site infection, which consequently increases the total duration of hospitalization, undermining the advantages of Laparoscopic cholecystectomy. Based on these interesting results, surgeons should make every effort to prevent gallbladder perforation by performing careful and precise dissection during the operation.

Keywords: laparoscopic cholecystectomy, spillage bile& gall stone, outcome

Introduction

Gallstone disease constitute a major health problem throughout the world.¹² Its prevalence in the United States adult population is around 10%, rising to 30% in the last two decades.³

Cholecystectomy is the treatment of choice for gallstones disease.⁴ Carl August Langerbach performed first open cholecystectomy in 1882, while Philippep Mouret performed first laparoscopic cholecystectomy in Lyon, France in 1987.⁵

Laparoscopic cholecystectomy has become the standard treatment for gallstone disease and has replaced open cholecystectomy.⁶⁷ In US alone out of 600,000 operations performed annually for gallstones disease, 75% are performed laparoscopically.⁷⁻¹⁰

Laparoscopic cholecystectomy offers the patient the benefits of minimally invasive surgery (MIS) including cosmetic operative scars, better postoperative recovery and early return to work.¹⁰⁻¹¹

However, it is associated with certain complications that have rarely been reported with open cholecystectomy.

Complications of laparoscopic cholecystectomy include complications due to port entry,⁸ bleeding,¹³ and biliary complications including spilled bile and gallstones,¹⁴ biliary leaks and bile duct injuries.⁸,¹⁵
Perforation of gallbladder and spillage of gallstones during laparoscopic cholecystectomy is a frequently observed phenomenon. Its estimated incidence is reported to be between 3% and 33%. 14,16

Moreover, gallbladder perforation is increasing in frequency because of increased efforts to perform minimally invasive surgery, which has limited the visual field and mobility of the surgical instruments.

A number of studies have demonstrated the effect of intraperitoneal contamination with spillage of bile juice and gallstones. Previously the majority of surgeons believe that gallstone spillage during laparoscopic cholecystectomy is a benign complication and it does not justify conversion to laparotomy, even if a large number of gallstones remain in the abdomen. 18-22

However, there are also some reports that have demonstrated the complications of gallstone spillage, such as intraperitoneal abscesses, adhesions, small bowel obstruction, cutaneous fistulas, and septicemia. 15,23

Aim of This Study

Aim of this study is to evaluate the short term effect of spilled bile and gallstones on clinical outcome in patients who sustained a gallbladder perforation.

Patients and Method

This is a randomized prospective study, was conducted in department of General Surgery at Al-sader Teaching Hospital and Al-Fayhaa General Hospital in Basrah, Iraq from September 2015 to October 2017.

The study included 396 patients of either gender and different age groups who underwent laparoscopic cholecystectomy.

Those patients with gallbladder neoplasms, patients with coexisting stones within the common or hepatic duct, were excluded from the study.

All patients were fully informed and a written consent was taken. And also a predesigned proforma which included: age, gender, stage at which gallbladder perforation occur, operative time post-operative pain, postoperative complications( fever, vomiting, ileus, port site infection ) and duration of hospital stay was made for all patients.

A detailed history, clinical physical examination and investigations included complete blood count, blood urea, serum creatinine, blood glucose, liver function test, electrocardiography, chest X-ray and ultrasound of abdomen were done for all patients.

Operative time ( in minute): mean time start from skin incision till finishing the skin closure.

Postoperative hospital stay: means number of days spent in the hospital from the day of operation till discharge of the patients to their home.

Port site infection is diagnosed based on clinical findings such as increased redness and pain with pus discharge.

Post-operative pain was assessed by the VAS(Visual Analogue Scale).

Visual Analogue Scale (VAS) : is a measurement instrument that tries to measure a characteristic or attitude that is believed to range across a continuum of values and cannot easily be directly measured for pain. VAS ranges from no pain (0) to the most severe pain (10). As shown in fig (1).

![Figure 1 : Visual analogue scale](image)

A patients who underwent laparoscopic cholecystectomy were operated on nearly by same team of surgeons.

All patients received dose of one gram Third generation cephalosporin intravenously at time of induction for prophylaxis ( single dose ) and twice daily for 3 days postoperatively.

Surgical Technique: All operations were performed with the patient under general anesthesia. The umbilical port using an 10-mm trocar was introduce by closed method and CO₂ gas was insufflated to establish a pneumoperitoneum with an intraperitoneal pressure of 12-15 mmHg. Under visual confirmation, an Epigastric port was inserted into the right border of the falciform
ligament with a 10-mm trocar, Midclavicular port 5-mm and Anterior axillary line port 5-mm was made. The operating table was placed in the reverse Trendelenburg position and tilted to the left.

We used the technique of critical view of safety by releasing lateral peritoneal attachment of gallbladder for better dissection of calot’s triangle. Then dissection was continued from posterior aspect of calot’s triangle to identify the cystic artery and cystic duct. Clipping and division of cystic duct then cystic artery were achieved. Gallbladder was dissected off its bed in the liver with monopolar cauterization of any bleeding points.

In case of perforation of the gallbladder, prompt aspiration of bile spillage and retrieval of residual stones were done by using endobag and then abundant irrigation. Also put a drain according to the operative field.

The surgeons assessed the suitability for discharge, considering the clinical symptoms. And continue follow up the patients for 2 week from day of admission.

All the data were analyzed by using SPSS system version 20 with P-value of < 0.05 regarded as significant.

Results

This study included 396 patients who underwent laparoscopic cholecystectomy, 66 patients sustained a gallbladder perforation (16.7%).

The age distributions and number of patients who sustained gallbladder perforation are shown in table(1), and the figure shows sex distributions in which most of the patients are females (325 (82%)), while only (71 (18%)) are males.

<table>
<thead>
<tr>
<th>Age (years)</th>
<th>No.</th>
<th>NO. of patients with gallbladder perforation</th>
</tr>
</thead>
<tbody>
<tr>
<td>10-20</td>
<td>9</td>
<td>1</td>
</tr>
<tr>
<td>21-30</td>
<td>150</td>
<td>25</td>
</tr>
<tr>
<td>31-40</td>
<td>130</td>
<td>21</td>
</tr>
<tr>
<td>41-50</td>
<td>94</td>
<td>15</td>
</tr>
<tr>
<td>51-60</td>
<td>8</td>
<td>3</td>
</tr>
<tr>
<td>61-70</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>396</td>
<td>66</td>
</tr>
</tbody>
</table>

Gallbladder perforation primarily occurred during dissection of gallbladder from the hepatic fossa in 42 patients (63.6%). There were also 12 cases perforation occur during traction of gallbladder, 10 cases perforation occur during dissection of cystic duct and two cases during extraction of the gallbladder through a port site. (Table 2).

Table (3). Shows a short term effect of spilled bile and gallstones on clinical outcomes. The mean operative time and the duration of the postoperative hospital stay were significantly longer in the perforated group (P = 0.015 and P = 0.001).

All patients used the same components of analgesia but the VAS scores for pain on the first and second days after surgery were higher in patients with a gallbladder perforation (P = 0.009 and 0.034).

The postoperative complications, such as fever, vomiting, were not different between groups. While, ileus (the patient complains of abdominal discomfort with symptoms of constipation) and port site infection, were significantly more common in the perforated group (P = 0.001 and P = 0.004).
Table III: Shows a short term effect of spilled bile and gallstones on clinical outcomes

<table>
<thead>
<tr>
<th>Clinical outcomes</th>
<th>Nonperforated groups</th>
<th>Perforated groups</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operative time ( Min ± SD)</td>
<td>50.04 ± 28.24</td>
<td>69.83 ± 40.14</td>
<td>0.015</td>
</tr>
<tr>
<td>Postoperative hospital stay (Day ± SD)</td>
<td>3.50 ± 2.14</td>
<td>5.58 ± 3.09</td>
<td>0.001</td>
</tr>
<tr>
<td>Postoperative pain (VAS ± SD)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>First POD</td>
<td>2.56 ± 1.74</td>
<td>3.50 ± 2.16</td>
<td>0.009</td>
</tr>
<tr>
<td>Second POD</td>
<td>1.88 ± 2.16</td>
<td>2.50 ± 1.85</td>
<td>0.034</td>
</tr>
<tr>
<td>Postoperative complications</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fever</td>
<td>42(12.8%)</td>
<td>8(12.1%)</td>
<td>0.104</td>
</tr>
<tr>
<td>Vomiting</td>
<td>50(15.2%)</td>
<td>10(15.2%)</td>
<td>0.989</td>
</tr>
<tr>
<td>Ileus</td>
<td>52(15.9%)</td>
<td>28(42.4%)</td>
<td>0.001</td>
</tr>
<tr>
<td>Port site infection</td>
<td>10(3.0%)</td>
<td>10(15.2%)</td>
<td>0.004</td>
</tr>
</tbody>
</table>

**Discussion**

During the past decade, laparoscopic cholecystectomy has become the standard surgical procedure for gallbladder disease. Laparoscopic cholecystectomy offers a variety of advantages, such as decreased postoperative morbidity, shorter hospital stay, quicker return to normal activities and work, and improved cosmesis, compared with open cholecystectomy.19

In our study, the rate of gallbladder perforation was 16.7%, which was similar to the average rate reported by others. 19-21

The wall of the gallbladder may be torn by traction and repetitive grasping, and it may also be inadvertently entered during dissection from the hepatic fossa with cautery, which was the most common cause of gallbladder perforation in the present study.

Some studies have reported that intraperitoneal contamination with bile and gallstone does not affect the clinical outcomes.20,22,24,25

However, there are also many cases of postoperative complications, such as intra-abdominal abscesses and wound infections, and one study reported that complications occur in about 1.7 per 1000 laparoscopic cholecystectomy with gallbladder perforation.23,26,27

Gallbladder perforation and spillage of bile and gallstones leads to prolongation of the operative time and postoperative hospital stay and consequently an increase in the total hospital costs, which reduces the advantages of laparoscopic cholecystectomy compared with open cholecystectomy.

The mean operative time was longer in the perforated group, and it was likely to be due to the time required for abundant irrigation to obtain a clear aspiration and retrieve the gallstones.

The postoperative hospital stay was also longer in the perforated group, which may be due to increased pain and ileus, including constipation which may result from irritation of the peritoneum due to the spillage of bile juice and gallstones.

There were ten cases of significant port site infection in the perforated group, but the result could have been affected since we had used prophylactic perioperative antibiotics in all patients.

Sometimes the spilled gallstones mimic a malignancy, requiring the patient to spend time and money for unnecessary examinations, as well as the psychological trauma associated with the incorrect diagnosis of malignancy.15 Therefore, the surgeon should inform the patient about the possible consequences of spillage of bile and gallstones and should not hesitate to record the events.

Closing the perforated part of a gallbladder with application of a clip or an Endoloop is a possible solution to prevent spillage after gallbladder perforation, but it is ineffective in many cases because the clip or Endoloop may slip or loosen during traction.

**Conclusion**

In conclusion, short term effect of gallbladder perforation during laparoscopic cholecystectomy causes more postoperative pain, more operative time, ileus,
and port site infection, which consequently leads to an increase in the duration of hospitalization, thereby reducing the advantages of a laparoscopic procedure.

We should remember the interesting finding that careful and precise dissection should be performed during operation to prevent gallbladder perforation.

In addition, the surgeons should not hesitate to record the intraoperative events of spillage bile and gallstones and inform the patient about the possible consequences.

**Ethical Clearance:** Taken from health committee

**Source of Funding:** Self

**Conflict of Interest:** No

**References**


Identification of Periodontitis Bacteria and Resistance Test on Amoxicillin Antibiotics in Patients of RSGM Kandea Makassar

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ABSTRACT

Background: Porphyromonas gingivalis and Agregatibacter actinomycetemcomitans are bacteria found in periodontitis and Amoxicillin is a bactericidal antibiotic that is often used by periodontitis patients.

Objective: to find out whether the bacteria that causes periodontitis has been resistant to the antibiotic Amoxicillin

Method: This study was conducted at the dental and mouth hospital of Hasanuddin University in October 2018 with a total sample of 20 people suffering from periodontitis. In the subjects of the study, it was taken subgingival specimens with cotton swabs and excavators, then cotton swabs containing specimens were put into the transport medium that had been prepared and AA and PG bacteria were obtained from the swab of periodontitis patients in RSGM, Kandea then cultured on 20 petri dishes, then tested the sensitivity of Amoxicillin antibiotics to bacteria AA and PG. Data analysis was done using SPSS version 22.0 for Windows.

Results: The resistance test results from bacteria that caused periodontitis, namely bacteria Aa and Pg, there were 2 (15.4%) Aa bacteria and 2 (50%) Pg bacteria were resistant to Amoxicillin antibiotics. While those that was sensitive to Aa were 11 (84.6%) bacteria and Pg 2 bacteria (50%).

Conclusion: In the results of the study it is found that AA and PG bacteria are still sensitive to the antibiotic amoxicillin

Keywords: Periodontitis, Amoxicillin, Resistance

Introduction

Periodontal disease is one of the most common dental and oral diseases in the world community, especially in Indonesia. Periodontal disease that is often found is inflammation of the gums or gingivitis and periodontitis. Periodontal disease is different from dental caries, in periodontal disease it is more chronic and does not cause severe pain. Even at an early condition, there are no complaints of pain. This disease is caused by bacterial plaque that begins with gingivitis or gum inflammation. At present periodontal disease is often found at a young age, one of the causes is the presence of calculus in the teeth. Inflammation of the gums or gingivitis can become periodontitis, but not all gingivitis can develop into periodontitis.¹

Periodontitis is an inflammatory disease that occurs in teeth supporting tissues caused by specific microorganisms, which can cause damage to the periodontal ligament and alveolar bone, increase in probing depth, recession, or can occur both. Clinical features that occur include gingival color changes, contours, consistency, bleeding on probing, all of these are signs of periodontal disease. Histological picture of periodontal tissue shows an infection due to bacterial colonization of the periodontal pocket. Inflammatory characteristics of periodontal tissue are damage to the supporting tissues of the teeth, including the alveolar bone and periodontal ligament.²³

Based on the 2013 Basic Health Research Data (Riskesdas) the Indonesian population experienced dental and oral health problems of 25, 9%, among these dental and oral problems were caries and periodontal disease [3]. By province in 2013, those with high dental and mouth problems were South Sulawesi (36.2%), South...
Kalimantan (36.1%), and Central Sulawesi (35.6%), among dental and oral problems are dental caries and periodontal. Based on data from the RISKESDAS (2013) for the Southeast Sulawesi province there were dental and mouth problems with a percentage of 28.6.4

Antibiotics are substances produced by a microorganism (bacteria, fungi, actinomycetes) that can inhibit the growth of other types of microorganisms. The use of antibiotics as a basic therapy in infectious diseases must be done wisely and rationally to avoid an increase in antibiotic resistance and unwanted side effects that cause infectious diseases to be increasingly difficult to eradicate. Drugs used to eradicate microbes, the cause of infection in humans, are determined to have the highest possible selective toxicity.5

Several studies have described resistance to amoxicillin from several germs in the oral cavity. Amoxicillin shows a rate of resistance up to 30–80% against Prevotella and Porphyromonas.6

Based on this, the writer was interested in conducting research on "Identification of bacteria causing periodontitis and antibiotic amoxicillin resistance testing in RSGM Kandea patients”

**Research Method**

The type of research used was descriptive. The sample used in this study was patients diagnosed as periodontitis. This research was conducted at the dental and oral hospital Dentistry Faculty, Hasanuddin University in October 2018. A total sample of 20 people who suffered from periodontitis. In the research subjects, subgingival specimens were taken with cotton swabs and excavators, then cotton swabs containing specimens were put into the transport medium prepared. Data analysis was done using SPSS version 22.0 for Windows.

**Research Results**

### Table 1: Results of microbial identification in patients with periodontitis at RSGM Kandea

<table>
<thead>
<tr>
<th>Microbe</th>
<th>n</th>
<th>Negative</th>
<th></th>
<th>Positive</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Total</td>
<td>%</td>
<td>Total</td>
<td>%</td>
</tr>
<tr>
<td>A. actinomiticemcomitans</td>
<td>20</td>
<td>7</td>
<td>35.0</td>
<td>13</td>
<td>65.0</td>
</tr>
<tr>
<td>P. gingivalis</td>
<td>20</td>
<td>16</td>
<td>80.0</td>
<td>4</td>
<td>20.0</td>
</tr>
<tr>
<td>Candida sp.</td>
<td>20</td>
<td>15</td>
<td>75.0</td>
<td>5</td>
<td>25.0</td>
</tr>
<tr>
<td>Propionibacterium</td>
<td>20</td>
<td>17</td>
<td>85.0</td>
<td>3</td>
<td>15.0</td>
</tr>
<tr>
<td>S. Pneumoniae</td>
<td>20</td>
<td>19</td>
<td>95.0</td>
<td>1</td>
<td>5.0</td>
</tr>
<tr>
<td>Fusobacterium sp.</td>
<td>20</td>
<td>19</td>
<td>95.0</td>
<td>1</td>
<td>5.0</td>
</tr>
<tr>
<td>Staphylococcus</td>
<td>20</td>
<td>19</td>
<td>95.0</td>
<td>1</td>
<td>5.0</td>
</tr>
<tr>
<td>E. coli</td>
<td>20</td>
<td>19</td>
<td>95.0</td>
<td>1</td>
<td>5.0</td>
</tr>
<tr>
<td>Klebsiella</td>
<td>20</td>
<td>18</td>
<td>90.0</td>
<td>2</td>
<td>10.0</td>
</tr>
<tr>
<td>Enterobacter Agglomerous</td>
<td>20</td>
<td>18</td>
<td>90.0</td>
<td>2</td>
<td>10.0</td>
</tr>
</tbody>
</table>

The results of the research conducted on 20 samples obtained 10 kinds of microbes consisting of Aa Bacteria as many as 13 (65%), Pg as many as 4 (20%), Propionibacterium as many as 3 (15%), Klebsiella as many as 2 (10%), Enterobacter agglomerous as many as 2 (10%), S. pneumoniae as many as 1 (5%), Fusobacterium as many as 1 (5%), Staphylococcus as many as 1 (5%), and E. coli as many as 1 (5%) and Candida sp. as many as 5 (25%)

The lack of Pg bacteria identified in this study was probably due to the process of identification specimens were taken deep enough thus the possibility for Pg bacteria contained in subgingival specimens was relatively smaller. This was evidenced from the Pg bacteria identified 3 out of 4 bacteria obtained from a sample of periodontitis patients whose teeth were removed and specimen collection by inserting a cotton swab into the tooth socket. While another bacterial periodontitis was obtained from subgingival specimens from patients who were to be treated for teeth with periodontitis.

The lack of the type of bacteria obtained in each sample was probably due to the process of identification
with the bacterial culture method in the petri dish was less effective than the identification using PCR.

### Table 2: The resistance test results of Aa and Ph bacteria on amoxicillin in Patients at RSGM Kandea

<table>
<thead>
<tr>
<th>Microbe</th>
<th>n</th>
<th>Sensitive Total</th>
<th>Sensitive %</th>
<th>Resistant Total</th>
<th>Resistant %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aa</td>
<td>13</td>
<td>11</td>
<td>84.6</td>
<td>2</td>
<td>15.4</td>
</tr>
<tr>
<td>Pg</td>
<td>4</td>
<td>2</td>
<td>50.0</td>
<td>2</td>
<td>50.0</td>
</tr>
</tbody>
</table>

The resistance test results from bacteria that cause periodontitis, namely bacteria Aa and Pg, there are 2 (15.4%) Aa bacteria and 2 (50%) Pg bacteria are resistant to Amoxicillin antibiotics. While that is sensitive to Aa are 11 (84.6%) bacteria and Pg 2 bacteria (50%).

### Table 3: The relationship between the history of antibiotic use against the Aa bacterial resistance test

<table>
<thead>
<tr>
<th>History of antibiotic use</th>
<th>Resistant Test</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Sensitive</td>
<td>%</td>
</tr>
<tr>
<td>No</td>
<td>2</td>
<td>100</td>
</tr>
<tr>
<td>Once</td>
<td>9</td>
<td>81.8</td>
</tr>
</tbody>
</table>

In the table above, it can be seen the relationship between the history of drug use and bacterial resistance Aa. Patients who never took antibiotics are 2 people and all are sensitive, while patients who took antibiotics were 11 people, who are still sensitive to Amoxicillin antibiotics are as many as 9 people (81.8%).

A history of antibiotic use has an effect on the level of resistance of Aa bacteria. This is shown in the table above, but in the statistical test conducted there was no significant relationship between antibiotic use and the level of bacterial resistance Aa. This can be caused by the small number of samples that cannot show a significant relationship.

### Table 4: The relationship between the history of the use of antibiotics against Pg bacterial resistance testing

<table>
<thead>
<tr>
<th>History of antibiotic use</th>
<th>Resistant Test</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Sensitive</td>
<td>%</td>
</tr>
<tr>
<td>Once</td>
<td>2</td>
<td>50.0</td>
</tr>
</tbody>
</table>

Whereas the relationship between the use of antibiotics against Pg bacteria was found that all patients who had Pg bacteria had taken Antibiotics and who were still sensitive to Amoxicillin antibiotics as many as 2 (50%).

The history of antibiotic use against Pg bacterial resistance in this study cannot be detected because the number of samples that was very lacking can be characterized by Pg bacteria that were not found in patients who have never taken antibiotics..

The relationship of regularity with Pg bacterial resistance was not significantly obtained in the SPSS program. Of the four Pg bacteria, patients who were not regularly taking medication are 2 people and those who were resistant are 2 bacteria (100%), while those who regularly took medicine are all sensitive.

For the dosage relationship there were three patients who took the drug less than the dose and there was one sample that was resistant, and who took the drug according to the dose of 1 person and was resistant.

## Discussion

This study used the most dominant bacteria in periodontitis, Actinobacillus actinomycetemcomitans with Porphyromonas gingivalis. The antibiotic used in this study was Amoxicillin which is a derivative of the penicillin group because this type of antibiotic is most widely used by people for infectious diseases such as periodontitis.

AA and PG bacteria were obtained from the swabs of periodontitis patients at KandGM RSGM, then cultured on 20 petri dishes, then tested the sensitivity of Amoxicillin antibiotics to AA and PG bacteria seen through inhibitory zones formed on petri dishes. AA bacteria were found in 13 petri dishes with the results of Amoxicillin sensitivity as many as 11 petri dishes so it can be concluded that AA bacteria were sensitive to amoxicillin. PG bacteria were found in 4 petri dishes with amoxicillin sensitivity results in 2 petri dishes so it was concluded that PG bacteria was also sensitive to amoxicillin.

The mechanism of amoxicillin in inhibiting bacteria AA and PG does not kill directly but by preventing bacteria from forming a kind of layer attached to the whole body. This layer is very vital for bacteria to protect bacteria from environmental changes and to keep
the bacterial body from scattering. Bacteria will not be able to survive without this layer, therefore in this study AA and PG bacteria in periodontitis were sensitive to amoxicillin [6].

Based on research by Rahmiati Muhtar in 2017, amoxicillin antibiotics had a sensitive level of 0%, intermediates at 6.25% and resistance at 93.75%. This shows the antibiotic amoxicillin resistant to bacteria isolated from dental plaque of patients at Ranotana Weru Health Center Manado. The results obtained are in accordance with the study, where the isolated bacteria have experienced resistance to antibiotics amoxicillin. Resistance to amoxicillin which is a penicillin group antibiotic is caused by several resistance mechanisms, namely: the formation of enzymes that damage penicillin namely the enzyme β-lactamase wherein this enzyme will cause the opening of the β-lactam ring in penicillin and cephalosporins which damage antimicrobial activity, autolisin enzyme germs do not work thus the germ-tolerant properties of the drug arise, germs do not have cell walls (eg mycoplasma), and PBP or drug changes cannot reach PBP [7].

| Table 5: The relationship between regularity of taking medication and antibiotic doses of Aa bacterial resistance in periodontitis patients at RSGM Kandea |
|---------------------------------------------|----------------|
| Description                  | Sensitive | Resistant |
|                              | Total | %    | Total | %    | Significance (p) |
| Regularity                   |       |       |       |       |                   |
| No                           | 3     | 60.0  | 2     | 40.0  | 0.087             |
| Regular                      | 6     | 100.0 | 0     | 0.0   |                   |
| Dosage                       |       |       |       |       |                   |
| Less                         | 3     | 60.0  | 0     | 0.0   | 0.338             |
| Less                         | 6     | 75    | 2     | 25    |                   |

The results of this study indicate that the relationship of regularity with the level of resistance of Aa bacteria to Amoxicillin antibiotics has a significant significance (p <0.05). This is because patients who were not regularly consuming drugs were as many as 5 people while those who are resistant are 2 people (40%), while patients who regularly took medicine are as many as 6 people while those who have been resistant to antibiotic amoxicillin were not obtained.

For the relationship between dosage and resistance there was no significant relationship (p> 0.05), from 3 patients whose dosage was lacking and there are no patients who are resistant. While patients with appropriate doses were 8 people and those who are resistant are 2 people (25%)
Penicillin is bactericidal with work activities damaging bacterial cell walls. Penicillin is known as the first line antibiotic because penicillin has the ability to fight most bacteria that cause infection. Many bacteria are sensitive to penicillin, except the bacteria that produce the enzyme β-lactamase, because β-lactam ring contained in the chemical structure of penicillin is damaged by the enzyme thus penicillin becomes inactive. The study conducted also compared between regular and irregular people consuming amoxicillin against resistant and sensitive conditions to PG bacteria and then analyzed and obtained p value of 0.046 (significant p <0.05) which means that there are significant differences between people who are organized and not regularly taking amoxicillin against resistance, this study also compared adequate doses of amoxicillin and less doses to resistant conditions and obtained a p value of 0.505 (significant p <0.05) which means that there was no significant difference between the group taking the right dose and less dose.

While the comparison between people who are regular and irregular in consuming amoxicillin against conditions of resistance and sensitivity to bacterial AA obtained a p value of 0.087 (significant p <0.05) which means that there was no significant difference between the groups consuming amoxicillin and resistance. Then to compare adequate doses of amoxicillin and less doses to resistant conditions and p value 0.338 (significant p <0.05), which means that there were no significant differences between the groups taking the drug with the right dose and the less dose.

**Conclusion**

There are Aggregatibacter Actinomycetemcomitans and Porphyromonas Gingivalis in patients with periodontitis. In the results of the study it is found that AA and PG bacteria are still sensitive to antibiotic amoxicillin because amoxicillin inhibits bacteria AA and PG not by killing directly but by preventing bacteria from forming a kind of layer attached to the whole body. As for the history of antibiotic use affects the level of bacterial resistance, if the use of drugs that are not rational then resistance will occur.

**Suggestion**

It is expected that the results of this study can provide an overview for further researchers to conduct more samples of research to obtain more effective results and it is hoped that more subgingival swabs will be taken to obtain more Porphyromonas Gingivalis bacteria.

**Conflict of Interest:** There is no conflict of interest in this study.

**Source of Funding:** Domestic government

**Ethical Clearance:** This study obtained a label of ethics escaped by the number: 0082/PLO9/KEPKFKG - RSGMUNHAS/2018 and register number UH 17120068 on Oktober 9, 2018.

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Comparison of Self-Directed Video and Simulation Method on First Aid Knowledge among Indonesian Students: A Randomized Control Trial

Eky Madyaning Nastiti1, Siswanto2, Yulian Wiji Utami3
1Postgraduate Program of Nursing, School of Nursing, 2Department of Public Health, Medical Faculty, 3Department of Basic Nursing, School of Nursing, Universitas Brawijaya

ABSTRACT

Injuries are a health issue that needs quick treatment and relates to the high number of mortality and morbidity. School-age is one of the most vulnerable groups of injuries due to the low level of understanding about hazard and first aid concepts. The solution required is the importance of initiating first aid education for students. This study aims to analyze the effectiveness of self-directed and simulation method in increasing first aid knowledge among students. This study used randomized-postest control group design. The population of this study was students aged 13-14 years old coming from two different schools in Jember, East Java, Indonesia. 80 respondents were selected using a simple random sampling technique, then divided into two groups: self-directed video and simulation method. Data of the knowledge variable was collected for 7 days after administering the treatment using a questionnaire. The collected data of this study were analyzed using Wilcoxon and Mann Whitney test (α = 0.05) with SPSS 20 program. There was significant difference in first aid knowledge between two groups before and after treatment. Both groups showed the increasing of first aid knowledge, where score of self directed video group was (from 8.43 ± 1.430 to 12.5 ± 1.432, p = 0.000) and score of simulation group was (from 7.95 ± 1.50 to 11.90 ± 1.21, p = 0.000). Furthermore, the comparison results of the knowledge among two groups showed that a mean difference in the self-directed video group = 4.07 while the simulation group = 3.95 (p = 0.022). It means that there was a significant difference in knowledge between the self-directed video and simulation method, with a higher difference of self directed video methods of 4.07. The self directed video method showed better results in increasing knowledge among students aged 13-14 compared to the simulation method after 7 days follow up.

Keywords: knowledge, first aid, simulation, self directed video, injury

Introduction

An injury is now known to have a high prevalence rate and require serious treatment because it is associated with mortality and morbidity. The injury that occurred in Indonesia is quite high reaching up to 9.2% with the most incidents including: bruises, sprains and torn wounds. School-age children become one of the age groups that are vulnerable to have an injury with an increased prevalence in the last 5 years reaching 12.1 percent. This increase is related to several factors including the condition of the school environment that is not safe, low understanding of first aid and hazard concepts. The basic knowledge of students regarding the first aid procedure is still low and therefore it is necessary to provide first aid education.

First aid education can be initiated since school age because besides being a vulnerable group of injury, this group also has the ability to learn enthusiastically so that they can teach and practice with others. Some studies found basic first aid can be started and taught at the age of 13-14 years. A systematic review stated that children at age of 5-18 years is able to learn first aid.
First aid techniques, while children the age of 11-18 years shows a willingness to provide assistance. This first aid education is needed to increase their confidence.

So far, the first aid education provided to students is delivered through traditional methods, one of which is often used is the simulation method. This method has some advantages such as learning about original problems in the form of illustrations, building critical thinking and gaining clinical experience. From the aforementioned advantages, a study stated that training participants with simulations experienced a decline in knowledge after three months afterwards. This indicates that this method had limitation related to the unavailability of media to review the material provided. For this reason, another method is needed as an alternative, especially with the development of globalization and current technology. The self-directed video is one of the technology-based methods that is repeated training in nature to empower individuals to learn new abilities independently in accordance with their needs. In addition, this method has advantages, especially its ease to be accessed with a wider time and flexible nature. The aims of this study were to analyze the differences in the increase in knowledge of students aged 13-14 years about first aid for injuries between self-directed video and simulation methods.

Method and Material

The method used in this study was true experimental with randomized pretest-posttest control group design. The research was conducted in November 2018 at SMP Muhammadiyah 1 Jember and SMP Darus Sholah Jember, East Java, Indonesia. The population in this study were 269 students and 80 respondents were selected using simple random sampling technique with inclusion criteria: age 13-14 years, sitting in class 8, never received first aid education before the study, owning a smartphone and being willing to become respondents. Then the respondents were divided into two groups, namely: self-directed video group and simulation group.

Each group has a different treatment. In the self-directed video group, respondents were given five videos with total of duration nine minutes, discussing the concept of first aid as well as the demonstration of injury sent to the respondent’s smartphone while the simulation group used a module. Both consist of material content: emergency calls, injuries, fire wound, bleeding and bone, muscle, and limb joint injuries developed by researchers based on the International Federation of Red Cross and Red Crescent Societies (IFRC) and first aid curriculum guidelines. Informed consents were given to all participants prior to the study. The stage of data acquisition is divided into three stages. First, the pretest was performed in both groups. Second, the intervention stage. At this stage, the self-directed video group was given a video containing first aid material which could be studied independently in their smartphones and during this process, the researchers were not allowed to give direction while the respondents were allowed to study videos without time and frequency limits. For the simulation group, the provision of first aid education using module media and an instructor is in charge of delivering oral material followed by a 60 minute demonstration.

The research instrument used a knowledge questionnaire of 15 questions. Validity and reliability test of questionnaire were conducted involving 25 respondents with the same characteristics as the research subject. Validity and reliability test are indicated by corrected item-total correlation > r table (0.3809) and Cronbach’s alpha value of 0.901. The data were tested by the Wilcoxon Sign Rank test and Mann Whitney test, because data is not normally distributed even though data transformation has been done. Statistical analysis was carried out using the SPSS 20 program.

Results

This research involved 80 respondents (40 respondents in the self-directed group and 40 respondents in the simulation group). All respondents have attended the research since beginning and none was lost to follow up.

### Table 1: Characteristics of respondents by age

<table>
<thead>
<tr>
<th>Characteristics Variable Respondents by Age</th>
<th>Frequency (n)</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>13 years old</td>
<td>34</td>
<td>42.5</td>
</tr>
<tr>
<td>14 years old</td>
<td>46</td>
<td>57.5</td>
</tr>
<tr>
<td>Total</td>
<td>80</td>
<td>100</td>
</tr>
</tbody>
</table>

Characteristic of respondents by age is presented in table 1. The result shows the majority of respondents (57.5%) was 14 years old.
Table 2: Characteristics of respondents by gender

<table>
<thead>
<tr>
<th>Characteristics Variable Respondents by Gender</th>
<th>Frequency (n)</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>28</td>
<td>35</td>
</tr>
<tr>
<td>Female</td>
<td>52</td>
<td>65</td>
</tr>
<tr>
<td>Total</td>
<td>80</td>
<td>100</td>
</tr>
</tbody>
</table>

Characteristics of respondent by gender is presented in table 2 shows that the majority of respondents (57.5%) was female.

Table 3: Knowledge of first aid before and after first aid education on self-directed video and simulation groups

<table>
<thead>
<tr>
<th>Variable</th>
<th>Group</th>
<th>N</th>
<th>Pretest/posttest Mean (SD)</th>
<th>Difference</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge</td>
<td>Self directed video</td>
<td>40</td>
<td>Pretest 8.43 (± 1.430)</td>
<td>4.07</td>
<td>0.000</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Posttest 12.50 (± 1.432)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Simulation</td>
<td>40</td>
<td>Pretest 7.95 (± 1.50)</td>
<td>3.95</td>
<td>0.000</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Posttest 11.90 (± 1.21)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 3 shows the difference of first aid knowledge in both groups before and after receiving first aid education. The statistical test reveals that both self-directed video and simulation group’s knowledge show different mean scores before and after intervention with p = 0.000. Furthermore, it is known that self-directed video group has a higher increase (4.07) compared to the simulation group.

Table 4: Knowledge differences tests on self directed video and simulation group

<table>
<thead>
<tr>
<th>Variable</th>
<th>Group</th>
<th>N</th>
<th>Difference</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge</td>
<td>Self-directed video</td>
<td>40</td>
<td>4.07</td>
<td>0.022</td>
</tr>
<tr>
<td></td>
<td>Simulation</td>
<td>40</td>
<td>3.95</td>
<td></td>
</tr>
</tbody>
</table>

Table 4 shows the differences in the increased of first aid knowledge among groups given the self-directed video and the simulation method. The result of Mann Whitney test show that p = 0.022 (p-value <0.05), it reveals that there is a significant difference in the increase of first aid knowledge between two groups with a higher increase in the self-directed video group.

Finding

The statistical test results showed a significant increase of knowledge in both groups before and after getting first aid education. This shows that both self-directed video and simulation methods can be useful in increasing the knowledge about first aid for 13 to 14-year-old kid. Furthermore, based on the mean difference test in increase of the knowledge score between self-directed video and simulation method, there is a significant difference between those two methods, where the mean difference in the self-directed video group showed a higher score than the simulation method. This shows that first aid education given to 13 to a 14-year-old student using the self-directed video method is better in improving knowledge than that of the simulation method.

These research results are consistent with other studies comparing the increase in resuscitation knowledge by a bystander with the help of technology in which there are video features compared to simulation methods17. The level of knowledge obtained through video-based methods shows better results than through face-to-face methods with the instructor while giving an impact on the ability to learn independently18. Self-directed video method combining with technological approach can stimulate the human brain and later it increases the first aid knowledge. The use of technology in the education process has the effect of increasing the activation of the frontal and parietal contexts that trigger cognitive stimulation and strengthen a person’s memory to remember what has been learned 19, 20.
The self-directed video method used in this research can be used as one of the effective learning methods because it is able to provide better levels of knowledge compared with the simulation methods. This is possible to happen because in the simulation method, respondents only focused on the instructor and the simulation was only given once. First aid education process with self directed video provides the better appearance of features in the form of a combination of writing, images and videos, thus it became something more interesting and made respondents more enthusiastic in learning. In addition, the principle of self learning becomes an advantage in the self directed video method and then it will lead to active learning. In a learning process, respondents tend to respond positively to a new and interesting educational method. This positive response will have an impact on the motivation of respondents in the learning process in line with their willingness to learn new material and it is expected to increase the opportunity to apply their new knowledge in dealing with the surrounding injury events. By using the self directed video method, the respondents can also focus on learning videos on their smartphone anywhere and anytime independently so that it is possible to review material repeatedly. Self-directed video method design innovations can be an effective choice in providing first aid education as an application of the modality method. So the self-directed video method is recommended as an effective and efficient method in the first aid education process as an effort to prevent and handle injury conditions.

Conclusion

There is a significant difference in increase of first aid knowledge among students aged 13-14 after receiving first aid education using the self directed video and simulation method, where the results show that the self-directed video method is better at increasing knowledge compared with simulation method. This finding proves that the self-directed video method can be used as an alternative and effective method of first aid education by taking into account the advantages possessed. It is recommended to do further research to investigate the knowledge retention with a period of 30 or 60 days follow up

Conflict of Interest: None

Ethical Clearence: This study has passed the ethical test held at Faculty of Medicine Universitas Brawijaya with number 284/EC/KEPK-S2/11/2018

Source of Funding: None

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Influence of Increasing Consuming of Whey Protein Supplement on Reproductive system in Rats

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ABSTRACT
The current study was conducted to evaluate the harmful effects of increasing consuming of nutritional supplement (whey protein) on reproductive system of laboratory rats. Thirty two of rats were randomly divided into two main groups. The first group control group was not treated with whey protein, the second group was divided into three subgroups which administrated the whey protein 300 mg/kg body weight for (one, two and three month) respectively. Reproductive performance was measured by determination of count sperm, malformations, motility, dead sperm, weights of (testes, epididymis, prostate glands and seminal vesicles) and testicular structure was studied.

The results referred to receiving of whey protein for long periods led to significant decreasing (P≤0.05) in total count of sperm, motility and significant decreasing (P≤0.05) in weights of all studied organs included (testes, epididymis, prostate glands and seminal vesical) while significant increasing (P≤0.05) was observed in sperm abnormalities and dead sperm. Also, the results showed that the nutritional supplement caused many abnormalities of sperm included lacking, quirky, starched and hooked tail while the malformations of head encompassed lacking, elliptical and global head. The histological changes in testicular structure manifested by destroyed and increasing thickness of interstitial tissue, congestion of blood vessels, necrosis and reduction numbers of spermatocytes in all supplemented groups.

Keywords: Nutrition Supplements, Whey Protein, Reproductive system.

Introduction
Nutritional supplements are compounds extracted from animal or botanical natural dietary constituents, these include minerals as iron and calcium, amino acids, enzymes, vitamins like D and E. Nutritional supplements are traditional products in many forms powders, drinks, capsules and tablets which taken by athletes and adults (1). Dietary supplements have variety types such as protein supplements contain high protein increase the weight and carbohydrates supplements that featuring by fast absorption, digestive and oxidation for releasing energy (2,3).

Eating of these supplements has important benefits by energy, immunity and metabolism increasing, preserve and earn muscular strength for muscles (4). Sensitivity, liver damage, renal insufficiency, gastric disorders and diarrhea are harmful effects of dietary supplements for its consumers when taking irregular and large doses (5). Whey protein is one of powders dietary supplements, it contains 90 % of protein which has health benefits for stimulate synthesis of muscles protein, improvement of anti-oxidant activity and adiposity control (6). There are three types of whey protein concentrate, isolate and hydrolyzed whey protein, these include immunoglobulins, lactoferrin, lactalbumin which present a source of branch chained amino acids(7).

The current study was aimed to investigate influence of nutrition supplement (whey protein) in some physiological and histological parameters of reproductive system in rats.

Materials and Method
Animals and Experimental Designed: Albino male rats (Rattus norvegicus) had been used, these rats obtained and treated in the animal house of biology department, university of Thi-Qar. All animals were kept under temperature 22 ± 2 °C and 12:12 hours light: dark cycle. Thirty two male rats aged (10-13 weeks) and weighted (200 -220 grams) divided into main two groups:
First group: (Control group) (n = 8): Animals were without any treatment and administrated distilled water and feed.

Second group: (Supplemented group): This group divided into three subgroups (n=8) in each group as:

Group A: Animals were administrated whey protein supplement (300 mg/kg body weight) for one month.

Group B: Animals were administrated whey protein supplement (300 mg/kg body weight) for two month.

Group C: Animals were administrated whey protein supplement (300 mg/kg body weight) for three month.

Sperm Characteristics: The method of Soto (8) was used to determination the sperm count while the percentage abnormalities of sperm was carried out according to Wyrobek and Bruce (9). Sperm motility was evaluated according to Robb et al. (10) while the dead sperms was assessed according to Chemineau et al. (11).

Measurement the Weights of Organs: After ending the period for each treatment, (testes, epididymis, prostate glands and seminal vesicles) were weighted by using sensitive electronic balance. The weights compared among all groups.

Histopathological Study: After dissection of animals in all groups, testes were separated and fixed in10% formalin solution then histological sections were prepared according to method of Bancroft and Gamble(12).

Statistical Analysis

Data in tables are presented mean ± standard deviation that analyzed by SPSS (version 20). The differences among means were measuring for ANOVA at significant (p≤0.05) by Duncan test.

Results and Discussion

Table 1: Effect of whey protein supplement in some sperm characteristics (n = 8) (Mean ± Standard deviation)

<table>
<thead>
<tr>
<th>Group</th>
<th>Sperm Count (× 10⁴)</th>
<th>Sperm Abnormalities (%)</th>
<th>Motility (%)</th>
<th>Dead Sperm (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control group</td>
<td>205.97 ± 1.55</td>
<td>9.30 ± 1.12</td>
<td>78.68 ± 0.72</td>
<td>16.45 ± 0.41</td>
</tr>
<tr>
<td>Supplemented group (One month)</td>
<td>181.68 ± 4.81</td>
<td>35.17 ± 1.72</td>
<td>63.08 ± 0.71</td>
<td>21.40 ± 0.37</td>
</tr>
<tr>
<td>Supplemented group (Two month)</td>
<td>146.90 ± 4.85</td>
<td>58.52 ± 2.63</td>
<td>54.13 ± 0.50</td>
<td>28.88 ± 0.27</td>
</tr>
<tr>
<td>Supplemented group (Three month)</td>
<td>126.24 ± 1.81</td>
<td>88.05 ± 1.59</td>
<td>49.10 ± 0.37</td>
<td>38.13 ± 0.55</td>
</tr>
</tbody>
</table>

Different letters indicate to significant difference (P ≤ 0.05) among groups: Some of sperm characteristics were observed in table (1). These results demonstrated a significant decrease (P≤ 0.05) in total count and motility of sperm in supplemented groups which treated with whey protein for all periods compared with control group while the percentage of sperm abnormalities and dead sperm increased significantly (P≤ 0.05) in supplemented groups compared with control group. These results may be linked to effect nutritional supplement (whey protein) on concentration of testosterone hormone which important in spermatogenesis. Christensen (13) noted the testosterone hormone necessary for initiation and maintenance of spermatogenesis, this agree with Jawad et al. (14) who revealed to significant reduction in concentration of testosterone in smokers and non-smokers athletes after receiving a nutritional supplements.

A significant increasing (P≤ 0.05) in percentage of abnormal sperm, malformations of sperm included lacking, quirky, starched and hooked tail and lacking, elliptical and global head (picture 2-7) were found in supplemented groups, this could be related to effect of whey protein supplement on activity of testosterone which influence on spermatogenesis. William (15) reported to disorder in secretion of gonadotropins from anterior pituitary gland that interfere with spermatogenic processes. The spermatogenesis in testes is depend on hypothalamus-pituitary- testis hormone axon, GnRH is release from hypothalamus which induce releasing of LH and FSH. LH has important role in induction testosterone releasing from leydig cells (16,17). So, the reduction of count sperm belong to decreasing testosterone. This agreement with Jawad et al. (14) who found nutritional supplements caused a significant decline in testosterone.

Oxidative stress was resulted from eating of nutritional supplements may be regarded to reduction
of count sperm, occurrence and their abnormalities by production free radical especially ROS. Tinkel et al. (18) revealed to oxidative stress causes cellular damage by ROS, this free radicals are responsible for main causes of infertility (19). This finding is accepted with Garge et al. (20) who exhibited generation of ROS by exposure for whey protein supplements. Also, many abnormalities were occurred in sperm may be due to effect of free radicals which resulted from whey protein supplement on DNA of sperm, this accordance to Trivedi et al. (21) who noted the damage of DNA lead to abnormalities in head sperm. Lipid peroxidation (LPO) may be interfere with DNA causing destruction of DNA (22) subsequently effecting on sperm characteristics.

Table 2: Effect of whey protein supplement on weights the organs reproductive system (n = 8) (Mean ± Standard deviation)

<table>
<thead>
<tr>
<th>Groups</th>
<th>Testes</th>
<th>Epididymis</th>
<th>Prostate Glands</th>
<th>Seminal Vesicles</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control group</td>
<td>1.50 ± 0.01</td>
<td>0.63 ± 0.00</td>
<td>0.54 ± 0.00</td>
<td>0.58 ± 0.00</td>
</tr>
<tr>
<td>Supplemented group (One month)</td>
<td>1.23 ± 0.01</td>
<td>0.56 ± 0.00</td>
<td>0.50 ± 0.00</td>
<td>0.53 ± 0.00</td>
</tr>
<tr>
<td>Supplemented group (Two month)</td>
<td>1.08 ± 0.00</td>
<td>0.46 ± 0.00</td>
<td>0.42 ± 0.00</td>
<td>0.44 ± 0.00</td>
</tr>
<tr>
<td>Supplemented group (Three month)</td>
<td>0.84 ± 0.03</td>
<td>0.38 ± 0.00</td>
<td>0.34 ± 0.00</td>
<td>0.39 ± 0.00</td>
</tr>
</tbody>
</table>

Different letters indicate to significant difference (P≤ 0.05) among groups: Weights of sex organs (testes, epididymis, prostate gland and seminal vesicles) in table (2) detected a significantly decreasing (P≤ 0.05) in means weights of all supplemented groups when compared with control group. This decreasing may be due to diminution of testosterone level by exposure for whey protein supplement. Chowdhury and Steinberger (23) reported role of testosterone in augmentation the weight of sex organs especially testes and seminal vesicles. This similar to Jawad et al. (14) who mention to reverse relationship between administration nutritional supplements and testosterone hormone subsequently affect on weight of reproductive organs, or this result related to decrement production of seminiferous tubular fluid, that participate in weight of testis (24).

The histopathological changes which observed in testes of supplemented groups included destroyed and increasing thickness of interstitial tissue, congestion of blood vessels, necrosis and reduction numbers of spermatocytes (pictures 9-16), these may be associated to treatment with whey protein supplement by ROS. Mitra et al. (25) suggested to that ROS in testes causes histological hazards in testicular structure and the free radicals disables membrane safety leading to occurrence these changes. Necrosis and some other histological damages which found in testes may be belong to oxidative stress and ROS which resulted from exposure for whey protein supplement. This identical with Mohamed et al. (26) who reported the imbalance between ROS production and antioxidants induce oxidative stress led to damages of biological molecules as protein, lipids and DNA causing apoptosis and cellular necrosis.

Reduction of spermatocytes may be due to role of nutritional supplements in generation of free radicals, Mohamed et al. (27) revealed to free radicals cause shrinking spermatocytes and breakdown of tubular epithelium.

Figure 1: Showed normal sperm of control group (Eosin Stain) (100 X)

Figure 2: Showed abnormalities sperm (lacking tail and quirky tail) of supplemented group (One month) (Eosin Stain) (100 X)
Figure 3: Showed abnormalities sperm (lacking head) of supplemented group (Two month) (Eosin Stain) (100 X)

Figure 4: Showed abnormalities sperm (elliptical head) of supplemented group (Two month) (Eosin Stain) (400 X)

Figure 5: Showed abnormalities sperm (lacking head and lacking tail) of supplemented group (Three month) (Eosin Stain) (100 X)

Figure 6: Showed abnormalities sperm (global head and starched tail) of supplemented group (Three month) (Eosin Stain) (100 X)

Figure 7: Showed abnormalities sperm (lacking head and hooked tail) of supplemented group (Three month) (Eosin Stain) (100 X)

Figure 8: Showed section in testis of control group showing seminiferous tubules (A) interstitial tissue (B) spermatocytes (C) sperms (D) (H&E) (100 X)

Figure 9: Showed section in testis of supplemented group (One month) showing destroyed of interstitial tissue (H&E) (100 X)

Figure 10: Showed section in testis of supplemented group (One month) showing congestion of blood vessel (H&E) (400 X)
Figure 11: Showed section in testis of supplemented group (Two month) showing destroyed of interstitial tissue (H&E) (100 X)

Figure 12: Showed section in testis of supplemented group (Two month) showing congestion (H&E) (400 X)

Figure 13: Showed section in testis of supplemented group (Two month) showing necrosis (H&E) (400 X)

Figure 14: Showed section in testis of supplemented group (Three month) showing necrosis (A) reduction of spermatocytes (B) destroyed of interstitial tissue (C) (H&E) (100 X)

Figure 15: Showed section in testis of supplemented group (Three month) showing increasing thickness of interstitial tissue (H&E) (100 X)

Figure 16: Showed section in testis of supplemented group (Three month) showing congestion (H&E) (100 X)

Conclusions

Our finding revealed to health hazards of reproductive system by elevated consumption of nutritional supplements especially whey protein. Although this nutritional supplements are mentioned to have benefits, their toxic damages were observed during usage for long term.

Conflict of Interest: None

Source of Funding: Self

Ethical Clearance: Not required

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Indonesia Towards Universal Health Coverage: Indonesia Health Card Holders Satisfaction on Pharmaceutical Service at Primary Health Cares

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ABSTRACT

Background: Primary Health Care is the most visited health care by people who use National Health Insurance by Indonesia Government for medical treatment. But in practice, many visits are not equivalent with patient satisfaction on primary health care service.

Purpose: Identify patient satisfaction to pharmaceutical service at Puskesmas as primary health care.

Subjects and Method: This is a cross sectional descriptive study with 100 selected respondents using accidental sampling. Respondents filled out a likert scale questionnaire. Data analysis use service quality (servqual) and customer window method. Data analysis compare patient perceptions to service performance and patient expectation.

Results: Servqual method shows that patients are not satisfied to pharmaceutical services performance at Puskesmas. Customer window method shows that pharmaceutical services performance (Quadran A) that inadequate and must be improved are waiting room; ensuring the reciever of the drug is patient or patient’s family, not others; confirmation of patient’s allergy history; and confirmation of patient’s drug history.

Conclusion: National Health Insurance by Indonesia Government is unable to satisfy patient on health care service especially pharmaceutical service at primary health care (Puskesmas). Many things about pharmaceutical service need to be improved to create a good and comprehensive health service for all levels of society.

Keyword: Pharmaceutical services, patient satisfaction, Primary Health Care, BPJS Kesehatan, Universal Health

Introduction

Public welfare of a country can be assessed by how the people accesses existing health care. Indonesia is one of the developing countries that seek to provide easy access for all levels of society to health services. Now, Indonesia is at the middle level in providing comprehensive health service with index of 56% (¹). To reach the country’s index for comprehensive health service, ease of access to health services for the community is not enough. The government must also ensure that the quality of health services provided is good, effective and efficient (²). One of important aspect in health service is pharmaceutical service that involve providing pharmaceutical products or appropriate health care products and the right information, at the right time, in the amount and quality needed (³).

In order to make it happen, Indonesia initiated a National Health Insurance program managed by the Social Security Organizing Agency of Health or better known as BPJS Kesehatan. This program helps people get the best service with affordable costs. The card holder pays a premium which nominal value matches the class taken each month. The health care system implemented by BPJS Kesehatan is a referral system where health services are carried out in stages according...
to medical needs. At the first stage, members of National Health Insurance can go to primary health care such as Puskesmas. Primary health care strategy that has been implemented to improve the effectiveness of the health care system (4).

Puskesmas (Pusat Kesehatan Masyarakat) is a technical implementation unit of Health Department of City/District that responsible to organizing health development in work area (5). As a primary health care provider for people, Puskesmas need to be supported by good pharmaceutical services to achieve individual health efforts and public health efforts (6). The number of Puskesmas visitors was the highest number of visitor compared to other primary health care, which 18,929,689 visitor (7). Community has been developing perception that Puskesmas is a low-level health care for community with middle to lower economic condition. This perception due to the lack of availability of health workers, the drug and the lack of a good relationship between patients and health workers.

The number of visits to puskesmas develops perception that patient has recieved a good service. But this number of visits is not equivalent with patient satisfaction. Therefore, this study aims to determine the level of patient satisfaction with one type of health service in the primary health care, pharmaceutical service. Quality of health service measured using servqual method which includes direct evidence, reliability, responsiveness, assurance, empathy. While, patient satisfaction measured using customer window method.

Materials and Method

This is a cross sectional descriptive study which is using accidental sampling method to collect data. This research instrument use Likert scale questionnaire that has been tested for validity and reliability (8). Likert scale is a general ranking format for surveys. Respondents are ranked from high to low or best to worst quality (9). Data were collected in July 2016 until August 2016 and January 2017. The study participants were 100 respondents across 10 primary health care in the north of Surabaya.

Data Analysis

Analysis Servqual: Servqual method can be used to assess patients’ satisfaction on pharmaceutical services because the servqual method is universal and can be used for a variety of services to assess the quality of services provided (10). The servqual score for each item statement in the questionnaire can be calculated using formula below (11):

\[
\text{Servqual score} = \text{performance score} - \text{expectation score}
\]

Analysis Customer Window: Customer Window Analysis Quadrant is used to measure the level of priority according to the patient’s perceptions in relation to what should Puskesmas do in order to produce high-quality pharmaceutical services (12). Importance Performance Matrix Analysis is a matrix consisting of 4 quadrant (13).

<table>
<thead>
<tr>
<th>Expectation</th>
<th>Performance</th>
</tr>
</thead>
<tbody>
<tr>
<td>High</td>
<td>A</td>
</tr>
<tr>
<td>High Importance/ Low Performance “concentrate here”</td>
<td>High Importance/ High Performance “Keep Up the Good Work”</td>
</tr>
<tr>
<td>Low</td>
<td>C</td>
</tr>
<tr>
<td>Low Importance/ Low Performance “Low Priority”</td>
<td>Low Importance/ High Performance “Possible overkill”</td>
</tr>
</tbody>
</table>

Results

Demographic data of respondents and the number of respondents in each primary health care: The demographic data in this study were used as an illustration to find out the data of puskesmas visitors who were used as respondents in this study. Most of the respondents are women aged 25-44 years, high school education or equivalent, have the category of private sector/entrepreneur, and housewife.

The Results of research received 113 respondents who met the inclusion criteria. Among the 12 puskesmas in the north of Surabaya, the Puskesmas Dupak has highest number of respondents. Total respondents who filled out the questionnaire were 113 respondents but 3 questionnaires could not be processed due to incomplete filling, so only 100 questionnaires could be analyzed.

a. Servqual method and Customer Window method: Data in this following table is based on a questionnaire filled out by respondents. It
determines the level of patient satisfaction to pharmaceutical service and customer window services to measure the level of priority according to patient perception in relation to what should *Puskesmas* do in order to produce high-quality pharmaceutical services.

Table 1: Calculation of servqual and Customer Window method

<table>
<thead>
<tr>
<th>Variable</th>
<th>Indicator</th>
<th>Servqual/Customer Window</th>
<th>Gap/Quadrant Position</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Performance score/mean</td>
<td>Expectation/mean score</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(X)</td>
<td>(Y)</td>
</tr>
<tr>
<td>Tangibles</td>
<td>Comfortable of waiting room</td>
<td>3.84</td>
<td>4.15</td>
</tr>
<tr>
<td></td>
<td>Availability of health poster/brochure/magazine/conseling</td>
<td>3.64</td>
<td>4.10</td>
</tr>
<tr>
<td></td>
<td>Drug locket which is adequate for drug information service</td>
<td>3.83</td>
<td>4.23</td>
</tr>
<tr>
<td></td>
<td>Drug is in good condition</td>
<td>4.68</td>
<td>4.35</td>
</tr>
<tr>
<td></td>
<td>Drug is well packed</td>
<td>4.66</td>
<td>4.42</td>
</tr>
<tr>
<td></td>
<td>Officer writes instruction manual clearly</td>
<td>4.63</td>
<td>4.38</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td><strong>25.28</strong></td>
<td><strong>25.63</strong></td>
</tr>
<tr>
<td>Reliability</td>
<td>Officer explain instruction manual of drug both verbally or written</td>
<td>4.34</td>
<td>4.34</td>
</tr>
<tr>
<td></td>
<td>Officer explain instruction manual of taking the drug and time of taking the drug both verbally or written</td>
<td>4.48</td>
<td>4.34</td>
</tr>
<tr>
<td></td>
<td>Officer explain period of taking a drug both verbally or written</td>
<td>4.36</td>
<td>4.28</td>
</tr>
<tr>
<td></td>
<td>Officer explain instruction manual to take a drug both verbally or written</td>
<td>4.39</td>
<td>4.29</td>
</tr>
<tr>
<td></td>
<td>Officer explain the side effect of the drug both verbally or written</td>
<td>3.20</td>
<td>4.07</td>
</tr>
<tr>
<td></td>
<td>Officer explain information about food and drink that must be avoided while take adrug both verbally or written</td>
<td>3.41</td>
<td>4.06</td>
</tr>
<tr>
<td></td>
<td>Officer explain information about drug storage both verbally or written</td>
<td>3.17</td>
<td>3.97</td>
</tr>
<tr>
<td></td>
<td>Officer explain about if patients forget to take the drug</td>
<td>2.99</td>
<td>3.93</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td><strong>30.34</strong></td>
<td><strong>33.28</strong></td>
</tr>
<tr>
<td>Assurance</td>
<td>Officer ensure the receiver of the drug is patient or family patient, not others</td>
<td>3.82</td>
<td>4.19</td>
</tr>
<tr>
<td></td>
<td>Officer confirm patient’s disease history</td>
<td>3.58</td>
<td>4.13</td>
</tr>
<tr>
<td></td>
<td>Officer confirm patient’s allergy history</td>
<td>3.58</td>
<td>4.19</td>
</tr>
<tr>
<td></td>
<td>Officer confirm patient’s medicine record</td>
<td>3.59</td>
<td>4.16</td>
</tr>
<tr>
<td></td>
<td>Officer confirm all of information which are given</td>
<td>2.79</td>
<td>3.79</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td><strong>17.36</strong></td>
<td><strong>20.46</strong></td>
</tr>
<tr>
<td>Responsiveness</td>
<td>Officer solve patient’s problem related to drug uses</td>
<td>3.88</td>
<td>4.22</td>
</tr>
<tr>
<td></td>
<td>Officer serve quickly</td>
<td>4.09</td>
<td>4.34</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td><strong>7.97</strong></td>
<td><strong>8.56</strong></td>
</tr>
<tr>
<td>Empathy</td>
<td>Officer respond to patient’s complaint</td>
<td>4.24</td>
<td>4.25</td>
</tr>
<tr>
<td></td>
<td>Officer serve politely</td>
<td>4.32</td>
<td>4.36</td>
</tr>
<tr>
<td></td>
<td>Officer use language which is easy to understand</td>
<td>4.48</td>
<td>4.33</td>
</tr>
<tr>
<td></td>
<td>Officer monitor patient drug use by phone or when the patient comes back</td>
<td>2.17</td>
<td>3.39</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td><strong>15.21</strong></td>
<td><strong>16.33</strong></td>
</tr>
<tr>
<td></td>
<td><strong>Nilai Total</strong></td>
<td><strong>96.16</strong></td>
<td><strong>104.26</strong></td>
</tr>
</tbody>
</table>
If results of calculations on servqual method are positive gaps, then it concludes that patients are satisfied with pharmaceutical services in puskesmas, and the other way around. Overall, the tangible variable shows that patients are not satisfied, but several indicators show that patients are satisfied. Those several indicators are: drug condition is good; drug is well packed; and officer write instruction manual clearly. Overall, the reliability variable shows that patients are not satisfied with health services, but several indicators shows that patients are satisfied. Those several indicators are officer explained information about instruction manual to take a drug both verbally or written; officer explained information about time and period of taking the drug both verbally or written.

Assurance variable shows that patients are not satisfied with health services and no indicators in this variable are positive. The responsiveness variable shows that patients are not satisfied and all indicators in this variable are negative. Last variable is empathy. Overall, patients are not satisfied but one indicator in this variable is positively satisfying. The indicator is officer using easy to understand language. Overall, sum of servqual method is -8.10 and it shows that patients are not satisfied with health services.

Data analysis with customer window quadrant shows indicators that included in A, B, C, or D Quadrant. A quadrant shows indicators that need to be improved and become a priority because they performances are low while expectations from respondents are high. Quadrant A indicators are: the comfortable waiting room; availability of health promotion media for drug information or counseling efforts; availability of drug locket which is adequate for drug information service; Officer explained information about food and drink that must be avoided when taking medicine; information about drug storage; information about if patients forget to take the drug; officer confirmed the recipe receiver; officer confirmed medical record and medicine record; officer solves patient problems related to drug and officer serve quickly.

B Quadrant shows indicators that need to be maintained because both performance and expectation are high. B Quadrant indicators are: drug’s condition is good; drug is well packed; and officer write instruction manual clearly; information about drug’s use; information about instruction manual of drug, time and period of taking the drug; and easy to understand language. C Quadrant shows a low priority because performances and expectations are low. C Quadrant indicator is monitoring drug use. D Quadrant shows exaggerate indicators because performances are high but expectations are low. Nothing indicator is in D Quadrant.

**Discussion**

National Health Insurance is health insurance managed by government that has not been providing satisfaction for patient. This is evidence that patients are not satisfied with health services especially pharmaceutical service. In practice, tangible variable shows that patients had felt less comfortable with the chairs in waiting room because the number of chair were not comparable with the number of patients who was waiting. Patients were standing up when they took the drug. Other variable, reliability shows that officer should explain some information to patient such as side effect of the drug, food that must be avoided, and period of taking the drug. Then, other thing that becomes the focus of patient is the health worker did not ask about the history of allergies, history of patient’s disease so assurance variable got a negative response and was not as expected. In responsiveness variable, patient had felt that service of drug acceptance took a long time, this is caused by poor health condition and uncomfortable waiting room. In empathy variable, overall, this variable shows that patients were not satisfied with monitoring of patient drug use. This is caused by the officers often did not ask about medicine record. Monitoring of patient’s medicine record is one of important aspect for patient who was suffering from degenerative disease. So not all patients got the same treatment because if this aspect is applied to all patients it can increase the waiting time of other patients.

In term of improving the quality of services, related parties can see table 2 which shows important aspect that need to be improved in A Quadrant; and things which already exist and got positive response and need to be maintained in B Quadrant. There are not many categories in C Quadrant, this quadrant is not very important so factors in this quadrant can be ignored if the officer wants to evaluate the services for patient. There are no categories in D Quadrant.

Case mentioned above are motivated by a better level of community education so they become more critical and sensitive to what is happening, as most respondents have high school or equivalent.
Previous studies have shown that this program is not good and unsatisfactory such as study which is describing the differences satisfaction between National Health Insurance’s patients and non-National Health Insurance patients. Non-National Health Insurance patients more satisfied than National Health Insurance (14). The drugs given to National Health Insurance’s patient are generic drugs listed in the National Formulary (Fomularium Nasional). The paradigm which develops in the community believes that generic drugs are not a good drug. This paradigm may cause patients dissatisfaction to pharmaceutical services. Study conducted at the RSUD DR. Soediran Mangun Sumarso Wonogiri showed the same results. The study also stated that non-National Health Insurance patients are more satisfied than National Health Insurance patients (8). The study explained that patient dissatisfaction is caused by a non-transparency amount of drug and type of drug. Study conducted at Puskesmas in Magelang District described patients dissatisfaction (15). The study showed that patient expectation is more than officer performance. From 18 questions items related to pharmaceutical services at the health center, only 3 questions items showed that the patient was satisfied.

Limitation of study is this study cannot be generalized because this study only describes patient’s satisfaction at time and in place when/where study was conducted. Other limitation is this study did not review the level of patient’s need and patient’s mindset which are supporting the background of the level of patient’s satisfaction and dissatisfaction.

Conclusion

Patient who was treated using National Health Insurance in Puskesmas are not satisfied with pharmaceutical services provided by puskesmas. Patient dissatisfaction can brought a bad impact to the sustainability of this program such as withdrawing their participation. This possibility can be impacted to mission of Indonesia for being a country that provide a comprehensive health care and to public’s life expectancy.

Ethical Clearance: The current study was carried out in correspondence with the research principles. It is implemented the basic principle ethics of respect, beneficence, non-maleficence, and justice. The research process entangles participants in the survey using a compatible questionnaire that was in accordance with the ethical research principle based on the research ethics committee’s regulation.

Conflict of Interest: The author reports no conflict of interest of this work.

Source of Funding: This study is completed with individual funding.

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A Study on the Organization, Job Environment and Service Quality of Elderly Friendly Industrial Facilities Based on Healthcare

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ABSTRACT

This study was conducted on workers in elderly friendly industrial facilities based on healthcare. Those who worked directly in the services sector were the target. As a fusion study on the effects of organizational environment and job environment variables on service quality, we analyzed the mediating effects of organizational support perception. The service quality of the provided directly to the elderly was studied. 582 workers were analyzed. Gender and facility type group. A fusion study was conducted using latent mean analysis. The conclusion is as follows. First, organizational environment, job environment, and organizational support recognition were identified as significant factors affecting service quality. Second, the mediating effect of organizational support awareness has been confirmed. Third, gender was found to be a significant path in the inter - group path coefficients. The type of facility was not significant. Fourth, as a result of verifying the inter - group path coefficients, the male group and the use facility group were significant in the organizational environment path. In the work environment path, the female group and the living facilities group were significant. This study confirms that the organizational environment and job environment are important for service quality of the facility. In order to improve this, it was confirmed that it is necessary to improve the awareness of the organization support.

Keywords: Healthcare, Elderly Friendly Industrial, Organizational Environment, Job Environment, Organizational Support, Service Quality

Introduction

The rapid growth of the elderly population, the increased interest in wellness for health promotion, and the introduction of long-term care insurance system, the healthcare-based elderly friendly industrial facilities are growing rapidly. Elderly friendly industrial facilities based on healthcare have living facilities that include the concept of residency such as cure and care for elderly people. It can also be divided into facilities for health care and prevention. It is aimed at various projects such as business for well-being, preventive and therapeutic business for health, old-age residence business, public senior health-related business. Facility service adopts consumer support method based on needs assessment. In addition, user fees are imposed, and the rights and options of users are guaranteed1. The elderly friendly industrial facility based on health care has rapidly increased with social change and has changed into an active countermeasure to take a competitive advantage with the facilities. In order to cope with such a demand, there is a growing interest in organizational performance factors in order to operate the facility efficiently. Service quality has been attempted as one of the important components to measure the important performance of an organization2. Service quality is an overall evaluation of user service. Service quality can be affected by organizational environment and job environment. The organizational environment of facilities can have a significant impact on the attitude of the organization3. If satisfied with the organizational environment, the quality of service provided to the client changes. The organizational environment is defined through an approach to organizational behavior theory that is studied in terms of organizational attitudes. In terms of organizational attitudes, sub - variables of organizational behavior are job satisfaction and organizational commitment. In the case of professionals providing human services in the facility, the service quality is substantially influenced by the degree of job
satisfaction. Organizational commitment is an expanded future-oriented concept that includes both attitudes and actions to accept organizational goals and to work hard for the organization. Organizational commitment is an important factor in improving service quality. Because human services provide services directly to employees and clients, the ability of employees can have a significant impact on organizational performance. The ability of a worker is also an individual factor, but it can affect the work environment. The more positive the job environment the employees perceive, the higher the satisfaction and service quality of the client. The job environment of the employees affects the service quality, which is the performance of the organization. When facility workers are praised or recognized by the facility, they become more immersed in the facility and have a positive impact on job performance. Organizational support awareness is the belief that facilities value the efforts or contributions of workers and are interested in the welfare of workers. Organizational support awareness plays an important role in shaping the attitudes of facility workers. In the elderly friendly industrial facility based on healthcare, facility workers show different characteristics according to their gender and facility type because their organizational environment and job environment are different. Therefore, empirical studies are needed to confirm whether factors affecting service quality are different depending on gender and facility type. It is necessary to identify factors that can improve the quality of service through fusion empirical analysis.

**Method**

**Subjects of Investigation:** The subjects of this study were 582 employees of elderly friendly industrial facility based on healthcare. The gender was 154 (26.5% for male) and 428 (73.5% for female), 250 (43.0% for facilities and 332 (57% for living facilities).

**Measuring Tools:** Potential variables in this study are service quality, organizational environment, and organizational support awareness. All questions consist of five points, a Likert scale (not at all = 1 and very yes = 5). Service quality was revised and supplemented by the SERVPERF measure of Cronin and Taylor (1992), which modified the SERVQUAL measure of Parasuraman et al (1988). Questionnaire consists of a total of 22 questions. The organizational environment was revised and supplemented the scales of Smith et al (1969) and Allen and Meyer (1990). Questionnaire consists of a total of 12 questions. Job environments were revised and adjusted for the scale of Hackman and Oldham (1980), the scale of Cook. J and Toby wall (1980), and the scale of Quinn (1988). Questionnaire consists of a total of 22 questions. Organizational support perceptions have been revised by Wayne et al (1997). Questionnaire consists of a total of 9 questions.

**Data Analysis:** This study was carried out a correlation analysis using the SPSS 23.0. Using AMOS 23.0 was applied to the average group analysis and potential analysis. The structural equation model through the RMSEA, TLI assessed the fit of the model. If the value is less than 0.05 RMSEA good fit, 05-.08 is the right fit. If the value is 0.90 or more TLI good fit. Use the structural equation model to perform empirical analysis using control variable validation, multi-group analysis, and latent mean analysis.

**Result**

**Descriptive Statistics:** In the structural equation model, distorted results can be derived if the variables to be measured are not satisfied with the normal distribution condition. As a result, the skewness was -.211 - -.712 and the kurtosis was .367 - 2.703. This result satisfies all of the normal distribution conditions (skewness <2, kurtosis <4), which is a requirement to apply the structural equation model of the main variables.

Correlational relationships between the variables used for the causal structure set out in this study were analyzed. All the variables were significant at .01. All latent variables showed statistically significant Correlational Relationship (.427 ~ .589).

**Table 1: Correlational Relationship**

<table>
<thead>
<tr>
<th>Variable</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>.544***</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>.589***</td>
<td>.511***</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>.480***</td>
<td>.490***</td>
<td>.427***</td>
<td>1</td>
</tr>
</tbody>
</table>

1. Organizational Environment, 2. Job Environment, 3. Organizational Support, 4. Service Quality. * p<.05, ** p<.01, ***p<.001

As a result of the analysis of the research model, the fit of the research model was found to be good.
fit was TLI = .929 and RMSEA = .080. Overall, it was found to be good. The structural model of this study can be assessed to an acceptable level.

The path coefficients estimated from the study model are shown in Table 2. All were statistically significant.

The higher the perception of organizational environment, the higher the organizational support (β = .430, p <.05) and the service quality (β = .100, p <.015). The higher the perception of job environment, the higher the organizational support (β = .432, p <.001) and the service quality (β = .177, p <.001). The higher the organizational support, the higher the quality of service (β = .149, p <.01). Organizational environment, job environment, and organizational support are significant variables affecting service quality. Organizational support has been shown to mediate the relationship between organizational and job environments that affect service quality.

Table 2: Model parameter estimation

<table>
<thead>
<tr>
<th>Variable</th>
<th>Estimate</th>
<th>Direct effect</th>
<th>Indirect effect</th>
<th>Total effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>.430(.475) ***</td>
<td>.430</td>
<td>.000</td>
<td>.430</td>
</tr>
<tr>
<td>2</td>
<td>.432(.431) ***</td>
<td>.432</td>
<td>.000</td>
<td>.432</td>
</tr>
<tr>
<td>3</td>
<td>.100(.170) *</td>
<td>.100</td>
<td>.064</td>
<td>.165</td>
</tr>
<tr>
<td>4</td>
<td>.177(.270) ***</td>
<td>.177</td>
<td>.064</td>
<td>.241</td>
</tr>
</tbody>
</table>

1. Organizational Support, 2. Organizational Environment, 3. Job Environment, 4. Service Quality, * p<.05, ** p<.01, ***p<.001

Comparison of measurement models and Latent mean analysis: For the latent mean analysis, all the model’s configural invariance, metric invariance, and metric and scalar invariance should be established. Correlational relationships between all potential variables were allowed for the verification of the measurement model. The fit of the model was compared. As shown in Table 3, all of them were satisfactory. This shows that measurement tools and intercepts in gender and facility types function in the same way. The observed mean difference between the two groups reflects the actual difference in potential variables.

Table 3: The fit index for invariance validation

<table>
<thead>
<tr>
<th>Division</th>
<th>χ²</th>
<th>DF</th>
<th>TLI</th>
<th>CFI</th>
<th>RMSEA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model 1</td>
<td>601.147</td>
<td>320</td>
<td>.932</td>
<td>.942</td>
<td>.032</td>
</tr>
<tr>
<td>Model 2</td>
<td>637.234</td>
<td>335</td>
<td>.930</td>
<td>.938</td>
<td>.032</td>
</tr>
<tr>
<td>Model 3</td>
<td>791.384</td>
<td>354</td>
<td>.904</td>
<td>.910</td>
<td>.038</td>
</tr>
<tr>
<td>Model 4</td>
<td>842.035</td>
<td>359</td>
<td>.895</td>
<td>.901</td>
<td>.039</td>
</tr>
</tbody>
</table>


The mean of the factors in the latent mean analysis is not directly estimable. The potential average of the measurement organization was estimated assuming that the potential average of one group was zero in gender and facility type (gender: female, facility type: use facility). A common standard deviation is applied when the variance of potential variables is the same. The fit of metric, scale, and factor variance invariance (model 4) was compared with metric and scalar invariance (model 3). As a result of comparison, there was almost no change. Metric, Scale and Factor variance invariance were secured. Thus, the effect size values were calculated using a common standard deviation. According to Cohen’s criteria, there was no significant difference in gender between groups. In the facility type, the difference in the service quality was significant. And the use facilities were relatively higher than the living facilities.

Table 4: Latent mean difference analysis

<table>
<thead>
<tr>
<th>Variable</th>
<th>Gender</th>
<th>Facility Type</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Male</td>
<td>Female</td>
</tr>
<tr>
<td>1</td>
<td>.116</td>
<td>3.44</td>
</tr>
<tr>
<td>2</td>
<td>.127</td>
<td>3.45</td>
</tr>
<tr>
<td>3</td>
<td>.118</td>
<td>3.19</td>
</tr>
<tr>
<td>4</td>
<td>-.021</td>
<td>3.65</td>
</tr>
</tbody>
</table>
1. Organizational Environment, 2. Job Environment, 3. Organizational Support, 4. Service Quality. * p<.05, ** p<.01, ***p<.001

Comparison of inter-group path coefficients: The test of structural model invariance across the groups is to analyze the difference in path coefficients between measurement models in a structural equation model. The analysis was done through the process of metric invariance constraints and cross-group equality constraints.20 Metric invariance constraints are used to verify that the results of each group response are identical in the study model. The fit of the path model with the same fixed standardized estimates of all factors for each latent variable was measured. The analysis showed satisfactory fitness. Table 5 shows the inter-group path coefficients.

Table 5: Models of group-specific parameter estimates

| Parameter | Gender | | | Facility Type | | | |
| --- | --- | --- | --- | --- | --- | --- |
| | Male | Female | Use | Living | | |
| 1 | 2 | .560(.641) *** | .373(.412) *** | .430(.491) *** | .443(.467) *** | |
| 3 | .210(.205) | .509(.512) *** | .435(.445) *** | .426(.421) *** | |
| 4 | 2 | .200(.319) * | .064(.109) | .128(.233) * | .104(.164) | |
| 3 | .257(.350) ** | .137(.216) * | .094(.154) | .223(.331) *** | |
| 4 | .030(.042) | .213(.333) ** | .160(.256) | .132(.198) * | |

1. Organizational Support, 2. Organizational Environment, 3. Job Environment, 4. Service Quality, * p<.05, ** p<.01, ***p<.001

- Number: Regression Weights (standardized Regression Weights)

The results of the path coefficient check are shown in Table 6. First, the gender path was statistically significant in the organizational environment -> organization support -> service quality path. The type of facility was not significant. However, in the specific path, the male group and the use facility group were identified as statistically significant. Second, job environment -> organization support -> service quality path was significant in gender path. However, in the specific path, it was confirmed that the female group and the living facilities group were statistically significant.

Table 6: Result of path coefficient check

| Parameter | Gender | | | Facility Type | | | |
| --- | --- | --- | --- | --- | --- | --- |
| | Total | Male | Female | Dismissal | Total | Use | Living |
| 1 | significant | Dismissal | | Dismissal | significant | Dismissal |
| 2 | significant | | | | Dismissal | significant |

1. organizational environment->Organizational Support->service quality
2. job environment->Organizational Support->service quality

Conclusion

The purpose of this study is a social worker in charge of medicine. Analyzed the relationship between organizational and job environment variables and service quality through the recognition of organizational support in social welfare facilities. In order to identify the significant pathways to service quality, the potential average analysis was conducted by dividing into gender and facility type. The conclusion is as follows. First, organizational environment, job environment, and organizational support recognition were identified as significant factors affecting service quality. Second, the mediating effect of organizational support awareness has been confirmed. Third, gender was found to be a significant path in the inter-group path coefficients. The type of facility was not significant. Fourth, as a result of verifying the inter-group path coefficients, the male group and the use facility group were significant.
in the organizational environment path. In the work environment path, the female group and the living facilities group were significant. This study confirms that the service quality of social welfare facilities is important for the organizational environment and job environment of social welfare facilities. In order to improve this, it was confirmed that it is necessary to improve the awareness of the organization support. Suggestion for follow-up research. Development and research should be carried out on programs that enhance the quality of service and awareness of organizational support among workers in social welfare facilities.

Ethical Clearance: Gwangju University

Source of Funding: This Study was conducted by research funds from Gwangju University in 2019.

Conflict of Interest: Nil

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5. Jin SB. The Effect of Perceived Compensation on the Job Attitudes of Social Workers: Focused on Organizational Commitment and Adaptation Flexibility. Graduate School of Konkuk University. 2015.


Mediated Moderation Effect of Organizational Culture and Social Support in the Emotional Labor and Employee Turnover of Health Care Workers

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ABSTRACT
This study investigated the relationship between emotional labor and Employee turnover. The Mediated Moderation Effect, which includes the mediating effect of organizational culture and the moderating effect of social support, was verified. In this study, 658 healthcare workers were surveyed. Data were analyzed using SPSS 25.0 and SPSS Macro. The mediated control model is an integrated model with mediating effect, so it verifies the mediating effect, the moderating effect, and the mediated moderation effect. The results of the study are as follows. First, the mediating effect of organizational culture has been verified in relation to emotional labor and employee turnover. Second, the relationship between emotional labor and employee turnover was controlled by social support. Finally, the overall mediated modulation effect was confirmed using SPSS Macro. The mediated moderation effect of social support was found to be statistically significant in the way that emotional labor and organizational culture influenced turnover. This study confirms the comprehensive path that emotional labor affects employee turnover. Through the route, confirmed the employee turnover of healthcare workers more interactively. Explored the variables that could be practically intervened and confirmed the mediating effect and the moderating effect.

Keywords: Healthcare, Emotional Labor, Employee Turnover, Organizational Culture, Social Support, Mediated Moderation Effect.

Introduction
The healthcare industry has been expanding due to social and technological changes based on environmental factors such as the aging population, government policies, and technological development. The expansion of the healthcare industry market has expanded the market for competition. Recognition of the importance of full-scale human services has raised the issue of quality of care for healthcare facilities, the provision of medical personnel for treatment, and the securing and management of human resources for providing and managing services. The healthcare service environment requires quality manpower while increasing patient care and quality care as well as patient care. The role of the workers became important. Particularly, the roles of the employees became more important because they have to win the competition between the healthcare and the public service. In this process, the turnover rate of the healthcare workers is increasing due to various reasons such as the competent facility management system and the emotional labor in relation with the patient and the workplace. In the case of nursing staff, which occupies the largest portion of healthcare, the turnover rate is as high as 70-80%. The rate of turnover of nurses varies according to the number of operation beds of the medical institutions. In the case of less than 200 beds, 27.4%, 200-399 beds 23.7%, 400-599 beds 18.8%, 600-799 beds 12.5%, 800-999 beds 12.9% And 8.1% for over 1,000 beds. In addition, the turnover rate of new nurses was 42.7% and 43.2% in general hospitals and hospitals, which is higher than the average of all new nurses 38.1%. In the health care industry, the average turnover rate of care workers in the year 2011-212 was 41%. This is higher than the average turnover rate of 20 ~ 30% in other countries. The high turnover rate of the workers lowers the stability of the organization. Lack of a skilled workforce degrades the expertise of the workforce. It is a factor that increases the workload and stress of the remaining colleagues. One of the reasons why the turnover rate is high is due to the characteristics of the employees’ emotional laborers in the nature of...
the health care industry. Understanding and mediating the organizational culture of nurses within hospital organizations has become an essential management strategy for effectively operating hospital organizations. In the organizational culture study of nurses, the lower the relationship culture and the adhocracy culture, the higher the hierarchical culture, the higher the Employee turnover. Hierarchical culture is partly understood by the nature of hospitals. However, if the organizational culture continues, it will be necessary to consider this because it increases of the nurse employee turnover. Personnel management of healthcare workers is very important, and continuous research is needed to identify the multidimensional influences that affect them. The research problems are as follows.

First, Is there a mediating effect of organizational culture in relation to emotional labor and employee turnover perceived by healthcare workers?

Second, does the social support show a moderating effect in the emotional labor and the employee turnover of health care workers?

Third, is there a mediated moderation effect of social support?

**Method**

**Research Model:** This study examines whether the interaction term (the moderating effect) between the emotional labor and social support of healthcare workers affects employee turnover through a parameter. Emotional labor is an independent variable, Employee turnover is a dependent variable, Social support is a controlling variable, and Organizational culture is a parameter. The research model is shown in [Figure 1].

![Figure 1: Research model](image)

**Data Analysis:** The collected data were analyzed using SPSS 25.0 and SPSS Macro. First, using SPSS 25.0, descriptive statistics and correlation analysis were conducted for each variable. In order to verify the research model, we analyzed the mediating effect of organizational culture in relation to emotional labor and employee turnover through hierarchical regression analysis using the same analysis tool. Respectively. In order to verify the research model, we analyzed the mediating effect of organizational culture in relation to emotional labor and employee turnover through hierarchical regression analysis using the same analysis tool. In addition, bootstrapping through SPSS Macro was performed to verify the statistical significance of the mediating effect. In addition, the interaction effects of emotional labor and social support through regression analysis were verified using SPSS 25.0 and SPSS Macro, and the significance was verified. Finally, using the SPSS Macro, the emotional labor according to the level of social support confirms the mediated moderation effect that influences the employee turnover through the organizational culture respectively.

**Result**

**Correlational Relationship:** Analyzed the correlations of factors affecting employee turnover extracted through exploratory factor analysis. There is a statistically significant correlation between all the factors of emotional labor, social support, organizational culture, and employee turnover.
Table 1: Correlational Relationship

<table>
<thead>
<tr>
<th></th>
<th>1</th>
<th>2</th>
<th>3</th>
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</tr>
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<td>1</td>
<td>1</td>
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<td></td>
</tr>
<tr>
<td>4</td>
<td>.468***</td>
<td>.441***</td>
<td>.585***</td>
<td>1</td>
</tr>
<tr>
<td>M</td>
<td>3.6996</td>
<td>3.4227</td>
<td>3.3878</td>
<td>3.4419</td>
</tr>
<tr>
<td>SD</td>
<td>.55168</td>
<td>.80664</td>
<td>.83972</td>
<td>.73080</td>
</tr>
</tbody>
</table>

1. Emotional labor, 2. Social support, 3. Organizational Culture, 4. Employee turnover

*p < .05, **p < .01 ***p < .001

Mediating Effect: In order to investigate the mediating effect of organizational culture in relation to emotional labor and employee turnover, the mediating effect verification process proposed by Baron and Kenny (1986) Were used. The mediating effect is shown in Table 2. Emotional labor had a significant effect on organizational culture in the first stage (β = .480, t = 14.013, p < .001). In the second stage, the overall effect of emotional labor on turnover intention was significant (β = .468, t = 13.576, p < .001). This indicates that the higher the emotional labor, the more the employee turnover is affected. In the third stage, the influences of the organizational culture, which is a parameter, on the employee turnover were confirmed while controlling the influence of the emotional labor. As a result, significant pathways were identified (β = .468, t = 13.422, p < .001).

The direct effect of emotional labor on employee turnover was .244 (p < .001), considering the effect of parameters. The effect of emotional labor on employee turnover when not considering parameters was .468 (p < .001). When the mediation. Direct effects taking parameters into account were less than those without parameters. However, when considering the parameters, the path from emotional labor to employee turnover showed statistical significance because the organizational culture, which is a parameter, is the emotional labor, this implies partial mediation of the impact on employee turnover. The indirect effect coefficient of emotional labor on Employee turnover was .225.

Table 2: Mediating Effect

<table>
<thead>
<tr>
<th>Stage</th>
<th>Non-Standard</th>
<th>β</th>
<th>t</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B</td>
<td>SE</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>.731</td>
<td>.052</td>
<td>.480</td>
</tr>
<tr>
<td>2</td>
<td>.620</td>
<td>.046</td>
<td>.468</td>
</tr>
<tr>
<td>3 (Emotional labor) (Organizational Culture)</td>
<td>.323</td>
<td>.046</td>
<td>.244</td>
</tr>
<tr>
<td></td>
<td>.407</td>
<td>.030</td>
<td>.468</td>
</tr>
</tbody>
</table>

1. Dependent variable: Organizational Culture, Independent variable: Emotional labor
2. Dependent variable: Employee turnover, Independent variable: Emotional labor
3. Dependent variable: Employee turnover, Independent variable: Emotional labor, Organizational Culture

* p < .05, ** p < .01, *** p < .001

Used bootstrapping to determine whether the magnitude of the mediating effect on the emotional labor turnover was statistically significant. To verify the statistical significance of this study, the number of samples re-extracted by bootstrapping was 5,000. The lower limit of the mediating effect coefficient obtained from the 95% confidence interval was .327 and the upper limit was .487. As shown in Table 3, there is no 0 between the lower limit and the upper limit in the 95% confidence interval. It can be seen that the mediating effect of Organizational Culture is not the result of statistical random errors. Therefore, we confirmed that organizational culture is partly mediated in relation to emotional labor and employee turnover.

Table 3: Bootstrapping

<table>
<thead>
<tr>
<th>Effect</th>
<th>Boot SE</th>
<th>95%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>LLCI</td>
</tr>
<tr>
<td>Organizational Culture</td>
<td>.407</td>
<td>.327</td>
</tr>
</tbody>
</table>
Moderating Effect: The moderating effects were analyzed in three steps proposed by Aiken and West (1991)\(^{15}\). The effect of interaction terms was analyzed by calculating the mean centering of independent variables and control variables to reduce the multi-collinearity problems that may occur in the moderating effect verification. Emotional labor was introduced in the first stage. As a result, emotional labor had a significant effect on turnover intention (\(t = 13.576, p <.001\)). Explanatory power was 21.9%. In the second stage, emotional labor and social support were added. As a result, emotional labor (\(t = 10.592, p <.001\)) and social support (\(t = 9.392, p <.001\)) had a significant effect on each, respectively. Explanatory power was 31.2%. In the third stage, the interaction terms between emotional labor, social support, emotional labor and social support were introduced. As a result of the analysis, there was a significant moderating effect (\(t = -2.167, p <.05\)). The Variation in \(R^2\) was statistically significant (\(\Delta R^2 = .314, p <.05\)). Explanatory power was 31.7%. These results indicate that there is a moderating effect of social support in the relationship between emotional labor and employee turnover.

<table>
<thead>
<tr>
<th>Stage</th>
<th>Non-Standard</th>
<th>(\beta)</th>
<th>(t)</th>
<th>(R^2)</th>
<th>(\Delta R^2)</th>
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<tbody>
<tr>
<td>1</td>
<td>.620</td>
<td>.046</td>
<td>.468</td>
<td>13.576**</td>
<td>.219</td>
</tr>
<tr>
<td>2</td>
<td>.481</td>
<td>.045</td>
<td>.363</td>
<td>10.592***</td>
<td>.312</td>
</tr>
<tr>
<td>3</td>
<td>.292</td>
<td>.031</td>
<td>.322</td>
<td>9.392***</td>
<td>.317</td>
</tr>
</tbody>
</table>

Table 4: Mediating effect

Mediated Moderation Effect: Based on the data used in Muller et al. (2005)\(^{16}\), Mediated Moderation Effect was analyzed. The results of the analysis are summarized as shown in Table 5. First, analysis of Phase 1 revealed that \(\beta_{43}\) was significant. In other words, social support has a moderating effect. Second, In the second step analysis, organizational culture was selected as a dependent variable. Emotional labor and social support, and interaction term (emotional labor * social support) were selected as independent variables. In the second step analysis, \(\beta_{51}\) was significant but \(\beta_{53}\) was not significant. Third, for the three-step analysis, the dependent variable was Employee Turnover. Emotional labor, social support, and interaction term (Emotional labor * social support) were used as independent variables. Also, organizational culture, interaction term (Organizational Culture * social support) were also introduced as independent variables. Three-step analysis showed that both \(\beta_{61}\) and \(\beta_{65}\) were significant.

Fourth, comprehensive analysis shows that \(\beta_{43}\) is significant through the first step analysis. In addition, \(\beta_{51}\) and \(\beta_{65}\) showed significant mediated moderation effect through two step analysis and three step analysis. And \(\beta_{51}\) and \(\beta_{65}\) were significant, indicating a moderating effect between the parameters and dependent variables.

<table>
<thead>
<tr>
<th>Variable</th>
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<tbody>
<tr>
<td>1. Emotional labor</td>
</tr>
<tr>
<td>2. Emotional labor, Social support</td>
</tr>
<tr>
<td>3. Emotional labor, Social support, Emotional labor</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Stage 1</th>
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<th>Stage 3</th>
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<tbody>
<tr>
<td>(\beta)</td>
<td>(\beta)</td>
<td>(\beta)</td>
</tr>
<tr>
<td>(t)</td>
<td>(t)</td>
<td>(t)</td>
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<th>Variable</th>
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<tbody>
<tr>
<td>1. Emotional labor</td>
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<tr>
<td>2. Emotional labor, Social support</td>
</tr>
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<td>3. Emotional labor, Social support, Emotional labor</td>
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</table>

<table>
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<tr>
<th>4</th>
<th>5</th>
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</thead>
<tbody>
<tr>
<td>.078((\beta_{64}))</td>
<td>.078((\beta_{65}))</td>
</tr>
</tbody>
</table>

\(*p < .05, **p < .01, ***p < .001\)
Conculsion

This study has implications for understanding the emotional labor and employee turnover of healthcare workers and exploring the control strategies for helping employee turnover. For this purpose, we examined the mediated moderation effect of emotional labor, organizational culture, social support, and employee turnover. Emotional labor has a significant effect on employee turnover through organizational culture. In this connection, confirmed that social support plays a role as a control variable. Based on the verification of the integrated model, its implications are as follows. First, there was a significant correlation between emotional labor, organizational culture, social support, and employee turnover. All showed a positive (+) correlation. The relationship between organizational culture and employee turnover was relatively high. Second, organizational culture has a significant partial mediating effect on the relationship between emotional labor and employee turnover. The emotional labor of healthcare workers has a direct impact on employee turnover. And, organizational culture indirectly has a significant influence through mediation. Organizational culture was found to be an important factor in job turnover. Third, the moderating effect of social support was found to be significant in the effect of emotional labor on employee turnover. The emotional labor of healthcare workers was found to control the behavior of employee turnover according to the influence of social support. Social support was identified as an important moderating effect variable. Fourth, mediated moderation effect including the moderating effect of organizational culture and mediating effect of social support have significant results. In the relationship between emotional labor and employee turnover, the higher the level of social support, the more significant is the effect of organizational culture on turnover. This study has limitations in the generalization of healthcare practitioners. It is suggested that further studies should be carried out to increase the external validity of research by securing various regions and various levels of sample.

Ethical Clearance: Gwangju University

Source of Funding: This Study was conducted by research funds from Gwangju University in 2019.

Conflict of Interest: Nil

REFERENCES


The Effect of Dhikr before Bedtime on Sleeping Duration and Weight among Primary School Children

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1Master Student, Department of Community Nutrition, Bogor Agricultural University, 2Department of Islamic Education Management, Alauddin State Islamic University, Indonesia

ABSTRACT

The duration of sleeping for children <7 hours has twice the risk of obesity and was associated with health problems. At present, school-age children lack an average sleep duration of 20-25 minutes each day than their parents at their age. This study aimed to determine the effect of dhikr before bedtime on sleeping duration and weight among primary school children. A quasi-experimental design was conducted at SDN Kompleks IKIP Makassar for 3 months. Total 28 samples met the inclusion and exclusion criteria. Samples were divided into two groups, dhikr before bedtime (Db) and control (CT). Each group consists of 14 students. At baseline, showed that there were no significant differences in general characteristics, sleeping environment, sleeping duration, and weight between the intervention and control groups. The results of the analysis after the intervention showed that the intervention dhikr before bedtime significant effect on sleeping duration increased +0.92 minutes, but dhikr before bedtime but no significant effect on body weight, but there was a tendency of decreasing in weight about -0.22 kg. Intervention dhikr before bedtime can be used for the prevention of sleep disorders in children with short sleep duration. Further study, it is recommended that interventions for dhikr before bedtime with longer and be sustained.

Keywords: Dhikr before bedtime, sleeping duration, weight, primary school children

Introduction

Sleep was a basic need of every human being that was instrumental in improving the stability of endurance1. The benefits of sleep can be felt optimally if the sleep has good quality and quantity2. The need for sleep for children varies, according to the age stage, the average school-aged child needs around 9-11 hours a day3. Factors affecting the quantity and quality of children’s sleep habits before the child were sleeping, the sleep environment, drinks and food, lifestyle, physical activity, and stress factors4. Sleep duration of children <7 hours had twice the risk of obesity and related health problems5. Less sleep (2-4 hours a day) may result in an increase in appetite by 23-24%, have an impact on the lack of an increase in caloric intake and contribute to the accumulation of fat in children6. Meta-analysis of 700,000 children from 20 countries found that the average child was currently less sleep 20-25 minute a day compared to their parents at the same age7. The bed was very favorable to growth and development was fast asleep for about 7-8 hours without halting, without feeling restless and dreamless. Children were in desperate need of adequate and quality sleep because optimal growth and development depend heavily on adequate sleep. GH (Growth hormone) during sleep as much as 75%. High levels of GH affects the child’s physical condition because this hormone serves to stimulate the growth of bone and tissue, as well as regulate the body’s metabolism of children8.

Problems that occur to sleep were called sleep disorders. The sleep disorder was a collection of symptoms of the form of quantity and quality. Approximately 46% of sleep disorders in elementary school children have a type of disturbance in starting and maintaining sleep9. Sleep disorders in normal children and children with special needs were divided

DOI Number: 10.5958/0976-5506.2019.01330.5
The sleep disorder is not a disease but a symptom of a variety of physical, mental and spiritual. Efforts to overcome sleep disorders can be given pharmacological and non-pharmacological therapy. Long-term pharmacological therapy has dangerous side effects. Non-pharmacological therapy can be done with behavioral and environmental modifications. Dhikr was a non-pharmacological therapy that was widely practiced and effective to improve sleep quality, especially in patients hospitalized with various diseases, in remembrance Islamic religion was a form of surrender to Allah SWT. Dhikr relaxation was an attitude and passive behavior and surrender by saying words or sentences that were repeated so that it will cause a relaxation response before going to sleep, but there is no dhikr therapy before bedtime at school-age children that have sleep disorders. So this study aims to determine the effect of dhikr before bedtime on sleep duration and weight among primary school children.

Material and Method

The research design used was quasi-experimental. The study was conducted at SDN Kompleks IKIP Makassar, South Sulawesi. School selection done purposively, the subjects involved in the study were 28 students in grade 5A and 5B, each group consisting of 14 students who met the inclusion and exclusion criteria. The inclusion criteria of the subjects in this study were the 5th-grade students (Ages 10-11 years), Muslim, who had been screened overweight, had a sleep duration of <7 hours, were willing to be given intervention, approved and supported by student guardians of informed consent. Subject exclusion criteria were not experiencing pain, consuming certain drugs which can cause respondents to have trouble sleeping within a month before data collection.

Intervention in the form of dhikr before bedtime (DMT) material according to the Sunnah of the Prophet which reads the Surah Al-Fatihah, Al-Baqarah: 255, Al-Baqarah: 284-286, Al-Ikhlaş, Al-Falaq, and An-Naas then rubbed from the head, face and front body as much as 3 times, and last pray to sleep. The material was given through the media power point and pocketbooks. Pocketbook also comes with a sleeping child development control sheet filled out by the parents every day. The DB group was given an intervention in the form of dhikr before bedtime material given 40 minutes a week for 10 sessions in 3 months, until all the memorized dhikr. Technical dhikr before bedtime that has been taught at school was carried out by the subject and controlled by each parent. The CT group as a control group did not receive treatment. Interventions were carried out directly by researchers. Weight measurement using digital scales.

<table>
<thead>
<tr>
<th>General Characteristics</th>
<th>Group</th>
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<th>p</th>
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<tbody>
<tr>
<td></td>
<td>DB n (%)</td>
<td>CT n (%)</td>
<td>Total n (%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td>(n = 14)</td>
<td>(n = 14)</td>
<td>(n=28)</td>
<td></td>
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<tr>
<td>Male</td>
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<td>8 (25.0)</td>
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</tr>
<tr>
<td>Female</td>
<td>7 (25.0)</td>
<td>6 (25.0)</td>
<td>13 (46.4)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10 years</td>
<td>7 (25.0)</td>
<td>9 (32.1)</td>
<td>16 (57.1)</td>
<td>0.453</td>
<td></td>
</tr>
<tr>
<td>11 years</td>
<td>7 (25.0)</td>
<td>5 (17.8)</td>
<td>12 (42.9)</td>
<td></td>
<td></td>
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<tr>
<td>Allowance</td>
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<td></td>
</tr>
<tr>
<td>No</td>
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<td>0 (0.0)</td>
<td>2 (7.1)</td>
<td>0.326</td>
<td></td>
</tr>
<tr>
<td>5.000-15.000</td>
<td>11 (39.3)</td>
<td>13 (46.4)</td>
<td>24 (85.8)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&gt;15.000</td>
<td>1 (3.5)</td>
<td>1 (3.5)</td>
<td>2 (7.1)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 1: General characteristics of the intervention and control groups
Conted…

<table>
<thead>
<tr>
<th>Caffeinated Drinks</th>
<th>Yes</th>
<th>4 (14.3)</th>
<th>3 (10.8)</th>
<th>7 (25.0)</th>
<th>0.668</th>
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<tr>
<td></td>
<td>No</td>
<td>10 (35.7)</td>
<td>11 (39.3)</td>
<td>21 (75.0)</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Sports Frequency</th>
<th>Every day</th>
<th>3 (10.8)</th>
<th>6 (21.4)</th>
<th>9 (32.1)</th>
<th>0.269</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>Every week</td>
<td>8 (28.5)</td>
<td>6 (21.4)</td>
<td>14 (50.0)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Each month</td>
<td>3 (10.7)</td>
<td>2 (7.1)</td>
<td>5 (17.9)</td>
<td></td>
</tr>
</tbody>
</table>

Mann Whitney tests results in table 1 showed no significant differences in the general characteristics of the subject between DB and control groups. The majority of subjects were male (53.6%), 10 years old (57.1%), every day was given a 5,000-15,000 allowance (85.8%), consume caffeine (25%), exercise only once a week (50%), and have overweight nutritional status.

| Table 2: Sleeping Environment at Baseline of the Intervention and Control Groups |
|---------------------------------|---------------|---------------|---------------|-------|
| Sleeping Environment            | Kelompok      | Total         | P             |
|                                 |               |               |               |
|                                 | DB            | CT            |               |       |
|                                 | n (%)         | n (%)         | n (%)         |       |
| Habits before sleep             |               |               |               |       |
| Watching TV                     | 0 (0.0)       | 3 (10.8)      | 3 (10.8)      | 0.464 |
| Reading books                   | 3 (10.8)      | 2 (7.1)       | 5 (17.9)      |       |
| Playing video games             | 1 (3.5)       | 0 (0.0)       | 1 (3.5)       |       |
| Using the internet              | 10 (35.7)     | 8 (28.5)      | 18 (64.3)     |       |
| Listening Murottal Al-Quran     | 0 (0.0)       | 1 (3.5)       | 1 (3.5)       |       |
| Private Television              |               |               |               |       |
| Yes                             | 11 (39.2)     | 8 (28.5)      | 19 (67.8)     | 0.233 |
| No                              | 3 (10.8)      | 6 (21.4)      | 9 (32.2)      |       |
| Handphone Possession            |               |               |               |       |
| Ya                              | 13 (92.9)     | 14 (100)      | 27 (97.7)     | 0.317 |
| Tidak                           | 1 (7.1)       | 0 (0.0)       | 1 (2.3)       |       |
| Handphone Usage Limitation      |               |               |               |       |
| Restricted                      | 11 (78.6)     | 9 (64.3)      | 20 (76.2)     | 0.411 |
| Unrestricted                    | 3 (10.8)      | 5 (35.7)      | 8 (23.8)      |       |
| Brightness bedroom              |               |               |               |       |
| Bright                          | 1 (3.5)       | 5 (17.9)      | 6 (21.4)      | 0.704 |
| Dull                            | 6 (21.4)      | 1 (3.5)       | 7 (25.0)      |       |
| Dark                            | 7 (25.0)      | 8 (28.5)      | 15 (53.6)     |       |
| Temperature bedroom             |               |               |               |       |
| Warm                            | 0 (0.0)       | 1 (3.5)       | 1 (3.5)       | 0.138 |
| Neutral                         | 1 (3.5)       | 3 (10.7)      | 4 (14.4)      |       |
| Could                           | 13 (46.4)     | 10 (35.7)     | 23 (82.1)     |       |

Mann Whitney test results in table 2 showed no significant difference between the subjects of environment Sleeping DB and control groups. The majority of subjects had a habit before going to bed playing the gadget (64.3%), having a private television in the room (67.8%), handphone possession gets (97.7%), subjects not restricted from using gadget (23.8%), and during sleep they had dark light (21.4%) and cold (82.1%).
Table 3: The effect of Intervention on Sleeping Duration and Weight

<table>
<thead>
<tr>
<th>Effect of Intervention</th>
<th>Group</th>
<th></th>
<th></th>
<th>p°^1</th>
<th>p^2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>DB</td>
<td>CT</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mean ± SD</td>
<td>Mean ± SD</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sleeping Duration (h/m)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Before</td>
<td>6.11 ± 1.24</td>
<td>6.07 ± 0.91</td>
<td>0.704</td>
<td></td>
<td></td>
</tr>
<tr>
<td>After</td>
<td>7.04 ± 1.11</td>
<td>6.14 ± 0.74</td>
<td>0.040*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Δ Mean ± SD</td>
<td>0.92 ± 0.31</td>
<td>0.07 ± 0.43</td>
<td>0.000*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>p^3</td>
<td>0.001*</td>
<td>0.458</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weight (Kg^2)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Before</td>
<td>42.48 ± 6.43</td>
<td>40.60 ± 4.12</td>
<td>0.323</td>
<td></td>
<td></td>
</tr>
<tr>
<td>After</td>
<td>42.25 ± 6.78</td>
<td>41.07 ± 4.60</td>
<td>0.462</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Δ Mean ± SD</td>
<td>-0.22 ± 0.91</td>
<td>0.47 ± 1.04</td>
<td>0.110</td>
<td></td>
<td></td>
</tr>
<tr>
<td>p^3</td>
<td>0.568</td>
<td>0.024*</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*significant p<0.05

p°^1 Mann Whitney between DT and Control groups
p^2 Wilcoxon between before and after each group
Δ^3 After - Before

The results of the Mann Whitney test for table 3 showed that the subjects' sleep duration before intervention had no significant difference, but after the intervention, there was a significant difference between the DB and CT groups (p = 0.040). Wilcoxon test showed that there was a significant effect of sleep duration in the group with delta DT +0.92 minutes, this suggests that the form of therapeutic intervention dhikr before bedtime significant effect on the increase sleeping duration subject. Table 3 showed that the weight of the subject before and after intervention there was no significant difference, the CT group had a significant effect on weight. The DB group has no effect after the intervention, but there was a tendency to decrease the subject body rate by -0.22 kg. This indicates that the intervention in the form of dhikr before bedtime tends to reduce the weight of children was overweight.

Discussion

The quantity and quality of sleep of a child were influenced by several factors^4. In this study shows boy have shorter sleep duration than girls. This was consistent with research in Australia because boys spend more time on sedentary activities such as watching television and the internet. This can cause boys to have shorter sleep duration than girls^10. The results of the interviews before the intervention, 85.8% of subjects were given an allowance of 5,000-15,000 per day, the money given was used to buy food and drinks at school, a small portion was used to buy school supplies. Some foods and drinks consumed by the school cafeteria contain caffeine; such as tea, soft drinks, chocolate bars, and coffee-flavored ice cream. The effect of consumption of food and caffeinated drinks can begin to be felt 15-20 minutes after drinking even up to 4 hours later. Research in the United States found that the relationship between diet caffeine and sleep duration of children, children who consume caffeinated drinks experience shorter sleep duration than children who do not consume caffeinated drinks^11. Snacks in school children have been shown to increase calorie intake of children, consumed more quickly and produce a higher calorie intake^12.

Children’s lifestyle can lead to a decreased quality of sleep, exposure monitor screen ≥2 hours per day can cause sleep disorders in children^13. Electronic media can have an adverse impact on sleep quality, improper use of time and the brightness of the light emitted can cause changes in sleep patterns. Light emitted by electronic media to the retina signals the hypothalamus and interferes with the production of melatonin in the body, thereby changing sleep quality^14. Factors in the child’s sleep environment can increase and decrease the quality of sleep, the presence of external stimuli can inhibit sleep efforts such as uncomfortable temperatures and poor ventilation. A good temperature to provide
good sleep quality was around 24°C–26°C. Children who experience fatigue intermediate level tends to get a good night’s sleep, especially when fatigue derived from physical exercise, increase the amount of sleep, and reduce awakened during sleep.

Conditions before the intervention, some parents reported sleep disturbances in their children, some subjects found it difficult to start sleeping, often had nightmares, talked and walked while sleeping, and were difficult to wake up. Sleep duration subject after doing dhikr before bedtime for 3 months duration of sleep affects the subject, the subject was easier to initiate sleep, rarely woke up at night and feel more refreshed when you wake up in the morning. Relaxation condition caused by the pronunciation of words to remember God can provide the stimulus stimulation activity on the system and the hypothalamic pituitary adrenal sympathoadrenal, which can inhibit the secretion of adrenocorticotrophin hormone which can inhibit the production of a hormone that triggers the physiological changes include changes in the child’s sleep quality. Dhikr can affect one’s relaxation due to melatonin hormone secretion that was affected by a decrease in one’s brain waves down on the delta wave. When the brain delta surge will produce human growth hormone which was serotonin which was good for health. By the time someone reaches the pineal gland delta waves would change the substance serotonin into melatonin, which affects the quality of sleep was important to a person, so it feels good night’s sleep.

Short sleep duration causes changes in hormonal regulation of appetite and increased hunger and food intake, increases the body fatigue and reduced activity during the day so as to spend more time to settle down at home of adequate energy expenditure, often accompanied by irregular eating habits and increased calorie intake by tending to eat high energy dense. Increased calorie intake that was not offset by energy consumption causes weights to gain. Sleep also involves metabolic functions, namely hormones that regulate appetite and energy consumption. Sleep duration increased from 2-4 hours a day to 7 hours a day leads to weight loss, whereas sleep duration <7 hours per night increases the risk of obesity.

**Conclusion**

This study summarizes that dhikr before bedtime has a significant effect on increasing the child’s sleep duration, but dhikr before bedtime has no significant effect on the child’s body weight. But there was a tendency for weight loss.

**Acknowledgment**

The research was fully supported by the Bogor Agricultural Institute and the Makassar City Education Office in terms of providing facilities for conducting this research. This research has obtained Ethical Approval from the Human Ethics Committee of Bogor Agricultural University No.028/IT3.KEPMSM-IPB/SK/2018.

**Source of Funding:** Ministry of Education and Culture

**Conflict of Interest:** All authors declared no conflict of interest within this study.

**REFERENCE**


The Influence of Strategic Foresight on Hospital Financial Performance: Mediating Effect of Continuous Quality Improvement

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¹Assist. Prof. Dr., Iraqia University, College of Administration and Economics, Iraq; ²Lect. Dr., University of Kufa, College of Administration and Economics, Iraq

ABSTRACT

The aim of this study is to explore the mediation influence of continuous quality improvement between the strategic foresight and the financial performance of the hospital, with the intention of applying it to a specific medical service in the hospital. Through indicators that can be formed as a tool for assessment, monitoring, and control. The increasing pressure on health organizations in Iraq has led to a continuous increase in spending, an increase in population expectations and the need to get the most out of the invested resources, which require continuous quality improvement. These conditions require effective strategic tools such as strategic foresight tools that have proved as successful on a large scale. This study was applied in the health sector in Iraq. The questionnaire was adopted as a main instrument for the study. It was found that the adoption of strategic foresight and continuous improvement were necessary to improve hospital financial performance.

Keywords: Strategic Foresight, Competitor Foresight, Technology Foresight, Customer Foresight.

Introduction

Before the era of wars in the country and the subsequent sanction against the country, Iraq had a very high standard of healthcare when compared to other countries in the Arab region. Healthcare in the country was free by then, administered centrally through the ministry of health and well equipped with necessary equipment and the appropriate number of personnel¹.

Research conducted by Valeria Cetorelli and Nazar between 2003 to 2014 ², reveal that after a decade of war, the Iraqi government embarks in the strengthening of private firms after years of sanctions. The government of Iraq for the preceding period after the war and a series of several sanctions that negatively affected the health system focused on the development of the old system ³. The national statistics of the country reveal a positive and promising healthcare system concerning the demographics ⁴. For instance, the country consists of life expectancy of above 70 years for both male and female ⁵. The projection of the Iraqi private healthcare market is expected to proliferate as the country continues to stabilize political and civil matters. The country has a total population of 37.6 million people according to World Bank statistics ⁶. The Iraqi healthcare systems are projected to be dominated by the private sector after the political and economic conditions ⁷, especially in light of the troubled financial performance of the health sector in the country. The hospital financial performance aims to increase the efficiency and effectiveness of hospitals performance, thus improving the medical and health services provided to the customers in general ⁸, and this requires a set of strategic tools that accurate and guaranteed to achieve success by diagnosing the strengths and weaknesses by adopting a set of general indicators that efficiency control and corrective action.

Hence, the health sector needs to employ strategic tools that contribute to the process of continuous quality improvement. The concept of strategic foresight has emerged as a successful strategic tool ⁹, which can...
contribute to continuous improvement of quality and improve hospital financial performance.

Accordingly, this study aims to identify the mediation role of continuous quality improvement between strategic foresight and hospital financial performance.

**Literature Review**

**Strategic Foresight:** The awareness of the future and its anticipation and the identification of challenges and opportunities is an important factor in having a clear vision for the future, especially in the current era, which has great challenges, so strategic foresight has become an important strategic tool. The strategic foresight represents the planning discipline associated with future studies, and it is used to gather relevant information in the future and to predict the correct future picture. Strategy foresight activities focus on customers, competitors and technology, these activities are carried out through the company’s product and innovation unit.

**Competitor Foresight:** The competitor foresight is carried out by the home production unit and aims to identify and anticipate the movements of competitors. This activity is supported by a radar product and service tool for its classification and visualization.

**Technology Foresight:** Technology foresight is implemented by the technology exploration unit, which uses radar technology as a tool for classification and visualization, similar to radar products and services.

**Customer Foresight:** The prospective role of the client is assumed by user-driven innovation, which uses five tools to identify emerging needs (exploratory interviews, daily research, day life visits, vision clinics, and major studies) and make them quantifiable.

**Hospital Financial Performance:** The concept of performance is mainly related to the resources used to achieve a particular outcome and subsequently obtained, and here the performance is related to profit, financial benefit and financing. Financial performance represents the profit that is realized through the investment or through the benefit obtained later on after a certain period. In other words, financial performance is linked to the profitability obtained through the resources used. And the liquidity that is achieved. Profitability is an economic activity through which a series of materials, means, and human and financial resources have collected that aim at obtaining a series of results. That is, profitability is the yield generated by a series of capitals in a given period of time. Liquidity is the quality of assets that are converted into cash immediately without a significant loss of value. In a way that makes it easier to convert the asset into money.

**Continuous Quality Improvement:** Continuous improvement is an effective method of achieving total quality, also called excellence, which is the evolution that has experienced the concept of quality. Quality is good quality and good value.

In recent times the concept of quality assurance has been taking a lot of force, which can be defined as a stage that allows guaranteeing the continuous level of the quality of the product or service provided by the organization, which gives greater prominence and importance to the continuous improvement. The Continuous quality improvement consists of Assess, plan and improve, Assessment of performance begins with research and asses of staff strengths and identification of areas to be remedied and process. The plan aims to improve as a primary objective, the sequence of the plan evaluation identifies a supportive system for continuous improvement.

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**Material and Method**

**Sampling:** The population of this research is physicians of Iraqi hospitals, random sampling is used as a method of selection. 130 questionnaire were distributed and 114 were retrieved, 109 were valid to the analysis with 83.8% response rate, and is considered highly adequate for analysis because it was above 70% which is recommended as adequate. Cronbach alpha was used in this study to determine the reliability of the measures and its exceed 0.70 which is an acceptable range as shown in Table 1.

| Table: 1 Cronbach Alpha |
|---|---|---|
| Variable | Code | Cronbach Alpha |
| Strategic Foresight | SF | 0.778 |
| Competitor Foresight | Cof | 0.702 |
| Technology Foresight | Tef | 0.749 |
| Customer Foresight | Cuf | 0.739 |
Continuous Quality Improvement CQI 0.802
Assess As 0.814
Plan Pl 0.829
Improve Im 0.831
Hospital Financial Performance HFP 0.894

Research Hypothesis: After review of the literature, the conceptual framework was formulated as in Figure 1 to discuss the hypotheses as follows:

H1: Continuous quality improvement has a mediation role in the relationship between competitor foresight and hospital financial performance.

H2: Continuous quality improvement has a mediation role in the relationship between technology foresight and hospital financial performance.

H3: Continuous quality improvement has a mediation role in the relationship between customer foresight and hospital financial performance.

Findings

Confirmatory Factor Analysis: In order to identify the components of the variables, the confirmatory factor analysis is performed as shown in Table 2 the CFA exceed 0.5 and refer to that the items relating to each factor of SF which was composed of three dimensions (SF1, SF2, SF3) and CQI which was composed of three dimensions (CQI1, CQI2, CQI3) Each of the dimensions is measured through four questions and HFP is measuring through eight questions, the results indicate that the questions are adequate to measure its dimension. Also, the fitting indicators are expressed in Table 3 which refer to acceptable values.

<table>
<thead>
<tr>
<th>Item</th>
<th>Factor</th>
<th>Loading</th>
</tr>
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<tbody>
<tr>
<td>q1</td>
<td>SF1</td>
<td>0.879</td>
</tr>
<tr>
<td>q2</td>
<td>SF1</td>
<td>0.866</td>
</tr>
<tr>
<td>q3</td>
<td>SF1</td>
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</tr>
<tr>
<td>q4</td>
<td>SF1</td>
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<tr>
<td>q5</td>
<td>SF2</td>
<td>0.916</td>
</tr>
<tr>
<td>q6</td>
<td>SF2</td>
<td>0.920</td>
</tr>
<tr>
<td>q7</td>
<td>SF2</td>
<td>0.934</td>
</tr>
<tr>
<td>q8</td>
<td>SF2</td>
<td>0.926</td>
</tr>
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</table>
Table 3: Goodness Fit Index

<table>
<thead>
<tr>
<th>Index</th>
<th>Condition</th>
<th>Value</th>
<th>States</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>SF</td>
<td>CQI</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.918</td>
<td>0.908</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.957</td>
<td>0.951</td>
</tr>
<tr>
<td></td>
<td>&lt;5</td>
<td>3.124</td>
<td>2.748</td>
</tr>
<tr>
<td></td>
<td>&lt;0.08</td>
<td>0.069</td>
<td>0.074</td>
</tr>
</tbody>
</table>

Hypotheses Testing: After analyzing the internal and external consistency, the internal model was tested for hypothesis testing. However, direct and indirect effects were examined in this part. In direct effect, all direct hypotheses were examined without the mediator. In indirect effect, mediation hypotheses were tested. Table 4, Figure 2 shows that the direct effect of SF1 on HFP (-0.089) is not significant at the level of (P < 0.05), and the direct effect of SF1 on CQI (0.218) is significant at the level of (P < 0.05), also the indirect effect of SF1 on HFP (0.214) is significant at (P < 0.05), these results support H1 hypothesis. The direct effect of SF2 on HFP (0.020) is not statistically significant at (P < 0.05), and the direct effect of SF2 on CQI (0.514) is significant at (P < 0.05), also the indirect effect of SF2 on HFP (0.506) is statistically significant at (P < 0.05). these results support H2 hypothesis. Additionally, the direct effect of SF3 on HFP (-0.073) is not significant at (P < 0.05), and the direct effect of SF3 on CQI (0.186) is significant at (P < 0.05), also the indirect effect of SF3 on HFP (0.183) is statistically significant at (P < 0.05). these results support H3 hypothesis.

Table 1: Direct and Indirect Effect

<table>
<thead>
<tr>
<th>Path</th>
<th>Effect</th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>T Statistics</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>SF1…&gt;HFP</td>
<td>-0.089</td>
<td>-0.092</td>
<td>0.115</td>
<td>0.778</td>
<td>0.437</td>
</tr>
<tr>
<td>SF2…&gt;HFP</td>
<td>0.020</td>
<td>0.028</td>
<td>0.122</td>
<td>0.166</td>
<td>0.868</td>
</tr>
<tr>
<td>SF3…&gt;HFP</td>
<td>-0.073</td>
<td>-0.066</td>
<td>0.088</td>
<td>0.826</td>
<td>0.409</td>
</tr>
<tr>
<td>SF1…&gt;CQI</td>
<td>0.218</td>
<td>0.239</td>
<td>0.091</td>
<td>2.393</td>
<td>0.017</td>
</tr>
<tr>
<td>SF2…&gt;CQI</td>
<td>0.514</td>
<td>0.491</td>
<td>0.102</td>
<td>5.051</td>
<td>0.000</td>
</tr>
<tr>
<td>SF3…&gt;CQI</td>
<td>0.186</td>
<td>0.187</td>
<td>0.081</td>
<td>2.291</td>
<td>0.022</td>
</tr>
<tr>
<td>SF1…&gt;CQI…&gt;HFP</td>
<td>0.214</td>
<td>0.233</td>
<td>0.093</td>
<td>2.318</td>
<td>0.021</td>
</tr>
<tr>
<td>SF2…&gt;CQI…&gt;HFP</td>
<td>0.506</td>
<td>0.478</td>
<td>0.114</td>
<td>4.438</td>
<td>0.000</td>
</tr>
<tr>
<td>SF3…&gt;CQI…&gt;HFP</td>
<td>0.183</td>
<td>0.180</td>
<td>0.079</td>
<td>2.321</td>
<td>0.021</td>
</tr>
</tbody>
</table>
Health institutions work in a rapidly evolving environment that requires compatibility between their various available resources and capability and those imposed by this external and internal environment \(^2\) (including changing in meeting needs and health services to patients) \(^2\) so they have to find all the means and methods that assist in achieving their objectives efficiently and effectively \(^2\). The literature review discusses the earlier studies done on the above topic and the main reason for this review is to take an in-depth insight on how to improve the Iraqi hospital financial performance by using strategic foresight and continuous quality improvement. This article aims to determine the effort that strategic foresight takes to improve the quality and performance which will enable the hospital to compete on the same level as other hospitals in this country.

The results proved that strategic foresight does not affect the financial performance directly, but it has a positive influence when there is a continuous improvement as a mediator between the relation. The results showed that the influence of competitor foresight is a positive, this result is supported by literature \(^2\) which have shown that competitive planning has a positive impact on performance improvement.

The influence of customer foresight has a positive influence on performance, and this result has been consistent with multiple studies, and the perception of the customer positively affects the improvement of performance\(^2\), as the orientation of customer trends leads to the improvement of strategic plans and thus reflected on the efficiency of performance \(^2\).

Conclusion

In light of the findings of the study, it can be seen that the strategic foresight have a positive indirect influence on the dependent variable hospital financial performance and therefore hospital management should try to use of these strategies.

Ethical Clearance: All ethical issues were approved from the local committee of ethical for scientific researches.

Conflict of Interest: Authors declared: None.

Source of Funding: Self-Funding.

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Lipid Profile Improvement of Overweight-Obese Adults after High Antioxidant Tomato and Rice Bran Drinks Intervention

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ABSTRACT

This study aimed to evaluate the consumption benefits of tomato juice-rice bran drink and tomato juice-rice bran oil emulsion drink on serum lipid profile picture of obese adults. This study used a preexperimental design parallel two group pretest-posttest design involving 13 obese subjects each group for a total of 26 people. The main phase consisted of 4 weeks-intervention. Intervention was performed by giving two glasses of tomato drink and two drinks beverages of rice bran oil every day which is equivalent to 42 mg of lycopene and 57.2 mg of γ-oryzanol, respectively. The results showed that tomato juice, rice bran powdered and oil emulsion drink lowered the level of total cholesterol and LDL cholesterol significantly (p<0.05), whereas triglyceride and HDL level were not changed.

Keywords: rice bran powder, rice bran oil emulsion, tomato juice, lipid profile, obese adults

Introduction

Based on data by World Health Organization (WHO), in 2016 more than 1.9 billion (39%) adults aged 18 years and older were overweight1. Based on basic health research (BHR) 2013 by Indonesia Ministry of Health (MOH), national prevalence of adults overweight was 28.9%, prevalence of women (32.9%) was higher than men (19.7%)2. Raised BMI is a major risk factor for non-communicable diseases as well as abnormalities of lipid profiles. Overweight and obesity, as well as their related non-communicable diseases are largely preventable1.

One of many ways of overweight and obesity intervention is food-based intervention. Many researches have shown that component of food such as phytonutrient has been found to be effective in controlling obesity3. Two of important sources of phytonutrient were tomato and rice bran. Blended or boiled tomato seemed to be better source of lycopene than the whole or raw one, because there was isomerization and oxidation during heat processing4. There is bioactive compound in rice bran, such as vitamin E (tocopherol and tocotrienol), oryzanol and pangamic acid. Bioactive compound, as antioxidant, can scavenge free radical so can decrease blood cholesterol level, prevent cancer, and increase hormone secretion5. Rice bran oil can decrease significantly blood total cholesterol and LDL level. Those decreasing effect was caused by bioactive compound, i.e. γ-oryzanol, but not by fibre content6.

Previously, effect rice bran in addition to plant sterol combination on blood lipids in healthy overweight-obese adults was studied7. Thus, this study aimed to evaluate the consumption benefits of tomato juice-rice bran powder drink (TRP) and tomato juice-rice bran oil emulsion drink (TRO) against obesity complications as assessed by serum lipid profile picture of obese adults.

Material and Method

This research was intervention of combination high-antioxidant tomato and rice bran drinks. Location of this research was Bogor Agricultural University, Indonesia and being held from May to November 2013.
Subjects: Subjects of this research were adults which inclusion criteria were BMI 25-35 kg/m², age 24-56 years, fasting glucose level ≤ 126 mg/dL, and voluntary participating which proved by informed consent. Exclusion criteria were chronic disease history; consuming supplement of antioxidant; pregnant or breast feeding, postmenopausal, and hormone replacement therapeutic for women, chronic inflammation diseases; and/or unbearable to consume intervention products.

Minimal sample size was counted based on minimum sample size for estimating difference mean between groups. Based on that formula, minimal sample size were 12 subjects for each group. By purposive sampling, these subjects were allocated into TRP or TRO group. Based on screening, which met the inclusion and exclusion criteria, the total of samples were 27 (14 for TRP and 13 for TRO).

Intervention: Period of intervention was four weeks, i.e. the first 2 weeks was provision of tomato juice and the following 2 weeks was provision of rice bran powder or rice bran oil emulsion drink. Tomato juice should be consumed twice daily, each was 240 mL. Rice bran powder should be dissolved in water before consumed and consumed twice daily, each was 15 gram. Rice bran oil emulsion was given in the form of ready to drink and should be consumed twice daily, each was 220 mL.

Preceeding period of intervention, there was run-in period for two weeks. In this period, subjects did not allow to consume high antioxidant content of food and/or supplement. In the end of each of tomato juice, rice bran powder or rice bran oil emulsion provision, blood lipid profile were analyzed.

Statistical Analysis

The data were analyzed using Microsoft Excel for Windows and SPSS. The data were analyzed using descriptive analysis, comparative analyses independent sample t-test and paired sample t-test.

Findings

During intervention, one subject from TRP group was dropped because she could not consume rice bran powder. Therefore each group consisted of 13 subjects. The age range involved in this study was 26-55 years. The highest level of education was high school education level (48.1%) and the lowest at the primary education level (7.4%). Most of the respondents were married (88.5%).

Table 1: Characteristics of respondents

<table>
<thead>
<tr>
<th>Categories</th>
<th>n</th>
<th>%</th>
</tr>
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<td></td>
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</tr>
<tr>
<td>Young adult (20-35 yrs old)</td>
<td>7</td>
<td>25.9</td>
</tr>
<tr>
<td>Late adult (36-45 yrs old)</td>
<td>4</td>
<td>14.8</td>
</tr>
<tr>
<td>Elderly (46-55 yrs old)</td>
<td>16</td>
<td>59.3</td>
</tr>
<tr>
<td>Education level</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Elementary school</td>
<td>2</td>
<td>7.4</td>
</tr>
<tr>
<td>Junior high school</td>
<td>3</td>
<td>11.1</td>
</tr>
<tr>
<td>Senior high school</td>
<td>13</td>
<td>48.1</td>
</tr>
<tr>
<td>University</td>
<td>9</td>
<td>32.3</td>
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<tr>
<td>Married status</td>
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<td></td>
</tr>
<tr>
<td>Married</td>
<td>23</td>
<td>88.5</td>
</tr>
<tr>
<td>Not married</td>
<td>3</td>
<td>11.5</td>
</tr>
<tr>
<td>Occupation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cleaning service</td>
<td>7</td>
<td>25.9</td>
</tr>
<tr>
<td>Education staff</td>
<td>17</td>
<td>63.0</td>
</tr>
<tr>
<td>Lecturer</td>
<td>3</td>
<td>11.1</td>
</tr>
</tbody>
</table>

All lipid profiles were decreased on both intervention groups, except triglyceride on TRP group which increased at week-4. After intervention, total cholesterol level of both groups decreased significantly (p<0.05), i.e. 77.8 mg/dL (39%) and 64 mg/dL (33%) for TRO group and TRP group, respectively.

Both TRP and TRO provision tended to decrease High Density Lipoprotein (HDL) level at the first two weeks of intervention. The last two weeks intervention showed that administration of both TRP and TRO tended to increase HDL level even though TRO was more powerful in increasing HDL level than rice bran powder. In TRP group, HDL level increased but not statistically significant and in TRO group, HDL level significantly increased from 35.6 mg/dL to 42.5 mg/dL (p<0.05).

Serum Low Density Lipoprotein (LDL) level decreased significantly (p<0.05) after intervention of either TRP or TRO. TRO was more powerful in decreasing LDL level (74.1 mg/dL) than TRP (65.7 mg/dL). After period of intervention, provision of TRO had inconsistent effect on TG level. However provision of TRO decreased triglycride level but not statistically significant (p>0.05).
Table 2: Average of lipid profiles

<table>
<thead>
<tr>
<th>Lipid profile</th>
<th>TRP (week-0)</th>
<th>TRP (week-2)</th>
<th>TRP (week-4)</th>
<th>TRO (week-0)</th>
<th>TRO (week-2)</th>
<th>TRO (week-4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cholesterol Total</td>
<td>193.3 ± 31.4a</td>
<td>137.934.3b</td>
<td>129.3 ± 35.0b</td>
<td>200 ± 33.2a</td>
<td>175.3 ± 44.8b</td>
<td>122.2 ± 19.7c</td>
</tr>
<tr>
<td>HDL</td>
<td>48.5 ± 12.0a</td>
<td>40.3 ± 6.9b</td>
<td>40.8 ± 7.8b</td>
<td>51.7 ± 12.5a</td>
<td>35.6 ± 10.3b</td>
<td>42.5 ± 7.9c</td>
</tr>
<tr>
<td>LDL</td>
<td>125 ± 27.4a</td>
<td>77 ± 33.0a</td>
<td>59.3 ± 42.5b</td>
<td>119.8 ± 19.3a</td>
<td>102.2 ± 39.9a</td>
<td>45.7 ± 12.0b</td>
</tr>
<tr>
<td>Triglyceride</td>
<td>122.9 ± 51.4ab</td>
<td>103.5 ± 44.2a</td>
<td>145.8 ± 46.9a</td>
<td>193.6 ± 121.8a</td>
<td>190.7 ± 142.0a</td>
<td>182.2 ± 121.9a</td>
</tr>
</tbody>
</table>

**Discussion**

Result indicated that provision either tomato juice-rice bran powder drink (TRP) or tomato juice - rice bran oil emulsion drink (TRO) were both effective in decreasing total cholesterol level. However, TRO intervention had better effect than TRP provision, each after tomato juice provision.

Damayanthi *et al.* showed that provision of tomato juice and rice bran powder with the same of dosage and period tended to decrease total cholesterol level of high cholesterol women with or without breast cyst. Phytosterol of rice bran oil as part of margarine ingredients which consumed by normolipidemic person as much as 2.1 gram per day could decrease their total and LDL cholesterol by 5% and 9%, respectively.

Another research showed that in comparison with the control group, the results of treatment with rice bran oil, total cholesterol level significantly decreased by 10.3% (*P* < 0.05) 11. Study by Hongu *et al.* showed decreased total cholesterol among subject who received rice bran treatment. Result showed average decrease in total cholesterol was significantly higher in the rice bran and plant sterol group than in the pigmented rice bran group (difference 36 ± 25 g/dL vs 7 ± 16 g/dL; *p* = 0.044)7. Study by Choudary *et al.* among 60 moderately hyperlipidemic patients who received blended rice bran and olive oil showed that the level of TC decreased by 3.7 even though not significant statistically12. Children received 1 ml/kg/day of rice bran oil showed significant declining in serum cholesterol levels at 4 weeks from initiation of treatment13. Consumption of 18 g rice bran oil modified milk daily significantly decreased total serum cholesterol concentrations by 3.6% (from 184.3 mg/dL to 177.6 mg/dL)14.

In human macrophages, lycopene dose dependently reduced intracellular total cholesterol. Such an effect was associated with a decrease in cholesterol synthesis through a reduction of 3-hydroxy-3-methylglutaryl coenzyme-A reductase activity and expression, a modulation of LDL receptor and acyl-coenzyme A:cholesterol acyltransferase activity. An increase in cholesterol efflux through an enhancement of ABCA1 and caveolin-1 expression was also observed. In animal models of atherosclerosis, lycopene and tomato products decreased plasma total cholesterol, LDL cholesterol and increased HDL cholesterol15.

Mechanism of decreasing cholesterol level as a result of provision of rice bran oil, γ-oryzanol, and pherulic acid in hypercholesterolemic Golden Syrian hamster (*Mesocricetus auratus*) was via increasing excretion of cholesterol and its metabolite through feces16. Another mechanism of decreasing cholesterol level by rice bran oil in hyperlipidemic rats was via 7α-hydroxilase cholesterol of liver, liver receptor-LDL, and hydroxyl-3-methylglutaryl coenzim A reductase mRNA of liver. High content of γ-oryzanol and γ-tocotrienol in rice bran oil could increase neutral sterol of feces and excretion of bile acid through upregulation of synthesis and metabolism of cholesterol17. Since oryzanol has a closely related structure to cholesterol, it may compete for the binding sites of cholesterol and thus may inhibit dietary cholesterol absorption. Oryzanol may affect cholesterol metabolism by altering dietary cholesterol absorption18.

Higher HDL level after treatment was desired. However, this research showed that in both treatment groups, HDL decreased at 2nd week and increased at 4th week. In TRO group, HDL level significantly increased from 35.6 mg/dL to 42.5 mg/dL (*p*<0.05). Tazakori *et al.* conducted double blind non cross-over trial to 60 diabetic patients who were given 10 g soluble rice bran and showed that HDL level increased significantly (*p*<0.05) from 46 mg/dL to 53 mg/dL19. Tabassum *et al.* showed that HDL level increased after treatment with rice bran but not statistically significant13 and some studies showed that HDL level decreased but not statistically significant after rice bran treatment11,12,14,18.
In subjects whom consumed control diet or defatted rice bran diet were no decrease in total, LDL, or HDL cholesterol as reported by Most et al. But, the rice bran oil diet lowered total and LDL cholesterol significantly more than did the control diet. Furthermore seemed that the reduction in cholesterol was likely due to other components present in the rice bran oil. He showed that the effect of rice bran oil on serum cholesterol concentration is due to the unsaponifiable present in it and not to its lipid profile.

Hongu et al. showed the decrease in low-density lipoprotein (LDL) cholesterol (difference 22.3 ± 25.2 g/dL vs 4.4 ± 18.9 g/dL; p = 0.062) among healthy overweight-obese adults who received rice bran and plant sterol treatment compared to only rice bran treatment. Study by Choudary et al. among 60 moderately hyperlipidemic patients who received blended rice bran and olive oil showed that the levels of LDL cholesterol decreased by 9.0 % even though not significant statistically. Children received 1 ml/kg/day of rice bran oil showed significant declining in LDL levels at 4 weeks from initiation of treatment. Consumption of 18 g rice bran oil modified milk daily significantly tended to decrease LDL cholesterol concentrations by 2.7% (from 11.9 mg/dL to 108.0 mg/dL).

The treatment group of hyperlipidemic patients received rice bran oil (30 g/day) showed that in comparison with the control group, the results of treatment with rice bran oil, LDL level significantly decreased by 7.1% (P < 0.05). High levels of unsaponifiable material are found in rice bran oil. This is composed of phytosterols (γ-oryzanol), triterpene alcohols, and vitamin E isomers (tocopherols and tocotrienols). Rice bran oil contains up to 20% SFA and equal amounts of MUFA and PUFA.

Damayanthi et al. indicated that antioxidant activity of tomato juice and rice bran powder were 1.87 AEAC and 28.74 (mg/100 g), respectively. Rice bran oil and oryzanol can inhibit human LDL oxidation (in vitro) that indicated by relatively lower the level of malonaldehyde LDL in which plasma was supplemented with rice bran oil than control. Percentage of human malonaldehyde β-VLDL and LDL decreased significantly (p=0.05), each was 39-56% and 15-41%, respectively.

Provision of TRP had inconsistent effect on TG level. However provision of TRO decreased triglyceride level but not statistically significant (p>0.05). Tazakori et al. conducted double blind non cross-over trial to 60 diabetic patients who were given 10 g soluble rice bran and showed that triglyceride level decreased significantly (p<0.05) from 294 mg/dL to 237 mg/dL. Kennedy et al. conducted single-blind crossover study to test effect of rice bran and sunflower oil blend (RSBO) on 48 hyper-and normo-lipidemic subjects. RSBO produced significant reduction in serum triglyceride level in hyperlipidemic by 15%. When subjects were crossed over to control oil, the serum lipid values were not statistically different from baseline values. Serum triglyceride level was more likely due to food consumption, such as quantity of fat, kind of fat and/or fatty acid and dietary fiber. Another research showed that after the intervention of ready to drink rice bran oil-chocolate beverage, triglyceride levels remained unchanged.

**Conclusion**

Tomato juice, rice bran powdered drink (TRP) and rice bran oil emulsion drink (TRO) lowered the level of total cholesterol and LDL cholesterol significantly, whereas triglyceride and HDL level were not changed. Drinking tomato juice, rice bran powder, and/or rice bran oil emulsion regularly is recommended to maintain of blood lipid profile in normal range.

**Conflict of Interest:** There is no conflict of interest among authors

**Ethical Clearance:** Ethical clearance was received from Ethical Committee of Research and Development Board of Ministry of Health (MOH) of Indonesia LB.02.01/5.2/KE-311/2013 (July 15, 2013).

**Source of Funding:** This research was funded by Directorate General of Higher Education, Ministry of National Education through the Competitive Grant of National Strategic Research Number 046/SP2H/PL/Dit. Litabmas/III/2012, 7th March 2012.

**REFERENCES**


A Comparative Study Between *S. aureus*, Methicillin Resistance *S. Aureus* and *Pseudomonas Aeruginosa* Carriage in Diabetic’s Patients in General and Those with Foot Ulcer in Baquba City, Diyala Province

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**ABSTRACT**

**Introduction:** Diabetes mellitus is a serious public health problem that’s rapidly expanding worldwide. Increase the risk of *S. aureus*, MRSA and *P. aeruginosa* carriage in patients with diabetes may reflect association between diabetes and bacterial carriers.

**Aim of the study:** Study was to compare prevalence *S. aureus*, MRSA and *P. aeruginosa* carriage in diabetics’ patients in general and those with foot ulcer with rates in healthy carriers.

**Materials and Method:** The study was conducted on (450) diabetics’ patients, attended the out patients clinic in Baquba Teaching Hospital, their ages ranged from (15-65) years, and 150 healthy group, during the period from May 2016 to April 2017, patients were classified into two groups according to type of diabetes. Swabs were taken from anterior nares, toe and axillae for each patient, identified based on standard bacteriological methods.

**Results:** The results showed rates of bacterial carriage in anterior nares of diabetic patients type-1 were (9.7%), (1.6%), (0.5%), respectively for *S. aureus*, MRSA and *P. aeruginosa*. In healthy group the rate of *S. aureus* carriage were (4.8%), and (0.5%) for each MRSA and *P. aeruginosa*. in toe were (5%), (0.8%), (5.8%), respectively for *S. aureus*, MRSA and *P. aeruginosa*. In axillae of diabetic patient’s type-1 were (3.7%), (1.8%), (10.1%), respectively for *S. aureus*, MRSA and *P. aeruginosa*.

**Conclusion:** We concluded an increasing rate of *S. aureus* nasal carriage and *P. aeruginosa* toe, axillae carriage in diabetic patients in general and those with foot ulcer compare with healthy carriers.

**Keywords:** Diabetes type 1 and 2, *S. aureus*. nasal carriage, Foot ulcers, *P. aeruginosa*.

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**Introduction**

Diabetes mellitus is a serious public health problem that’s rapidly expanding worldwide (1). Infections with diabetes is one of the leading causes of human mortality and morbidity. It represents a severe complication of diabetes and the most common cause of diabetes associated hospital admissions (2). Diabetes is a chronic infection occurs when pancreas receive sufficiently amount of insulin and may when the body cannot efficiently use the insulin (3). Several abnormalities of the host defense system might result in a higher risk of infections, from these abnormalities immunological impairments such as impaired migration, phagocytosis, intracellular killing and chemo taxis in leukocytes (4). *Staphylococcus aureus* and *Pseudomonas aeruginosa* are the most common bacteria isolated from ulceration of diabetic patients (5). The presence of *S.aureus* carriage increased the risk of subsequent hospitalization with an *S.aureus* infection by over five-fold (6). chronic leg ulcers affect 1–2% of the general population and are related to increased morbidity and health costs (7). *S. aureus*
was the most frequent pathogen(25.6%) in diabetic patients, and a high proportion of *S. aureus* isolates were MRSA(63.4%) (8), and almost two-thirds of *S. aureus* isolates were MRSA in diabetic patients with foot ulcers (9,10). The pathology resulting from *S. aureus* and *P. aeruginosa* infections is of great importance due to the ubiquitous nature, growing resistance to antimicrobial agents, increasing prevalence and ability to delay healing (11,12). Multiple studies have also detected the presence of bacteria and the polymicrobial nature of chronic, non-healing wounds, and the frequency of *S. aureus* and *P. aeruginosa* infections has been shown to be high (13,14). *S. aureus* is able to produce biofilms and to express antimicrobial resistance and a variety of virulence factors such as surface proteins, exoenzymes and endotoxins, which enhances its virulence especially MRSA (15), colonization of the anterior nares is an important risk factor for infection and cross-sectional surveys of healthy adult populations have reported nasal carriage rates that are typically 20-55% (16). Diabetes has been associated with increased *S. aureus* nasal carriage in some mostly studies(17,18), but not others(19,20,21). The increased carriage in patients with diabetes may reflect association between diabetes and risk factors found in the general population such as, bacterial carriers among diabetic patients (22). This study aimed to determine and compare prevalence *S. aureus*, (MRSA) and *P. aeruginosa* carriage in diabetics’ patients in general and those with foot ulcer with rates in healthy carriers.

**Materials and Method**

The study was conducted on 450 diabetic patients ascertained from a variety of sources, attended the outpatient clinic in Baquba Teaching Hospital, their ages ranged (15-65) years, with mean age of 36.15 ± 9years, and 150 healthy non diabetic as control group who were randomly selected, during the period from May 2016 to April 2017 in Baquba city in Iraq. Patients were classified into two groups according to type of diabetes, group 1 included: (184) type 1-diabetes, and group 2: included (266) type 2-diabetes, (97) patients with foot ulcers. Swabs were taken from anterior nares, toes and axillae for each patient in the present study, the specimens were inoculated on Blood agar, MacConkey agar and Mannitol salt agar plates by streaking methods for isolation of aerobic bacteria, incubated aerobically at 37°C for 48 hour, the isolates were identified based on standard bacteriological methods(23). Isolates of *S. aureus* were inoculated on Muller–Hinton agar to isolate Methicillin resistance *S. aureus* by using Cefoxitin(30 µg and Oxacillin(1) µg. (24). Patients found to be colonized were asked to return for follow-up swabs and those with MRSA carriage.

**Statistical Analysis:** SINGLE SAMPLE Z SCORE:

This tool calculates the z score of the mean of a single sample. It can be used to make a judgment about whether the sample differs significantly on some axis from the population from which it was originally drawn.

**Results**

Patient was considered to be an *S. aureus*, MRSA and *P. aeruginosa* carrier when positive bacterial swab was cultured from the anterior nares, axillae and toes at least two separate occasions. Heavy carriage was defined as a positive direct culture, a negative culture was defined as when the microorganism could not be isolated by either direct or enrichment culture, the results as showed in Table -1/Fig1 Positive bacterial growth in type-1 diabetes were 136(22.5%), in type-2 diabetes without complications were140 (23.17%), in type-2 diabetes with complications were77 (12.74%), and 61 (10.09%) in healthy group. Table-2 explain distribution of positive bacterial growth from different regions in type-1,2 diabetes and healthy group’s. Rates of bacterial carriage in anterior nares of diabetic patients type-1 were 18(9.7%), 3(1.6%), 1(0.5%), respectively for *S. aureus*, MRSA, *P. aeruginosa*, and 40(21.6%) for other types of bacteria. Rates of bacterial carriage in type-2 diabetes with complications were 16(8.6%), 4(2.1%), 2(1%) and 12 (6.4%) respectively for *S. aureus*, MRSA, *P. aeruginosa* and other type of bacteria. Rate of positive growth of *S. aureus* carriage in healthy group were 9 (4.8%), 1(0.5%) for each MRSA and *P. aeruginosa*. In type-2 diabetes without complications were 8(6.7%), 3(2.5%), 11(9.2%) respectively for *S. aureus*, MRSA, *P. aeruginosa* and 5 (4.2%) for other types of bacteria. Rates of bacterial carriage in axillae of diabetic patients type-1 were 4(3.7%), 2(1.8%), 11(10.1%), respectively for *S. aureus*, MRSA, *P. aeruginosa*, and 25(22.9%) for other types of bacteria, where in type-2 diabetes without complications were 6(5.5%), 5(4.5%), 13(11.9%) respectively for *S. aureus*, MRSA, *P. aeruginosa* and 18 (16.5%) for other types of bacteria, Rates of bacterial carriage in type-2 diabetes with complications were 2 (1.8%), 1(0.9%) for each MRSA and *P. aeruginosa*, 3(2.8%) for other type of
bacteria. Rates of positive growth of *S. aureus*, MRSA, *P. aeruginosa*, and other type of bacteria carriage in healthy group were 3 (2.7%), 1(0.9%), 5(4.5%) and 9(8.5%) respectively as explain in table-5 and figure-1. A rate of bacterial carriage in healthy control group explains in table-6.

Table 1: The rate of positive and negative bacterial growth from different regions in type -1, 2 diabetes and healthy group

<table>
<thead>
<tr>
<th>Study groups</th>
<th>Positive result N (%)</th>
<th>Negative result N (%)</th>
<th>Total N (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type-1 diabetes</td>
<td>136(22.5)</td>
<td>48(8)</td>
<td>184(30.6)</td>
</tr>
<tr>
<td>Type-2 diabetes without complications</td>
<td>140(23.17)</td>
<td>29 (4.8)</td>
<td>169(28.1)</td>
</tr>
<tr>
<td>Type-2 diabetes with complications</td>
<td>77(12.74)</td>
<td>20(3.6)</td>
<td>97 (16.2)</td>
</tr>
<tr>
<td>Healthy group</td>
<td>61(10.09)</td>
<td>93(15.39)</td>
<td>154(25.4)</td>
</tr>
<tr>
<td>Total</td>
<td>414(69)</td>
<td>190(31)</td>
<td>604(100)</td>
</tr>
</tbody>
</table>

Note: This percentages of bacterial growth that may be contain mixed growth

Table 2: The rate of positive bacterial growth from different regions in type -1, 2 diabetes and healthy group

<table>
<thead>
<tr>
<th>Type-1 diabetes 184</th>
<th>Type-2 diabetes 266</th>
<th>Healthy group 150</th>
</tr>
</thead>
<tbody>
<tr>
<td>136</td>
<td>169</td>
<td>97</td>
</tr>
<tr>
<td>Without complications</td>
<td>140</td>
<td>With complications</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Anterior nares</th>
<th>Toe</th>
<th>Axillae</th>
</tr>
</thead>
<tbody>
<tr>
<td>62</td>
<td>32</td>
<td>42</td>
</tr>
<tr>
<td>62</td>
<td>36</td>
<td>42</td>
</tr>
<tr>
<td>34</td>
<td>36</td>
<td>7</td>
</tr>
<tr>
<td>27</td>
<td>16</td>
<td>18</td>
</tr>
</tbody>
</table>

Table 3: The rate of *S. aureus*, MRSA and *P. aeruginosa* carriage in anterior nares of diabetics patients type-1, 2 and healthy group

<table>
<thead>
<tr>
<th>Bacteria Total no.185(100)</th>
<th>Type-1diabetes 62(33.5)</th>
<th>Type-2 diabetes without complication 62(33.5)</th>
<th>Type-2 diabetes with complication 34(18.5)</th>
<th>Healthy group 27(14.5)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Staphylococcus aureus</td>
<td>18(9.7)</td>
<td>21(11.4)</td>
<td>16(8.6)</td>
<td>9(4.8)</td>
<td>0.05</td>
</tr>
<tr>
<td>Methicillin Resistance S.aureus</td>
<td>3(1.6)</td>
<td>8(4.4)</td>
<td>4(2.1)</td>
<td>1(0.5)</td>
<td>0.06</td>
</tr>
<tr>
<td>Pseudomonas aeruginosa</td>
<td>1(0.5)</td>
<td>4(2.1)</td>
<td>2(1)</td>
<td>1(0.5)</td>
<td>0.9</td>
</tr>
<tr>
<td>Other types of bacteria</td>
<td>40(21.6)</td>
<td>29(15.6)</td>
<td>12(6.4)</td>
<td>16(8.6)</td>
<td>0.01</td>
</tr>
<tr>
<td>P value</td>
<td>0.01</td>
<td>0.01</td>
<td>0.05</td>
<td>0.05</td>
<td></td>
</tr>
</tbody>
</table>

(0.05) P value

Table 4: The rate of *S. aureus*, MRSA and *P. aeruginosa* carriage in Toe of diabetics patients type-1, 2 and healthy group

<table>
<thead>
<tr>
<th>Bacteria Total no. 120(100)</th>
<th>Type-1diabetes 32(26.6)</th>
<th>Type-2 diabetes without complication 36(30)</th>
<th>Type-2 diabetes with complication 36(30)</th>
<th>Healthy group 16(13.4)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Staphylococcus aureus</td>
<td>6(5)</td>
<td>8(6.7)</td>
<td>11(9.2)</td>
<td>4(3.3)</td>
<td>0.11</td>
</tr>
<tr>
<td>Methicillin Resistance S.aureus</td>
<td>0.8)</td>
<td>3(2.5)</td>
<td>6(5)</td>
<td>1(0.8)</td>
<td>0.13</td>
</tr>
<tr>
<td>Pseudomonas aeruginosa</td>
<td>7(5.8)</td>
<td>11(9.2)</td>
<td>14(11.6)</td>
<td>5(4.1)</td>
<td>0.06</td>
</tr>
<tr>
<td>Other types of bacteria</td>
<td>18(15)</td>
<td>14(11.6)</td>
<td>5(4.2)</td>
<td>6 (5)</td>
<td>0.06</td>
</tr>
<tr>
<td>P Value</td>
<td>0.01</td>
<td>0.06</td>
<td>0.05</td>
<td>0.09</td>
<td></td>
</tr>
</tbody>
</table>

p.value(0.05)
Table 5: The rate of S. aureus, MRSA and P. aeruginosa carriage in Axillae of diabetics patients type-1, 2 and healthy group

<table>
<thead>
<tr>
<th>Bacteria</th>
<th>Type-1 diabetes Total no. 42(38.5)</th>
<th>Type-2 diabetes without complication Total no. 42(38.5)</th>
<th>Type-2 diabetes with complication Total no. 7(6.4)</th>
<th>Healthy group Total no. 18(16.6)</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Staphylococcus aureus</td>
<td>4(3.7)</td>
<td>(5.5)</td>
<td>2(1.8)</td>
<td>3 (2.7)</td>
<td>0.21</td>
</tr>
<tr>
<td>Methicillin Resistance S.aureus</td>
<td>2 (1.8)</td>
<td>5(4.5)</td>
<td>1(0.9)</td>
<td>0.9)) 1</td>
<td>0.17</td>
</tr>
<tr>
<td>Pseudomonas aeruginosa</td>
<td>11(10.1)</td>
<td>13(11.9)</td>
<td>1(0.9)</td>
<td>5 (4.5)</td>
<td>0.05</td>
</tr>
<tr>
<td>Other types of bacteria</td>
<td>25(22.9)</td>
<td>18(16.5)</td>
<td>3(2.8)</td>
<td>9(8.5)</td>
<td>0.05</td>
</tr>
</tbody>
</table>

P value (0.05)

Table 6: The rate of bacterial carriage in healthy control group (no diabetic)

<table>
<thead>
<tr>
<th>Bacteria</th>
<th>Anterior nares Total no. 63(40.9)</th>
<th>Toe Total no. 37(24)</th>
<th>Axillae Total no. 54(35.1)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Staphylococcus aureus</td>
<td>9(5.8)</td>
<td>4(2.6)</td>
<td>3(1.9)</td>
<td>0.06</td>
</tr>
<tr>
<td>Methicillin resistance S.aureus(MRSA)</td>
<td>1(0.6)</td>
<td>1(0.6)</td>
<td>1(0.6)</td>
<td>0</td>
</tr>
<tr>
<td>Pseudomonas aeruginosa</td>
<td>1(0.6)</td>
<td>5(3.2)</td>
<td>5(3.2)</td>
<td>0.07</td>
</tr>
<tr>
<td>Other types of bacteria</td>
<td>16(10.4)</td>
<td>6(3.9)</td>
<td>9(5.8)</td>
<td>0.05</td>
</tr>
<tr>
<td>No growth</td>
<td>36(23.4)</td>
<td>21(13.6)</td>
<td>36(23.4)</td>
<td>0.063</td>
</tr>
</tbody>
</table>

P value (0.05)

Figure 1: Distribution different genus of bacteria isolated from different regions in diabetic patients and healthy group

Discussion

Diabetes and its complications were chronic and non-healing due to several factors such as bacteria were the predominant pathogens in the diabetic infections especially ulcers (25). Our study revealed the high prevalence rate of bacterial carriage was observed especially in type-2 diabetes with complications. S. aureus was the most common bacteria of community and hospital-acquired infections that can cause morbidity and mortality, S. aureus and MRSA nasal carriage vary between diabetic patients but increased in type-2 diabetes (26,27,28). Increase risk of S. aureus and multidrug resistance bacteria especially MRSA carriage in patients with diabetes may association with many factors such as obesity, old age, in appropriate previous
antibiotics treatment and prolonged hospital stay, and state for several months, patients with MRSA frequently colonization at readmission. Almost 50% of bacterial isolates from diabetic patients with foot ulcers were *S. aureus* and two-thirds (63.4%) of *S. aureus* isolates were MRSA. 25-28 MRSA nasal carriers had previous hospital admissions for medical problems such as chronic renal failure and diabetic ulcers. Toe and axillae *P. aeruginosa* carriers was significantly higher than rate of *S. aureus* and MRSA carriers in type-2 diabetes.

**Conclusion**

We concluded increasing rates of *S. aureus*, MRSA nasal carriage and *P. aeruginosa* toe, axillae carriage in patients with type-2, may lead to a significantly increased risk of infections and complications association with diabetes type-2. The infection rates and clinical outcomes were secondary to the *S. aureus*, MRSA and *P. aeruginosa* carriers. We showed that the chance of *S. aureus*, MRSA and *P. aeruginosa* infection was significantly higher in bacterial carrier compared to non-carrier.

**Acknowledgment**


The Scientific Ethical Committee in the College of Medicine, University of Diyala and Baquba Teaching Hospital was approved that the research proposal submitted by Assistant prof. Burooj Mohammed Razooqi Al-ajjem, entitled (A comparative study between *S. aureus*, MRSA and *Pseudomonas aeruginosa* carriage in diabetic’s patients in general and those with foot ulcer in Baquba city, Diyala province). Under the scientific research with the necessary rules and regulations governing the ethics of scientific research, scientific ethical committee decided to approve the research project and give the ethical number (MD42 January 2016BMR).

**Source of Funding:** Funded by the researcher and the College of medicine at Diyala University

**Conflict of Interest:** Do not conflicts with interests

**REFERENCES**


Early Detection of Increased Pulmonary Pressure in Hypertensive Patients Using Left Atrial Speckle-Tracking

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ABSTRACT
Systemic hypertension is one of the causes of pulmonary hypertension (PHT) who developed heart failure with preserved ejection fraction (HFpEF). Development of PHT in HFpEF is considered as a poor prognostic factor, calls for early detection that plays an important role in decreasing morbidity and mortality in those patients. This study aimed to identify whether the global left atrial strain (GALS) % could serve as a predictive factor for increased pulmonary pressure in hypertensive patients. One hundred essential hypertensive patients of either sex with preserved left ventricle ejection fraction (LV EF% > 55%) with a mean age of (48.6 ± 6 years) classified into 74 patients with reversed E/A ratio on PW Doppler with normal tissue Doppler image (TDI) (group I) and 26 patients with normal E/A ratio on PW Doppler and reversed Eprime/Aprime on TDI (group II). One hundred sex and aged-matched healthy individuals as control (group III). These groups were subjected to detailed history, blood pressure measurements, ECG, a list of investigations and echocardiographic study considering LV EF%, LV diastolic function using PW Doppler and TDI, left atrial volume index (LAVI) calculation, LA speckle tracking and mean pulmonary artery pressure(MPAP) calculation using right ventricular outflow tract acceleration time(RVOT-AT). The results revealed that there were significant negative linear correlations between GALS% with that of E/A, E/E prime, LAVI. In addition to significant negative linear correlations between GALS% with the estimated MPAP (r= −0.47, p=0.001). Moreover, GALS% could be served as a predictor factor for the development of pulmonary hypertension in hypertensive patients since it is strongly correlated with increased pulmonary pressure.

Keywords: Pulmonary hypertension; Systemic hypertension; Speckle tracking echocardiography.

Introduction
Pulmonary hypertension (PH) is a pathological hemodynamic condition defined as an increase in mean pulmonary arterial pressure (MPAP) ≥ 25mmHg at rest1. One form of PH is post-capillary PH which is most commonly results from left heart disease (LHD) which accounting about 65–80% of the cases2. Systemic hypertension (HT) is one of the causes of PH due to LHD in patients with heart failure with preserved ejection fraction (HFpEF)3. Patients with longstanding hypertension having HFpEF, the diastolic dysfunction can trigger pulmonary hypertension4.

PH can develop in LHD in response to a passive backward transmission of the effect of elevated filling pressure, mainly driven by left ventricle (LV) diastolic function and its outcome on left atrial (LA) compliance5.

Reason for LA dysfunction in hypertensive patients is explained on the bases of chronic pressure exposure of the LA. In early hypertensive disease, LA stretching causes a temporary enhancement of LA pump function. When compliance is lost and contractility decreases the LA pressure rise with the reduction of reservoir and conduit functions6. In a later stage, the LA mechanics depressed with the resultant backward pressure on the pulmonary circulation the causative factor for the development of pulmonary hypertension in hypertensive patients7.

One of the new sensitive techniques in the evaluation of LA function is Speckle tracking echocardiography (STE) that may provide additional data in pulmonary hypertension and in the preclinical detection of high-risk patients8.
This study aimed to identify whether the global left atrial strain (GALS) % could serve as a predictive factor for increased pulmonary pressure in hypertensive patients with preserved ejection fraction.

Subjects and Methods

This case-control study was conducted at Department of Echocardiography and Catheterization/Baghdad Teaching Hospital – Medical city, Baghdad, Iraq. It included one hundred patients with essential hypertension of either sex with an age range from 35 to 55 years old (48.6 ± 6 years) with preserved EF% (EF) > 55%). The patients classified into two groups according to the PW and TDI results. One hundred sex and aged-matched healthy individuals were recruited as a control group III. Patients with diabetes mellitus, ischemic heart disease, valvular heart diseases, primary pulmonary disease, renal failure, thyroid diseases, LV systolic dysfunction, infiltrative cardiac disease, SLE, smoking, obesity, cardiomyopathy, hyperlipidemia, atrial fibrillation and Patients with poor echocardiographic images were excluded. Medical history, recent CXR and ECG were evaluated in addition to the blood pressure measurements according to the American Heart Association guideline for blood pressure measurements9 using Rossmax MG150f Digital blood pressure monitor sphygmomanometer.

A standard 2-D and Doppler echocardiogram was performed according to standardized protocol of American Society of Echocardiography (ASE) and the European Association of Echocardiography recommendations 2015 using a 3.5 MHz transducer with commercially available equipment (Philips CX 50 ultrasound, USA machine). The LV ejection fraction was calculated according to the Teichholz M-mode formula10. Transmitral PW Doppler and TDI of the lateral mitral annulus was considered to calculate (E), (A) and (E prime) velocities11. While, the LA volume was measured by the biplane area-length method, then the reading was indexed to body surface area to calculate LA volume index12. Whereas the mean pulmonary pressure (MPAP) was calculated by using Right ventricular outflow tract acceleration time (RVOT-AT) using the following formula:

$$MPAP = 90 - (0.62 \times RVOT-AT)^{13}.$$  

LA Speckle-tracking echocardiography was obtained from apical four and two-chamber views during end-expiratory breath-hold and stable ECG recording using offline QLAB-CMQ software program14. The endocardial surface of the LA was traced manually by a three-point-and-click approach. The region of interest was thus created, and this was manually adjusted. The LA myocardium divided into six segments and the global longitudinal strain calculated for each view. However, the strain values are averaged and the measurements were obtained through three consecutive cardiac cycles15.

Results

The studied samples were categorized into three groups with a mean age of 48.6 ± 6 years according to PW Doppler and PW-TDI results as:

Group I: Consist of 74 (74 %) hypertensive patients of either sex; 31 men and 43 women with reversed E/A ratio on PW Doppler and normal E prime/A prime ratio on PW tissue Doppler.

Group II: Consist of 26 (26%) hypertensive patients of either sex; 10 men and 16 women with normal E/A ratio on PW Doppler and reversed E prime/A prime ratio on PW tissue Doppler.

Group III: Consist of 100 healthy subjects of either sex; 39 men and 61 women served as a control group.

Table 1. reveals that the studied groups were matched regarding age, BMI and BSA (P > 0.05). Moreover, the higher percentage of hypertension were reported in females (61%) in respect to males (39%) while, there were significant difference regarding the duration of hypertension ((P = 0.005) with a longer disease duration (8.5 ± 4 years) and a higher percentage of uncontrolled hypertension (84.6 %) recorded in Group II. In addition, there were a significant difference within groups in the systolic blood pressure (155 ± 15) mmHg in group II. Whereas there were significant differences between the diseased groups and the control regarding diastolic blood pressure being higher in group II (89 ± 7) mmHg.
Table 1: Demographic and blood pressure parameters of the studied groups

<table>
<thead>
<tr>
<th>Variables</th>
<th>Group I n (74)</th>
<th>Group II n (26)</th>
<th>Group III Normal n (100)</th>
<th>GI s. GIII P value</th>
<th>GI vs. GIII P value</th>
<th>GI vs. GI P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td>48 ± 6</td>
<td>49 ± 5</td>
<td>49 ± 6</td>
<td>0.845</td>
<td>0.936</td>
<td>0.759</td>
</tr>
<tr>
<td>BMI (Kg/m²)</td>
<td>26.84 ± 1.4</td>
<td>26.85 ± 0.8</td>
<td>26.85 ± 1.2</td>
<td>1.000</td>
<td>0.998</td>
<td>1.000</td>
</tr>
<tr>
<td>BSA (m²)</td>
<td>1.82 ± 0.1</td>
<td>1.77 ± 0.1</td>
<td>1.82 ± 0.1</td>
<td>0.765</td>
<td>0.789</td>
<td>0.985</td>
</tr>
<tr>
<td>Disease duration (years)</td>
<td>5.5 ± 4</td>
<td>8.5 ± 4</td>
<td>……</td>
<td>……</td>
<td>……</td>
<td>0.005</td>
</tr>
<tr>
<td>Uncontrolled Bp %</td>
<td>64.9</td>
<td>84.6</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Systolic Bp (mmHg)</td>
<td>148 ± 16</td>
<td>155 ± 15</td>
<td>116 ± 5</td>
<td>0.001*</td>
<td>0.001*</td>
<td>0.033*</td>
</tr>
<tr>
<td>Diastolic Bp (mmHg)</td>
<td>88 ± 9</td>
<td>89 ± 7</td>
<td>74 ± 6</td>
<td>0.001*</td>
<td>0.001*</td>
<td>0.984</td>
</tr>
</tbody>
</table>

BMI= Body Mass Index, BSA= Body surface area, Bp = blood pressure.

Table 2 reveals that there was a significant difference between diseased groups in comparison to control in respect to a higher left ventricle EF% in group I (68 ± 5), decreased E velocity in group I (70 ± 14) and decreased Ea velocity in group II (6.5 ± 1.1). Whereas a significant increasing in E/Ea ratio was noticed in group II (15.2 ± 0.9).

Table 2: Left ventricular function echocardiographic parameters of the studied groups

<table>
<thead>
<tr>
<th>Variables</th>
<th>Group I n (74)</th>
<th>Group II n (26)</th>
<th>Group III Normal n (100)</th>
<th>GI s. GIII P value</th>
<th>GI vs. GIII P value</th>
<th>GI vs. GI P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Left ventricle EF%</td>
<td>68 ± 5</td>
<td>67 ± 6</td>
<td>63 ± 2</td>
<td>0.001*</td>
<td>0.001*</td>
<td>0.895</td>
</tr>
<tr>
<td>E (cm/s)</td>
<td>70 ± 14</td>
<td>92.92 ± 17.0</td>
<td>102 ± 7</td>
<td>0.001*</td>
<td>0.001*</td>
<td>0.001*</td>
</tr>
<tr>
<td>A (cm/s)</td>
<td>84 ± 15</td>
<td>78 ± 22</td>
<td>73 ± 5</td>
<td>0.001*</td>
<td>0.001*</td>
<td>0.107</td>
</tr>
<tr>
<td>E/A</td>
<td>0.63 ± 2.8</td>
<td>1.72 ± 1.3</td>
<td>1.4 ± 2.1</td>
<td>0.001*</td>
<td>0.001*</td>
<td>0.001*</td>
</tr>
<tr>
<td>Ea (cm/s)</td>
<td>6.8 ± 1.1</td>
<td>6.5 ± 1.1</td>
<td>12.5 ± 1.4</td>
<td>0.001*</td>
<td>0.001*</td>
<td>0.001*</td>
</tr>
<tr>
<td>E/Ea</td>
<td>8.0 ± 1.7</td>
<td>15.2 ± 0.9</td>
<td>6.9 ± 0.3</td>
<td>0.001*</td>
<td>0.001*</td>
<td>0.001*</td>
</tr>
</tbody>
</table>

EF% =Ejection Fraction percentage.

Table 3 shows a significant difference within the groups being the largest LAVI (32 ± 1ml/m²), the shortest acceleration time (93 ± 6 ms) and a highest MPAP (31 ± 4 mm Hg) reported in group II.

In addition, the correlations show significant negative linear correlations between GALS% with that of E/A (r= -0.55, p=0.001), E/E prime (r= -0.573, p=0.001) and LAVI (r= -0.57, p=0.001). Moreover, figure 1 demonstrates a significant negative linear correlation between GALS% with that of estimated MPAP (r= -0.47, p=0.001).

Table 3: Mean pulmonary artery pressure and LA echocardiographic parameters of the studied groups

<table>
<thead>
<tr>
<th>Variables</th>
<th>Group I n (74)</th>
<th>Group II n (26)</th>
<th>Group III n (100)</th>
<th>GI s. GIII P value</th>
<th>GI vs. GIII P value</th>
<th>GI vs. GI P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>LAVI (ml/m²)</td>
<td>23 ± 5</td>
<td>32 ± 1</td>
<td>20 ± 3</td>
<td>0.001*</td>
<td>0.001*</td>
<td>0.001*</td>
</tr>
<tr>
<td>RVOT-AT (ms)</td>
<td>114 ± 14</td>
<td>93 ± 6</td>
<td>120 ± 5</td>
<td>0.002*</td>
<td>0.001*</td>
<td>0.001*</td>
</tr>
<tr>
<td>MPAP (mmHg)</td>
<td>16 ± 6</td>
<td>31 ± 4</td>
<td>15 ± 10</td>
<td>0.808</td>
<td>0.001*</td>
<td>0.001*</td>
</tr>
<tr>
<td>GALS (%)</td>
<td>35 ± 2</td>
<td>32 ± 1</td>
<td>44 ± 3</td>
<td>0.001*</td>
<td>0.001*</td>
<td>0.001*</td>
</tr>
</tbody>
</table>

LAVI=Left atrial volume index, RVOT-AT=right ventricular outflow tract acceleration time and MPAP=mean pulmonary artery pressure; GALS=Global atrial longitudinal strain.
In this study hypertension reported the higher percentage in female patients (61%) is correlated with the findings of other studies \textsuperscript{16,17}. In contrast to the study of Hajjar I. et al\textsuperscript{18} where they reported only 28.7% among females in respect to the higher percentage of the disease in males. These differences may be attributed to several factors such as race, obesity, socioeconomic status, level of education, and lifestyle modifications.

The systolic, diastolic blood pressure were correlated to Xu et al\textsuperscript{16} while both systolic and diastolic being higher in this study when compared with Maryam et al\textsuperscript{19}. These differences may be attributed to that most of the patients in this study were with uncontrolled blood pressure (more than two- thirds of group I and 84.6% of group II).

The diastolic function of group I patients revealed that a reversed E/A ratio with normal E/E prime ratio (signs of Early diastolic dysfunction (DD)) while in group II patients, the higher E velocity and E/E prime ratio (further worsening of diastolic function). These differences in the diastolic function could be attributed to hypertension that affects LV relaxation and the decreases in LV compliance too. In addition to longer duration of the disease that worsens the diastolic function where the duration of hypertension in group I was (5.5 ± 4 y) while in group II (8.5 ± 4 y) which was matched with other studies\textsuperscript{16,20,21}.

These DD were significantly correlated with GALS % which were comparable with the Miyoshi et al\textsuperscript{22}, where they found that there was a significant correlation between LV diastolic dysfunction E/E prime and reduced LA systolic strain (P < 0.001). These finding can be attributed to the negative impact of LV diastolic dysfunction on the LA function.

The increasing LA volume index in the diseased groups being higher in group II are matched with Chen et al\textsuperscript{23}. These changes in LA volume reflects sub-acute or chronic DD that occurs in parallel with the degree of LV diastolic dysfunction which results in increasing the filling pressure and its effect on LA function and volume.

The results in this study revealed reduced GALS% value despite the normal LA volume measurements which was in similar with the other studies\textsuperscript{16,24,25}. These findings reflect the valuable usefulness of LA speckle tracking echo technique in detecting early LA changes. Furthermore, the results of GALS% in this study (32 ± 1.5% in group II) were better than that reported by Hennawy et al\textsuperscript{24}(24.00 ± 6.92%). This could be explained on the bases that the patients in this study are younger and without risk factors like smoking and diabetes mellitus.

The result of this study revealed that the shorter the acceleration time the higher the MPAP. Furthermore, the GALS% correlated well with MPAP in this study which was in concordance with other studies\textsuperscript{26,27}.

**Conclusion**

The GALS% could be served as a predictor factor for the development of pulmonary hypertension in hypertensive patients since it is strongly correlated with increased pulmonary pressure.

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

**Ethical Clearance:** All subjects informed to be included in this study, according to the Local Ethical Committee of the Ministry of Health Iraq.

**Source of Funding:** This study done by self-funding from the authors.

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Assessment of Hormonal Changes in Female Patients with Migraine

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ABSTRACT

Background: Migraine is a common neurovascular disorder in Iraq. Hormonal effect in migraine headache and severity is proved by many authors although the mechanism of hormonal effect in pathogenesis of migraine in women is still unknown.

Objectives: To find out the role of hormonal changes in development of different types of migraine among women.

Materials and Method: The design of current study was cross sectional which carried out in outpatient clinics of Neurology and Obstetrics & Gynecology departments of Teaching Hospital in Kirkuk city for duration of 1st of January to 31st of December, 2018 on sample of 100 women with migraine. Fourteen women were diagnosed as migraine with aura (MA) and 86 women were diagnosed as migraine without aura (MWA). The estradiol, progesterone, leutinizing, follicular stimulating and prolactin hormones were assessed and according to menstrual phases.

Results: The progesterone hormone mean in both phases (follicular and luteal) was significantly higher among female patients of MWA. The estradiol hormone level at luteal phase was significantly higher among female patients having MWA. The estradiol hormone level at follicular phase was significantly higher among female patients with mild MWA. The mean prolactin hormone was significantly increased with increase in severity of MA and MWA.

Conclusion: The changes in reproductive hormones had a prominent role in development and severity of migraine in women, mostly migraine without aura.

Keywords: Hormonal role, Migraine with aura, Migraine without aura.

Introduction

Migraine is defined as a common neurovascular disease in which the trigeminovascular system is affected mainly. It is a predominant disorder of women with more prevalent migraine symptoms, severity and complaining than men with incidence rate in women of 43% and in men 18% ⁴. Migraine is highly related to sex hormones ⁵,⁶. In Iraq, the main reported risk factors for migraine are psychological upset, stress and excessive physical activity with no profound effect for sex hormones ⁷. However, current Iraqi literature reported significant correlation between sex hormones and migraine ⁶. The onset and severity of migraine in early adulthood of women are dependable on hormonal changes. Migraine attacks women are mostly observed 48 hours prior menstrual bleeding in earlier 72 hours of menses⁸,⁹. The menstrual migraine attacks are explained by decline of estrogen level at late luteal phase ⁹. The migraine is very severe with long duration attacks and not easily treated in younger age women ¹⁰ and about 60% of women with migraine had exacerbated headache attacks around menses time ¹¹. The migraine attacks related to menses are called menstrual migraine.

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which are MWA that represented 10-15% of cases, while migraine with or without aura occurs during other times of the cycle 12, 13. The definite mechanism of migraine and role of sex hormones is unknown. It was shown that alterations in cerebral perfusion were related to sympathetic nervous system 14. The effect of estrogen and progesterone hormones is obvious through expression of their receptors in cortical and subcortical regions of the brain 15. The estrogen withdrawal theory is explaining decreased serotonin level as subsequently, the cranial vessels may be dilated and trigeminal nerve may be stimulated that would influence attacks of migraine 14, 16. The pregnancy lead to high levels of estrogen and progesterone with less incidence except for migraine with aura which worsens during pregnancy 14. During the period of perimenopause and menopause, the hormones alterations affect migraine without aura 17. The incidence of migraine attacks are increased during this period. Estrogen levels are variable and increased with high receptor expression than normal in this period. After menopause, the migraine attacks decreased and sometimes diminished. This decrease is might be related to declined levels of estrogen 14. The migration attacks observed at postmenopausal period are often related to hormone replacement therapy 13. The steadily increase in number of women with migraine attending to public health clinics with high application of health care facilities represent a big burden on health status in Kirkuk city. The objective of current study was to find out the role of hormonal changes in development of different types of migraine among women.

Material and Method

The design of present study was cross sectional that was carried out in outpatient clinics of Neurology and Obstetrics & Gynecology departments of “Azadi Teaching Hospital in Kirkuk city” in duration of 1st of January to 31st of December, 2018. Study population was all women in reproductive age group (15-45 years) presented with migraine attended to Neurology outpatient clinic. Women in reproductive age group (15-45 years) presented with migraine were the inclusion criteria. The exclusion criteria were patients on chronic hormonal therapy, oral contraceptive pills, pregnant or puerperal period, patients with premature menopause, patient with polycystic ovarian syndrome and women with irregular menstrual cycle. A sample of 100 women with migraine was included in the study. Fourteen women were diagnosed as migraine with aura and 86 women were diagnosed as migraine without aura. Ethical considerations were obtained from Helsinki Declaration by informed consent taken orally from the women before inclusion in the study, approval on study was acquired from hospital authorities and the researcher was responsible in monitoring and managing selected women. After full neurological history and examination, the diagnosis of migraine was carried out according to International Headache Society 2004, 18 and migraine cases were classified to MA women and MWA, then they had been sent for Gynecologist to determine the phase of menstrual cycle and for evaluation of hormonal assessment. All women were assessed for migraine severity by Migraine Disability Assessment (MIDAS) Questionnaire 19. A Blood sample 10ml was withdrawn from all women during migraine attack after taking history of which phase of menstrual cycle, and then sent for serum Estradiol, Progesterone, LH, FSH and Prolactin hormone. Progesterone, Prolactin, Estradiol, FSH and LH blood levels were measured by Cobas e 411 which is trade mark of Roche. Normal value for Progesterone (Follicular 0.2-1.5ng/ml, Luteal 1.7-27.0ng/ml, Ovulation 0.8-3ng/ml, Menopause: 0.1-0.8ng/ml). Normal value for Estradiol(E2) (Follicular phase:173-315pg/ml, Ovulation phase:317-525pg/ml, Luteal phase:294-752pg/ml, menopause:51.6-314pg/ml. Normal value for FSH (On follicular =3.5-12.5mlU/ml, and on ovulating =4.7-21.5mlU/ml, while for luteal =1.7-7.7mlU/ml, menopause: 25.8-134.8mlU/ml). Normal value for LH (On follicular=2.4-12.6 mlU/ml, on ovulating =14.0-95.6 mlU/ml, while for luteal =1.0-11.4mlU/ml, postmenopause:7.7-58.5mlU/ml). Normal value for Prolactin in women:4.79-23.3ng/ml. The data collected were analyzed statistically by SPSS software version 20. Fischer’s exact test, independent sample t-test and one way ANOVA analysis were applied for analyzing the data as suitable. Level of significance (p value) was regarded statistically significant if it was 0.05 or less.

Findings

This study included 100 female patients with acute attack of migraine; 14 female patients had MA and 86 female patients had MWA. The age of patients for both migraine groups was not significantly different (p=0.7); prevalent age for women with MA was 30-39 years (35.7%), while prevalent age of women with MWA was 30-39 years and ≥40 years group (41% and 41%, respectively). (Table 1)

As shown in Table 2, the progesterone hormone mean in both phases (follicular and luteal) was significantly higher among female patients of migraine without aura (p<0.001 and p=0.001, respectively). At follicular phase, there was no significant differences between women having MA and those women having MWA regarding
estradiol (p=0.1), LH (p=0.7) and FSH (p=0.8). The estradiol hormone level at luteal phase was significantly higher among women having MWA (p<0.001). In same direction, the LH level at luteal phase was significantly higher for women with MWA (p=0.01). At luteal phase, THE FSH level was no significantly different between women having MA and women having MWA (p=0.5). The prolactin hormone level was significantly higher among women having MA (p<0.001).

As shown in Table 3, the reproductive hormone levels (progesterone, estradiol, LH and FSH) at both phases were not significantly related to different severity classifications of MA. The mean prolactin hormone was significantly increased with increase in severity of MA (p=0.01).

Reproductive hormone levels (progesterone, LH and FSH) at both phases were not significantly related to different severity classifications of MWA. The estradiol hormone level at follicular phase was significantly higher among women with mild MWA (p=0.006), while estradiol hormone level at luteal phase was not significantly different according to severity classification of migraine without aura (p=0.7). The mean prolactin hormone was significantly increased with increase in severity of migraine without aura (p<0.001). (Table 4).

Table 1: Distribution of females age according to migraine types

<table>
<thead>
<tr>
<th>Variable Age</th>
<th>MA No. (%)</th>
<th>MWA No. (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;20 years</td>
<td>2 (14.3)</td>
<td>7 (25.5)</td>
</tr>
<tr>
<td>20-29 years</td>
<td>4 (28.6)</td>
<td>24 (33.5)</td>
</tr>
<tr>
<td>30-39 years</td>
<td>5 (35.7)</td>
<td>41 (41.0)</td>
</tr>
<tr>
<td>≥40 years</td>
<td>3 (21.4)</td>
<td>14 (41.0)</td>
</tr>
<tr>
<td>Total</td>
<td>14 (100.0)</td>
<td>86 (100.0)</td>
</tr>
</tbody>
</table>

P value = 0.70 (not significant)

MA: migraine with aura MWA: migraine without aura

Table 2: Distribution of females reproductive hormones according to migraine types (N = 100)

<table>
<thead>
<tr>
<th>Hormones</th>
<th>Phase</th>
<th>MA Mean ± SD</th>
<th>MWA Mean ± SD</th>
<th>P.value*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Progesterone</td>
<td>Follicular phase</td>
<td>0.56 ± 0.11</td>
<td>1.11 ± 0.22</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td></td>
<td>Luteal phase</td>
<td>19.4 ± 6.7</td>
<td>25.3 ± 1.3</td>
<td>0.001</td>
</tr>
<tr>
<td>Estradiol</td>
<td>Follicular phase</td>
<td>194.3 ± 8.3</td>
<td>186.8 ± 23.5</td>
<td>0.10</td>
</tr>
<tr>
<td></td>
<td>Luteal phase</td>
<td>408.8 ± 134.2</td>
<td>652.1 ± 62.4</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>LH</td>
<td>Follicular phase</td>
<td>6.1 ± 0.9</td>
<td>6.5 ± 2.2</td>
<td>0.70</td>
</tr>
<tr>
<td></td>
<td>Luteal phase</td>
<td>9.6 ± 0.9</td>
<td>10.5 ± 0.73</td>
<td>0.01</td>
</tr>
<tr>
<td>FSH</td>
<td>Follicular phase</td>
<td>7.1 ± 0.35</td>
<td>7.4 ± 2.6</td>
<td>0.80</td>
</tr>
<tr>
<td></td>
<td>Luteal phase</td>
<td>4.9 ± 1.45</td>
<td>5.2 ± 0.9</td>
<td>0.50</td>
</tr>
<tr>
<td>Total prolactin</td>
<td>13.38 ± 7.2</td>
<td>8.6 ± 3.6</td>
<td>&lt;0.001</td>
<td></td>
</tr>
</tbody>
</table>

P. value < 0.05 is significant, SD: standard deviation

MA: migraine with aura MWA: migraine without aura

Table 3: Distribution of females reproductive hormones at both phases according to severity of migraine with aura (N=14).

<table>
<thead>
<tr>
<th>Hormones</th>
<th>Phase</th>
<th>Little</th>
<th>Mild</th>
<th>Moderate</th>
<th>Severe</th>
<th>P.value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Progesterone</td>
<td>Follicular phase</td>
<td>-</td>
<td>0.5 ± 0.0</td>
<td>-</td>
<td>0.7 ± 0.0</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td>Luteal phase</td>
<td>19 ± 9.8</td>
<td>16 ± 7.3</td>
<td>25 ± 0.0</td>
<td>21.7 ± 5.7</td>
<td>0.60</td>
</tr>
<tr>
<td>Estradiol</td>
<td>Follicular phase</td>
<td>-</td>
<td>199 ± 2.8</td>
<td>-</td>
<td>185 ± 0.0</td>
<td>0.10</td>
</tr>
<tr>
<td></td>
<td>Luteal phase</td>
<td>322 ± 32.5</td>
<td>523.5 ± 168.5</td>
<td>399 ± 0.0</td>
<td>340 ± 48.8</td>
<td>0.10</td>
</tr>
<tr>
<td>LH</td>
<td>Follicular phase</td>
<td>-</td>
<td>6.5 ± 0.7</td>
<td>-</td>
<td>5.3 ± 0.0</td>
<td>0.40</td>
</tr>
<tr>
<td></td>
<td>Luteal phase</td>
<td>9.4 ± 0.7</td>
<td>9.3 ± 1.1</td>
<td>9.0 ± 0.0</td>
<td>10.2 ± 1.1</td>
<td>0.60</td>
</tr>
<tr>
<td>FSH</td>
<td>Follicular phase</td>
<td>-</td>
<td>7.3 ± 0.28</td>
<td>-</td>
<td>6.8 ± 0.0</td>
<td>0.30</td>
</tr>
<tr>
<td></td>
<td>Luteal phase</td>
<td>4.1 ± 1.1</td>
<td>5.8 ± 0.6</td>
<td>7.0 ± 0.0</td>
<td>3.9 ± 1.4</td>
<td>0.07</td>
</tr>
<tr>
<td>Total prolactin</td>
<td>6.0 ± 0.0</td>
<td>10.1 ± 6.4</td>
<td>12 ± 0.0</td>
<td>20.6 ± 3.2</td>
<td>0.01</td>
<td></td>
</tr>
</tbody>
</table>

All values are mean ± standard deviation (SD)
F. value < 0.05 is significant
Discussion

In recent literatures, it was shown that headache features, anatomical picture of central nervous system and functional magnetic resonance imaging findings differ according to sex of patients. Despite the multifactorial causes of sex differences in migraine, an acceptable evidence confirms the role of hormones in development of migraine. Present study showed significantly higher progesterone, estradiol and luteinizing hormones levels for migraine patients without aura specifically at luteal phase. These findings are consistent with results of Sacco et al study in Italy and Brandes study in USA which documented the relationship between sex hormones migraine without aura specifically at luteal phase. Many authors indicated that headache particularly in migraine is more common among women in reproductive age period. The effect of sex steroid hormones on development and severity of migraine extended to men also; as a study conducted in Netherlands found that estradiol sex hormone was increased in normal weight males with migraine with evidence of androgen deficiency. Gupta et al stated that although the steroid sex hormones were not obviously involved in development of migraine in women, these hormones were proved to act as modulators for multiple mechanisms lead to enhancing and increasing intensity of migraine such as neuronal stimulation by increasing calcium ions and decreasing magnesium levels, the synthesis with release of nitric oxide and neuropeptides and vessels dilation caused by receptors influence. Our study showed a significantly lower level of prolactin hormone among women with MWA as compared to women with MA. Current study carried out in Iraq by AlGawwam found a significantly higher prolactin hormone level in women with migraine as compared to women but with no significant difference in prolactin level between aura and without aura migraine types. This inconsistency from our findings is explained by low number of enrolled women in AlGawwam study (20 women) as compared to our study. Higher levels of prolactin hormone among migraine patients with aura interfere and inhibit estradiol and progesterone hormones. Regarding severity of migraine, current study showed that prolactin hormone level was significantly increased with increased severity of both migraine types (with and without aura). This finding coincides with results of Cavestro et al study in Italy which reported that

Table 4. Distribution of females reproductive hormones at both phases according to severity of migraine without aura (N=86).

<table>
<thead>
<tr>
<th>Hormones</th>
<th>Phase</th>
<th>Little</th>
<th>Mild</th>
<th>Moderate</th>
<th>Severe</th>
<th>P.value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Progesterone</td>
<td>Follicular phase</td>
<td>1.1±0.2</td>
<td>1.07±0.2</td>
<td>1.17±0.2</td>
<td>1.1±0.2</td>
<td>0.60</td>
</tr>
<tr>
<td></td>
<td>Luteal phase</td>
<td>25.7±0.2</td>
<td>24.9±1.8</td>
<td>26.1±0.3</td>
<td>25.2±0.9</td>
<td>0.60</td>
</tr>
<tr>
<td>Estradiol</td>
<td>Follicular phase</td>
<td>182.8±7.2</td>
<td>202.5±4.6</td>
<td>186±11.2</td>
<td>187.2±6.2</td>
<td>0.006</td>
</tr>
<tr>
<td></td>
<td>Luteal phase</td>
<td>672.5±31.8</td>
<td>667.1±76.7</td>
<td>633±49.6</td>
<td>631.4±57.7</td>
<td>0.70</td>
</tr>
<tr>
<td>LH</td>
<td>Follicular phase</td>
<td>6.6±2.3</td>
<td>6.6±2.1</td>
<td>6.1±2.3</td>
<td>6.6±2.2</td>
<td>0.90</td>
</tr>
<tr>
<td></td>
<td>Luteal phase</td>
<td>10.4±0.7</td>
<td>10.3±0.58</td>
<td>10.7±0.7</td>
<td>10.7±1.1</td>
<td>0.70</td>
</tr>
<tr>
<td>FSH</td>
<td>Follicular phase</td>
<td>7.5±2.3</td>
<td>7.1±3.0</td>
<td>6.3±2.5</td>
<td>7.9±2.6</td>
<td>0.50</td>
</tr>
<tr>
<td></td>
<td>Luteal phase</td>
<td>4.3±0.6</td>
<td>5.1±1.1</td>
<td>5.6±1.3</td>
<td>5.3±0.5</td>
<td>0.50</td>
</tr>
<tr>
<td>Total prolactin</td>
<td>5.3±0.8</td>
<td>7.2±2</td>
<td>10.5±3.4</td>
<td>11.7±3.3</td>
<td>&lt;0.001</td>
<td></td>
</tr>
</tbody>
</table>

All values are mean ± standard deviation (SD)
P. value <0.05 is significant
prolactin hormone is adjunctive worsening factor for migraine but it could be easily eliminated. Higher level of estradiol hormone in present study showed a significant relationship with mild severity of migraine patients without aura. Consistent with our findings, MacGregor study in UK which reported that lower level of estradiol hormone in perimenopausal women with migraine lead to severe symptoms 30.

**Conclusion**

The changes in reproductive hormones had a prominent role in development and severity of migraine in women, mostly MA. The estradiol had a profound effect on severity of migraine without aura while prolactin hormone was effective on severity of both migraine types.

**Ethical Clearance:** All were approved, patients consents were obtained

**Source of Funding:** Self

**Conflicts of Interest:** None

**REFERENCES**


Evaluation of the Incidence of Abortion in Babylon—
An Epidemiological Study

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ABSTRACT

Objective: study the incidence of abortion in Al-Mahaweel General Hospital, and determine it types.

Method: A cross sectional study was conducted from January 2018 to December 2018 at the Department of gynecology and obstetrics, Al-Mahaweel General Hospital, Babylon directorate. A sample of 230 patients included in this study.

Results: During the follow-up period a total of 1256 cases was admitted, leading to incidence of 183.12 (95%CI: 180.98–185.26) cases with abortion per 1000 women, the most common age group was 21 – 30 years (50.9%), the majority of cases came from rural residency (77%), and incomplete abortion was the most common with 89.9% of the cases.

Conclusions: The incidence of abortion was 183.12 per 1,000 pregnancy, indicating a higher rate of abortion in Babylon directorate, the majority of abortion due to incomplete abortion.

Keywords: abortion, incidence, age, residency, Babylon

Introduction

Uterine evacuation is an integral part of obstetric and gynecologic care, not only for elective pregnancy termination, but also in the management of spontaneous abortion, intrauterine fetal demise, retained products of conception, and gestational trophoblastic neoplasia. The choice of technique for uterine evacuation depends more upon uterine volume and operator experience than the underlying indication for the procedure¹².

The estimated worldwide rate for abortion from 2010 to 2014 was 35 per 1000 women ages 15 to 44; the rate in developed countries was 27 per 1000 and in developing countries was 37 per 1000³. The highest rate was in the Caribbean (65 per 1000) and the lowest rate was in North America (17 per 1000) and Northern or Western Europe (18 per 1000). An estimated 25 percent of pregnancies worldwide ended in induced abortion⁴.

First-trimester aspiration abortion is a safe procedure, with an overall complication rate of 9.05 per 1000. Major complications (suspected perforation, ectopic pregnancy, hemorrhage, sepsis) are very rare (0.71 per 1000)⁵. The overall mortality rate associated with legal abortion in the United States is 0.7 per 100,000, with markedly reduced rates at lower gestations (0.1 per 100,000 at <8 weeks, 0.2 per 100,000 at 9 to 10 weeks, and 0.4 per 100,000 at 11 to 12 weeks). In the first trimester, infection is the most common cause of abortion-related mortality (31 percent), with anesthesia complications accounting for 22 percent and hemorrhage accounting for 14 percent of deaths⁶.

In Iraq legal indications for induced abortion were either certain severe maternal diseases or fetal anomalies that are incompatible with life and in the absence of such legal indications, abortion is called illegal induced abortion which is regarded unsafe, even when it is performed by clinical practitioner⁷. The objective of the current study to study the incidence of abortion in Al-Mahaweel General Hospital, and determine it types.

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Email: Hayder.adnan2010@gmail.com
Method

Setting: A cross-sectional study was conducted from January 2018 to December 2018 at the Department of gynecology and obstetrics, Al-Mahaweel General Hospital, Babylon directorate. A sample of 230 patients included in this study who attended Al-Mahaweel General Hospital due to abortion. Maternal age, residency, and type of abortion were collected from the patients.

Physical examination and ultrasound

Physical examination includes:
- Vital signs
- Gestational age estimated by uterine size on pelvic examination
- Uterine flexion assessment by pelvic examination and/or ultrasound
- Cardiac and pulmonary physical examination

Ultrasound is also used if ectopic pregnancy or early pregnancy loss is suspected, if uterine tenderness is present on physical examination, the clinician should evaluate for uterine infection and treat appropriately.

Antibiotic Prophylaxis: All women offered antibiotic prophylaxis to prevent infection for patients undergoing first-trimester uterine aspiration abortion, the regimen consisted of Metronidazole (500 mg IV three times per day), with Gentamicin (5 mg/kg IV) with or without vancomycin (15 mg/kg IV), and after discharge Metronidazole (500 mg orally) and ciprofloxacin (500 mg orally)8.

Statistical Analysis

Discrete variables presented using there number and percentage, 95%CI of the prevalence was calculated using the formula:

$$95\% \, CI = p \pm Z\sqrt{\frac{p(1-p)}{n}}$$

In which $p =$ prevalence of the disease, $q = 1 - p$, $z$ is normal score distribution, $\alpha = 95\%$, $n =$ total sample size. SPSS 22.0.0 (Chicago, IL), software package used to make the statistical analysis, $p$ value considered when appropriate to be significant if less than 0.05.

Result

During the follow-up period a total of 1256 cases was admitted, leading to incidence of 183.12 (95%CI: 180.98 – 185.26) cases with abortion per 1000 women, the most common age group was 21 – 30 years (50.9%), the majority of cases came from rural residency (77%), and incomplete abortion was the most common with 89.9% of the cases, as illustrated in table 1.

Table 1: Assessment of demographic and clinical data

<table>
<thead>
<tr>
<th>Variables</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number</td>
<td>230</td>
</tr>
<tr>
<td>Maternal age (years), n (%)</td>
<td></td>
</tr>
<tr>
<td>15 – 20</td>
<td>21 (9.1%)</td>
</tr>
<tr>
<td>21 – 30</td>
<td>117 (50.9%)</td>
</tr>
<tr>
<td>31 – 40</td>
<td>70 (30.4%)</td>
</tr>
<tr>
<td>41 – 50</td>
<td>22 (9.6%)</td>
</tr>
<tr>
<td>Residency</td>
<td></td>
</tr>
<tr>
<td>Urban</td>
<td>53 (23.0%)</td>
</tr>
<tr>
<td>Rural</td>
<td>177 (77.0%)</td>
</tr>
<tr>
<td>Type of abortion</td>
<td></td>
</tr>
<tr>
<td>Incomplete with curettage</td>
<td>193 (89.9%)</td>
</tr>
<tr>
<td>Complete abortion</td>
<td>37 (10.1%)</td>
</tr>
</tbody>
</table>

Discussion

Abortion whether it is spontaneous or induced, is one of the determinants of pregnancy wastage. In Iraq abortion was the fourth most common cause of hospitalization in 2005 and ranked as the fourth disease in the list of the top ten leading causes of morbidity in 20077.

In the current study the incidence of abortion was 183.12 (95%CI: 180.98 – 185.26) cases with abortion per 1000 women, which was in agreement with previous Iraqi study with 177.6 abortion per 1000 pregnancy7, it was slightly higher than the incidence reported in India in 2015 with a rate of 144·7 pregnancies per 1000 women aged 15-49 years8. However it was higher than the incidence reported in US in 2014 the abortion rate was 14.6 abortions per 1,000 women aged 15–44, while in 1995 it was 22.5 abortions per 1,000 women10. And lower than Malawi, in 2015 the incidence was 38 abortions per 1,000 women aged 15-4911, and also higher than reported in Congo with abortion rate of 56 per 1,000 women aged 15-4912.
involved 1069 country-years the incidence for 1990 to 2014 of abortion the incidence was 35 abortions (90% uncertainty interval [UI] 33 to 44) occurred annually per 1000 women aged 15-44 years worldwide in 2010-14\textsuperscript{3}.

In the present study the most common age group was 21 – 30 years, our finding was in agreement with Jones and Jerman study which showed that women aged 20 to 24 years accounted for the largest share of abortions and also had the highest abortion rate: 28.0 per 1000. The second highest abortion rate was among those aged 25 to 29 years: 22.8 per 1000\textsuperscript{13}, and in agreement with Alvey et al with more than half of all abortions (58%) were obtained by women aged 25 years or older, followed by women 20 to 24 years old (31%)\textsuperscript{14}.

**Conclusions**

The incidence of abortion was 183.12 per 1,000 pregnancy, indicating a higher rate of abortion in Babylon directorate, the majority of abortion due to incomplete abortion.

**Conflict of Interest:** None

**Ethical Clearance:** Informed written consent was obtained from all the participants in the study, and the study and all its procedure were done in accordance with the Helsinki Declaration of 1975, as revised in 2000. The study was approved by the gynecology and obstetrics, Al-Mahaweel General Hospital.

**Source of Funding:** The study supported by authors only

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A Morphological Comparative Study for the Species of Caryophyllaceae in Middle and North of Iraq

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¹University of Tikrit, College of Education for Pure Sciences, Department of Life Sciences

ABSTRACT

In this study, 12 species were studied within 8 species belonging to the Caryophyllaceae family in central and northern Iraq. The study examined the similarities and differences in the morphological characteristics of the roots, stems, leaves, flowers, fruits and seeds. The study showed that Stellaria media was the longest species with a length of 74.6 cm. The longest roots appeared in the type Spergularia rubra was 26.35 mm and the lowest root length was in the type Stellaria media of 5.6 mm. The parasites in the legs was the most in the type of Saponoaria officinalis and 10.3 cm, and characterized the papers in the species under study being simple. Simple Blades Not divided or fragmented. Cauline leaves, in the form of sessile leaves, do not have a pregnant and arranged opposite. The opposite of the two bases is the two sides of the joint, which are bound together with a part of the salami containing the enzymes. The leaves differed in terms of blade shapes, peaks and base, but they were similar on the edge of the blade. As it was flat and smooth. Entire and the highest rate of the length of the blade in the type Spergulariarubra was 52.7 mm and was the lowest in the type Sagina petala and 11.8 mm, and resembled flowers in all species under study in terms of forms, consisting of 5 leaves petals composition, and varied in colors. Solitary or massively aggregated. The difference in the shape of the fruits in the species under study was elliptic in Cerastium perfoliatum, Sagina petala, Sagina saginoides, Spergularia rubra and Stellaria media capsule in Cerastium dichotomum, while the seeds showed clear differences in dimensions and shapes and inscriptions was the longest in Vaccaria Hispanica and 148.9 micrometres in Sagina saginoides, 33.5 micrometers. The seed of the Cerastium perfoliatum was characterized by a seeded wing that was not observed in other species. Its surface inscriptions were fine-reticulate in Saponaria officinalis, Stellaria media, Telephium imperatic and Sagina saginoides and Spergularia rubra Vaccaria hispanica and free of inscriptions in Vaccaria saginata.

The study included 12 species of pink family spread in central and northern Iraq:

Cerastium dichotomum, Cerastium perfoliatum, Minuartia picta, Sagina petala, Sagina saginoides, Saponaria officinalis, Spergularia marina, Spergularia rubra, Stellaria media, Telephium imperatic, Vaccaria hispanica, Vaccaria saginata.

Keywords: phenotypic study, plant, pink family

Introduction

The Caryophyllaceae family is one of the most widespread plant families whose plants grow in the temperate regions of the North and South Iraq. Their spread extends towards the poles and in the Mediterranean basin.¹⁾ It has an annual, double or perennial herbaceous plants, rarely in the form of trees or shrubs.²⁾ The family of the pink family is divided into three sub-families namely Paronychioideae, Alsinoideae and Caryophylloideae, comprising 11 clans.³⁾ Globally, 88 species and 2200 species and they have in Iraq ⁴⁾ 23 genera and 145, and the plants of the family pink is part of the trade of flowering cultured in the world, including varieties of flowering plants such as plant Stellaria media, known as chickpeas, and Cerastiumerastoides plant known as grass. The mouse and the spp plant Saponaria and is known as soap plants ⁵⁾, and noted ⁶⁾ Stellaria media L. Medical used to stop the secretion of milk and diuretic and tonic and healing wounds and housing for pain and rheumatism and treatment of itching, such as eczema and respiratory infections as medical countermeasures. For asthma, I found ⁷⁾ through the chemical survey in the root, leaves and flowers of the type Stellaria media L. contained (Vaccaria hispanica)⁸⁾, while (Vaccaria hispanica) contain flavonoids in Spergularia marina and Vaccaria hispanica... ⁹⁾
Materials and Method

The morphological study was based mainly on the soft plant samples collected through field trips to central and northern Iraq, including Arbil, Sulaymaniyah, Kirkuk and Tikrit, which reached 30 trips in all between November 2017 and June 2018. Many plant samples were collected during flowering and composition and in neighboring countries. The soft samples were stored with a FAA solution consisting of one volume of foams and three volumes of cell acid. The sample was analyzed using the dissecting microscope and the Olympus composite microscope and it was also analyzed using the ocular microscope and the stage microscope.

Results and Discussion

The study showed that, the nature and durability of the studied species which are of annual nature except Telephium imperatic and Saginasaginoides which were perennial. However, while the, Spergularia marina was of a biennial nature.

The detailed study of the root, stem, leaves, surface covering, floral systems, flowers, fruits and seeds are presented in Table 1 and Figure 1.

The study showed the roots of the tap root system, varied in length and secondary roots, and differed in the nature of the branches were very forked in Telephium imperatic and short in the types Saginasaginoides and Spergularia marina and Vaccaria hispanica while the highest rate of length F.

The roots of Spergularia rubra were 26.35 mm in length and the lowest in Stellaria media which was 5.6 mm. The other species ranged between the two extremities. The dimensions of the legs legs showed variations in the types studied in dimensions as shown in Table 1. With the previous characteristics ranging from 2.4 cm in Minuartiapicta and 10.3 cm in the type Saponoaria officinalis and between these two values in the other species, and in the direction of growth of the stem were all types studied upright and Erect list except the types Stellaria media and Saginasaginoides.

The overcoat on the leg was all booed Glabrous except the species Spergularia rubra, Saponoaria officinalis, Cerasiumdichotomum and Cerasiumperfliatium which were of the villous type.

The variability of capillary variability in the species under study according to its prevalence, nature, density, color and dimension according to species is, as shown in (Table 2).

The Table, showed two groups in the species: Glandular species in dichotomum Vaccariasagetalis, Cerasiumperfliatium, Spergularia rubra, Saginaapetala, and Telephium imperatic Saponoaria officinalis and Cerasiumdichotomum and Saginasaginoides and Cerasiumperfliatium and Saginaapetala and Spergulariamarin. as showed variation in its dimensions, it was found that more hairs in length were leg of the type Cerasiumdichotomum reached 73.3 micrometers and the shortest was in the bristles leg of the type Telephium imperatic reached 10.5 Micrometer while its length ranged In other types between these two extremes, with the largest diameter of the filament was in full swing type Saginasaginoides reached 2.8 micrometers and less in diameter were Rite leg type Spergularia rubra 0.7 micrometers.

The leaves were generally different in terms of dimensions, peaks and base, and their leaves were stemmed in Spergularia rubra, Vaccaria hispanica, Telephium imperatic, Stellaria media, Saginasaginoides, Saginaapetala, Vaccaria Sagetalis, Cerasiumperfliatium and Spergularia marina. But, they differed at its peak and they were between sharp in Spergularia marina and Vaccaria hispanica and pointed in Cerasiumperfliatium and Saginasaginoides and ovarian in Stellaria media and Saginaapetala, while the basal leaves were in the forms of blades Blades were Oval Ovate in Cerasiumdichotomum and Saponoaria officinalis and Telephium imperatic and Stellaria media and bar Liner in Cerasiumperfliatium and Saginaapetala and MottiPectinate in Minuartiapicta, Saginasaginoides and elliptic in Spergularia rubra, Vaccaria hispanica, Vaccariasagetalis and cylindrical in Spergularia marina.

The flowers in all the species under study were characterized by a pediculate of the two species of Hermaphroditic. The floral systems in the studied species had a determinate system of four groups. One was simple-determinate in Cerasiumdichotomum, Saginaapetala, Spergularia rubra, Cerasiumperfliatium, Monoclonal antibody, spergulariamarin, Saginasaginoides, monocytogenes, Boragoid cyme, Saponoaria officinalis, Minuartiapicta, simple dichasium cyme in Telephium imperatic, and bioluminescence compound dichasium cyme in the Vaccaria hispanica and Vaccariasagetalis..
The fruit of the species under study was Table 3 as dry-Dehiscent and a capsule from a high ovum composed of three carbels united by Teeth at the top, while different shapes, dimensions and colors were formed between elliptic fruits in Cerastiumperfoliatum Saginasaginoides, Spergulariarubra, Stellaria media, extensive ovarian species in Minuartia Picta, the fruits of Urceolate in Vaccariahispanica, Spergularia marina, cylindrical Vaccaria Sagetalis, capsule fruits in Cerastium dichotomum, and fruit of Sorosis in Telephiumimperatic, officinalis, and for its dimensions has reached its longest 33 mm in the type Telephiumimperatic and was the shortest in the type Cerastiumperfoliatum and reached 6.4 μm and the rest of the species between these two dimensions, the presentation was the highest recorded in the type Minuartiapicta of 18.6 mm and 2.7 mm in the type Saginasaginoides and ranged in other types between These two values, while the fruit contained the coating properties in Cerastiumperfoliatum, Saginaapetala, Saponoariaofficinalis, Cerastiumdichotomum, Telephiumimperatic and Spergulariarubra, was not observed in other species under study.

The fruits were showed a difference in color in the dark green color of Spergularia marina, Spergulariarubra, Telephiumimperatic, olive oil in Saginaapetala, Cerastiumdichotomum, Cerastiumperfoliatum, reddish green inSaponoariaofficinalis, Stellaria media, yellowish green in Saginasaginoides and Vaccariahispanica and pale green in Minuartiapicta And Vaccariasagetalis, but the pale green color is the most common in the species under study before the season of open fruit season and will soon to change color with environmental conditions.

The seeds were in miniscule species with different shapes and dimensions depending on the species (. Table 4), in addition to the differences in the nature of the seed surface and color from one species to another. Seed forms are important diagnostic traits. Ovoid ovals appeared in Saginasaginoides and Spergulariarubra, Stellaria media, Circular Circulation in Cerastiumdichotomum, Cerastiumperfoliatum, Minuartiapicta, Telephiumimperatic, Vaccariahispanica, Reniform in Saginaapetala, Saponoariaofficinalis, Spergularia marina and iglagic in Vaccariasagetalis..

The colour was showed a difference in color was the color of light brown to yellowish orange - in Stellaria media and Cerastiumperfoliatum and Telephiumimperatic, light yellow to in brown-yellow in Vaccariasagetalis and dark yellow color of orange in Minuartiapicta and Saponoariaofficinalis and olive green-olive in Spergulariarubra, dark-brown color in Spergulariamarain and Saginaapetala in red-light red in Vaccariahispanica, Cerastiumdichotomum and Saginasaginoides.

Vaccaria Hispanica was the longest in the world, with a length of 148.9 μm followed by Spergularia Marina with 105.3 micrometers, while the Saginasaginoides were the shortest and were and 33.5 micrometers in length. The other seeds ranged between these two extremes. The seeds were wider in Stellaria media, (165.4 micrometers),Telephiumimperatic, (96.3 micrometers),and the lowest in saponoariaofficinalis, 13.05 micrometers, and the other species ranged between these two extremes.

Table 1: Shows the dimensions of the root, colors, stems and leaves of the species under study

<table>
<thead>
<tr>
<th>Type</th>
<th>Root</th>
<th>Leaf</th>
<th>Leg</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Average length</td>
<td>Average width</td>
<td>Color</td>
</tr>
<tr>
<td>Cerastiumdichotomum</td>
<td>7.65</td>
<td>1.5</td>
<td>Brown</td>
</tr>
<tr>
<td>Cerastiumperfoliatum</td>
<td>6.85</td>
<td>3.3</td>
<td>Brown</td>
</tr>
<tr>
<td>Minuartiapicta</td>
<td>5.83</td>
<td>2.7</td>
<td>Brown</td>
</tr>
<tr>
<td>Saginaapetala</td>
<td>15.4</td>
<td>1.6</td>
<td>Brown</td>
</tr>
<tr>
<td>Saginasaginoides</td>
<td>8.8</td>
<td>2.7</td>
<td>Brown</td>
</tr>
<tr>
<td>Saponoariaofficinalis</td>
<td>13.3</td>
<td>1.35</td>
<td>Brown</td>
</tr>
<tr>
<td>Spergularia marina</td>
<td>15.1</td>
<td>2.8</td>
<td>White</td>
</tr>
<tr>
<td>Spergulariarubra</td>
<td>26.3</td>
<td>5.1</td>
<td>White</td>
</tr>
<tr>
<td>Stellaria media</td>
<td>5.6</td>
<td>1.6</td>
<td>White</td>
</tr>
<tr>
<td>Telephiumimperatic</td>
<td>20</td>
<td>1.2</td>
<td>Brown</td>
</tr>
</tbody>
</table>
Table 2: Shows the dimensions of glandular and glandular capillaries

<table>
<thead>
<tr>
<th>Types</th>
<th>Rye shape</th>
<th>Type of Rye</th>
<th>Hair length</th>
<th>Rye diameter</th>
<th>Top of the Rye</th>
<th>The surface of the filament</th>
</tr>
</thead>
<tbody>
<tr>
<td>cerastiumdichotomum</td>
<td>Straight or curved</td>
<td>Glandular - no glandular</td>
<td>71.5</td>
<td>3.0</td>
<td>Hooky</td>
<td>rough</td>
</tr>
<tr>
<td>cerastiumperfoliatum</td>
<td>Striped</td>
<td>Glandular - no glandular</td>
<td>25.7</td>
<td>1.5</td>
<td>Straight</td>
<td>Warts</td>
</tr>
<tr>
<td>saginaapetala</td>
<td>Cross-shaped</td>
<td>Glandular - no glandular</td>
<td>25.1</td>
<td>2.9</td>
<td>Taper</td>
<td>Smooth</td>
</tr>
<tr>
<td>saginasaginoides</td>
<td>Falciform</td>
<td>No glandular</td>
<td>55.2</td>
<td>4.5</td>
<td>Taper</td>
<td>Soft scheme</td>
</tr>
<tr>
<td>saponoariaofficinalis</td>
<td>Straight or curved</td>
<td>No glandular</td>
<td>5.4</td>
<td>3.1</td>
<td>Sharp</td>
<td>Accurate warts</td>
</tr>
<tr>
<td>spergulariarubra</td>
<td>Conical</td>
<td>Glandular</td>
<td>27.5</td>
<td>2.3</td>
<td>Straight</td>
<td>Warts</td>
</tr>
<tr>
<td>telephiumimperatic</td>
<td>Cornish shape</td>
<td>No glandular</td>
<td>18.7</td>
<td>1.7</td>
<td>Circular</td>
<td>Smooth</td>
</tr>
<tr>
<td>vaccariasagetalis</td>
<td>Curved</td>
<td>Glandular</td>
<td>105.3</td>
<td>75.8</td>
<td>Round</td>
<td>Brown to black</td>
</tr>
<tr>
<td>cerastiumdichotomum</td>
<td>Straight or curved</td>
<td>Glandular - no glandular</td>
<td>71.5</td>
<td>3.0</td>
<td>Hooky</td>
<td>Rough</td>
</tr>
<tr>
<td>cerastiumperfoliatum</td>
<td>Striped</td>
<td>Glandular - no glandular</td>
<td>25.7</td>
<td>1.5</td>
<td>Straight</td>
<td>Warts</td>
</tr>
</tbody>
</table>

Table 3: Shows the dimensions of seed, shape and color in the plant species under study

<table>
<thead>
<tr>
<th>Qualities</th>
<th>Types</th>
<th>Length</th>
<th>Width</th>
<th>I/O rate</th>
<th>Shape</th>
<th>Color</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cerastiumdichotomum</td>
<td>78.1</td>
<td>14.9</td>
<td>1.35</td>
<td>irregular</td>
<td>Light red</td>
<td></td>
</tr>
<tr>
<td>Cerastiumperfoliatum</td>
<td>61.8</td>
<td>67.0</td>
<td>0.30</td>
<td>irregular</td>
<td>Light brown slanted to orange</td>
<td></td>
</tr>
<tr>
<td>Minuartiapicra</td>
<td>107.1</td>
<td>79.5</td>
<td>1.42</td>
<td>oval</td>
<td>Bold for orange</td>
<td></td>
</tr>
<tr>
<td>Saginaapetala</td>
<td>68.6</td>
<td>77.9</td>
<td>0.88</td>
<td>irregular</td>
<td>Brown to black</td>
<td></td>
</tr>
<tr>
<td>Saginasaginoides</td>
<td>33.5</td>
<td>51.4</td>
<td>0.92</td>
<td>renal</td>
<td>Light red</td>
<td></td>
</tr>
<tr>
<td>Saponoariaofficinalis</td>
<td>59.4</td>
<td>13.05</td>
<td>4.58</td>
<td>renal</td>
<td>Bold for orange</td>
<td></td>
</tr>
<tr>
<td>Spergularia marina</td>
<td>105.3</td>
<td>75.8</td>
<td>1.5</td>
<td>circular</td>
<td>Brown to black</td>
<td></td>
</tr>
<tr>
<td>Spergulariarubra</td>
<td>53.4</td>
<td>72.4</td>
<td>1.0</td>
<td>oval</td>
<td>Green Olive</td>
<td></td>
</tr>
<tr>
<td>Stellaria media</td>
<td>95.8</td>
<td>165.4</td>
<td>0.44</td>
<td>circular</td>
<td>Light brown slanted to orange</td>
<td></td>
</tr>
<tr>
<td>Telephiumimperatic</td>
<td>96.4</td>
<td>96.3</td>
<td>0.86</td>
<td>renal</td>
<td>Light brown slanted to orange</td>
<td></td>
</tr>
<tr>
<td>Vaccaria hispanica</td>
<td>148.9</td>
<td>31.0</td>
<td>4.72</td>
<td>renal</td>
<td>Light red</td>
<td></td>
</tr>
<tr>
<td>Vaccariasagetalis</td>
<td>80.2</td>
<td>67.3</td>
<td>1.47</td>
<td>oval</td>
<td>Light yellow</td>
<td></td>
</tr>
</tbody>
</table>
Conclusion

Our results concluded that, the Caryophyllaceae family that cultivated in central and northern Iraq that contain many species that, we can differentiated between this species from the characters of the roots, leaves, legs, stems, flowers, fruits and seeds. and its shape that have characters differ from species to another species.

Conflict of Interest: Nil

Source of Funding: Self

Ethical Clearance: Not required

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Evaluation of the Main Minerals in Osteoporosis Patients: Calcium, Phosphorus, Vitamin 25 (OH) D and Alkaline Phosphatase as a Case Study

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College of Medicine, Department of Physiology, University of Kirkuk, Kirkuk, Iraq

ABSTRACT

Background: Osteoporosis is a growing public concern of elderly persons. It is a disease characterized by low bone mineral density (BMD) which is a direct consequence of fractures. Therefore, Osteoporotic is the primary cause of disability. However, despite being studied intensively throughout the past decades, there still many concerns about its etiology that need to be investigated.

Method: 100 female patients aged 40-80 years old are enrolled in this work. Separately, all these patients are those who referred to rheumatology units/Azadi teaching hospital in the Kirkuk city for eighteen months (from February 2015 to July 2016). Half of them had osteoporosis confirmed by Dual Energy Xray Absorptiometry (DEXA-Scan), whereas the remaining patients were controls. We measured the mineral vitamin D, calcium (Ca), phosphorus and alkaline phosphatase in the sera of the entire participant.

Results: One hundred women participated in this work with the mean age of (61.0 ± 10.2) years were studied. 50% of them were in the control group, and 50% of them had osteoporosis. Age of osteoporosis group (61± 10.2) was significantly higher than control groups (56 ± 9.0) years. Additionally, Body Mass Index significantly higher (p < 0.001) in osteoporosis (29.1 ± 5.9) compared to the control group (28.9 ± 3.4).

Conclusion: We conclude that there is no greater association among serum Calcium, Phosphors and alkaline phosphates with BMD. Additionally, the results showed a positive association between vitamin 25 (OH) D levels and age.

Keyword: Osteoporosis; Vitamin 25 (OH) D; Calcium; Phosphorus; Alkaline Phosphatase.

Introduction

Osteoporosis disease, by definition, is deemed as a common metabolic bone issue. As mentioned earlier, it is qualified by BMD, microarchitectural disruption of bone tissue and loss of bone mass. As a consequence, increases the risk of fractures which are the primary outcome of this illness (1)(2). Fractures of osteoporotic, the vertebra mainly, are common in the elderly and result in grief morbidity and mortality following minimal trauma (3). Consequently, this disease became a significant public health concern which is rapidly prevailing, particularly among Asians elderly persons as they live longer (4),(5). Osteoporosis mainly caused by lack of physical stress applied to bones which typically occurs because of different reasons, such as reduced activity (6).

Typically, osteoporotic fractures take place at forearm, vertebra and hip. Furthermore, fracture of rib, pelvis and humorous are also common (7). So far, vitamin D is deemed to a common medical condition in the world (8). The abnormal serum vitamin D is associated with heightened PTH secretion, in consequence, increased renal calcium excretion and bone resorption (9). It has been experimentally verified that vitamin D is essential for calcium metabolism, thus, fractures prevention. Recent experiments have demonstrated that the serum 25 (OH) D is optimal within the region of (50 - 80 nmol·L⁻¹). It was suggested and thought that there is a strong relation between fracture development and vitamin D deficiency. Accordingly, significantly heightened in mortality and morbidity rates of fracture patients (10)(11). Typically, vitamin D status can be evaluated by measuring the level of serum 25-hydroxy-vitamin D (25 (OH) D) (12)(13). Sufficient intake of calcium is important for adequate bone mineralization and healthy growth, in consequence, teeth and skeletal system development (14)(15).
On the other hand, phosphate has been found experimentally to be an essential dietary source of acid phosphate. It was supplied in a generous amount in the diet through grains products and meat (16). Although phosphate is considered the primary mineral component of hydroxyapatite, the primary structural element of bone the acid-ash hypothesis posits that dietary phosphate. Additionally, detrimental to bone is a marker of metabolic production of acid is (17)(18)(19). Calcium intakes (which can be limited or insufficient) may affect the relationship among bone health, the diet acid load and phosphate (20)(21). Lastly, the authors in (22) showed that 50% of the total Alkaline Phosphatase (AIP) activity arises from the bones, while the other 50% originates from the liver. Therefore, our goal is to study the main minerals in osteoporosis patients. In consequence, the objectives of this study are as follows:

- Exam vitamin D and to show its effect on bone loss.
- Measure calcium ion and determine its role in bone loss.
- Lastly, calculate phosphate and alkaline phosphatase to identify their effect on bone loss.

**Case Study**

This study was conducted on 100 subjects (42-80 years) at the Rheumatology Unit at Azadi teaching hospital at Kirkuk city from February 2015 to July 2016. We included women attended the outpatient clinic at Azadi teaching hospital for screening for osteoporosis by DEXA scan. A particular questionnaire form was constructed which included patients details, such as name, age, sex, weight and height. Special attention was paid to collect valuable information about the patients’ previous history (e.g., hip replacement, smoking, glucocorticoids intake, rheumatoid arthritis, alcohol drinking, drinking milk, coffee, tea).

We started the experiments by collecting five millimetres of venous blood in plain tubes. After that, the blood centrifuged at 3000 rpm for 5 mins. Then, the serum was kept in the deep freezer (-20 C) until analysis. Total Calcium and Phosphorus were measured in serum samples using a spectrophotometer-based method using kits provided by Biomeurx (France). We measured AIP using Reflotron plus machine (Roche). Therefore, vitamin D nutritional status can be obtained by measuring 25 (OH) D instead of 1,25 (OH) D because it is the main circulating form of vitamin D (23). Vitamin D estimation was carried out in a private laboratory using Mini Vidas machine from France. The 25 hydroxy cholecalciferol levels were categorized as deficient (≤ 10 ng/ml), insufficient (11 - 29 ng/ml) and sufficient (≥ 30 ng/ml) (24). As mentioned earlier, 25 (OH) D measurement of BMD was performed by DEXA-Scan (25).

**Results**

In this study, data were analyzed with SSPS version 25 (Chicago, IL). A standard two-sided t-test was carried out to compare the mean value of the biochemical tests in different groups. Additionally, the Pearson correlation coefficient was also used to show the correlation with age, biochemical parameters and BMD. In the entire statistical analysis, the p-value was less than 0.05 which means that they were considered statistically significant.

One hundred females were involved in this work have a mean age of (61.0 ± 10.2) years. of them 50 were controls, and the rest of the study population were confirmed to have osteoporosis. Figure 1 illustrates the mean and Standard Deviation (SD) of Age, BMI, serum Alkaline phosphatase, calcium, phosphorus, Vitamin D2 (OH) and DEXA ray in both osteoporosis patients and controls group. Firstly, the BMI of the osteoporosis group (28.9 ± 3.4) was significantly (p <0.001) lower than control groups (29.1 ± 5.9). Secondly, the calcium levels were significantly higher in control (8.89 ± 0.564 mg/dl) than osteoporotic group (8.776 ± 0.496 mg/dl). Thirdly, phosphorus levels in control groups were (3.34 ± 0.53) significantly lower than osteoporotic group (3.78 ± 0.4). Fourthly, both control and osteoporosis women had serum calcium and phosphorus level within normal range. Lastly, serum of alkaline phosphatase was significantly higher in osteoporosis (96.89 ± 8.00) than control groups (81.0 ± 12.4), yet it is still within normal range.

![Fig. 1: The mean and SD of the parameters of each group](image-url)
According to the experiments, the level of serum vitamin 25 (OH) D in study group women appeared there were (34) of them below ≤10 (ng/ml) had deficient the Mean ± SD (8.712 ± 0.756). On the other hand, the number of women was ranging between (11-29 ng/ml) was (59) Mean ± SD (4.455 ± 5.269) had insufficient. The last ones had sufficient their number was (7) and Mean ± SD was (33.114 ± 6.201). The results in Figures 2 and 3 show the correlation of age with BMD, vitamin D, and phosphorus in both groups. It is worth mentioning that in both figures the symbol \( \chi^2 \) represents Chi test, and DF is the abbreviation of the degree freedom. Furthermore, in Figure 2 and 3, the p-value was less than (0.005). However, in Figure 2, it showed (non-significant) significant in (Ca and AIP) BMD, vitamin D and P. On the other hand, in Figure 3, it showed non-significant in all parameters except BMD.

### Discussion

The data also showed no significant difference in the level of serum Calcium between osteoporosis group (8.89 ± 0.569 mg/dl) and control group (8.77 ± 0.496 mg/dl). Similarly, there was no relation between BMD and calcium ion \((26) (27)\). Our work agrees with Rana A. Hmadi \((28)\) who found no significant difference in calcium level in osteoporotic women (2.19 ± 0.11 mmol/l) and in control group (2.24 ± 0.14 mmol/l) the normal range in mmol/l (2.1 - 2.6). Additionally, serum phosphorus showed significant difference between osteoporosis groups (3.78 ± 0.4 mg/dl) and control groups (3.34 ± 0.53 mg/dl). Furthermore, it showed no significant difference in the level of serum phosphorus for study women groups (6.39 ± 1.14 mg/dl). It is worth mentioning that a study done by Rana A. Hmadi \((28)\) found that osteoporotic group is (1.13 ± 0.19 mmol/l) whereas control is (1.15 ± 0.17 mmol/l) and the normal range in mmol/l (0.8 - 1.6).

Serum alkaline phosphatase showed a significant difference between osteoporotic groups (96.89 ± 8.00 mg/dl) compared to the control group (81.0 ± 12.4 mg/dl). Nevertheless, their value within a normal range that means there was no significant relation between osteoporosis and alkaline phosphatase. However, our results disagree with Ramesh et al. in \((29)\) who showed raised the level in alkaline phosphatase.

Evaluating the vitamin D status in our work showed that (59%) of women had vitamin D insufficient which agree with Wei et al. \((30)\) (64.7%) of women had vitamin D deficient. Besides, in our study (34%) of the women had a deficiency which agrees with experiments done by Francisco \((31)\) (24%) of their study groups below <25.
Ramesh et al. (29) found that 25 (OH) D levels revealed (62%) of their patients had vitamin D deficiency, and four subjects had vitamin D deficiency strongly. In work done in Saudi by Abdulla A (32) found that (36.4%) had insufficiency moderate to (8.6%) severe vitamin D deficiency. However, Pedro et al. found that no significant difference between vitamin 25 (OH) D, age group and BMD (33). The decrease in serum vitamin D levels occurred due to several reasons. Firstly, less outdoor activities of the women. Secondly, with a decrease in exposure to sunlight or by wearing a long dress and may consequently prevent vitamin D in the skin to induce and convert to the active form(34).

Conclusion

In this paper, we evaluated Vitamin D and Ca to identify their effect on bone loss. Therefore, one hundred women participated in the mean age of (61.0 ± 10.2) years were studied. 50% of them were in the control group, and 50% of them had osteoporosis. To implement our goals, the SSPS was used to analyze the data. Accordingly, we conclude that the BMD significantly related to age and BMI which the elderly women with low BMI were had more risk factor to osteoporosis and fracture than those younger and normal BMI. Additionally, serum calcium, phosphorus, and alkaline phosphatase were not significantly be affected by BMD.

Recommendation

The BMD significantly related to age and BMI. The elderly women with low BMI have more risk factor to osteoporosis and fracture than those younger and normal BMI. Furthermore, the main minerals in Osteoporosis patients (like Calcium, Phosphorus, Vitamin 25 (OH) D and Alkaline Phosphatase) were not significantly be affected by BMD.

Conflict of Interest: The authors have no financial, consultative, institutional, and other relationships that might lead to bias or conflict of interest.

Source of Funding: The authors have no sources of funding, so it is self-funding research.

Ethical Approve: The author has ethical approval.

REFERENCES


Evaluation of Food, Health and Sports Systems for Fitness Centers in the Center of Najaf Governorate for Females

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¹Department of Physical Education and Sports Sciences, College of Education for Girls, Iraq.

ABSTRACT

This research contains a number of axes, which came from the importance of food, health and sports programs and the right ways to eat with the use of sports programs. In addition to the use of human transportation convenient helped him to be very lazy, making little movement and does not perform any sports activity where he is suffering from health problems and suffers from several diseases. The importance of research lies in finding ways and means to evaluate and evaluate the food, health and sports systems through the study of the prevalence of fitness centers and fitness, which has become obsessed with many researchers to identify the positive effects and tuberculosis.

And where the problem of research came as most of the centers deployed in the province of Najaf does not follow the correct methods and devoid of medical supervision with a lack of specialized training staff that the reasons for the spread of centers back to several things, for example, the following things:

1. High rates of obesity, especially women
2. The desire of most women to maintain the aesthetics of the body
3. The desire of some women to maintain public health and get rid of some diseases

After discovering the reality of the spread of these centers, it became clear that the centers differ among themselves after them points, especially in terms of the requirements of the center’s equipment, as well as follow the food, health and sports programs, as the researcher learned about the staff and workers in the centers of sports and medical cadres.

The researcher found a great difference between the center and the other in terms of providing services in general, so the researcher decided to study and evaluate these centers so that they can evaluate the food, health and sports systems for females, the content of the title and problem of this research.

Keywords: Food systems, nutrition and sports programs.

Introduction

With the development of life in accordance with modern technologies and the proliferation of means of technology and rapid pace of life and the abundance of work and concerns of the human be dependent on fast food and away from eating healthy as well as most people do not have a culture and the knowledge of nutrition ((Nutrition and methods of eating The food properly as well as the use of human transportation convenient helped him to be very laziness, which made him little movement and does not perform any sports activity where he has suffered from health problems and suffers from several diseases and perhaps the most prominent obesity and other diseases such as (sugar, pressure, Hormones) where it became difficult to get rid of his eating habits As well as epidemiological studies and studies of modern age diseases indicate that the rate of diabetes in individuals who exercise less than those who do not exercise

The importance of research is to find ways and means to evaluate and evaluate the food, health and sports systems used in the fitness and fitness centers, which have become obsessed with many researchers to identify their positive and negative effects.

Common customs and traditions in the Arab countries in general and in Iraq in particular have a major role in the spread of obesity as their national and
religious suitability is linked to different types of food. Psychological work is one of the most important factors leading to obesity. Obesity is affected by the emotional state of the person. Some people resort to frustration, failure or loneliness to eat large quantities of food, and there are individuals who are on the contrary, where they increase their ability to eat in cases of happiness and success. The psychological state has an important role in determining the amount of food consumed by the person and affected the body weight.\(^3\)

The practice of eating habits and reducing the number of meals eaten by the individual to one meal per day only leads to the mobilization of metabolic methods in the body with fats and carbohydrates and increase the proportion of triglycerides in the blood and the body moves in the process of conversion this crowd of energy taken into stock energy in the body and begin the process of fat formation and sedimentation and lead to the secretion of the hormone insulin to counter the rise of glucose in the blood, which triggers the process of building fat. Hypertrophic adipocytes are also resistant to insulin secretion and are more sensitive when these fat cells are reduced and body weight decreases. The natural ability to fully metabolize carbohydrates decreases.\(^4\)

**The Study Aims**

1. To identify the number of centers deployed in the center of Najaf.
2. To identify and evaluate the food, health and sports systems used in these centers.
3. To identify the effect of some of the systems in question (weight, body mass, body fat percentage, water percentage in the decomposition, level of physical fitness) of the members of the research sample.

**Field Research Procedures**

**Field visit to fitness centers in question:** Before selecting the procedures, the researcher conducted field visits and a comprehensive survey of all fitness centers in Najaf city center for females. The purpose of this field survey is to identify: \(^4\)

1. Number of centers in the city of Najaf for females and their places and locations in the city.
2. See the establishment and halls for each center.
3. Access to the equipment and sports equipment used.
4. See the administrative, sports and medical staff.
5. Access to the food, health and sports systems prepared by the centers.
6. To see the numbers of women and their ages and their social status, health and sports.

In light of the points mentioned above, and through the field survey, the researcher conducted the following field procedures:

**First:** Design the form of collecting information about the participants in the centers see Appendix (11).\(^6\)

**Second:** Designing a form for collecting information about the food, health and sports systems of the participants is considered Appendix (12).\(^6\)

**Tests used in research:**

1. Measuring weight and length: (in kilograms and meters).
2. Measurement of body components: The measurement of the body components through the use of devices to measure (the environment of the body, skin folds).
3. Measurement of physical fitness: The 30-D walk test was selected using the electric walk-in device and calculating the distance traveled for easy implementation of this test. This test was determined by presenting the expert questionnaire form to show the physical competence of the members of the sample, where the test achieved 85% of the opinions of experts.

**Pretests:** The tests and Pre measurements were carried out in all the research variables (weight, height, body components, physical efficiency, and physiological measurements) on 10/11/2017 for all members of the research samples. The measurements were made at the Ghada Fitness Center and Al Sadr Teaching Hospital in Najaf.

**Posttests:** The researcher carried out dimension measurements for all the above mentioned search variables on 15/11/2017 at the same place Ghada Center for Fitness and Fitness and Al-Sadr Teaching Hospital.
Results and Discussed

For the purpose of knowing whether the objectives of the research were achieved or not?

The researcher processed the data by some statistical means and in light of the methodology used and came out with the following results:

View and analyze the results of the research sample the first experiment that applied the sport system of Ghada Center for fitness and fitness for the variables of research.

Table 1: Shows the mean and standard deviations of the variables of the first experiment

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Variables</th>
<th>Units</th>
<th>Pretest</th>
<th>Posttest</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Weight</td>
<td>Kg</td>
<td>96.910</td>
<td>18.670</td>
</tr>
<tr>
<td>2.</td>
<td>Body fat percentage</td>
<td>Percent</td>
<td>46.400</td>
<td>5.398</td>
</tr>
<tr>
<td>3.</td>
<td>Percentage of water in the body</td>
<td>Percent</td>
<td>35.900</td>
<td>4.065</td>
</tr>
<tr>
<td>4.</td>
<td>Muscle mass</td>
<td>Kg</td>
<td>25.710</td>
<td>3.289</td>
</tr>
<tr>
<td>5.</td>
<td>Level of physical fitness</td>
<td>How many</td>
<td>1.730</td>
<td>0.595</td>
</tr>
</tbody>
</table>

The researcher used the statistical relationship t-test to extract the differences between the Pre and Post measurements and Table (1) shows the differences of the search variables for the members of the first experimental sample.

Table 2: Shows the calculated t value, the tabular and the significance

<table>
<thead>
<tr>
<th>Variables</th>
<th>(t) calculated</th>
<th>(t) tabulated</th>
<th>Statistical significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>weight</td>
<td>2.423</td>
<td>2.262</td>
<td>Sig.</td>
</tr>
<tr>
<td>Body fat percentage</td>
<td>2.587</td>
<td></td>
<td>Sig.</td>
</tr>
<tr>
<td>Percentage of water in the body</td>
<td>2.368</td>
<td>2.262</td>
<td>Sig.</td>
</tr>
<tr>
<td>Muscle mass</td>
<td>2.596</td>
<td></td>
<td>Sig.</td>
</tr>
<tr>
<td>Level of physical fitness</td>
<td>24.308</td>
<td></td>
<td>Sig.</td>
</tr>
</tbody>
</table>

The value of the (t) tabular at a significance level (0.05) = 2.262

Presentation and analysis of the results the second experimental research sample that applied the mathematical system prepared by the researcher for the research variables under study and the following table shows that:

Table 3: Shows the computational and standard deviations of the second experimental research sample applied to the mathematical system prepared by the researcher

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Variables</th>
<th>Units</th>
<th>Pretest</th>
<th>Posttest</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>weight</td>
<td>Kg</td>
<td>94.63</td>
<td>10.892</td>
</tr>
<tr>
<td>2.</td>
<td>Body fat percentage</td>
<td>Percent</td>
<td>45.9</td>
<td>3.203</td>
</tr>
<tr>
<td>3.</td>
<td>Percentage of water in the body</td>
<td>Percent</td>
<td>35.9</td>
<td>4.065</td>
</tr>
<tr>
<td>4.</td>
<td>Muscle mass</td>
<td>Kg</td>
<td>25.88</td>
<td>3.413</td>
</tr>
<tr>
<td>5.</td>
<td>Level of physical fitness</td>
<td>How many</td>
<td>1.45</td>
<td>0.418</td>
</tr>
</tbody>
</table>

For the knowledge of the Pre and Post measurement of the sample of the second experiment, which applied the mathematical system prepared by the researcher, the researcher used the statistical relationship (t) and Table (4)
Presentation and Analysis of Results The third empirical research sample applied by the system (food-mathematical) prepared by the researcher for the variables of research under study:

Table 5: The following table shows the computational and standard deviations of the research sample.
The third experiment applied by the system (food - sports) prepared by the researcher for the variables of research under study

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Variables</th>
<th>Units</th>
<th>Pretest</th>
<th>Posttest</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Mean</td>
<td>SD</td>
</tr>
<tr>
<td>1.</td>
<td>Weight</td>
<td>Kg</td>
<td>94.630</td>
<td>11.413</td>
</tr>
<tr>
<td>2.</td>
<td>Body fat percentage</td>
<td>Percent</td>
<td>49.100</td>
<td>2.923</td>
</tr>
<tr>
<td>3.</td>
<td>Percentage of water in the body</td>
<td>Percent</td>
<td>35.700</td>
<td>3.86</td>
</tr>
<tr>
<td>4.</td>
<td>Muscle mass</td>
<td>Kg</td>
<td>1510.00</td>
<td>128.668</td>
</tr>
<tr>
<td>5.</td>
<td>Level of physical fitness</td>
<td>How many</td>
<td>1.728</td>
<td>0.571</td>
</tr>
</tbody>
</table>

Discussions

The researcher finds that these results are consistent with the results of the study of Hiba Shaker Mahmoud (2012) in terms of the need to balance the nutrients in the individual proportions required by the body, and when this balance, it affects positively on the components of the body, which leads to increase muscle mass, The percentage of body fat decreases and therefore the body weight decreases.7

The researchers believes that the system of sports followed by the center has a positive effect on the mass of muscles, but in small percentages due to the lack of this system of balanced nutrients, this study agrees with the study of Hiba Shaker (2012), which states that the chemical system lacks nutrients Despite the increase in the proportion of proteins in the body, but does not increase the mass of muscle to a large extent, due to low weight to the low proportion of water in the body, which is contrary to the recommendations of health food that urges the individual not to reduce the proportion of water in the body than the normal rate Adversely affect the mass This is because water represents a large part of the weight of the muscles and is involved in building the cell and the chemical reactions that occur within it.8

Low body fat percentage in both systems as follows: The rate of change in body fat percentage in the sports diet was prepared by the researcher (7.668), and the percentage of change in the mathematical system prepared by the researcher was (3.609). It is clear that the percentage of body fat decreased for the three groups and the athlete’s diet is the best percentage of decline, followed by the athlete’s system prepared by the researcher.9

The researchers found that these results are consistent with the results of the study conducted by Hiba Shaker Mahmoud (2012), which states that it must be a weight...
loss of body fat while maintaining the natural water in the body. The researcher finds that these results contradict with the study conducted by Hiba Shaker Mahmoud (2012), which refers to the importance of water in the body but at the natural rate of about 70% of the body weight and to do many processes such as: digestion and absorption, And the formation of body cells.\textsuperscript{11}

The change in the percentage of water in the body as it reached in the athlete’s system prepared by the researcher (2.368) and it is clear that the sample lost the excess proportion of water in the body only, which led to access to the normal rate, and this has a positive effect on low body weight And increase muscle mass.\textsuperscript{12}

The researchers finds that these results are consistent with the study conducted by Hiba Shaker Mahmoud (2012), which states that the best food systems that maintain the proportion of water needed for the body as it works to expel harmful substances outside the body,\textsuperscript{13} and the transfer of food intake to plasma blood and Carbon dioxide is caused by metabolism in muscle cells, which positively affects low body weight and increases muscle mass.\textsuperscript{14}

**Conclusions**

1. The sports diet has a positive effect on the variables of research, especially (weight variable, muscle mass, body fat percentage, body water percentage, muscle mass, level of physical fitness). The results were the increase in muscle mass by 2.81% And the decrease in the body fat percentage by 4.8%, and decrease the proportion of water in the body by 1%, which led to a small percentage to reach the normal rate for each person, so the diet sports may give the best results that correspond to the search variables.

2. The sports system adopted by the centers has positive effects on some variables Research: The percentage of body fat decreased to 0.9% as it has negative effects on some of the research variables, including muscle mass increase by 1.09%, but in the proportion of water in the body led to a 2.5% drop.

3. The positive effects of the research variables in the mathematical system prepared by the researcher are: The system increased muscle mass to 2.55% and reduced body fat to 2.4%.

4. The athlete’s diet system prepared by the researcher led to a decrease in weight by 10.57% and a rise in the level of physical fitness to 4,727%. This corresponds to the nutritional health recommendations by 100%.

5. In the sports system followed by the centers, this led to a decrease in weight by 6.04% and a high level of efficiency to 1.238%. This corresponds to the health food recommendations by 40%.

6. In the sports system prepared by the researcher led to a decrease in weight by 6.95% and a high level of physical fitness to 1,508% and this corresponds to the health food recommendations by 85%.

**Ethical Clearance:** College of Education for girls

**Source of Funding:** Self

**Conflict of Interest:** None

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Syrian Mesquite (*Prosopis Farcta*) as a Potent Maintainer for the Overall Health

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ABSTRACT

Objectives: Choosing of Syrian mesquite (*Prosopis farcta*) as potent oral hypoglycemic and anti-oxidant agents for the maintenance of overall health is the purpose of the present study.

Method: The inhibitory effect against α-glucosidase and anti-oxidant activities for n-hexan, ethyl acetate and methanol extracts of roots and stalks of Rhubarb (*Rhubarb ribes*) and roots, a bark of roots, leaves, and fruits of *P. farcta* have been studied. Different concentrations of extracts were subjected to α-glucosidase inhibitory assay and the percentage of α glucosidase inhibitory activity was calculated. A method of Folin-Ciocalteu was applied to measure the total phenol content, aluminum chloride method with modifications was used to measure total flavonoid content and free radical scavenging activity of the extracts was analyzed using 2,2-diphenyl-1-picryl-hydrazyl (DPPH) with a finding of the IC50.

Result: The methanol extract of the bark of roots for *P. farcta* (7.8125 mg/ml) gave the highest percentage (88.52604) of α-glucosidase inhibition out of all extracts. Methanol extract for roots of *P. farcta* showed the highest content of total flavonoid comparing with all extracts. Ethyl acetate extract for leaves of *P. farcta* showed stronger ability to scavenge DPPH comparing with all extracts.

Conclusion: Possessing properties of hypoglycemic and antioxidant may qualify *P. farcta* extracts to use as a potent antioxidant and sugar regulator for the maintenance of overall health.

Keywords: *Prosopis farcta*, α-glucosidase, health, hypoglycemic, inhibition.

Introduction

There is no enough information about the role of Syrian mesquite (*Prosopis farcta*) in inhibition of α-glucosidase as well as antioxidant activity, although, the local administration of *Prosopis farcta* fruit dusk powder and root aquatic extract showed accelerates healing in diabetic rats ¹. Although there is a report indicating that the Rhubarb extracts can improve oral glucose tolerance in diabetic animals ², but there is no enough information about their role in inhibition of α-glucosidase as well as antioxidant activity.

Inhibitors of α-amylase and α-glucosidase delay the breaking down of carbohydrates in the small intestine and diminish the postprandial blood glucose excursion ³. The functions of all systems in the body depend on the equilibrium between free radicals and antioxidants. Oxidative stress will happen when free radicals become higher than the ability of antioxidants. Therefore, use an external source of antioxidants can help in coping this oxidative stress ⁴.

Several plants contain components that have the ability to reduce reactive oxygen species (ROS) induced oxidative damage. There are many assays in vitro use to measure the antioxidant potential for the plants and most of these assays revealed potent antioxidant activity ⁵.

Because, there are no sufficient studies about *P. farcta* role in inhibition of α-glucosidase as well as antioxidant activity, so the purpose of this study is evaluate their activities compared with *R. ribes*, which is also considered as cheap, available, and good antioxidant.

Material and Method

Plant Material: The roots, leaves, and fruits of *P. farcta* and *R. ribes* were collected from Koya in Erbil
Governorate, Iraq. Dr. Ali Sonboli identified the plants and voucher specimens have been deposited in the Herbarium of Medicinal Plants and Drugs Research Institute, Shahid Beheshti University, under the herbarium codes of MPH-1296 and MPH-1342, respectively.

**Extraction:** Two plants have been collected from Kurdistan of Iraq; the first was Syrian mesquite (P. farcta) and the second was Rhubarb (R. ribes). Fruits, leaves, roots and their barks of Syrian mesquite and roots and stalks of Rhubarb were used in this study. The plant materials were dried at room temperature and ground into fine powders in a mechanical grinder. A 10 g portion of each plant was weighed accurately in a digital balance and successively extracted with n-hexane (3×50 mL), ethyl acetate (3×50 mL) and methanol (3×50 mL) by maceration on a magnetic stirrer for 1 h at room temperature. The extract of each solvent was evaporated to dryness under reduced pressure at 45 °C to obtain solvents n-hexane, ethyl acetate, and methanol extracts.

**Determination of alpha glucosidase inhibitor activity:**
Alpha-glucosidase inhibition was analyzed by using a kit (Sigma Aldrich Chemical Co, USA) and ELISA reader. Dimethyl sulphoxide was used to obtain different concentrations of extract samples, which included 125mg/1ml for 1st test, 62.5 mg/ml for 2nd test, 31.25 mg/ml for 3rd test, 15.625 mg/ml for 4th test, 7.8125 mg/ml for the 5th test.

The % inhibition has been obtained using the formula: % inhibition = (1- an average of sample slope/ average of enzyme slope) ×100.

**Anti-oxidant activity assays:** The dried extract was dissolved in dimethyl sulfoxide 99% and different concentrations of each extract were used for getting suitable concentration. The calculation has been done based on 1000 ppm of the extract samples. Method of Folin-Ciocalteu was applied to measure the total phenol content (TPC) in each extract with some modifications. Different concentrations of gallic acid were used as equivalent to be standards. Aluminum chloride method with modifications was used to measure the total flavonoid content besides using of Quercetin as standard.

The free radical scavenging activity of the extracts was analyzed using 2,2-diphenyl-1-picryl-hydrazyl (DPPH) (Sigma –Aldrich – Germany) according to . BHT (Butylated hydroxytoluene) (Sigma –Aldrich – Germany) in different concentrations was used as a standard. These measurements were performed in duplicate and percentage of inhibition (Pi) was calculated using the following equation:

\[ \text{Pi} = \left( \frac{A_b - A_s}{A_b} \right) \times 100 \]

\( A_b \) is the absorbance reading of control and \( A_s \) is the absorbance reading of the extract. The IC50 values were calculated using linear regression analysis for indicating antioxidant capacity.

**Statistical Analysis:** Determination of assays was done in triplicates. The value for each sample was calculated as the mean ± standard deviation (SD). The results were evaluated by using the SPSS and one-way ANOVA. Differences among samples were considered to be statistically significant if \( p<0.05 \).

**Results**

**A-glucosidase Inhibition Assay:** At the 1st test, the abstracts of n-hexane (125mg/ml) which included six abstract samples showed very low inhibition so they have ignored in next tests. In 2nd test (62.5 mg/ml) and third test (31.25 mg/ml) a number of samples were unclear in the results because their slopes were negative which means low or lack of inhibition effect, so they had to repeat in more dilute for some extracts and ignored others in next test.

The competition for inhibition was close between the sample of methanol extract for roots of P. farcta and the sample of methanol extract for the bark of roots of P. farcta, although the sample of methanol extract for the bark of roots of P. farcta was the better (Table 1). 5th test (7.8125 mg/ml) was conducted to confirm the best sample extract that does greater inhibition among these three samples. The sample of methanol extract for the bark of roots of P. farcta was the best one (Table 2).

**Table 1: Forth test for % inhibitions of the alpha glucosidase enzyme of samples of ethyl acetate and methanol abstracts (15.625 mg/ml) for Rhubarb and Syrian mesquite (P. farcta)**

<table>
<thead>
<tr>
<th>Samples</th>
<th>% inhibition of the alpha glucosidase enzyme</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethyl acetate extract for roots of P. farcta</td>
<td>86.90357</td>
</tr>
<tr>
<td>Ethyl acetate extract for bark of roots of P. farcta</td>
<td>78.57143</td>
</tr>
</tbody>
</table>
Conted…

<table>
<thead>
<tr>
<th>Samples</th>
<th>% inhibition of the alpha glucosidase enzyme</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethyl acetate extract for roots of P. farcta</td>
<td>45.90075</td>
</tr>
<tr>
<td>methanol extract for roots of P. farcta</td>
<td>36.06453</td>
</tr>
<tr>
<td>methanol extract for bark of roots of P. farcta</td>
<td>88.52604</td>
</tr>
</tbody>
</table>

Antioxidant Activities

a. **Total Phenolic Content:** Results of table 3 reveal that total phenolic content in P. farcta was higher than Rhubarb (R. ribes). The best part of the P. farcta, which has the higher content, was ethyl acetate extract for leaves.

Table 3: Total phenolic content of extracts for Syrian mesquite (P. farcta) and Rhubarb (R. ribes)

<table>
<thead>
<tr>
<th>Extracts of plant parts</th>
<th>n-hexane</th>
<th>Ethyl acetate</th>
<th>Methanol</th>
</tr>
</thead>
<tbody>
<tr>
<td>root barks of Prosopis farcta</td>
<td>28.00 ± 0.16 a</td>
<td>76.47 ± 0.35 f</td>
<td>101.22 ± 0.45 k</td>
</tr>
<tr>
<td>roots of Prosopis farcta</td>
<td>9.50 ± 0.09 b</td>
<td>74.78 ± 0.35 f</td>
<td>116.22 ± 0.51</td>
</tr>
<tr>
<td>fruits of Prosopis farcta</td>
<td>5.13 ± 0.07 c</td>
<td>52.59 ± 0.26 h</td>
<td>40.50 ± 0.21 j</td>
</tr>
<tr>
<td>leaves of Prosopis farcta</td>
<td>69.93 ± 0.33 e</td>
<td>143.7 ± 0.62 w</td>
<td>88.53 ± 0.40 i</td>
</tr>
<tr>
<td>roots of R.ribes</td>
<td>20.65 ± 0.13 d</td>
<td>88.28 ± 0.40 i</td>
<td>82.84 ± 0.38 m</td>
</tr>
<tr>
<td>stalks of R.ribes</td>
<td>11.72 ± 0.10 b</td>
<td>21.91 ± 0.14 d</td>
<td>37.84 ± 0.20 j</td>
</tr>
</tbody>
</table>

Each value represents the average ± SD (µg GAE/mg of extract).

Averages in a column followed by the same letter are not significantly different and different letters are significantly different.

b. **Total Flavonoid Content:** Results of table 4 reveal that total flavonoid content in P. farcta was higher than Rhubarb (R. ribes). The best part of the P. farcta that has the higher content was methanol extract for roots.

Table 4: Total flavonoid content of extracts for Syrian mesquite (P.s farcta) and Rhubarb (R.ribes), expressed as µg of quercetin equivalent per 1 mg of extract

<table>
<thead>
<tr>
<th>Extracts of plant parts</th>
<th>n-hexane</th>
<th>Ethyl acetate</th>
<th>Methanol</th>
</tr>
</thead>
<tbody>
<tr>
<td>root barks of Prosopis farcta</td>
<td>65.9 ± 3.00 a</td>
<td>199.50 ± 5.24 g</td>
<td>292.70 ± 6.99 k</td>
</tr>
<tr>
<td>roots of Prosopis farcta</td>
<td>50.98 ± 2.03 b</td>
<td>141.11 ± 4.76 h</td>
<td>331.62 ± 12.99 l</td>
</tr>
<tr>
<td>fruits of Prosopis farcta</td>
<td>1.16 ± 0.36 c</td>
<td>5.62 ± 0.36 i</td>
<td>23.75 ± 2.88 m</td>
</tr>
<tr>
<td>leaves of Prosopis farcta</td>
<td>34.48 ± 2.75 d</td>
<td>187.26 ± 5.57 j</td>
<td>217.83 ± 4.34 n</td>
</tr>
<tr>
<td>roots of R.ribes</td>
<td>15.90 ± 1.80 e</td>
<td>200.00 ± 6.46 g</td>
<td>278.19 ± 5.76 o</td>
</tr>
<tr>
<td>stalks of R.ribes</td>
<td>10.23 ± 1.58 f</td>
<td>19.03 ± 1.07 e</td>
<td>8.317 ± 0.76 f</td>
</tr>
</tbody>
</table>

Each value represents the average ± SD (µg quercetin E/mg of extract).

Averages in a column followed by the same letters are not significantly different and different letters are significantly different.
c. DPPH free radical scavenging assay: Decreasing of DPPH free radical is represented by IC50. *P. farcta* was stronger than Rhubarb (*R. ribes*) for decreasing of DPPH free radical. The best part of the *P. farcta* was ethyl acetate extract for leaves. Table 5 shows previous changes.

Table 5: IC50 values for DPPH radical scavenging of extracts for Syrian mesquite (*P. farcta*) and Rhubarb (*R. ribes*), expressed as µg/ml

<table>
<thead>
<tr>
<th>Extracts of plant parts</th>
<th>n-hexane</th>
<th>Ethyl acetate</th>
<th>Methanol</th>
</tr>
</thead>
<tbody>
<tr>
<td>root barks of <em>Prosopis farcta</em></td>
<td>8941.01 a</td>
<td>677.68 g</td>
<td>76.32 m</td>
</tr>
<tr>
<td>roots of <em>Prosopis farcta</em></td>
<td>15572.50 b</td>
<td>392.28 h</td>
<td>115.04 n</td>
</tr>
<tr>
<td>fruits of <em>Prosopis farcta</em></td>
<td>15910.06 c</td>
<td>83.61 i</td>
<td>629.75 o</td>
</tr>
<tr>
<td>leaves of <em>Prosopis farcta</em></td>
<td>6463.71 d</td>
<td>22.47 j</td>
<td>49.02 p</td>
</tr>
<tr>
<td>roots of <em>R.ribes</em></td>
<td>7483.33 e</td>
<td>125.03 k</td>
<td>96.70 q</td>
</tr>
<tr>
<td>stalks of <em>R.ribes</em></td>
<td>19948.33 f</td>
<td>48229.05 l</td>
<td>19115.01 r</td>
</tr>
</tbody>
</table>

Data are presented as mean ± SD values of triplicate determination. Different letters for a given value within a column are significantly different from each other (P<0.05). S.D.: Standard Deviation; IC50: Half-maximal inhibitory concentration.

**Discussion**

Inhibition of α-glucosidase by *P. farcta* extracts may be done by competing with the binding of oligosaccharides with alpha-glucosidase and prevent their breaking down to monosaccharides. That leads to prevent entrance of monosaccharides to the blood circulation thereby lowering the glucose level. Herbal agents have the most strong alpha-glucosidase inhibiting components since they show maximum inhibition even at low quantities and may without side effects.

The highest value of phenolic content was showed by ethyl acetate extract for leaves of *P. farcta*. Strong antioxidant activity mostly related to existing phenolic compounds in many plants. Stabilizing lipid oxidation depends on the antioxidant activity of phenolic compounds through hydroxyl groups that are considered as main groups in phenolic compounds. These hydroxyl groups have the ability to scavenge the free radicals by binding with them. Reduction-oxidation reaction is the main reason for this scavenging activity through binding with oxygen (singlet) and triplet oxygen forms, neutralizing and absorbing free radicals or decomposing peroxides.

The highest content of total flavonoid was with methanol extract for roots of *P. farcta*. Flavonoids have many important activities such as antidiabetic, anti-inflammatory, antibacterial, antiviral, anticancer and antiallergic activities. These activities of flavonoids are related to many mechanisms, and the direct and indirect antioxidant action is the dependent one among them. The antioxidant action of flavonoids comes from the phenolic hydroxyl groups attached to ring structures that can scavenge the free radicals also they are considered as reducing agents and metal chelators.

Ethyl acetate extract for leaves of *P. farcta* showed stronger ability to scavenge 2, 2-diphenyl-1-picrylhydrazyl DPPH comparing with all extracts. DPPH radical is used for detection of antioxidant activity of plant extracts because it is stable free radical. The plant extract that doing more reduction for this DPPH radical is considered as a strong antioxidant. This reduction is occurred through the donation of hydrogen atoms or electrons to capture the free radicals. The positive result for this test represents with change the purple colored 1, 1-diphenyl-2-picrylhydrazyl (DPPH) to yellow colored complex because of the reduction. This DPPH assay is the most important test for the in vitro determination of Antioxidant activity.

**Conclusion**

This study shows that parts of Syrian mesquite (*P. farcta*) have potential antioxidant effect as well as potent inhibitory action against alpha glucosidase and they are more potent than Rhubarb (*R. ribes*). This result enhances *P. farcta* to use as a potent antioxidant and sugar regulator for the maintenance of overall health.
Conflict of Interest: The authors declare that there is no conflict of interest.

Source of Funding: The ministry of higher education in the Kurdistan region/Iraq via Koya University at Kurdistan region/Iraq was source of funding.

Ethical Clearance: All experiments were done in vitro, without using human and animals. Research ethics approval was obtained from Medicinal Plants and Drugs Research Institute, Shahid Beheshti, University, Tehran, Iran.

REFERENCES


The Correlation of Some Heavy Metals in Recurrent Pregnancy Loss in AL-Yarmouk Teaching Hospital

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1College of Medicine, 2Assist. Prof., College of Medicine, 3Prof., Obs and Gyn Department, College of Medicine, Department of Chemistry and Biochemistry, Al- Mustansirya University

ABSTRACT

Recurrent pregnancy loss is define as the spontaneous loss of three or more successive pregnancies before 24 weeks of gestation. Heavy metal may play a role in recurrent pregnancy loss. Case control study included 90 women, thirty of them were patients diagnosed with recurrent pregnancy loss between (7-20) weeks of gestation and the other sixty controls were (30 ongoing pregnant women and 30 non-pregnant ). Serum levels of Chromium (VI) and Manganese was measured by using graphite furnace atomic absorption spectrometer technique. While total serum iron was measured by colorimetric method. The result were expressed as mean ± standerd error of mean. P value of < 0.01 was considered to be statistically significant. The levels of serum chromium and manganese were significantly higher in patients with recurrent pregnancy loss compared to control groups, while the concentration of total serum iron was significantly lower in patients with recurrent pregnancy loss compared to control group. As conclusion, it can be concluded that high levels of chromium (VI), manganese and low level of iron increase the risk of spontaneous pregnancy loss in Iraqi women.

Keywords: Recurrent pregnancy loss, Chromium, Manganese, Iron, Graphite Furnace Atomic Absorption Spectrophotometry

Introduction

Miscarriage is defined as fetal loss before 24 weeks of gestation (1). 1–3% of losses are recurrent miscarriage, which defined as three or more consecutive early pregnancy losses (2,3). Trace elements, are essential for human health and are involved in various metabolic and biological functions. Deficiencies or excesses in these trace elements are usually related to human diseases (4). Micronutrients support maternal health and fetal development throughout gestation through processes that are integrated across maternal, placental and fetal compartments (5). Chromium (VI) has strong oxidation properties with greater toxicity than Chromium (III) (6). Both can cause adverse effects on fertility and subsequent embryonic development (7). Manganese(Mn) is an essential mineral nutrient in humans, is required for normal metabolism, it can act by activating certain enzymes which is essential for proper immune function the body’s defense against free radicals, blood sugars control, reproduction and bone growth(11). Mn may affect development and functioning of the brain as it acts as a cofactor of several enzymes involved in neurotransmitter synthesis and metabolism(12). No clear effects of deficiency or excess of manganese on the developing human fetus or pregnancy outcome (13). Women at increased risk as it absorbed more Mn than male Mn concentration increase progressively throughout pregnancy (14-16). This might explained by increase in Mn intestinal absorption (17) or differences in tissue manganese mobilization related to increased estrogen and progesterone concentration during pregnancy (18,19). Iron (Fe) is an essential nutrient, it is a cofactor for many enzymes and it is essential for oxygen transport (in hemoglobin) and electron transfer (20). Intestinal absorption of Mn is up-regulated when iron stores are low and increase in blood manganese concentrations can be demonstrated with lower ferritin concentrations (21-23). Around 23% of all pregnant women
suffering of anemia in industrialized countries\textsuperscript{(24)}, so intestinal absorption of Mn increase during in pregnancy\textsuperscript{(25)}. Mn easily passes through the placenta, the elevated gastrointestinal absorption during pregnancy may lead to excess fetal exposure, and potentially toxicity, in highly exposed mothers\textsuperscript{(26,27)}. Even active transport is saturated at excessive Mn exposure, but simple diffusion of Mn across the placenta may still occur, indicating that there may be a risk of excess fetal exposure\textsuperscript{(28)}. Aim of the present study was to evaluate some minerals in Iraqi women with recurrent abortion.

**Material and Method**

This study protocol was approved by the Ethical Committee of the Collage of Medicine/AL-Mustansiriyah University/Department of Clinical Biochemistry. Samples were collected from out Patients Department & AL- Yarmouk Teaching Hospital (Obstetrics & Gynaecology) between (11-2017 to 3-2018). Ninety (90) Pregnant women included in this study were between 7-20 weeks of gestation, their age was (18-40 years),they were divided into three main groups: Group1 : ( Unexplained recurrent pregnancy loss) includes pregnant women with missed miscarriage with a history of three or more consecutive missed miscarriage, No=30. Group2: Pregnant women with single viable fetus without history of miscarriage, No. =30. Group 3: non- pregnant women without history of miscarriage, No. = 30. RH immunized patient, patients with medical disease like diabetes mellitus and thyroid disease, congenital abnormality of uterus, thrombophilia screen (+ve), antiphospholipid syndrome, twin pregnancy, fetus with congenital abnormality all have been excluded from this study. Serum chromium and manganese were measured by Graphite Furnace Atomic Absorption Spectrophotometry (GFAAS)\textsuperscript{(29)}. Serum iron (Fe\textsuperscript{2+}) was measured by colorimetric method\textsuperscript{(30)}.

**Results**

Table (1) show the mean of Chromium was significant highest value in recurrent pregnancy loss group compared with non-pregnant and ongoing pregnancy groups, while in ongoing pregnancy was higher than non – pregnant women.

<table>
<thead>
<tr>
<th>Cases</th>
<th>No.</th>
<th>Normal</th>
<th>Mean ± SD</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>No.</td>
<td>%</td>
<td>No.</td>
</tr>
<tr>
<td>Recurrent pregnancy loss</td>
<td>30</td>
<td>4</td>
<td>13.3</td>
<td>26</td>
</tr>
<tr>
<td>Ongoing Pregnancy</td>
<td>30</td>
<td>29</td>
<td>96.7</td>
<td>1</td>
</tr>
<tr>
<td>Non-pregnant</td>
<td>30</td>
<td>30</td>
<td>100</td>
<td>0</td>
</tr>
</tbody>
</table>

Table (2) revealed that manganese level was significantly lower in recurrent pregnancy loss as compared to non-pregnant women and ongoing pregnancy which was higher than non – pregnant women,(p value <0.001)

<table>
<thead>
<tr>
<th>Cases</th>
<th>No.</th>
<th>Normal</th>
<th>Mean ± SD</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>No.</td>
<td>%</td>
<td>No.</td>
</tr>
<tr>
<td>Recurrent pregnancy loss</td>
<td>30</td>
<td>2</td>
<td>6.7</td>
<td>28</td>
</tr>
<tr>
<td>Ongoing pregnant</td>
<td>30</td>
<td>29</td>
<td>96.7</td>
<td>1</td>
</tr>
<tr>
<td>Non-pregnant</td>
<td>30</td>
<td>28</td>
<td>93.3</td>
<td>2</td>
</tr>
</tbody>
</table>

Table (3) shows that iron concentration (mg/dl) in recurrent loss group was significantly lower compared to non-pregnant women (p value= 0.038),while no significant difference between ongoing pregnancy and non-pregnant women and between ongoing pregnancy and recurrent loss women,( p-value > 0.05).
Table 4: Assessment of Iron between different groups

<table>
<thead>
<tr>
<th>Cases</th>
<th>No.</th>
<th>Low</th>
<th>No</th>
<th>%</th>
<th>Normal</th>
<th>No</th>
<th>%</th>
<th>High</th>
<th>No</th>
<th>%</th>
<th>Mean ± SD</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recurrent pregnancy loss</td>
<td>30</td>
<td>4</td>
<td>13.3</td>
<td>26</td>
<td>86.7</td>
<td>0</td>
<td>0</td>
<td>71.5 ± 27.7</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ongoing pregnant</td>
<td>30</td>
<td>3</td>
<td>10</td>
<td>25</td>
<td>83.3</td>
<td>2</td>
<td>6.7</td>
<td>84.8 ± 34.4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-pregnant</td>
<td>30</td>
<td>4</td>
<td>13.3</td>
<td>26</td>
<td>86.7</td>
<td>0</td>
<td>0</td>
<td>92.7 ± 32.9</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Discussion

In this present study, serum Chromium level was found significantly higher in group 1 in comparison with other groups. 86.7% was reported in this study, while 1.60% was reported by study in Nigeria to chromium (31). Another study showed increased risk of spontaneous miscarriage by 2.31 or 20.47 times in worker women with occupational chromium exposure, which is considered a public health concern (32), adverse reproductive effects of Chromium observed by other study (33-35).

Additional adverse pregnancy outcome as Intrauterine growth restriction, low birth weight was associated with high levels of Cr in the blood, urine, and umbilical cord blood and in the neonate (36-38). It unclear whether exposed before or during gestation affect pregnancy outcome, however most studies demonstrated Cr(VI) accumulates in maternal tissues and crosses the placenta during pregnancy as increase in chromium levels in the placenta has been demonstrated (39) this high level of chromium might affect glucose tolerance or due to effect of chromium on sperm viability, motility, and morphology in exposed male workers with history frequent spontaneous miscarriage in their families as reported by others (40). In this study the Manganese concentration was significantly higher in group with recurrent pregnancy loss compared to other groups, similar findings are noted by other study (41). One possible explanation for the effect would be oxidative stress caused by high manganese levels leading to impairment of cellular function and growth (42). In addition, manganese caused DNA damage and chromosomal aberrations and was toxic to the embryo and fetus (43). The data of current study indicates statistically significant lower iron in the material with recurrent pregnancy loss as compared with other groups in agreement with other study in (2015) (44), showed that iron levels gradually decreased as the pregnancy progressed. One third of pregnant women have iron deficiency during the first and second trimester. A study showed that Iron, manganese, lead, and cadmium have similar mechanism of absorption (45) and low dietary intake of iron can lead to excess absorption of manganese (46-50) and the subsequent accumulation of manganese in the central nervous system as showed by many studies in adult (51), it effect infants and children need further investigation (52,53).

Conclusion

In conclusion, it can be concluded that high levels of chromium (VI), manganese and low level of iron increase the risk of spontaneous pregnancy loss in Iraqi women.

Source of Funding: Self
Conflict of Interest: Nil

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Wilson's Disease: Laboratory Evaluation and Clinical Presentation of Iraqi Sample

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1MSc. Biotechnology, General Directorate of Biology Department, 2University of Anbar, College of Science Anbar Education, 3Consultant in Internal Medicine Gastroenterology, Assistant Professor Lecturer in the Department of Medicine, College of Medicine, University of Anbar

ABSTRACT

Wilson's disease (WD) is an inherited defect in copper metabolism that causes accumulation of copper in various body organs. It is treatable if it is diagnosed promptly and treated consistently. In this study, the mode of hepatic presentation constituted (57.14%), The neurological presenting problems in this study was (28.57%). Routine biochemistry testing was recorded for all study patients, So Mean values of serum level of ALT, AST, ALP and bilirubin in patients with WD were 136.83 ± 34.770 U/L, 111.86 ± 32.343 U/L, 174.51 ± 25.897 U/L and 6.629 ± 1.6063 mg/dl respectively which differed significantly from their counter parts in asymptomatic group that were (26.36 ± 3.370 U/L, 31.53 ± 1.645 U/L, 76.04 ± 2.698 U/L and 0.780 ± 0.0510 mg/dl respectively), Mean values of serum level of copper 145.29 ± 24.427 μg/dl despite that many cases exceeded the normal range (70-155 μg/dl), this average does not differ significantly from that of Asymptomatic (their families) with a Mean values 74.40 ± 3.145 μg/dl. On the other hand, mean serum levels of ceruloplasmin in patients 9.20 ± 2.745 mg/dl compared with 73.60 ± 2.258 mg/dl in Asymptomatic (their families) significant difference (Table3). The serum AST to urine cu mg/24 hrs Positive correlation (the other variable has a tendency to also increase) (0.951**), total bilirubin Positive correlation (0.795*), S.CU mg/dl Positive correlation lower (0.691). In this study Majority, part of Wilson disease patients had hepatic presentations. the patients were with below 20 years age of onset. The majority part of Wilson disease patients of positive consanguineous parents. A significant association exists between the serum AST, billirubin, 24 hr- urine copper. Serum cooper and 24-hr urine copper levels were significantly lower.

Keywords: Wilson disease, Copper, Ceruloplasmin, Hepatic, Bilirubin

Introduction

Wilson’s disease (WD) can be defined as the excessive deposition of copper in many organs like the liver and brain. It is one of those rare genetic disorders that benefit from effective and lifelong treatments that have dramatically transformed the prognosis of the disease. In Europe, its clinical prevalence is estimated at between 1.2 and 2/100,000 but the genetic prevalence is higher, at around 1/7000. The difference between the numerous genetic prevalence and how many patients diagnosed with WD in Incomplete penetrance of the gene and modifier genes may play an important role1. Hepatolenticular degeneration also called to Wilson disease (WD), mutations in copper transporter gene ATP7B due to occur copper metabolism disorder is a rare inherited autosomal recessive disorder, therefore resulting in hepatic and neuropsychiatric manifestations2,3. Remains incompletely understood because it is close century described.WD patients can be controlled by specialist medicines if it is diagnosed earlier. Many patients are not diagnosed, however, the patients who are not diagnosed are various symptoms and dysfunctions are often neglected1,3. If patients remain undiagnosed, they are often fatal with WD1. Patients with WD may have a broad spectrum of clinical symptoms5. The common organs in WD are liver and brain, and because of the great variable of both types of hepatic as well as neurological symptoms and often delaying diagnosed, they may face a hard diagnosis of WD5. Difficulty speaking, excessive salivation, ataxia, masklike facies, clumsiness with the hands and personality changes are the early appearances of symptoms, while dystonia, spasticity, grand mal seizures, rigidity, flexion contractures, and psychiatric features which occur in 10-20% of patients are regarded the late symptoms5.
Method

**Sampling:** The sampling method was a convenient nonrandom one, carried out through consecutive pooling of all WD patients. Five families with WD (patients, n=9; families, n=25) are recruited from already Hospital, Anbar University School of Medicine (al-Anbar, Iraq) from April 2018 to October 2018. We also recruited 25 family members from these families, including 10 parents (male, n=5; female, n=5;) and 15 siblings (male, n=11; female, n=4). Patients with WD were measured at the time of diagnosis and before therapy. Informed consent was obtained from participants included in the study. The study was approved by the Ethics Committee of ALramady’s Hospital of ALanbr University School of Medicine. A data of patients were collected by direct interviews, full clinical assessment, medical records analysis, and by doing some required laboratory investigations. Patients who accepted to participate in the study, completed the required parameters and fit the inclusion criteria during the study period were included in the study. The patient age should be fulfilling at least three of the above criteria and the last criterion is a definite diagnosis. These diagnostic standards had been proposed basing on Sternlieb’s criteria. The exclusion criteria were; age above 60 years, evidence of coexisting liver diseases including; viral hepatitis A, B C or E, chronic liver disease with cholestatic component, Alpha one antitrypsin deficiency, Coomb’s positive hemolysis, history of Alcohol intake, pregnancy, history of use of copper-containing intrauterine devices (IUCD) or oral contraceptive, history of intake of medications that may cause extrapyramidal side effect such as antipsychotic drugs and Metoclopramide and/or history of chorea.

**Clinical Examination:** The diagnosis of WD was based on clinical examination. The inclusion criteria were; history and clinical examination findings suggestive of WD as hepatic manifestations, neuropsychiatric manifestations, family history of WD, the presence of K–F rings. No symptom of clinical symptoms was typical for Wilson’s disease diagnosis, clinical symptoms that appeared in individuals were very difficult to occur immediately. The brain, which can cause less neurological and psychiatric neuroscience, which also promotes hepatic symptoms, is a family history of hepatic infections, So liver symptoms are hallmarks of Wilson’s disease and hepatic symptoms can precede neurological symptoms. For the rings, they did not appear in the infected sample, because the rings gradually disappear with physical therapy.

**Biochemical Tests:** The diagnosis of WD was based on biological tests such as (low serum ceruloplasmin level and increased 24-hour urinary copper excretion, serum ceruloplasmin level below 200 mg/L, if the liver copper concentration more than 250μg/g dry weight, serum copper level below 70 μg/dl “below 11μmol/L”, 24-hr. urinary copper excretion more than 100μg/24-hr., and/or positive Penicillamine challenge test (if 24-hr. urinary Copper more than1600μg/24- hr., more than 25mmol/L). The Statistical Package for the Social Science (SPSS) version 23.0 software had been used for all computerized statistical analysis. Numerical; normally distributed variables were expressed as mean ± standard deviation; while categorical variables were expressed as frequency, range and percentage. Continuous variables were compared by T-test for the variance analysis. P-value equal or less than 0.0001 was considered as a statistically significant.

Results and Discussion

**Modes of Presentation:** In this study, the mode of hepatic presentation constituted (57.14%), which is early similar to Auday’s study (70.83%), and also near similar to Bushra’s study (69.69%). The neurological presenting problems in this study was(28.57%), which is nearly similar to Auday’s study. Table(1).

<table>
<thead>
<tr>
<th>Presentations</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hepatic</td>
<td>57.14%</td>
</tr>
<tr>
<td>Neurologic</td>
<td>28.57%</td>
</tr>
<tr>
<td>Psychotic</td>
<td>14.28%</td>
</tr>
<tr>
<td>K–F rings</td>
<td>-</td>
</tr>
<tr>
<td>History family</td>
<td>-</td>
</tr>
</tbody>
</table>

Serum levels of ALT, AST, ALP, and Bilirubin: Mean values of serum level of ALT, AST, ALP and bilirubin in patients with WD were 136.83 ± 34.770 U/L, and 6.629 ± 1.6063 mg/dl respectively which differed significantly from their counterparts in asymptomatic group that were 26.36 ± 3.370 U/L, 31.53 ± 1.645 U/L and 0.780 ± .0510 mg/dl respectively as shown in (table 2).
Table 2: Serum levels of ALT, AST, ALP and Bilirubin in patients with WD and control group

<table>
<thead>
<tr>
<th>Index</th>
<th>WD patients mean ± SE</th>
<th>Asymptomatic mean ± SE</th>
<th>T-value</th>
<th>P-values</th>
</tr>
</thead>
<tbody>
<tr>
<td>ALT U/L</td>
<td>136.83 ± 34.770</td>
<td>26.36 ± 3.370</td>
<td>5.896</td>
<td>0.001</td>
</tr>
<tr>
<td>AST U/L</td>
<td>111.86 ± 32.343</td>
<td>31.53 ± 1.645</td>
<td>4.820</td>
<td>0.001</td>
</tr>
<tr>
<td>ALP U/L</td>
<td>174.51 ± 25.897</td>
<td>76.04 ± 2.698</td>
<td>6.993</td>
<td>0.001</td>
</tr>
<tr>
<td>Bilirubin (mg/dl)</td>
<td>6.629 ± 1.6063</td>
<td>0.780 ± 0.0510</td>
<td>7.145</td>
<td>0.001</td>
</tr>
</tbody>
</table>

The current study showed a significant increase in liver enzymes in patients. These findings indicate that the liver was injured. Damage to liver cells is an indication of the severe untreated rate of WD. These will result from the accumulation of free copper which will come in the stages of sulfhydryl and is given in the work of enzymes such as glucose 6-phosphate and glutathione yeast16. In addition, the interaction between free copper and oxygen species (such as superoxide anions and hydrogen peroxide) may encourage the formation of toxic hydroxyl radicals17. On the other hand, high levels of bilirubin in the extremities may be dangerous. Anemia is still unknown in red blood cells (RBCs).

The hypothesis is confirmed by spherocytes, which are characteristic of this type of anemia.

Serum Levels of Copper and Ceruloplasmin: Mean values of serum level of copper 145.29 ± 24.427 μg/dl despite that many cases exceeded the normal range (70-155 μg/dl), this average does not differ significantly from that of Asymptomatic (their families) with a Mean value 74.40 ± 3.145 μg/dl. On the other hand, mean serum levels of ceruloplasmin in patients 9.20 ± 2.745 mg/dl compared with 73.60 ± 2.258 mg/dl in Asymptomatic (their families) significant difference (Table3).

Table 3: Serum levels of copper and ceruloplasmin in WD Symptomatic( patients) and Asymptomatic (their families)

<table>
<thead>
<tr>
<th>Index</th>
<th>WD patients mean ± SE</th>
<th>Asymptomatic mean ± SE</th>
<th>T-value</th>
<th>P-values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Serum copper (mg/dl)</td>
<td>145.29 ± 24.427</td>
<td>74.40 ± 3.145</td>
<td>5.157</td>
<td>0.001</td>
</tr>
<tr>
<td>Serum ceruloplasmin (mg/dl)</td>
<td>9.20 ± 2.745</td>
<td>73.60 ± 2.258</td>
<td>14.196</td>
<td>0.001</td>
</tr>
</tbody>
</table>

Excess copper deposition occurs naturally in liver cells. However, free copper bypasses the storage capacity of the liver cells. These varying amounts of the metal and the extracellular matrix enter the bloodstream. Since the level of copper in the serum will be within normal limits, it is possible to understand that the disease is still in the primitive stages. The interpretation of the high amount of free copper through the fact that the increased concentration of copper inside the liver cells caused a decrease in a protein called inhibitory-associated X of apoptosis (XIAP). This leads to accelerated apoptosis in caspase 3 by accidental cell death18. Dead liver cells release all of its material, including accumulated copper, which was the cause of toxicity, which led to cell death. In patients with Wilson’s disease, Ceruloplasmin deficiency was evident19. To confirm this, the current study showed a reduction in Ceruloplasmin in WD patients where this mean protein was lower than in controls. In fact, ATP7B protein contains defects, we may find a decrease in Ceruloplasmin levels in serum (ATP7B), which makes it unable to complete the copper fusion with apoceruloplasmin and complete its secretion process, which will turn into an active and stable protein, ceruloplasmin, when the association with copper occurs, and finally, low levels of ceruloplasmin20.

Correlation among all biochemical tests: Routine biochemistry testing was recorded for all study patients. The serum AST to urine cu mg/24 hrs Positive correlation (the other variable has a tendency to also increase)(0.951**), total bilirubin Positive correlation(0.795*), S.CU mg/dl Positive correlation lower (0.691).

Correlation among all biochemical tests for Wilson disease patients

<table>
<thead>
<tr>
<th>Correlations</th>
<th>ALT U/L</th>
<th>AST U/L</th>
<th>ALP U/L</th>
<th>TSB mg/dl</th>
<th>S.CU mg/dl</th>
<th>S.CP mg/dl</th>
<th>onset age</th>
</tr>
</thead>
<tbody>
<tr>
<td>urine cu mg/24 hrs</td>
<td>0.055</td>
<td>0.951**</td>
<td>0.066</td>
<td>0.795*</td>
<td>0.691</td>
<td>0.374</td>
<td>0.096</td>
</tr>
</tbody>
</table>
The AST enzyme is found in different tissues of the body such as the liver, brain, spine, pancreas, kidneys, lungs and skeletal muscles. Any abnormalities in these tissues will lead to the release of the enzyme into the bloodstream. Therefore, the high serum level is considered an indication of an injury that may not be specific to the liver itself, but if the disease in the liver progresses slowly, the damage in the liver will affect the rest of the other organs. However, damage to the liver as well as other organs will show elevated levels of AST enzyme if the base of the elevation is a defect in the liver, this increase may be considered an indicator of Wilson’s disease. One of the products of the normal course of hemoglobin breakdown and specifically hematopoietic organisms is bilirubin. Therefore, the high level of bilirubin may indicate some diseases such as Wilson disease because one of the disposal routes is located in the liver. If there is a defect in the pathway inside the liver cells, thus its main symptom is the yellow color of the skin (jaundice). Copper is a cofactor many of the enzymes in the cells of the body that control many important vital functions within these cells. The presence of copper-free is tested in three positions and is either in urine, blood, or liver. Therefore, the copper test is essential in the diagnosis of Wilson’s disease for two reasons. The first is that copper is important for many of the enzymes of the liver and the second is that the process of regulation is through a protein expressed mainly in the liver, so the damage of organized protein in liver cells causes the accumulation of copper unregulated and thus damaged Liver cells release copper into circulation. From this, we conclude that the presence of copper in the blood at a high level of evidence of liver failure and that the accumulation of copper in the liver cells prevented the entry of other quantities and therefore copper in the blood free. However, this test was not useful, but this test was suggested as a diagnostic indicator for Wilson’s disease. In addition, it was noted that copper is high in the treated and untreated people. To diagnose Wilson’s disease and to monitor appropriate treatment, measuring the percentage of copper in 24 hours/day is very useful. Polycarbonate copper is an extension of the copper in the circulatory system, or it reflects the amount of copper that is not arranged by ceruloplasmin or any other transporter in blood. However, measuring the amount of copper as a test for Wilson disease is very difficult, since there is an overlap of results such as this with the results of other tests of liver disease and it is derived from other disorders. If this measurement is considered a diagnostic test, where it was noted that the measurement of the amount of copper urinary linked with the rise in the level of the enzyme, the high level of bilirubin and the lower level of copper in the blood or treated from the treatment of D-penicilamin and this latter challenge is very important in diagnosing the disease. Then they are considered an important diagnostic factor.

Conclusion

The common part of Wilson disease patients had hepatic presentations. The majority part of Wilson disease patients of positive consanguineous parents. A significant association exists between the serum AST, bilirubin, 24 hr- urine copper. Serum copper and 24-hr urine copper levels were significantly lower.

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

Source of Funding: Self

Ethical Clearance: This study is ethically approved by the Institutional ethical Committee.

REFERENCE


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Outcome of Low Birth Weight Infants in AL-Zahraa Teaching Hospital in Kut; Iraq (Comparison between 2003 and 2008)

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1Consultant Pediatrician and Assist. Prof. of Pediatrics, 2Senior Pediatrician and Tutor, Wasit University–Faculty of Medicine, Iraq

ABSTRACT

In AL-Zahraa Teaching Hospital in Kut, Iraq; 152 infants with birth weight less than 2500 g admitted to NICU in 2003 compared with 147 infants admitted in 2008 with male to female ratio of 1.37 : 1 and 1.19 : 1 respectively. The outcome was compared by mortality rate according to birth weight into three categories: 500-999g, 1000-1499g and 1500-2499g. The mortality rate was calculated as the number of deaths while admitted to NICU divided by the number of live births.

The mortality of LBWI was 8% in 2003 and 23.86% in 2008 (p.< 0.05), mortality of VLBWI was 47.36% in 2003 and 80.48% in 2008 (p.< 0.05) and mortality of extremely LBWI was 78.57% in 2003 and 77.77% in 2008 (p.> 0.05). The total mortality of infants had been increased from 24.34% in 2003 to 46.26% in 2008 (p.< 0.05).

RDS (29.73% in 2003 vs. 26.47% in 2008), perinatal depression (27% in 2003 vs. 32.35% in 2008) and sepsis (29.72% in 2003 vs. 30.88% in 2008) proved to be the commonest etiologies of death.

Keywords: outcome, LBWI, Al-Zahraa hospital, Kut.

Introduction

It is known that about 130 million live birth deliveries occur yearly worldwide and more than 4 million of them die in the neonatal period.1 About 75% of deaths occur in the first week of life, and more than 25% occur in the first 24 hours.1,2 Death in neonates constitutes about 40% of total deaths below 5 years of age worldwide. Sepsis (36%), premature delivery (28%) and perinatal depression (23%) are the leading causes of death for 87% of neonates worldwide.3

Preterm babies delivered below 37 weeks gestational constitute about 8% of total births on average and those who born below 2,500 g body weight are categorized as low birth weight infants (LBWI) while those below 1,500 g as very low birth weight infants (VLBWI) and infants below 1,000 g as extremely low birth weight infants (ELBWI).4,5 Both LBW and preterm babies are considered high-risk group because the majority of them need special care and facilities due to higher rates of morbidity and mortality. Global Standardizations applied to classify the child’s life into timed-specific periods to determine the quality of interventions needed to raise the chances of survival among children, so that neonatal period is recognized as the period since birth to the end of 28 completed days of life and it is considered the most critical period in an infant’s life. Neonatal death “deaths among live births during the first 28 completed days of life” which includes early neonatal deaths (deaths from immediately after birth to end of 7th day of birth) and late neonatal deaths (deaths after 7th day to end of 28th day of birth).6,7 The conditions for preterm baby to survive is based on gestational age over 23-24 weeks and a birth weight of 500 grams or more.8

The outcome of babies admitted to the NICUs is not determined exclusively by birth weight and gestational age only, but it is also affected by other conditions including perinatal and physiological factors of the individual patient, especially severity and impact of their diseases.8,9

A reduction in infant mortality rate is considered as an indicator of socio-economic improvement and progression of health standards and facilities in a society10 and for this reason, the infant mortality rate had significantly drop down all over the world in the past decade.11
Aims of the Study

To measure mortality rates according to birth weight and to determine the common etiologies of death among LBWI and to identify interventions for reduction of mortality among LBWI.

Patients and Method

All infants with birth weight of 500 to 2499 g delivered in AL-Zahraa Teaching Hospital in Kut, Iraq were admitted to the Neonatal Intensive Care Unit (NICU) for the period between 1st of January to 31st of December 2003 and for the same period during 2008.

Newborns were distributed according to their gestational age (4 groups according to last menstrual period determined by mothers, fetal assessment by ultrasonography, and clinical examination for assessment of maturity : 24-28 weeks, 29-32 weeks, 33-36 weeks, and 37 completed weeks or more ), birth weight( three groups : 500 – 999 g, 1000 – 1499 g and 1500 – 2499 g ), sex (male or female ), mode of delivery ( smooth vaginal delivery or caesarean section), and the Apgar score at 1 and 5 minutes ( 3 categories : score7 or more, score 4 – 6, score 3 or less).

The outcome of 152 newborn babies born through 2003 compared with 147 newborn babies born through 2008 with male to female ratio of 1.37 : 1 and 1.19 : 1 respectively. One hundred-five infants (69.1) were delivered vaginally and 47 (30.9%) by caesarean section in 2003 while 96 (65.3%) infants were delivered vaginally and 51(34.7%) by caesarean section in 2008.

The LBWI mortality increased from 8/100 ( 8%) in 2003 to 21/88 (23.86%) in 2008. The total mortality of infants had been increased from 37/152 (24.34 %) in 2003 to 68/147 (46.26%) in 2008. VLBWI mortality increased from 18/38 (47.36%) in 2003 to 33/41 (80.48%) in 2008 and the mortality of extremely LBWI was 11/14 (78.57%) in 2003 and 14/18 (77.77 %) in 2008.

Twenty – eight infants (26.6%) died in 2003 were delivered vaginally while 56 infants(58.33%) died in 2008 were delivered by the same route, nine infants(19.14%) died in 2003 were delivered by caesarean section while 12 infants (23.52%) died in 2008 were delivered by the same route. Twenty – two (59.46 %) male infants died in 2003 compared to 15 (40.54%) female infants, while 39 (57.35%) male infants died in 2008 compared to 29 (42.65%) female infants.

Respiratory distress syndrome (29.73% in 2003 vs. 26.47% in 2008), perinatal depression (27% in 2003 vs. 32.35% in 2008) and sepsis (29.72% in 2003 vs. 30.88% in 2008) ascertained to be the commonest aetiologies of death for the three subgroups of the studied population during both periods of this study. Among the LBWI who died, 64.87% in 2003 and 66.18% in 2008 had Apgar score below 7 at 5 minutes respectively.
### Table 1: Mortality rates and causes of death in LBWI.

<table>
<thead>
<tr>
<th>Birth weight (g)</th>
<th>Died n. (%)</th>
<th>Year</th>
</tr>
</thead>
<tbody>
<tr>
<td>500–999 g</td>
<td>6 (54.55)</td>
<td>6 (42.86)</td>
</tr>
<tr>
<td>1000–1499 g</td>
<td>2 (18.18)</td>
<td>3 (21.43)</td>
</tr>
<tr>
<td>1500–2499 g</td>
<td>2 (18.18)</td>
<td>3 (21.43)</td>
</tr>
<tr>
<td>Total</td>
<td>0 (0)</td>
<td>0 (0)</td>
</tr>
</tbody>
</table>

**Causes of death:**

- RDS: 6 (54.55), 6 (42.86), 7 (38.89), 13 (39.39), 2 (25), 3 (14.29), 15 (40.54), 22 (32.35)
- Perinatal depression: 6 (54.55), 6 (42.86), 7 (38.89), 13 (39.39), 2 (25), 3 (14.29), 15 (40.54), 22 (32.35)
- Meconium aspiration: 0 (0), 0 (0), 2 (11.11), 3 (9.09), 1 (12.5), 3 (14.29), 3 (8.11), 6 (8.82)
- Malformations: 0 (0), 1 (7.14), 1 (5.56), 1 (3.03), 0 (0), 1 (4.76), 1 (2.70), 3 (4.42)
- Others (IVH, Rh-isoimmun., . .): 1 (9.09), 1 (7.14), 2 (11.11), 1 (3.03), 0 (0), 1 (4.76), 3 (8.11), 3 (4.41)

**Total no. of Live Newborns:** 14, 18, 38, 41, 100, 88, 152 (100), 147(100)

### Table 2: Mortality rate distribution by birth weight

<table>
<thead>
<tr>
<th>Year</th>
<th>Outcome</th>
<th>Birth weight (g) : n. (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2003</td>
<td>Live born</td>
<td>14 (9.21)</td>
</tr>
<tr>
<td></td>
<td>Died</td>
<td>11 (78.57)</td>
</tr>
<tr>
<td>2008</td>
<td>Live born</td>
<td>18 (12.25)</td>
</tr>
<tr>
<td></td>
<td>Died</td>
<td>14 (77.77)</td>
</tr>
</tbody>
</table>

**P- value:** 0.95, 0.002, 0.003 < 0.05

### Table 3: Mortality rate distribution by mode of delivery

<table>
<thead>
<tr>
<th>Mode of delivery</th>
<th>Died : n. (%)</th>
<th>P. value</th>
</tr>
</thead>
<tbody>
<tr>
<td>2003</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vaginal</td>
<td>28 (26.6)</td>
<td>56 (58.33)</td>
</tr>
<tr>
<td>Caesarean section</td>
<td>9 (19.14)</td>
<td>12 (23.52)</td>
</tr>
<tr>
<td>Total</td>
<td>37 (24.34)</td>
<td>68 (46.25)</td>
</tr>
</tbody>
</table>

### Table 4: Apgar score at 5 minutes for live born and dead LBWI

<table>
<thead>
<tr>
<th>Apgar score at 5 min.</th>
<th>2003</th>
<th>p.value</th>
<th>2008</th>
<th>p.value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Live born n. (%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>≤ 3 points</td>
<td>7 (4.6)</td>
<td>6 (16.22)</td>
<td>9 (6.1)</td>
<td>9 (13.24)</td>
</tr>
<tr>
<td>4 – 6 points</td>
<td>33 (21.7)</td>
<td>18 (48.65)</td>
<td>45 (30.6)</td>
<td>36 (52.94)</td>
</tr>
<tr>
<td>≥ 7 points</td>
<td>112 (73.7)</td>
<td>13 (35.13)</td>
<td>93 (63.3)</td>
<td>23 (33.82)</td>
</tr>
<tr>
<td>Total</td>
<td>152 (100)</td>
<td>37 (24.34)</td>
<td>147 (100)</td>
<td>68 (46.26)</td>
</tr>
</tbody>
</table>
Discussion

The mortality rate in infants born with birth weight less than 2500 g in 2008 was high. The mortality rate in 2003 was 24.34% compared to 46.26% in 2008 while it was 19.4% in I.R. Iran. The mortality of ELBWIs was 78.57% in 2003 and 77.77% in 2008 and this is a very high rate compared to all published worldwide reports (In UAE, registered reports showed that the mortality was 14% in 2004 and 33% 2006). The VLBWI mortality increased from 47.36% in 2003 to 80.48% in 2008 and LBWI mortality increased from 8% in 2003 to 23.86% in 2008.

Among infants who died, 24/37 (64.87%) and 45/68 (66.18%) had Apgar score below 7 at 5 minutes in 2003 and 2008 respectively compared to 42.1% in Iran. The highest increase in mortality was among the products of normal vaginal delivery (26.6%) died in 2003 were delivered vaginally while (58.33%) died in 2008 were delivered by the same route compared to (19.14%) died in 2003 were delivered by caesarean section while (23.52%) died in 2008 were delivered by the same route. More male infants died and this is consistent with the general agreement that male sex per se is a risk factor for more severe disease in the newborn especially the preterm.

Mortality rate in preterm babies delivered before 30 weeks of gestation or with a birth weight below 1500 g was estimated with a wide range (11-60%) among NICUs which may be explained by variability in quality of staff and facilities.

The high mortality among LBWIs is mainly due to poor quality of medical supervision and facilities starting from bad antenatal care giving a high rate of preterm deliveries, bad management of labor by inefficient hospital nurses and midwives, inadequate number of highly qualified pediatricians and nurses who are specialized in neonatal intensive care so that critical newborn babies were attended by general physicians and inefficient nurses who lack the skills required to perform a good resuscitation for the distressed or severely asphyxiated newborn.

The three most common causes of potentially preventable deaths were RDS (29.73% in 2003 vs. 26.47% in 2008), perinatal depression (27% in 2003 vs. 32.35% in 2008) and sepsis (29.72% in 2003 vs. 30.88% in 2008) during both periods of this study. Important factors included unavailability of important therapeutics like surfactant, lack of advanced modes of assisted ventilation and the limitations of using corticosteroids antenatally.

The association of mortality rate to birth weight and Apgar scores had shown to be insufficiently precise in quality assessment of NIC settings and the quick progression and advances in neonatal care made the association between mortality rate and these determinants questionable. Many published studies revealed that weight at birth, age at admission, sex and period of hospitalization in the NICU had no considerable effect on mortality while the severity of illness of sick newborns compared to birth weight and gestational age is an important predictor of neonatal mortality rate.

Conclusions and Recommendations

- The mortality rate of LBWI is higher than expected and it increased markedly between 2003 and 2008. It was more in products of vaginal delivery than caesarean section, and more in male than female infants. RDS, perinatal depression and sepsis reported to be the commonest etiologies of death.
- Faculties of medicine are called to develop and create postgraduate specialties in neonatal intensive care in a manner to reach the quality standards and to cover the national requirements of Iraq.
- Centralization of care given to severely sick neonates and to women with high risk pregnancy in optimal conditions is most needed.
- A concomitant increase in neonatal intensive care resources through quality improvement projects including specialized training programmes for doctors and nursing staff, provision of new therapeutics and equipments, establishing a tight infection control policies, with organization of neonatal transport system.
- Health care authorities need to adapt a preventive strategy for reduction in the incidence of LBW and premature deliveries.

Conflict of Interest: Nil

Source of Funding: Self

Ethical Clearance: Taken from hospital committee
REFERENCES

Ultrasoundographic Study to Evaluate the Healing of Achilles Tendon Defect in Rabbits

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ABSTRACT
The current study conducted on twelve adult rabbits to evaluate the healing of Achilles tendon defect by using ultrasonography. Six animals exposed to traumatic injuries 5%. Our diagnostic study included: ultrasonic examination carried out by ultrasound apparatus employing 7.5 MHz frequency with linear probe. Ultrasound was successful in traumatic injury and partial rend of the tendon diagnosis and should be used as an excellent choice when the animal shows local clinical signs of tendon injury which represented swollen and pain. Radiography should be used when the bony insult is doubtful. A retard in identification and treatment of tendon injury has been shown to cause considerable impairment for that our study is offered elucidating the usefulness and readily of ultrasound to rapidly emphasize the diagnosis.

Keywords: Ultrasound, Diagnosis, Tendon injury.

Introduction
Tendon is rigorous band of fibrous connective tissue that connects muscle to bone and authorize transmission of forces created by muscles to bones, resulting in locomotion of joints [1]. Tendon is analogous to ligament, both are composed of collagen. Ligaments link one bone to another bone, “whilst tendon fastens muscles to bone [2]. The Achilles tendon is made of five tendons, four of these tendons attach to the heel or calcaneus bone and one gone over the back of the heel bone to the toes of the hind limb [3]. Histologically the tendon composed of dense regular connective tissue covered by dense irregular connective tissue sheaths ”. Normal sanitary tendons are consist of parallel arrangement of collagen fibers closely packed together, the dry mass of normal tendon which makes up about 30% of their overall mass. The tendon dry mass consists of around 86% collagen, 2% elastin, 1-5% proteoglycans and 0-2% in organic components such as calcium, manganese and copper [4]. The main function of the tendon is a mechanism that connects the muscles to the bones which act as forces transmission [5].

Tendon injuries can be two types occur most commonly traumatic and atraumatic [6].

Healing of the tendon occurs in three overlapping phase. Initially the inflammatory phase in which the inflammatory cells mostly neutrophils infiltrate to the injured site, a few days the proliferative phase begin to complete the repair process [3, 7]. Treatment of tendon injury treatment medically with external support and other choice is by reattaching the healthy ends of the injured tendons surgically by suturing, sometime may necessitate additional supporting device to maintain injured ends of the tendon apposite during healing period, such as natural or synthetic grafts. After tendon surgery must be prevent the tension on the treated tendon for 6-12 weeks [8].

Ultrasound diagnostic techniques are becoming more commonly because of its afford ability, rapidity and safety ultrasonic waves can be used for imaging tissues directly and can be also provide acquaintance concerning the mechanical state of the tendon [9]. The perfunctory location of the tendons in the body makes them especially appropriate to ultrasonographic estimation [10].

Materials and Method
Experimental Animals: Twelve Local bread male rabbits aged 9-12 months weighing 1.5-2 kg were used...
in current study. The animals were housed in standard room temperature (22 ± 3°C). During experimental time, rabbets were given same diet.

**Inducing Tendon Injury:** The posterior aspect of hind limb skin of the rabbits was prepared surgically. Animals were anesthetized with 35 mg/kg, of Ketamin and 5mg Xylazine\(^{[11]}\). A sharp skin incision made above the Achilles tendon for exposure the tendon and inducing trauma (figure1) as in studies by Chidambara et al., (2004), Pirbalouti et al., (2010) and Burgisser et al., (2016) \(^{[12, 13, 14]}\).

**Experimental Design:** Twelve adult male rabbits were divided randomly into two groups of sex animals each. Group I, represented control was prepared the site of operation surgically and casted with bandage and adhesive tape, and group II was exposed to transverse cutting of tendon and then sutured with four loop suture pattern using nylon suture size 3.0 (figure 2) and casting of affected limb, the animals gait was daily observed during the experiment. Each groups examined ultrasonography after 1 and 2 months to evaluate the healing of the tendon and comparing between the two groups carry out by ultrasound apparatus employing 7.5 MHz frequency with linear probe (figure3) as in studies by LaRocco et al., (2008) and Gurgenidze et al., (2009)\(^{[15, 16]}\).

![Fig. 1: The induced tendon injury](image1)

**Results and Discussion**

**Clinical Observations:** Initially the signs of local swelling, heat and pain were seen at the site of operation above the affected tendon; these inflammatory signs disappear gradually at (7-10 days) post induced injury but signs of lameness were persisted for 2- 3 weeks after surgery

**Ultrasonography Evaluation:** Information of Ultrasound mode-B images shows the clear difference between the two groups, regardless of the differences between the members of the second group ultrasonographically. The ultrasonography image of group I refer to the similarity among tendons of all animals which characterized by regular arrangement of tendon fibers and uniform in thickness and echogenicity in a longitudinal plane (fig.4), these findings are similar to the reports of Docking et al., 2015 \(^{[17]}\).

The collagen deposition still remained in irregular direction in second group and this give an indication of immature connective tissue formation (fig.6), this result was in accordance with \(^{[19]}\).

Some findings in the present study resembled partial tear which appear as a hypoechoic or anechoic cleft, indicates a partial tear (fig.7), that mentioned by several authors \(^{[20, 21, 22]}\).
Conclusions

The diagnosis of Tendon Injury by Ultrasound results has been shown to be effective for the different defects of tendon. Once the ultrasound examination has been mastered, the diagnosis of tendon injuries will be early enough to provide an opportunity for appropriate treatment.

Ethical Clearance: The ethical committee of the concerned institute approved the research protocol.

Source of Funding: Self

Conflict of Interest: Nil

REFERENCES


Assessment of Patients Fear from Cancer in Basra Oncology Center

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1Family Medicine, 2Psychiatric Nursing, 3Community Medicine, Department of Fundamental of Nursing, College of Nursing, University of Basrah, Basrah, Iraq

ABSTRACT

Cancer is a monstrous disease. The diagnosis of “cancer” evokes a shock reaction in the patient and his family. Perhaps the most universal emotional response to cancer is fear. The patient can express progressive fears: the fear of the unknown, a basic death anxiety; the fear of loneliness or separation, particularly from family and friends; fear of body image change such as mutilation; fear of loss control; fear of regression; and a fear of loss of identity. The mere diagnosis of cancer leads to fear, completely independent of the severity of the illness and any therapeutic interventions(5). Many patients suffer from fear and depression long...

Introduction

Cancer is a complex family of diseases characterized by cells that divide and grow without normal control(1). Cancer is a monstrous disease(2). The diagnosis of “cancer” evokes a shock reaction in the patient and his family(3). Perhaps the most universal emotional response to cancer is fear(4). The patient can express progressive fears: the fear of the unknown, a basic death anxiety; the fear of loneliness or separation, particularly from family and friends; fear of body image change such as mutilation; fear of loss control; fear of regression; and a fear of loss of identity. The mere diagnosis of cancer leads to fear, completely independent of the severity of the illness and any therapeutic interventions(5). Many patients suffer from fear and depression long...
after the conclusion of a successful primary therapy. (6) An adequate therapy of the fears and depression is a prerequisite for other rehabilitation measures (e.g., vocational). Medicinal support may be considered but it cannot replace cognitive therapy. (7).

Fear from Cancer: Cancer is often viewed as the “helpless disease”. Treatment is seen as something that is done to a patient and for a patient, with very little opportunity to actively assist the process. It is important for caregivers to recognize and appreciate the impact that the fear of cancer can have on a patient and his family. (8).

Fear of Hospitalization: The very act of being hospitalized is often a stressor which is overlooked by physicians, nurses, medical social workers, etc. Who are so acclimated to the hospital environment and its routine and rules that they fail to appreciate who difficult it is for many people to cope with and adjust to this world. (9).

Fear of Death: The word ‘cancer’ is enough to bring fear into people’s minds, sometimes overwhelming all else. For some, it is not fear of death but of dying, for which it is easier to offer some reassurance. (10).

Fear of Treatment: Even if the cancer patient is relatively well, treatment sometimes has drastic effects on their bodily appearance, ranging from the temporary hair loss caused by radiotherapy and chemotherapy to permanent change after surgical treatments. Hair loss is associated with depression, loss of confidence, and shame, and for some women with breast cancer it may be more distressing than the loss of a breast. (11).

Methodology

Design of the Study: A descriptive cross-sectional study was carried out in Basra oncology centers, started from December 1st 2016 up to 30 March 2017 in order to assess patient’s fear from cancer.

Setting of the Study: The present study carried out in Basra oncology centers in the following hospitals: 1- Al-Sadr teaching hospital 2- The General child hospital

The Sample of the Study: A probability (random) sample of (244) patients males and females in Al-Sadr teaching hospital were selected, and a non-probability (purposive) sample of (56) patients boys and girls in the general child hospital were selected. The patients in hospital were assigned for the study according to those whose ages are fifteen years old and older. 300 Patients were selected from Al-Sadr teaching hospital and from the general child hospital. These two groups of subject made up the total size of the sample.

Study’s Instrument: For the purpose of the study, the researcher constructed the study instrument because no existing tool was found to measure the desired information (Patient’s fear from cancer). The construction was based on the extensive review of relevant literature (12). Closed-end questions questionnaire was used for the purpose of data collection; the data collection was carried out from December 2016 to March 2017. The questionnaire contains two parts, the first part consists of 7 items related to Socio-demographic characteristics of the patients in Basra oncology centers and include: age, gender, type of treatment (chemotherapy, radiation, surgery), the diagnosis, number of chemotherapy’s doses, duration of diagnosis and number of tumors. The second part of the questionnaire consists of 16 questions that are concerned with patient’s fear from cancer. Standardized 3- point Likert scales ranging from never to very much (1 to 3 points) were used for all the 16 items. Fear was classified into two categories: feared and not feared \[ \frac{\text{total highest score - total lowest score}}{2} + \text{Total lowest score} \] The data was collected via face-to-face interviews. Each interview session took 10 to 15 minute. Before any attempt to collect data, approval to conduct the study was obtained from the heads of oncology’s centers and from the manager of the hospitals of both Al-Sadr teaching hospital and The General Child hospital. Also, each participant (patient) was informed about the aim of the study, they have the right to refuse to participate in the study, and confidently of the information gathered.

Statistical Analysis: Analysis was made by using SPSS (Statistical package for Social Sciences) version 16, data was expressed in (frequency and percentage). Bivariate correlations was used to examine the association between fear score and the demographic characteristics of the patients. T-test was also used to compare the arithmetic Means between males and females.
## Results and Discussion

<table>
<thead>
<tr>
<th>Characteristics of the participants</th>
<th>Categories/groupings</th>
<th>Frequency</th>
<th>Percent (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gender</strong></td>
<td>Male</td>
<td>149</td>
<td>49.7</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>151</td>
<td>50.3</td>
</tr>
<tr>
<td><strong>Age in years</strong></td>
<td>15-21 years</td>
<td>126</td>
<td>42.0</td>
</tr>
<tr>
<td></td>
<td>22-28</td>
<td>18</td>
<td>6.0</td>
</tr>
<tr>
<td></td>
<td>29-35</td>
<td>26</td>
<td>8.7</td>
</tr>
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<td></td>
<td>36-42</td>
<td>20</td>
<td>6.7</td>
</tr>
<tr>
<td></td>
<td>&gt;42</td>
<td>110</td>
<td>36.7</td>
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<tr>
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<td>Breast</td>
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<td></td>
<td>Brain</td>
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<td>36</td>
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<td>3.7</td>
</tr>
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<td>Liver</td>
<td>19</td>
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</tr>
<tr>
<td></td>
<td>Pancreas</td>
<td>20</td>
<td>6.7</td>
</tr>
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<td></td>
<td>Uterus</td>
<td>7</td>
<td>2.3</td>
</tr>
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<td>Ovaries</td>
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<td>1.7</td>
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<tr>
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<td>Testis</td>
<td>8</td>
<td>2.7</td>
</tr>
<tr>
<td></td>
<td>Leukemia</td>
<td>56</td>
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<td></td>
<td>Bladder</td>
<td>11</td>
<td>3.7</td>
</tr>
<tr>
<td></td>
<td>Esophagus</td>
<td>6</td>
<td>2.0</td>
</tr>
<tr>
<td></td>
<td>Pharynx</td>
<td>5</td>
<td>1.7</td>
</tr>
<tr>
<td></td>
<td>Spleen</td>
<td>1</td>
<td>.3</td>
</tr>
<tr>
<td></td>
<td>Rectum</td>
<td>1</td>
<td>.3</td>
</tr>
<tr>
<td><strong>Tumors</strong></td>
<td>1-2</td>
<td>160</td>
<td>53.3</td>
</tr>
<tr>
<td></td>
<td>3-4</td>
<td>64</td>
<td>21.3</td>
</tr>
<tr>
<td></td>
<td>5-6</td>
<td>15</td>
<td>5.0</td>
</tr>
<tr>
<td></td>
<td>7-8</td>
<td>9</td>
<td>3.0</td>
</tr>
<tr>
<td></td>
<td>&gt;8</td>
<td>66</td>
<td>17.3</td>
</tr>
<tr>
<td><strong>Treatment</strong></td>
<td>Chemotherapy</td>
<td>148</td>
<td>49.3</td>
</tr>
<tr>
<td></td>
<td>Radiotherapy</td>
<td>2</td>
<td>.7</td>
</tr>
<tr>
<td></td>
<td>Chemotherapy,</td>
<td>53</td>
<td>17.7</td>
</tr>
<tr>
<td></td>
<td>radiotherapy &amp; surgery</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Chemotherapy &amp;</td>
<td>30</td>
<td>10.0</td>
</tr>
<tr>
<td></td>
<td>radiotherapy</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Chemotherapy &amp;</td>
<td>52</td>
<td>22.0</td>
</tr>
<tr>
<td></td>
<td>surgery</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Radiotherapy &amp;</td>
<td>1</td>
<td>.3</td>
</tr>
<tr>
<td></td>
<td>surgery</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Chemotherapy doses</strong></td>
<td>0-52</td>
<td>243</td>
<td>81.0</td>
</tr>
<tr>
<td></td>
<td>53-106</td>
<td>40</td>
<td>13.0</td>
</tr>
<tr>
<td></td>
<td>107-160</td>
<td>10</td>
<td>3.3</td>
</tr>
<tr>
<td></td>
<td>161-214</td>
<td>5</td>
<td>1.7</td>
</tr>
<tr>
<td></td>
<td>&gt;214</td>
<td>2</td>
<td>.7</td>
</tr>
<tr>
<td><strong>Duration of diagnosis in months</strong></td>
<td>1-15</td>
<td>185</td>
<td>61.7</td>
</tr>
<tr>
<td></td>
<td>16-30</td>
<td>50</td>
<td>16.7</td>
</tr>
<tr>
<td></td>
<td>31-45</td>
<td>25</td>
<td>8.3</td>
</tr>
<tr>
<td></td>
<td>46-60</td>
<td>21</td>
<td>7.0</td>
</tr>
<tr>
<td></td>
<td>&gt;60</td>
<td>19</td>
<td>6.3</td>
</tr>
</tbody>
</table>
Table (1) showed that 151 (50.3%) of the studied sample were female, the majority of the sample were below (42) years of age, of them 56(18.7%) were diagnosed with leukemia, of them 160 (53.3%) were having (1-2) tumors, of them 148(49.3%) were taking chemotherapy, of them 243(81.1%) took below (53) doses of chemotherapy, regarding duration of diagnosis with cancer, 185 (61.7%) were less than (16) months.

Table 2: Sample’s fear scoring classes

<table>
<thead>
<tr>
<th>Fear Score Class</th>
<th>Frequency</th>
<th>Percent (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Never (1-16)</td>
<td>1</td>
<td>0.3</td>
</tr>
<tr>
<td>A little (17-32)</td>
<td>148</td>
<td>49.3</td>
</tr>
<tr>
<td>Very much (33-48)</td>
<td>151</td>
<td>50.3</td>
</tr>
</tbody>
</table>

Table (2) showed that 151(50.3%) of the patients fear from cancer very much, 148 (49.3%) of them fear from cancer a little, and only 1 (3%) of them never fear from cancer.

Table 3: Sample’s fear score

<table>
<thead>
<tr>
<th>Scores interval</th>
<th>Frequencies</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>16 - 20</td>
<td>7</td>
<td>2.4</td>
</tr>
<tr>
<td>21 - 25</td>
<td>27</td>
<td>9</td>
</tr>
<tr>
<td>26 - 30</td>
<td>68</td>
<td>22.6</td>
</tr>
<tr>
<td>31 - 35</td>
<td>107</td>
<td>35.6</td>
</tr>
<tr>
<td>36 - 40</td>
<td>72</td>
<td>24</td>
</tr>
<tr>
<td>41 - 45</td>
<td>13</td>
<td>4.4</td>
</tr>
<tr>
<td>46 and above</td>
<td>6</td>
<td>2</td>
</tr>
<tr>
<td>Total</td>
<td>300</td>
<td>100</td>
</tr>
</tbody>
</table>

The table showed that (2.4%) of the sample had the lowest degree of fear score (16-20), (9 %) of the sample had scores (21-25), (22.6 %) of the sample had scores (26-30), (35.6) of the sample had scores (31-35) (24%) of the sample had scores (36-40), (4.4%) of the sample had scores (41-45) and (2%) of the sample had scores (46 and above)

Table 4: Fear level among cancer’s patients regarding selected items (N = 300)

<table>
<thead>
<tr>
<th>Items</th>
<th>Feared</th>
<th>%</th>
<th>Not feared</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1- Do you have a heart pounding</td>
<td>237</td>
<td>79</td>
<td>63</td>
<td>21</td>
</tr>
<tr>
<td>2- Do you have difficulty breathing?</td>
<td>236</td>
<td>78.6</td>
<td>64</td>
<td>21.3</td>
</tr>
<tr>
<td>3- Do you have mouth dryness?</td>
<td>219</td>
<td>73</td>
<td>81</td>
<td>27</td>
</tr>
<tr>
<td>4- Do you feel faintness, dizziness or weakness?</td>
<td>254</td>
<td>84.6</td>
<td>46</td>
<td>15.3</td>
</tr>
<tr>
<td>5- Do you have trembling?</td>
<td>206</td>
<td>68.6</td>
<td>94</td>
<td>31.3</td>
</tr>
<tr>
<td>6- Do you feel discomfort or chest pain?</td>
<td>253</td>
<td>84.3</td>
<td>47</td>
<td>51.6</td>
</tr>
<tr>
<td>7- Do you feel nervousness or restless?</td>
<td>270</td>
<td>90</td>
<td>30</td>
<td>10</td>
</tr>
<tr>
<td>8- Do you sweat a lot?</td>
<td>196</td>
<td>65.3</td>
<td>104</td>
<td>34.6</td>
</tr>
<tr>
<td>9- Do you fear of losing control or going crazy?</td>
<td>117</td>
<td>39</td>
<td>183</td>
<td>61</td>
</tr>
<tr>
<td>10- Do you feel tense?</td>
<td>154</td>
<td>51.3</td>
<td>146</td>
<td>48.6</td>
</tr>
<tr>
<td>11- Do you fear of dying?</td>
<td>215</td>
<td>71.6</td>
<td>85</td>
<td>28.3</td>
</tr>
<tr>
<td>12- Do you have nausea or vomiting?</td>
<td>135</td>
<td>45</td>
<td>165</td>
<td>55</td>
</tr>
<tr>
<td>13- Do you have a loss of bladder control?</td>
<td>105</td>
<td>35</td>
<td>195</td>
<td>65</td>
</tr>
<tr>
<td>14- Do you have trouble in falling asleep or sleeping too much?</td>
<td>210</td>
<td>70</td>
<td>90</td>
<td>30</td>
</tr>
<tr>
<td>15- Do you feel that you are a failure or have let yourself or your family down?</td>
<td>236</td>
<td>78.6</td>
<td>64</td>
<td>21.3</td>
</tr>
<tr>
<td>16- Do you feel like choking sometimes?</td>
<td>165</td>
<td>55</td>
<td>135</td>
<td>45</td>
</tr>
</tbody>
</table>

Table (4) showed that the majority of cancer’s patients 237(79%) have a heart pounding from fear from cancer, the majority of them 236 (78.6%) had difficulty breathing from fear from their cancer, a lot of them 219(73%) had mouth dryness from fear from their cancer, the majority of them 254(84.6%) felt faintness, dizziness or weakness from fear from cancer, a lot of them 206 (68.6%) tremble from fear from cancer, the majority of them 253 (84.3%) felt discomfort or chest pain from fear from their cancer, the majority of them 270 (90%) feel nervousness or restless from fear from cancer, a high percent of them 196 (65.3%) sweat a lot from fear from cancer, 117 (39%) of them have fear of losing control or going crazy from fear from cancer, a high percent of
them 154 (51.3%) feel tense from fear from cancer, the majority of them 215 (71.6%) fear from dying from fear from their cancer, 135 (45%) of them have nausea and vomiting from fear from cancer, 105 (35%) of them have a loss of bladder control from fear from cancer, a high percent of them 210 (70%) had a trouble in falling asleep or sleeping too much from fear from cancer, the majority of them 236 (78.6%) feel that they are a failure or have let themselves or their family down, a high percent of them 165 (55%) feel like choking sometimes.

Table 5: Correlations between fear score with age, gender, diagnosis, treatment, doses, duration and tumors

<table>
<thead>
<tr>
<th>Variables</th>
<th>Age</th>
<th>Gender</th>
<th>Diagnosis</th>
<th>Treatment</th>
<th>Fear score</th>
<th>doses class</th>
<th>Duration class</th>
<th>Tumors class</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson Correlation</td>
<td>-.090-</td>
<td>.366**</td>
<td>-.140*</td>
<td>-.134*</td>
<td>1</td>
<td>-.036-</td>
<td>-.114*</td>
<td>.032</td>
</tr>
<tr>
<td>P-Value</td>
<td>.121</td>
<td>.000</td>
<td>.015</td>
<td>.020</td>
<td>.531</td>
<td>.049</td>
<td>.581</td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>300</td>
<td>300</td>
<td>300</td>
<td>300</td>
<td>300</td>
<td>300</td>
<td>300</td>
<td></td>
</tr>
</tbody>
</table>

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

Table (5) showed that there is a highly significant correlation between fear score and gender, there is significant correlation between fear score and treatment, and also there is a significant correlation between fear score and duration of diagnosis with cancer, there no significant correlation between fear score and age, neither with doses nor with tumors.

Table 6: Group statistics for male & female

<table>
<thead>
<tr>
<th>Gender</th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Std. Error Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>149</td>
<td>30.34</td>
<td>5.560</td>
<td>.455</td>
</tr>
<tr>
<td>Female</td>
<td>151</td>
<td>34.54</td>
<td>5.178</td>
<td>.421</td>
</tr>
</tbody>
</table>

Table (6) showed that the mean of male’s fear is 30.34 and the mean of female’s fear is (34.54).

Table 7: T-test for quality of Means between males and females

<table>
<thead>
<tr>
<th>Variable</th>
<th>Independent Samples Test</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>t-test for Equality of Means</td>
</tr>
<tr>
<td></td>
<td>T</td>
</tr>
<tr>
<td>Fear score</td>
<td>Equal variances assumed</td>
</tr>
</tbody>
</table>

Table (7) showed that the difference between the mathematical means of the two groups (male & female) is significant, and that the fear of female was higher than the fear of male.

Conclusions

1. Most cancer’s patients had a high percentage of fear from cancer.

2. Leukemia was the most common cancer in Basra followed by breast cancer while rectum and spleen cancers were the least cancers.

3. There was no statistical significant association found between patients’ fear and their age neither with their number of tumors nor with their number of chemotherapy doses.

4. There was significant association between patients’ fear and their gender, diagnosis, duration of diagnosis and treatment.

5. The level of fear was highest among females than males.

Recommendations

1. Attitude therapy (includes techniques aimed at keeping problems such as pain at a distance).

2. Distraction (takes off worries or discomforts. Talking with friends or relatives, watching TV,
listening to the radio, reading going to the movies, doing needlework or puzzles, building models, or painting are all ways to distract. Music or creative art therapies, dance therapies can be very helpful).

3. Hypnotherapeutic procedures (modifies perception of pain so that the latter is no longer perceived as distressful; help to lower the pain threshold).

4. Imaginative procedures (takes away tension).

5. Message therapy (achieves muscular relaxation).

6. Meditation and prayer (is especially helpful when mind and body are stressed from cancer treatment).

**Ethical Clearance:** Approval to conduct the study was obtained from the heads of oncology’s centers and from the manager of the hospital.

**Source of Funding:** Self

**Conflict of Interest:** Nil

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Dental Hygienist Awareness Level and Preference Image on Health and Non-Health College Students

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Abstract

The aim of this study was to investigate the perception level of dental hygienists by health (HRC) and non-health related college (NHRC) students. The data collection was conducted using the questionnaire tool in the web for HRC and NHRC students. The data were analyzed by frequency and x²-test using SPSS statistical program to verify the significance. There were 62.6% for NHRC students and 37.6% were HRC students. As a result of the perception of dental hygienists, 94% of HRC students knew dental hygienists and their main task is prevention of dental hygiene. However, 74.1% of NHRC students knew them and their main task is dental assistant work (p<0.05). The preferred external image of dental hygienist were responded as 50.7% for ‘neat image’ in HRC students, and 50.0% for ‘bright facial expression’ in NHRC students, but there was no statistically significant difference. In the important qualification that a dental hygienists should have internally was answered as ‘expertise’ by both HRC and NHRC students. Our findings suggest to provide efficient and better medical services for patients and to establish for recognizing dental hygienists properly, and the legal institutional arrangements, administrative support and diverse efforts are needed.

Keywords: perception level of dental hygienist, prevention of dental hygiene

Introduction

As the standard of living and consciousness of the people increases, the demand of customers for high quality medical care is getting higher and the demand for medical service is also strengthened as the expected level of medical service is increased accordingly(1). It is necessary to improve the quality of medical services in order to meet the demand for such services. It will be necessary to refine patients according to patient characteristics and to provide appropriate services to them in order to reconsider patient satisfaction through the quality of medical services and recommend the hospital to other patients(2). Therefore, in dental clinics and hospitals, various methods are being sought to increase the satisfaction of medical consumers. Among them, dental hygienist is one of the important factors that determine the quality of dental services(3).

The reason for this is that dentists can no provide dental health services that the public needs, and they also demand the role of professionals who combine expertise, technology, and service concepts(4). A desirable dental hygienist identity is to establish a dental hygienist is able to provide patients with dental treatment services based on their expertise, skills and experience in a positive manner so that the dental hygienist continues to grow and the patient develops a correct perception of the dental hygienist(5).

A professional image of a job is called 'professional image'. A desirable dental hygienist identity is to establish a dental hygienist is able to provide patients with dental treatment services based on their expertise, skills and experience in a positive manner so that the dental hygienist continues to grow and the patient develops a correct perception of the dental hygienist(5).

An image is generally a picture, reflection, a physical similarity, an expression or a symbol of a visible person-animal-object, or a concept that influences an individual’s attitude and behavior(6). In detail, the image suitable for the job is called 'professional image'. A professional image of a job is needed to give the core members, who interact in the course of an individual’s job role, a belief that he or she will outperform the average(7). Also, considering that the image of a profession generally has a significant influence on the
development of the professionalism, image research is inevitably required in the development of dental hygienist professions(8).

However, research on the image of dental hygienists is limited to the image of the uniform, and there is insufficient research on the preference of the specific image desired by the patient by analyzing the dental hygienist in detail. The purpose of this study is to investigate the preference of dental hygienists by health related (HRC) and non-health related college (NHRC) students, and to compare the image preference difference between students who have basic medical knowledge and students who do not by comparing images and services.

Material and Method

Subject and Period: The subjects of this study were college students from HRC and NHRC residing in Busan from April 14th to May 12th, 2018. The questionnaires were collected using the Naver Office form for mobile to HRC and NHRC students. A total of 207 subjects were surveyed by self-filling questionnaire and within the survey, 28 were excluded which was not respond in good faith and 179 were analyzed.

Research Method: The questionnaire used in the survey was based on the degree of recognition of the dental hygienist and the image survey(9) questionnaire. The questionnaire consisted of 30 questions, 15 items on gender, age, and sequence, and 15 questions on dental hygienist awareness and preference.

Statistical Analysis: The study data were analyzed using the SPSS 24.0 program. The general characteristics of the subjects were analyzed, and the general characteristics and dental hygienist preference survey items were cross-categorized and verified by chi-square.

Findings

General Characteristics of the Subjects: Table 1 shows the general characteristics of the subjects. As a result of gender, male and females were 42.5% and 57.5%, respectively. By age, 21.8% were under 20 years old, 64.8% were between 21-25 years old, 12.3% were between 26-30 years old, and 1.1% were over 31 years old.

37.4% of the students were in the HRC and 62.6% of the students were in the NHRC. Among them, 26.3% were freshman, 26.8% were sophomore, 13.4% were junior, and 33.5% were senior year of the college. The recent dental experience from these students were as follows: 38.5% have visited within 6 months, 21.8% have visited within 12 months, 7.3% have visited within 18 months, 10.1% have visited within 24 months, and 22.3% have not visited dental clinic.

Table 1: General characteristics

<table>
<thead>
<tr>
<th>Sort</th>
<th>No. of people</th>
<th>Percentile (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>76</td>
<td>42.5</td>
</tr>
<tr>
<td>Female</td>
<td>103</td>
<td>57.5</td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Under 20</td>
<td>39</td>
<td>21.8</td>
</tr>
<tr>
<td>21-25 year old</td>
<td>116</td>
<td>64.8</td>
</tr>
<tr>
<td>26-30 year old</td>
<td>22</td>
<td>12.3</td>
</tr>
<tr>
<td>Above 31 year old</td>
<td>2</td>
<td>1.1</td>
</tr>
<tr>
<td>Affiliated department</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Health related</td>
<td>67</td>
<td>37.4</td>
</tr>
<tr>
<td>Non-health related</td>
<td>112</td>
<td>62.6</td>
</tr>
<tr>
<td>Year</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Freshman</td>
<td>47</td>
<td>26.3</td>
</tr>
<tr>
<td>Sophomore</td>
<td>48</td>
<td>26.8</td>
</tr>
<tr>
<td>Junior</td>
<td>24</td>
<td>13.4</td>
</tr>
<tr>
<td>Senior</td>
<td>60</td>
<td>33.5</td>
</tr>
<tr>
<td>Recent dental Experience</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Within 6 months</td>
<td>69</td>
<td>38.5</td>
</tr>
<tr>
<td>Within 12 months</td>
<td>39</td>
<td>21.8</td>
</tr>
<tr>
<td>Within 18 months</td>
<td>13</td>
<td>7.3</td>
</tr>
<tr>
<td>Within 24 months</td>
<td>18</td>
<td>10.1</td>
</tr>
<tr>
<td>None</td>
<td>40</td>
<td>22.3</td>
</tr>
</tbody>
</table>

Recognition of dental hygienists: As shown in Table 2, about the name of ‘dental hygienist’, 94.0% of the students in the HRC answered ‘I do know’ and 6.0% answered ‘I do not know’. Whereas 74.1% of the NHRC students answered ‘I do know’ and 25.9% said ‘I do not know’. There was a statistically significant difference between the groups (p<0.05).

Table 2: Recognition of dental hygienist

<table>
<thead>
<tr>
<th>Sort</th>
<th>Health related</th>
<th>Non-health related</th>
<th>Total</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>I know</td>
<td>63(94.0)</td>
<td>83(74.1)</td>
<td>146(81.6)</td>
<td>p = 0.001</td>
</tr>
<tr>
<td>I do not know</td>
<td>4(6.0)</td>
<td>29(25.9)</td>
<td>33(18.4)</td>
<td></td>
</tr>
</tbody>
</table>

(Number of subjects (%))
Dental hygienist’s main task recognition: As shown in Table 3, about the dental hygienists’ perception of their main duties, 41.8% of the students in the HRC students have answered as ‘preventive duties’ and 50.9% of the NHRC students have answered as ‘dental assistant work’ and it shows a statistically significant difference (P<0.05). Overall, 38.5% answered as ‘dental assistant work’, 25.1% answered as ‘preventive duties’, 17.3% answered as ‘oral health education’, 15.6% answered as ‘oral radiography and treatment’, 2.3% answered as ‘scaling’, and 1.2% answered as ‘others’.

<table>
<thead>
<tr>
<th>Sort</th>
<th>Health related</th>
<th>Non health related</th>
<th>Total</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oral health education</td>
<td>18(26.9)</td>
<td>13(11.6)</td>
<td>31(17.3)</td>
<td></td>
</tr>
<tr>
<td>Preventive duties</td>
<td>28(41.8)</td>
<td>17(15.2)</td>
<td>45(25.1)</td>
<td>p&lt;0.001</td>
</tr>
<tr>
<td>Dental assistant work</td>
<td>12(17.9)</td>
<td>57(50.9)</td>
<td>69(38.5)</td>
<td></td>
</tr>
<tr>
<td>Consultation on oral radiography</td>
<td>8(11.9)</td>
<td>20(17.9)</td>
<td>28(15.6)</td>
<td></td>
</tr>
<tr>
<td>Consultation on oral radiography</td>
<td>8(11.9)</td>
<td>20(17.9)</td>
<td>28(15.6)</td>
<td></td>
</tr>
<tr>
<td>Scaling</td>
<td>0(0.0)</td>
<td>4(3.6)</td>
<td>4(2.3)</td>
<td></td>
</tr>
<tr>
<td>Others</td>
<td>1(1.5)</td>
<td>1(0.9)</td>
<td>2(1.2)</td>
<td></td>
</tr>
</tbody>
</table>

Preferred external image of dental hygienist: In the preferred image of dental hygienist according to the affiliated department, 50.1% of the HRC students answered ‘Neat image’ whereas 50.0% of the NHRC students answered ‘Bright facial expression’, but there was no statistically significant difference (p>0.05). Overall, ‘Bright facial expression’ was the most answered by 45.8% of the respondents, followed by 41.3% of ‘Neat images’ and 6.7% of ‘intelligent images’ respectively.

<table>
<thead>
<tr>
<th>Sort</th>
<th>Health related</th>
<th>Non-health related</th>
<th>Total</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neat image</td>
<td>34(50.7)</td>
<td>40(35.7)</td>
<td>74(41.3)</td>
<td>p=0.129</td>
</tr>
<tr>
<td>Bright facial expression</td>
<td>26(38.8)</td>
<td>56(50.0)</td>
<td>82(45.8)</td>
<td></td>
</tr>
<tr>
<td>Intelligent image</td>
<td>5(7.5)</td>
<td>7(6.3)</td>
<td>12(6.7)</td>
<td></td>
</tr>
<tr>
<td>Stylish image</td>
<td>2(3.0)</td>
<td>3(2.7)</td>
<td>5(2.8)</td>
<td></td>
</tr>
<tr>
<td>Others</td>
<td>0(0.0)</td>
<td>6(5.4)</td>
<td>6(3.4)</td>
<td></td>
</tr>
</tbody>
</table>

Whether the external appearance of a dental hygienist affects confidence or stability: As shown in Table 5, 86.2% of HRC students and 78.6% of NHRC students were affected by whether the external appearance of the dental hygienist had an influence on the confidence or stability, and there was a slight difference of approximately 11.0% but there was no significant difference (P>0.05).

<table>
<thead>
<tr>
<th>Sort</th>
<th>Health related</th>
<th>Non-health related</th>
<th>Total</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Does affects</td>
<td>56(86.2)</td>
<td>88(78.6)</td>
<td>144(81.4)</td>
<td>p=0.236</td>
</tr>
<tr>
<td>Does not affect</td>
<td>9(13.8)</td>
<td>24(21.4)</td>
<td>33(18.6)</td>
<td></td>
</tr>
</tbody>
</table>

Important qualifications that a dental hygienist should have internally: The question about the important qualifications that a dental hygienist should have internally was answered as ‘Expertise’ by both HRC and NHRC students with 43.9% and 44.6% respectively, but there was no statistically significant difference (p>0.05). Overall, expertise was 44.4%, sincerity and responsibility was 28.1%, kindness was 15.2%, and personality and cultivation was 12.4%.
Table 6: Important qualifications that a dental hygienist should have internally

<table>
<thead>
<tr>
<th>Sort</th>
<th>Health related</th>
<th>Non-health related</th>
<th>Total</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Expertise</td>
<td>29(43.9)</td>
<td>50(44.6)</td>
<td>79(44.4)</td>
<td>p=0.107</td>
</tr>
<tr>
<td>Personality and cultivation</td>
<td>4(6.1)</td>
<td>18(16.1)</td>
<td>22(12.4)</td>
<td></td>
</tr>
<tr>
<td>Kindness</td>
<td>9(13.6)</td>
<td>18(16.1)</td>
<td>27(15.2)</td>
<td></td>
</tr>
<tr>
<td>Sincerity and responsibility</td>
<td>24(36.4)</td>
<td>26(23.2)</td>
<td>50(28.0)</td>
<td></td>
</tr>
</tbody>
</table>

**Conclusion**

As the medical environment changes, demand for oral health increases and competition among hospitals is accelerating. As a result, dental hygienists are increasingly playing a role in providing dental hygienists with access to high-quality medical services which is becoming very important because doctors and dentists cannot provide all the oral services that customer wants. In order to fulfill this role, it is important to learn about the image of dental hygiene that customers want. Therefore, this study aims to provide better medical services by examining the perception level of dental hygienists and the preference of image dental hygienists by HRC and NHRC students as well as by constructing and comparing images and services corresponding to them to provide better medical services.

In the present study, 94.0% of the students in the HRC and 74.1% of the NHRC students were aware of the dental hygienist’s perception level. This is consistent with the findings of Kim et al.\(^{(10)}\) that 100.0% of the health department, 87.8% of the non-health department, 84.1% of civil society, and 80.0% of the natural engineering department. In addition, according to additional survey data, from 81.9% of the respondents answered ‘Yes’, only 39.9% are aware of the dental hygienist’s occupation exactly. About 40 percent of people know exactly what a dental hygienist is, and about 20 percent of people do not even know about it, so it is thought that active publicity and efforts are needed to inform dental hygienists.

In the main task recognition of dental hygienists, prevention work was the highest with 41.8% in the HRC, while the dental assistant work in the NHRC was the highest with 50.9%. Moreover, 38.5% of the respondents said that the duties of the dental assistant work were the main tasks, and the second was 25.1% of the preventive duties. In the study of Kim et al.\(^{(10)}\) in 2016, 43.6% were in the first place for the dental diagnosis assistant work, 30.1% were in the second place for the plaque removal, and 25% were in the third place for the dental consulting. In addition, in the study of Choi et al.\(^{(11)}\) and Yoo et al.\(^{(12)}\) in 2004 and in 2002, 53.3% and 71.8% responded the dental hygienist’s main task were dental assistant work respectively.

Although the percentage of dental hygienists’ perceptions of dental hygienists is decreasing as the years go by, the perception of dental assistant work is stronger than prevention, education and scaling work especially in NHRC students\(^{(13)}\). In order to improve this, it is necessary to take measures to publicize dental hygienists’ work to the general public.

In the preferred images of dental hygienists, 50.7% answered ‘neat image’ and 38.8% of ‘bright facial expressions’ in HRC students and 50.0% answered ‘bright facial expressions’ and 35.7% answered ‘neat image’ in NHRC students so that both groups preferred ‘neat image’ and ‘bright facial expressions’. In addition, 86.2% and 78.6% for both HRC and NHRC students responded the external image influences to the trust and stability of dental hygienists so that it is important to have good image and bright expression in order to give confidence and stability to the dental hygienist.

Dental hygienists’ internal qualities of qualification were responded as ‘expertise’ with 43.9% and 44.6% for both HRC and NHRC, respectively. This is because the expert knowledge is one of the most important factors in the modern service, and it is one of the qualities that should be equipped.

The purpose of this study is to analyze the perception level and preference image of dental hygienists and to provide opportunities for those working in dental related services to think about the qualities of qualifications which should be considered and prepared for the future and this study can be supportive material for them. Through these efforts, it is believed that the dental hygienist’s social status will be enhanced by providing more efficient medical services and increasing awareness and role of dental hygienists in the intensified medical competition.
This study is based on the research conducted on some part of HRC and NHRC students, so it may be insufficient to generalize it. Through this study, it is possible to contribute the basic data and to establish a role as a medical professional by arranging measures to inform the general public about the dental hygienists’ work in order to provide better service and improve the patient with proper recognition of dental hygienist and formation of desirable image. Therefore, it will be necessary to carry out concrete and systematic research with a wider age group through future research.

Conflict of Interest: The authors declare no conflict of interest.

Source of Funding: This work was supported by Dongseo University, "Dongseo Cluster Project" Research Fund of 2019 (DSU-20190002)

Ethical Clearance: There were no ethical clearance

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2. Lee KH. The effect of perceived service quality by dental patients on satisfaction and hospital recommendation. Seoul: Korea University Graduate school of public health; 2012.


**Stress Ulcer Prophylaxis in Patients with Brain Injury: Retrospective Study**

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**ABSTRACT**

**Background:** Brain injury is one of the risk factors for stress ulcers. As many as 52% of brain injury patients use inappropriate prophylaxis, this can result in gastrointestinal bleeding and may lead to death. Until now the most widely used type of prophylaxis is the H2-Antagonist receptor, Proton Pump Inhibitor (PPI) and sucralfate.

**Objective:** This study aims to determine the use of stress ulcer prophylaxis in patients with brain injury.

**Method:** Retrospective study with 43 data of patients with brain injury. The data on stress ulcer prophylaxis during the patient’s hospitalization are collected.

**Results:** There are 3 types of prophylaxis used, namely H2-Antagonists, PPIs, and Sucralfates. The most widely used type is H2-Antagonist, which is 85.7%. The next drugs were PPI by 10.39% and sucralfate by 3.90%. The route of administration is mostly through oral administration of ranitidine as much as 93.5%. Therapy can be given in single drug or in a combination.

**Conclusion:** The type of drug used for stress ulcer prophylaxis in patients with brain injury is H2-Antagonists, PPIs and Sucralfate. Prophylactic therapy can be given in single drug or in combination. The administration of omeprazole affected the performance of phenytoin and diazepam.

**Keywords:** stress ulcer prophylaxis, brain injury, H2-Antagonist, PPI

**Introduction**

Brain injury is one factor in the occurrence of stress ulcers(1). This occurs due to microcirculation of the mucosal and bicarbonate gastroduodenal barrier so that it can trigger stress ulcers and the risk of gastrointestinal bleeding(2). However, the use of stress ulcer prophylaxis in patients with high risk is inappropriate. Inappropriate use of prophylaxis can lead to increased costs of health care, side effects and drug interactions(3).

There are several factors that can trigger Stress Related Mucosal Disease (SRMD), including excessive gastric acid secretion, gastric mucosal ischemia (so that it can cause splachnic hypoperfusion). Hypoperfusion can cause an imbalance between supply and oxygen requirements so that it can induce mucosal damage. Due to this imbalance, it triggers ischemic(2). It causes cell death and induces ulcers. In addition, there is a disruption of gastric mucosal homeostasis which causes prostaglandin production to decrease, resulting in a decrease in the ability of prostaglandins to protect the gastric mucosa from gastric acid.

Stress ulcer prevention is important to prevent the erosion of the submucosal tract, gastrointestinal perforation that may lead to death. Some effective drugs that can prevent stress ulcers are drugs that can reduce gastric secretion or can increase mucosal resistance to acids or pepsin. H2-Antagonists can block the release of stomach acid by blocking the effect of histamine on...
parietal cells so it will reduces the secretes of gastric acid. H2-Antagonist drug are i.e cimetidine, ranitidine, famotidine, nizatidine.

Proton Pump Inhibitor (PPI) is one of the drugs approved by the Food and Drug Administration for prevent bleeding so that it can also be used to prevent stress ulcers\(^2\). The most widely used type is oral omeprazole. However, although it was widely used there are no controlled trials that shows the benefit or optimal dose\(^2,5\). In addition, the use of sucralfate as a mucosal secretive agent is also common in prevention of stress ulcers. The mechanism of action of sucralfate is by minimizing wounds caused by gastric acid or by inhibiting the secretion of gastric acid. Sucralfate is available in tablets or liquid slurry at a dose of 1g orally or with a nasogastric tube every 4-6 hours.

Pharmacologically, combination and single therapy can be used to prevent stress ulcers. H2-Antagonists are most widely used for a single therapy, while for combination therapy can be used H2-Antagonists with sucralfate or the combination of PPI with sucralfate\(^6,8\).

In hospital services, 76% of patients receive stress ulcer prophylaxis even though there is no indication. The risk of the appearance of stress ulcers is related to the severity of brain injury, the amount of surgery and the length of surgery. The high clinical manifestations of stress ulcers in patients with brain injury and the many problems that arise related to the administration of stress ulcers need to be studied further regarding the administration of stress ulcer prophylaxis. Including the type, dose, route of administration and duration of administration of stress ulcer prophylaxis. This study aims to determine the use of stress ulcer prophylaxis in patients with brain injury.

**Method**

This study is a non-experimental study with a descriptive and retrospective design. Samples were taken using the time limited sampling method, that ranged from July to December 2015. The study was conducted by examining the medical record data of patients that had been in surgery and experiencing stress ulcer prophylaxis from July to December 2015 at Dr. Soetomo Hospital Surabaya. The study was conducted in March - July 2016 with the research criteria of patients being neurosurgical patients.

The study was conducted on patients with inclusion criteria receiving stress ulcer prophylaxis during hospitalization. Exclusion criteria: i) moderate or suspected suffering from gastrointestinal bleeding; ii) has a history of GERD, peptic ulcer, or erosive esophagitis.

Data that had been recorded includes: medical record number, patient identity, diagnosis, comorbidities, laboratory data, clinical data, treatment profile (type of therapy, administration dose, frequency of administration and duration of administration of the drug). The data obtained is then recapitulated and then analyzed descriptively in the form of narratives, tables or graphs which include patient demographics, drug usage patterns, and possible related drug problems that occur.

**Results**

After conducting a research related to patient demographic data and administration of stress ulcer prophylaxis, the following data that had been collected, as follow.

**General Data of Respondent:** 43 patients received stress ulcer prophylaxis. As in Table 1. From 43 respondents, the majority were male, as many as 32 people. Male in this case is higher because it is estimated that the types of activities carried out are heavier than women. The most common cause of injury is traffic accidents. A total of 27 respondents are diagnosed with mild brain injury.

<table>
<thead>
<tr>
<th>Table 1: General Data of Respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gender</strong></td>
</tr>
<tr>
<td>---</td>
</tr>
<tr>
<td>Male</td>
</tr>
<tr>
<td>Female</td>
</tr>
<tr>
<td><strong>Age (years)</strong></td>
</tr>
<tr>
<td>---</td>
</tr>
<tr>
<td>≤ 12 years</td>
</tr>
<tr>
<td>&gt; 12-45</td>
</tr>
<tr>
<td>46-60</td>
</tr>
<tr>
<td>≥ 60</td>
</tr>
<tr>
<td><strong>Main Cause</strong></td>
</tr>
<tr>
<td>---</td>
</tr>
<tr>
<td>Traffic accident</td>
</tr>
<tr>
<td>Collapse</td>
</tr>
<tr>
<td><strong>Diagnostic Classification</strong></td>
</tr>
<tr>
<td>---</td>
</tr>
<tr>
<td>Mild Brain Injury</td>
</tr>
<tr>
<td>Moderate Brain Injury</td>
</tr>
<tr>
<td>Severe Brain Injury</td>
</tr>
<tr>
<td><strong>Reasons of Discharge</strong></td>
</tr>
<tr>
<td>---</td>
</tr>
<tr>
<td>Improved Condition</td>
</tr>
<tr>
<td>At Own Request</td>
</tr>
<tr>
<td>Deceased</td>
</tr>
</tbody>
</table>
Duration of Therapy: The duration of therapy can be seen in Table 2. The most widely used is Ranitidine with the longest duration of therapy in the 1-7 day interval.

<table>
<thead>
<tr>
<th>Drugs</th>
<th>Duration (days)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1-7</td>
</tr>
<tr>
<td>Ranitidine</td>
<td>32 patients</td>
</tr>
<tr>
<td>Omeprazole</td>
<td>4 patients</td>
</tr>
<tr>
<td>Sucralfate</td>
<td>1 patients</td>
</tr>
</tbody>
</table>

Table 2: Duration of Therapy

The Use of Prophylaxis in Stress Ulcer: Therapy can be administered in the form of a single or combination therapy. The result showed that the dosage and route of the drug are in accordance with the guidelines.

The Types of Therapy: Based on Table 4. From 43 respondents, 85.7% of them were using H2-antagonist as treatment. Ranitidine is always given intravenously when patients are admitted to the hospital because generally the consciousness of neurosurgical patients with brain injury are decreasing. In combination therapy, mostly use ranitidine with omeprazole or added with sucralfate.

Table 3: Drug administration based on type of therapy

<table>
<thead>
<tr>
<th>No.</th>
<th>Therapy</th>
<th>Drugs Name</th>
<th>Drugs form</th>
<th>Dosage regimen</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Single</td>
<td>Ranitidine</td>
<td>Tablet</td>
<td>2x150mg</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Ranitidine</td>
<td>Intravenous Injection</td>
<td>2x50mg</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Ranitidine</td>
<td>Intravenous Injection</td>
<td>3x50mg</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Ranitidine**</td>
<td>Intravenous Injection</td>
<td>2x50mg</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Tablet</td>
<td>2x150mg</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Ranitidine**</td>
<td>Intravenous Injection</td>
<td>3x50mg</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Tablet</td>
<td>2x150mg</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Ranitidine**</td>
<td>Intravenous Injection</td>
<td>2x50mg</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Tablet</td>
<td>2x150mg</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Combination</td>
<td>Ranitidine</td>
<td>Intravenous Injection</td>
<td>2x1 amp</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Omeprazole</td>
<td>Intravenous Injection</td>
<td>2x1 amp</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Ranitidine</td>
<td>Intravenous Injection</td>
<td>2x1 amp</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Ranitidine</td>
<td>Tablet</td>
<td>2x1 tab</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Omeprazole</td>
<td>Intravenous Injection</td>
<td>2x1 amp</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Ranitidine</td>
<td>Intravenous Injection</td>
<td>2x1 amp</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Omeprazole</td>
<td>Intravenous Injection</td>
<td>2x1 amp</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Sucralfate</td>
<td>Suspension</td>
<td>3xC I</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Ranitidine</td>
<td>Intravenous Injection</td>
<td>2x1 amp</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Omeprazole</td>
<td>capsule</td>
<td>2x1 capsule</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Sucralfate</td>
<td>Suspension</td>
<td>3xC I</td>
<td></td>
</tr>
</tbody>
</table>

Assessment of drug-related problems: In this analysis it was found that the potential for drug interactions and Drug Related Problems (DRP) frequency of drugs. It is known that omeprazole inhibits the performance of phenytoin and diazepam.

Table 4: DRP assessment of drug interaction categories with stress ulcer prophylaxis

<table>
<thead>
<tr>
<th>No.</th>
<th>Drugs Name</th>
<th>Drug Interaction</th>
<th>Interaction Mechanism</th>
<th>Effect</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Omeprazole</td>
<td>Phenytoin</td>
<td>Omeprazole inhibits the liver metabolism of phenytoin in cytochrome P450 in the</td>
<td>Omeprazole increases the effect of phenytoin</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>CYP2C19 sub family</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## Discussion

From the data that has been collected, it can be concluded that patients of all respondents used several classes of stress ulcer prophylaxis, including H2-Antagonists, PPIs and Sucralfate. Based on sample analysis, the most widely used type is H2-Antagonist group which is equal to 85.7% which is an anti-acid secretion. The next drug is PPI and Sucralfate, which are 10.39% and 3.90% respectively. In America, the use of H2-antagonists is recommended as the treatment of choice by the Food and Drug Administration (9). In patients who are at risk of bleeding because of stress ulcers, additional therapy is given such as antacids and sucralfate (10).

H2-Antagonists and PPIs have the same function, namely as antisecretory, where H2-Antagonists are able to inhibit acid secretion by 60-70% (5). Therefore, administration of H2-Antagonists alone is quite effective (11,12). Combination therapy is carried out if the patient have a high risk of suffer from stress ulcer.

H2-antagonist that been used is Ranitidine. Ranitidine is the most widely used because the incidence of side effects is lowest compared to other types in the same group. Ranitidine is used in the form of intravenous injection and orally. Oral Ranitidine is used for short-term therapy or for indications of active duodenal ulcers. While intravenous injection is used in patients who are hospitalized if oral administration is not possible. Intravenous injection is more effective because it has better bioavailability and faster onset to deal with stress ulcer symptoms.

The PPI group is also an antisecretory agent but has a greater potential (10). PPI can inhibit acid secretes by 90% because PPI inhibits H + K + ATPase. PPI drugs are activated products after being absorbed systemically (13). About 50% of drug absorption is influenced by the presence of food, so the drug must be taken without a meal or 1 hour before a meal. In fasting conditions, only 10% of PPIs actively secretes acid and are susceptible to inhibition, so that peak serum concentrations coincide with maximal secretion activity. The PPI has a short half-life of about 1.5 hours, but the acid inhibition stage lasts up to 24 hours due to irreversible inactivation of the proton pump. From this group, omeprazole is widely used intravenously. PPI-class drugs are not the right drug because the inhibition of acid secretes may lead to hypochloride which can cause nosocomial infections (13). The dose of omeprazole is 20-40 mg once a day. In this study, the dosage that used was appropriate.

Sucralfate group is used to protect the stomach and intestinal mucosa and form a mucous layer so that it will protect mucosa from aggressive factors, especially gastric acid (14,15). The dose of sucralfate is 1g orally 4 times a day or 2g orally 2 times a day, the maximum dosage that can be taken are 8g a day, 1 hour before meals or before sleep. Sucralfate must be taken before meal/without meal because sucralfate can form complexes with food proteins. In this study the frequency of therapy is 1 tablespoon of sucralfate 3 times a day with a dose of 500mg/5ml each. The dosage is appropriate, not exceeding the maximum dose.

Table 4 shows the interaction between several drugs. Three patients received omeprazole therapy which was administered together with phenytoin. Omeprazole enhances the effect of phenytoin both orally and intravenously. The increase in the half-life of phenytoin is 27%. Omeprazole doses that are equal to or greater than 40 mg inhibit phenytoin metabolism. Omeprazole inhibits the liver metabolism of phenytoin and cytochrome P-450, the relatively strong CYP2C19 sub-family (16,17). This can be overcome by reducing the dose of phenytoin and must monitor the patient’s condition by examining drugs concentration in the blood. In addition, one patient received omeprazole therapy which was administered together with diazepam, where administered at the same time, it can reduce the effect of diazepam. Omeprazole increases plasma concentration of diazepam, thereby increasing the half-life elimination of diazepam by as much as 130% and omeprazole inhibiting the liver metabolism of diazepam which undergoes metabolism by cytochrome P-450-mediated oxidation in the liver
So, omeprazole extends diazepam elimination. Diazepam has a narrow therapeutic index so this can be a problem, for that it is necessary to monitor diazepam levels if administered together with omeprazole.

The duration of drug administration must be considered. PPI-class drugs are recommended not to be used for more than 7 days because they can lead to hypochloridia in patients.

This study shows that stress ulcer prophylaxis can overcome the symptoms that occur in patients, such as dyspepsia, nausea, and vomiting, that resolved after several doses of prophylactic therapy. Therapy is still administered to the patients even though the symptoms already disappeared due to prevent an increase in gastric acid reflux and to prevent gastrointestinal injury.

**Conclusion**

The type of stress ulcer prophylaxis that used is H2-antagonist, PPI and sucralfate can be added if it requires combination therapy. H2-antagonist that widely used is Ranitidine in tablet preparations. Prophylactic therapy can be given in a single way or a combination of several prophylactic drugs. The dosage are already appropriate.

**Ethical Clearance:** The research process involves participants in the survey using a questionnaire that was accordant with the ethical research principle based on the regulation of research ethic committee. The present study was carried out in accordance with the research principles. This study implemented the basic principle ethics of respect, beneficence, non-maleficence, and justice.

**Conflict of Interest:** The author reports no conflict of interest of this work.

**Source of Funding:** This study is done with individual funding.

**REFERENCES**


Modern Lifestyles and Overnutrition among Undergraduate Students in the Northeast of Thailand

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ABSTRACT

Overnutrition among adolescents is one of major global and Thailand public health problems. However, there are limited studies on how modern lifestyle might associate with overnutrition among undergraduate students in the Northeast (NE) of Thailand.

This study aims to determine the prevalence of overnutrition and influence of modern lifestyles on overnutrition among undergraduate students. A cross-sectional study was conducted among 1,184 undergraduate students who were selected by using multistage random sampling method from three universities in the NE. A self-administered structured questionnaire was used for data collecting. The generalized linear mixed model (GLMM) analysis was used to determine the association between modern lifestyles and overnutrition among students when control other covariates and clustering effects and presenting adjusted odds ratio (Adj. OR) with 95% confident interval (CI) were used to demonstrated to strength of association.

The results, most of students were female (70.10%) with the average age of 21.24 ± 1.19 years old. The prevalence of overnutrition was 24.24 % (95% CI: 21.87- 26.76). Multivariable analysis indicated that the modern lifestyles that associated with overnutrition were: had pizza for ≥ 3 days per week (Adj. OR=3.07, 95%CI:2.16-4.36; p-value <.001), had buffet for ≥ 3 days per week (Adj. OR=3.44, 95%CI:2.51-4.71; p-value <.001), consumed carbonate beverages for ≥ 3 days per week (Adj. OR= 2.37, 95% CI: 1.70-3.28; p-value <.001), and played games via internet ≥ 3 days per week (Adj. OR=2.31, 95%CI:1.53-3.48;p-value <0 .001). A significant covariate was alcohol for ≥ 3days per week (Adj.OR=3.12, 95%CI: 2.28-4.28; p-value<.001).

Keywords: Modern lifestyles, overnutrition, undergraduate students

Introduction

Overnutrition which includes overweight and obesity have been increasing dramatically worldwide as one major public health problem especially in childhood, adolescents and adults. In 2016, about 1.9 billion people aged 18 years or over (39%) were overweight and more than 600 million (13%) were obese. In Thailand, people aged 15-29 years or about 42.70 % (41.8 % of females and 32.9% of males) were obese. The Northeast (NE) region of Thailand, the prevalence of obesity was 35.20 %. It was noted that the prevalence of obesity was very high among female (41.80%) when compared to males (32.90%). One important related lifestyle factor is consumption of modern food such as fast food which can be defines as convenience food. Increasing of modern food consumption habits as well as poor diet were identified as the most important factors of obesity among young people and adults. In addition to fast food consumption, excessive consumption, lack of physical activity or exercise, insufficient sleep were related with overweight and obesity. This lifestyle is crucial risk factors of chronic illness such as cancer, type 2 diabetes and cardiovascular disease.

In Thailand undergraduate students are mostly aged 18 to 22 years old. It is a “crisis age” from their
body, socially changes, and most importantly an identity formation. Permanent personality, lifestyle usually begins in adolescence or early adolescents with the influence of social networking and parental independence attempted. Modern lifestyles of less physical activity such as using internet or watching TV, consuming fat, flour and sugar rich diet were common among them.

There were few studies that investigated the effects of modern lifestyle of undergraduates students on their over nutrition in Thailand of which to our knowledge, there was no data on modern lifestyle and over nutrition among adolescence. Therefore, we aimed to investigate the prevalence of over nutrition and the association between modern lifestyles and over nutrition among undergraduate students when controlling other covariates.

Material and Method

This cross-sectional study was conducted in the Northeast of Thailand. The population were undergraduate students of all universities in the Northeast. The sample size was estimated by using the sample size calculation formulae for a multiple logistic regressions analysis of Heish and et al. (1998). The estimated sample size was 391 and was further adjusted to control the model over-fitting, using the rho of 0.70 and variance inflation factors (VIF) equal to 3.33. Therefore, the total sample size was 1,184. The samples were recruited by using a multistage random sampling method. The first step was that 3 universities in the NE, Khon Kean, Mahasarakham and Ubon Ratchathani Universities were randomly selected. In each university, one faculty was randomly selected from each study field of Sciences and Technology, Health Sciences, and Humanity and Social Sciences. Therefore, the total of 9 faculties were included in this study. Then, simple random sampling was applied to select the students proportional to the size of undergraduate students of each faculty. The inclusions criteria were undergraduate students who have registered in academic year 2017, aged 20 years or older, able to verbally communicate with researchers, and agreed to participate in the study with written inform consent. The exclusion criteria were having critical illness.

The research tool was a structured questionnaire consisted of 5 parts: Demographic and socioeconomics characteristics; Modern lifestyle habits; Attitude towards modern lifestyle; Body figure perception; Body mass index (BMI): The BMI was calculated as weight in kilograms divided by the square of height in meters (kg/m²), and was used classified the nutritional status using the WHO criteria for Asian population as underweight = <18.22, normal =18.5-22.99, overweight = 23-24.99, obesity = ≥25.00. Overnutrition was BMI ≥ 23.00 kg/m². The questionnaire was validated by 5 experts. The Cronbach’s alpha coefficient of modern lifestyle, and attitude toward lifestyle were 0.76 and 0.78 respectively.

Participants received the study information and explanation. The written informed consent was signed before data collection. A self-administration questionnaire was conducted for data collection. If they had questions they could asked research assistant who were waiting outside the room. The research assistants were trained and standardization for data collection process.

Statistical Analysis

The characteristics of participants were described as frequency and percentage for categorical variables; mean and standard deviation or median for continuous variables. Simple logistic regressions were used to analyses the association between individual independent factors with over nutrition. The variables with p-value < 0.25 were proceeded to a multivariable analysis modeling using a generalized linear mixed model (GLMM) to determine the influence of modern lifestyle on overnutrition when control other covariates presenting adjusted odds ratio (Adj.OR), 95% confidence intervals (CI) and p-value, of which p-value < 0.05 was considered statistically significant.

Ethical consideration: This study was conducted according to the guidelines of the Declaration of Helsinki and all procedures involving human subjects were approved by the Khon Kaen University Ethical Review Broad Committee (approval number: HE 612120). A written informed consent was obtained from all subjects before data collection.

Findings

Sociodemographic characteristics, modern lifestyles, attitude on modern lifestyles and body figure perceptions: Among a total of 1,184 undergraduate students, 70.10% were female with the average age of 21.24 ± 1.19 years old [Table1], 54.44% had average
to high levels of modern lifestyle on eating habit, on internet use (74.41%). However, 85.80 % and 81.30% had low physical activity and recreation, 49.20% had average to good levels of attitude on modern eating habit, 72.10% had poor attitude on internet use, 61.90 % had average level of attitude on exercise and 57.80% perceived of being slim and thin (57.80%), 54.10% wanted to be slim and 33.20% wanted to join weight control program. [Table 2].

Table 1: Sociodemographic of undergraduate students

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>354</td>
<td>29.90</td>
</tr>
<tr>
<td>Female</td>
<td>830</td>
<td>70.10</td>
</tr>
<tr>
<td>Age (years)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>≤ 21</td>
<td>671</td>
<td>56.70</td>
</tr>
<tr>
<td>≥ 22</td>
<td>495</td>
<td>41.80</td>
</tr>
<tr>
<td>Mean ± SD.</td>
<td>21.24 ± 1.19</td>
<td></td>
</tr>
<tr>
<td>Median(Min:Max)</td>
<td>21(20-24)</td>
<td></td>
</tr>
<tr>
<td>University</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Khon Kaen</td>
<td>392</td>
<td>33.11</td>
</tr>
<tr>
<td>Mahasarakham</td>
<td>589</td>
<td>49.75</td>
</tr>
<tr>
<td>Ubon Ratchathani</td>
<td>203</td>
<td>17.14</td>
</tr>
<tr>
<td>Monthly expenditure support form family (baht)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt; 6,000</td>
<td>679</td>
<td>57.30</td>
</tr>
<tr>
<td>≥ 6,000</td>
<td>412</td>
<td>34.80</td>
</tr>
<tr>
<td>Mean ± SD.</td>
<td>6,946.00 ± 4,073.30</td>
<td></td>
</tr>
<tr>
<td>Median (Min:Max)</td>
<td>6,000(2,000:50,000)</td>
<td></td>
</tr>
</tbody>
</table>

Table 2: Modern lifestyle level, attitude toward modern lifestyle level and body figure perception of undergraduate students

<table>
<thead>
<tr>
<th>Variable</th>
<th>Frequency</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Modern food consumption</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>64</td>
<td>5.40</td>
</tr>
<tr>
<td>Average</td>
<td>649</td>
<td>54.00</td>
</tr>
<tr>
<td>High</td>
<td>401</td>
<td>39.80</td>
</tr>
<tr>
<td>Internet use</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>23</td>
<td>1.95</td>
</tr>
<tr>
<td>Average</td>
<td>280</td>
<td>23.64</td>
</tr>
<tr>
<td>High</td>
<td>881</td>
<td>74.41</td>
</tr>
<tr>
<td>Physical activity level</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>1016</td>
<td>85.80</td>
</tr>
<tr>
<td>Average</td>
<td></td>
<td></td>
</tr>
<tr>
<td>High</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 3: Nutritional status of undergraduate students

<table>
<thead>
<tr>
<th>Variable</th>
<th>Frequency (%)</th>
<th>95%CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nutritional status(BMI)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Underweight (&lt;18.50 kg/m²)</td>
<td>259(21.90)</td>
<td>19.60 to 23.20</td>
</tr>
<tr>
<td>Normal weight (18.50 -22.99 kg/m²)</td>
<td>638(53.90)</td>
<td>51.03 to 56.71</td>
</tr>
<tr>
<td>Overweight (23.00-24.99 kg/m²)</td>
<td>171(14.40)</td>
<td>12.56 to 16.57</td>
</tr>
<tr>
<td>Obesity (≥ 25.00-29.99 kg/m²)</td>
<td>116(9.80)</td>
<td>8.22-11.62</td>
</tr>
</tbody>
</table>

Conted…

<table>
<thead>
<tr>
<th>Variable</th>
<th>Frequency</th>
<th>95%CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average</td>
<td>163</td>
<td>13.80</td>
</tr>
<tr>
<td>High</td>
<td>5</td>
<td>0.40</td>
</tr>
<tr>
<td>Attitude toward modern eating habit</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Poor</td>
<td>388</td>
<td>32.80</td>
</tr>
<tr>
<td>Average</td>
<td>583</td>
<td>49.20</td>
</tr>
<tr>
<td>Good</td>
<td>213</td>
<td>18.00</td>
</tr>
<tr>
<td>Attitude toward internet level</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Poor</td>
<td>854</td>
<td>72.10</td>
</tr>
<tr>
<td>Average</td>
<td>326</td>
<td>27.50</td>
</tr>
<tr>
<td>Good</td>
<td>4</td>
<td>0.30</td>
</tr>
<tr>
<td>Attitude toward physical activity level</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Poor</td>
<td>379</td>
<td>32.00</td>
</tr>
<tr>
<td>Average</td>
<td>733</td>
<td>61.90</td>
</tr>
<tr>
<td>Good</td>
<td>72</td>
<td>6.10</td>
</tr>
<tr>
<td>Body figure perception</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thin</td>
<td>410</td>
<td>34.60</td>
</tr>
<tr>
<td>Slim</td>
<td>275</td>
<td>23.20</td>
</tr>
<tr>
<td>Plum</td>
<td>338</td>
<td>28.50</td>
</tr>
<tr>
<td>Obese</td>
<td>161</td>
<td>13.60</td>
</tr>
<tr>
<td>Body figure management needs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weight control program</td>
<td>393</td>
<td>33.20</td>
</tr>
<tr>
<td>Exercise</td>
<td>287</td>
<td>24.20</td>
</tr>
<tr>
<td>Diet control</td>
<td>274</td>
<td>23.10</td>
</tr>
<tr>
<td>Weight control pills</td>
<td>181</td>
<td>15.30</td>
</tr>
<tr>
<td>Other</td>
<td>49</td>
<td>4.10</td>
</tr>
</tbody>
</table>

Nutrition Status: Among the undergraduate students in the NE, 14.40% were overweight (95%CI=12.56-16.57), and 9.80 % (95%CI: 8.22 = 11.62) were obese. Only 53.90% were normal weight (95%CI=51.03-56.71). [Table 3].
Factors influencing overnutrition: A bivariate analysis: The bivariate analysis indicated that some modern eating habits including consumed pizza, barbecue buffet, buffet, fried chicken, French fries, buffet, coffee, alcohol, carbonate beverages ≥3 days per week were significantly associated with overnutrition. Internet use especially for game and entertainment ≥3 days per week were significantly associated with over nutrition. [Table 4].

Table 4: Association between modern lifestyle and overnutrition by bivariable analysis

<table>
<thead>
<tr>
<th>Modern lifestyle consumption, practices</th>
<th>Total (n=1184)</th>
<th>% of Overnutrition</th>
<th>Crude OR</th>
<th>95%CI</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall overweight</td>
<td>287</td>
<td>24.24</td>
<td>N/A</td>
<td>21.87 to 26.76</td>
<td>N/A</td>
</tr>
<tr>
<td><strong>Food consumption: weekly</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pizza</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt; 3 days</td>
<td>502</td>
<td>18.92</td>
<td>1.00</td>
<td>3.30 to 6.12</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>≥3 days</td>
<td>682</td>
<td>28.15</td>
<td>4.49</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Barbecue buffet</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt; 3 days</td>
<td>772</td>
<td>18.91</td>
<td>1.00</td>
<td>1.67 to 2.91</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>≥3 days</td>
<td>412</td>
<td>34.22</td>
<td>2.21</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Fried chicken</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt; 3 days</td>
<td>634</td>
<td>14.51</td>
<td>1.00</td>
<td>2.45 to 4.33</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>≥3 days</td>
<td>550</td>
<td>35.45</td>
<td>3.27</td>
<td></td>
<td></td>
</tr>
<tr>
<td>French fries</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt; 3 days</td>
<td>776</td>
<td>16.75</td>
<td>1.00</td>
<td>2.40 to 4.19</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>≥3 days</td>
<td>408</td>
<td>38.48</td>
<td>3.17</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Buffet</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt; 3 days</td>
<td>716</td>
<td>14.94</td>
<td>1.00</td>
<td>2.76 to 4.88</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>≥3 days</td>
<td>468</td>
<td>38.46</td>
<td>3.67</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Coffee</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt; 3 days</td>
<td>902</td>
<td>19.73</td>
<td>1.00</td>
<td>1.87 to 3.37</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>≥3 days</td>
<td>282</td>
<td>38.65</td>
<td>2.51</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alcohol</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt; 3 days</td>
<td>788</td>
<td>17.26</td>
<td>1.00</td>
<td>2.28 to 4.28</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>≥3 days</td>
<td>396</td>
<td>38.13</td>
<td>3.12</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Carbonate beverages</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt; 3 days</td>
<td>736</td>
<td>11.01</td>
<td>1.00</td>
<td>1.70 to 3.28</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>≥3 days</td>
<td>448</td>
<td>45.98</td>
<td>2.36</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Internet Use</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Internet for games &gt;1hrs</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt; 3 days</td>
<td>409</td>
<td>10.02</td>
<td>1.00</td>
<td>2.89 to 5.90</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>≥3 days</td>
<td>775</td>
<td>31.74</td>
<td>4.13</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Internet for entertain &gt;1hrs</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt; 3 days</td>
<td>643</td>
<td>18.20</td>
<td>1.00</td>
<td>1.53 to 2.65</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td>≥3 days</td>
<td>541</td>
<td>31.42</td>
<td>2.01</td>
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</tbody>
</table>
Effect of modern lifestyle on overnutrition when controlling other covariates: A multivariable analysis using GLMM: The GLMM model indicated that modern lifestyles were significantly associated with overnutrition were weekly consumption of: pizza ≥ 3 days (OR adj = 3.07, 95%CI=2.16-4.35), buffet ≥ 3 days (Adj.OR=3.44, 95%CI=2.52-4.71), carbonate beverages ≥ 3 days (Adj.OR=2.36, 95%CI=1.70-2.28); weekly use of internet for game more > 1 hour for ≥ 3 days (adj OR= 2.31,95%CI=1.53-3.48). The significant covariate was consumed alcohol ≥ 3 days per week (Adj.OR=3.12, 95%CI=2.28-4.28) [Table 5].

<table>
<thead>
<tr>
<th>Modern life style consumption, practices: Weekly</th>
<th>Total (n = 1184)</th>
<th>% of Over nutrition</th>
<th>Adjusted OR</th>
<th>95%CI</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Buffet</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt; 3 days</td>
<td>716</td>
<td>14.94</td>
<td>1.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>≥3 days</td>
<td>468</td>
<td>38.46</td>
<td>3.44</td>
<td>2.52 to 4.71</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td><strong>Pizza</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt; 3 days</td>
<td>502</td>
<td>18.92</td>
<td>1.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>≥3 days</td>
<td>682</td>
<td>28.15</td>
<td>3.07</td>
<td>2.16 to 4.35</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td><strong>Carbonate beverage</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt; 3 days</td>
<td>736</td>
<td>11.01</td>
<td>1.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>≥3 days</td>
<td>448</td>
<td>45.98</td>
<td>2.36</td>
<td>1.70 to 3.28</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td><strong>Internet for games &gt;1hrs</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt; 3 days</td>
<td>409</td>
<td>10.02</td>
<td>1.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>≥3 days</td>
<td>775</td>
<td>31.74</td>
<td>2.31</td>
<td>1.53 to 3.48</td>
<td>&lt; 0.001</td>
</tr>
<tr>
<td><strong>Alcohol consumption</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt; 3 days</td>
<td>788</td>
<td>17.26</td>
<td>1.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>≥3 days</td>
<td>396</td>
<td>38.13</td>
<td>3.12</td>
<td>2.28 to 4.28</td>
<td>&lt; 0.001</td>
</tr>
</tbody>
</table>

*OR_{adj}, controlled covariates and clustering effects.

**Discussion**

The prevalence of overnutrition was 24.24% of which 10% were obesity. At the young age of 20 to 24 years old, it is challenges for actions to prevent them from developing chronic diseases such as diabetes and cardiovascular diseases. A study in Thailand among people aged 15-29 years old indicated the prevalence of over nutrition was 25.60%. A study reports a 22.00% prevalence of overnutrition among undergraduate university students in low, middle income countries. Our results indicated weekly consumption pizza ≥ 3-7 days increased the odds of over nutrition by 3.07 times. It was common that fast foods were poor in nutrients, low in fiber, but had high energy density, glycemic load and large portion size with sugar; therefore, food consumption is positively related to overweight and obesity due to their extremely high energy density. Moreover, some studies reported that food consumption such as fried chicken, pizza were associated with overweight and obesity. Consuming extremely high amounts of food was positively correlated with weight gain. The students who had buffet ≥ 3 days weekly had 3.44 times higher odds of over nutrition. Buffet is common in the Northeast with ‘all you can eat’ for a lump sum price of 5-8.5 $. Therefore, they would consume as much as they could and gained more calories. Consumed alcohol ≥ 3 days per week were 3.12 times higher risk of overnutrition. There was positive association between alcohol intake and body weight. Calories from alcoholic beverages were equal to big meals. Consumed carbonate beverages ≥ 3 days week were 2.36 times higher chances to be overnutrition. On average of 12-oz serving, is equivalent to 10 teaspoons of table sugar, a carbonate beverage could make 15 pounds or 6.75 kilograms weight gain in 1 year. Low physical inactivity, using internet for game > 1hour for ≥3 days per week had 2.31 odds of...
overnutrition. Physical inactivity had strong association with overweight and obesity. Adults who spent more times with internet were more likely to be overnutrition\textsuperscript{18}.

The strength of this study was the large sample size, sampling technique that the samples were representative of undergraduate students in the Northeast of Thailand. Therefore, the results could be generalized to the population.

**Conclusion**

Modern lifestyles were associated with over nutrition among university students in the NE. The results from current study could be an evidence for universities, local administrations and health sectors to develop policies to promote healthy lifestyles such as food consumptions, active live with exercises, reduced times with computer and internet. Healthy public policies are essential for them to be able to modify their behaviors with supportive environments.

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

**Source of Funding:** Faculty of Public Health, Khon Kaen University for technical and financial support.

**REFERENCES**


Dietary Diversity and Nutritional Status of Female Residential Students in University of Dhaka, Bangladesh

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ABSTRACT

Background: Globally, micronutrient malnutrition has become a public health concern affecting millions of lives. Hence, the present study was undertaken to assess the dietary diversity and nutritional status of female residential students of Dhaka University.

Method: This is a cross-sectional study conducted among 180 female residential students, between 18-26 years of age, of three female dormitories of Dhaka University.

Results: The median age and BMI of the respondents were 21 years and 20.31 kg/m², respectively. About 70% of the respondents exhibited normal nutritional status with 63% had adequate micronutrients in their diets having minimum dietary diversity for women (MDD-W) ≥ 5. Significant positive associations were observed between energy and all nutrients intake, and MDD-W scores while only energy and some nutrients intake showed a positive correlation with nutritional status of the respondents.

Conclusion: The findings of the study represent the importance of diversified foods, especially among residential students who stay away from the home. The present study also confirms that high dietary diversity enhance nutrients intake thus helps to improve the diet with micronutrients adequacy. Therefore, it is needed to educate the female residential students to improve their diet quality through diversification for better nutrition and health outcome.

Keywords: dietary diversity, nutritional status, minimum dietary diversity for women (MDD-W), residential students, Bangladesh.

Introduction

Micronutrient deficiency, particularly vitamin A, iron, iodine, and zinc deficiency is a global public health concern undermining the health and welfare of millions of people worldwide.¹ The cause of these deficiencies can be many, however, a major portion of the population results from nutritional inadequacies.² As nutrition is the cornerstone of health, for proper and healthy growth and development, a balanced diet including a variety of foods from different food groups is especially needed and recommended internationally by nutritionists.³,⁴

A transition from secondary education to undergraduate level reflects one of the women’s life stages that can reshape their social and environmental situation, and impact upon their capacity to embrace healthy behaviors. Studies have shown that a female student’s dietary pattern may change notably, especially when they start living in dormitories away from home. They become accustomed to the food menu of the hall cafeteria and in the dormitory, and start taking the similar quality and quantity of foods almost every day ultimately fail to have a nutritious and diversified diet.⁵ This type of poor dietary practices may have a negative influence on their nutritional status predisposing them to undernutrition resulting in poor reproductive health

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DOI Number: 10.5958/0976-5506.2019.01349.4
outcomes which may lead to elevated preterm births, infant death and maternal mortality. Good nutrition, therefore, is desired for them due to their prominent reproductive and productive roles in the society especially to insure healthy birth outcome.6

Dietary diversity is a qualitative measure of consumption of a variety of foods and is also a proxy indicator for micronutrient adequacy.7 A number of studies have found that higher dietary diversity is associated with the nutritional status of adult women and the World Health Organization (WHO) suggests that one of the main strategies to improve nutrient content through increase dietary diversity.8 Information on diet quality and micronutrient status of the female residential students are less readily available and incomplete. However, few studies have been conducted to understand the poor dietary habits and health behaviors among university students. The present study, therefore, was undertaken to assess the dietary diversity and nutritional status of the female residential students.

Method

Study Design and Subjects: This cross-sectional study was conducted among the residential students of three female dormitories of the Dhaka University, Bangladesh during January to March 2016. A total of 180 female residential students, aged 18-26 years, were enrolled for the present study. The study was carried out with ethical approval from the Ethical Review Committee, Faculty of Biological Science, Dhaka University and a written consent was taken from each respondent before collecting information.

Dietary Assessment and Nutrient Intake: The food intake information was recorded using a Multiple-Pass 24-h food recall. The data were collected for three consecutive days (two weekdays and one weekend), to allow for better estimation of food intake. Foods consumed over this period were converted into weights in grams using standard reference tables.9 To compute usual intake of energy and other nutrients, the data of the mean 24-h dietary intake and “Food Composition Table for Bangladesh (FCTB)”9 was used. The recommended intake of energy and nutrients were estimated based on the age and sex-specific reference values.10-12

Anthropometric Measurements: WHO recommended standardized procedures were followed to collect the anthropometric information.13 Weight was measured to the nearest 100 g using Hanso HX6000 electronic scale, and height to the nearest 0.1 cm using locally made portable wooden stick equipped with height gauges (SECA 206 Bodymeter). The body mass index (BMI) was calculated as weight (kg)/Height² (m²) and respondents with a BMI less than 18.5 kg/m² were regarded as underweight, those between 18.5-24.9 kg/m² as normal, 25.0-29.9 kg/m² as overweight, while those with BMI ≥30.0 kg/m² were regarded as obese according to the WHO classification of BMI.14

Assessment of Dietary Diversity: Dietary diversity was assessed using a standardized Food and Nutrition Technical Assistance Project (FANTA) questionnaire based on a set of 10 food groups. The 10 food groups comprise: starchy staples group, pulses, nuts and seeds, dairy, animal foods, eggs, vitamin A rich dark green leafy vegetables, other vitamin A rich fruits and vegetables, other vegetables, and other fruits. The MDD-W score is ranged from 0 to 10. MDD-W ≥ 5 represents a greater likelihood of meeting micronutrient needs than MDD-W <5.15

Statistical Analysis: Statistical analysis was performed using Statistical Package for the Social Sciences (SPSS) for Windows version 25 (SPSS Inc., Chicago, IL, USA). Mean, median, standard deviation, interquartile range (IQR), percentage and frequency distribution of the data were estimated for the parameters where required. Differences among the categorical variables were determined by Mann-Whitney U test. The relationship between nutritional status and dietary diversity was assessed using the logistic model. Spearman’s rho correlation coefficient was used to explore associations between respondent’s dietary diversity, nutrient intake and nutritional status. P < 0.05 was accepted as statistically significant for all tests.

Results

Participant Characteristics: The median (IQR) age and duration of stay in the university residence of the participants were 21 (18-26) years and 24 (1-72) months, respectively. The respective median weight, height, and BMI of the respondents were found 50 kg (ranged 33-86 kg), 160 cm (ranged 141-174 cm), and 20.31 kg/m² (ranged 14.24-32.77 kg/m²). The median (IQR) MDD-W of the respondents was 5.0 (3.0-7.0). About 56% of the respondents prepared their food by themselves while other 44% get their food from both self-cooking and hall
The prevalence of underweight (BMI < 18.5 kg/m²), and overweight and obese (BMI ≥ 25.0 kg/m²) was 23.9% and 9.10%, respectively, while 70.0% exhibited normal nutritional status (BMI 18.5-24.9 kg/m²).

**Dietary Diversity:** About 63% of the respondents had micronutrient adequacy in their diets consuming ≥ 5 food groups in the previous 24-h while other 37% not fulfilling minimum dietary diversity (10% consuming three and 27% four food groups).

Along with the starchy staples group other groups that were consumed by 100% of the respondents were dark green leafy vegetables, other vitamin-rich fruits and vegetables, and other vegetables while other fruits group was not widely consumed by the respondents (only 30%). More than 90% of the respondents consumed pulses group but nuts and seeds group were consumed by none of the respondents in the reference period. In the animal-source foods group, meat, poultry, and fish were consumed by almost all students (98%) followed by eggs (96%) and dairy group (90%).

**Food Groups Intake:** The respondent’s intake of different food groups is shown in Table 1. The consumption of starchy staples was the highest among the food groups and varied significantly within the two groups of MDD-W (307.50 vs. 287.67 g; P<0.05). Dairy and other vegetables consumption also showed a significant difference between the MDD-W groups (6.0 vs. 12.0 g and 65.15 vs. 77.85 g; P<0.05, respectively). No significant differences were noted in other food groups intake within the two groups of MDD-W.

**Table 1: Intake of food groups among female residential students**

<table>
<thead>
<tr>
<th>Food groups</th>
<th>&lt;5 Food Groups</th>
<th>≥5 Food Groups</th>
</tr>
</thead>
<tbody>
<tr>
<td>Starchy staples (g/p/d)</td>
<td>307.50 (123.33-574.00)</td>
<td>287.67 (93.67-616.67)</td>
</tr>
<tr>
<td>Pulses (g/p/d)</td>
<td>17.00 (0.00-82.67.67)</td>
<td>18.34 (0.00-53.33)</td>
</tr>
<tr>
<td>Dairy (ml/p/d)</td>
<td>6.00 (0.00-101.33)</td>
<td>12.00 (0.00-270.00)</td>
</tr>
<tr>
<td>Meat, poultry and fish (g/p/d)</td>
<td>30.67 (9.00-81.00)</td>
<td>33.00 (0.00-88.33)</td>
</tr>
<tr>
<td>Egg (g/p/d)</td>
<td>28.67 (0.00-57.33)</td>
<td>28.67 (0.00-71.67)</td>
</tr>
<tr>
<td>Dark green leafy vegetables (g/p/d)</td>
<td>18.61 (5.53-49.06)</td>
<td>22.24 (7.11-75.49)</td>
</tr>
<tr>
<td>Other vitamin A-rich fruits and vegetables (g/p/d)</td>
<td>9.30 (2.77-24.53)</td>
<td>11.12 (3.55-37.74)</td>
</tr>
<tr>
<td>Other vegetables (g/p/d)</td>
<td>65.15 (19.37-171.71)</td>
<td>77.85 (24.87-264.21)</td>
</tr>
<tr>
<td>Other fruits (g/p/d)</td>
<td>0 (0.00-89.00)</td>
<td>0 (0.00-65.00)</td>
</tr>
</tbody>
</table>

*Nuts and seeds group is not included as none of the respondents consumed that group

*Medians with different superscript letters are significantly different (P<0.05) between the groups (Mann-Whitney U test)

**Energy/Nutrients Intake:** Table 2 shows the energy/nutrient intakes of the respondents along with their reference intake. The nutrients intake varied significantly between the MDD-W groups except for energy, carbohydrate, niacin, and vitamin B₁₂ intake. Nutrients intake were higher among respondents consuming ≥5 food groups. No respondents could meet their reference intake of energy and other nutrients expect for fat. However, respondents having ≥5 food groups could fulfill their reference intake of energy/nutrients by a higher percentage than respondents consuming < 5 food groups.

**Table 2: Intake of energy/nutrients by female residential students together with reference intake**

<table>
<thead>
<tr>
<th>Energy/Nutrients</th>
<th>Reference intake</th>
<th>&lt;5 Food Groups</th>
<th>≥5 Food Groups</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Median intake (IQR)</td>
<td>% of reference intake</td>
<td>Median intake (IQR)</td>
</tr>
<tr>
<td>Energy (kcal/p/day)</td>
<td>2100***</td>
<td>1371.36a 985.80-1968.00</td>
<td>65.30</td>
</tr>
<tr>
<td>Protein (g/p/d)</td>
<td>55*</td>
<td>37.50a 25.30-68.79</td>
<td>68.18</td>
</tr>
</tbody>
</table>
Association between MDD-W and nutritional status:
Between the two groups of MDD-W, median BMI was higher in individuals consuming more food groups (20.06 kg/m² in <5 food groups and 20.45 kg/m² in ≥5 food groups). There were also higher percentage of female students with normal nutritional status in the high category of MDD-W than in the lower category (48.9% vs. 27.2%). However, this difference between categories was not significant (Table 3).

Table 3: Association between MDD-W scores and nutritional status of female residential students

<table>
<thead>
<tr>
<th>MDD-W</th>
<th>Median BMI, kg/m²</th>
<th>% BMI ≥ 18.5 kg/m² and OR [95% CI]</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt; 5</td>
<td>20.06</td>
<td>27.2%, 1</td>
</tr>
<tr>
<td>≥ 5</td>
<td>20.45</td>
<td></td>
</tr>
</tbody>
</table>

Conted…
Table 4: Correlation coefficients* between nutrients intake, dietary diversity and nutritional status of female residential students

<table>
<thead>
<tr>
<th>Energy/Nutrients</th>
<th>MDD-W</th>
<th>Nutritional Status (BMI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Energy</td>
<td>0.24**</td>
<td>0.16*</td>
</tr>
<tr>
<td>Protein</td>
<td>0.25**</td>
<td>0.20**</td>
</tr>
<tr>
<td>Carbohydrate</td>
<td>0.16*</td>
<td>0.14</td>
</tr>
<tr>
<td>Fat</td>
<td>0.29**</td>
<td>0.08</td>
</tr>
<tr>
<td>Fiber</td>
<td>0.30**</td>
<td>0.14</td>
</tr>
<tr>
<td>Vitamin A</td>
<td>0.47**</td>
<td>0.08</td>
</tr>
<tr>
<td>Thiamin</td>
<td>0.27**</td>
<td>0.15*</td>
</tr>
<tr>
<td>Riboflavin</td>
<td>0.46**</td>
<td>0.08</td>
</tr>
<tr>
<td>Niacin</td>
<td>0.15*</td>
<td>0.16*</td>
</tr>
<tr>
<td>Folate</td>
<td>0.31**</td>
<td>0.10</td>
</tr>
<tr>
<td>Vitamin B₁₂</td>
<td>0.21**</td>
<td>0.18*</td>
</tr>
<tr>
<td>Iron</td>
<td>0.36**</td>
<td>0.16*</td>
</tr>
<tr>
<td>Zinc</td>
<td>0.21**</td>
<td>0.18*</td>
</tr>
<tr>
<td>Calcium</td>
<td>0.46**</td>
<td>0.07</td>
</tr>
</tbody>
</table>

*Correlations are Spearman’s rho; *P<0.05; **P<0.01

Discussion

The present study included the female residential students of reproductive age group (18-26 years) from university dormitories, for assessing their dietary diversity and nutritional status as they are one of the most vulnerable age groups having micronutrient deficiency.

The prevalence of underweight among female residential students was 23.9%. This result corroborates to a nationwide survey conducted in Bangladesh[16] as well as studies in Bangladesh and other countries.[17-20] This high prevalence of malnutrition among female students might due to their energy consumption.

A significant difference was observed between the dietary diversity and nutrient intakes (except for energy, carbohydrate, niacin, and vitamin B₁₂) of the respondents. Students whose diets were highly diversified had a higher nutrients intake. The findings support other similar studies conducted in India, South Africa, and Tehran.[4, 6, 21]

Although BMI was higher in individuals consuming more food groups, no significant association was observed between dietary diversity and nutritional status of the respondents in the study. This is agreeable with some other study findings.7, 22

In the present study, a positive correlation was noted between dietary diversity and energy/nutrients intake. The findings are similar to other study findings.4, 21 This suggests that nutrient intake increases with the increment of dietary diversity.

Conclusion

To inhibit the intergenerational cycle of malnutrition, amelioration of the quality of diet is thought to be the best way. The findings of the study highlight the importance of diversified foods along with adequate consumption of every food groups, especially among the residential students, staying away from the home. Present study again confirmed that a high dietary diversity score improves the nutrients intake thus helps to enhance the diet with micronutrients adequacy. There is, therefore, the need to educate and motivate the female residential students to promote behavioral change for diversifying their diet for a good nutrition and health outcome.

Conflict of Interest: None to declare.

Source of Funding: Self.

REFERENCES


Effect of Sponge Cylinder Exercises on The Rubber of Working Muscles to Perform Human Wheel Skill in Technical Gymnastics

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1University of Baghdad, Faculty of Physical Education and Sports Sciences for Girls, Iraq

ABSTRACT

The objective of the research is to prepare exercises using sponges to increase the elasticity of the working muscles to perform the human wheel skill on the treadmill in the technical gymnasium. Use the experimental method with tight control and design of the two equal groups with pre-test and post-test. The sample of the study was the third stage students in the College of Physical Education and Sports Science for Girls - University of Baghdad and the number of (38) students. The sample was selected by random sampling. After homogeneity and equivalence, the pre working muscle rubber tests were performed by the Stretch Sensor. After applying the exercises and conducting the post-tests, the researchers concluded: The use of sponge cylinder as part of the warm-up and final part of the lecture process has effectively contributed to the increase of elastic muscles operating short period of time corresponds to the time of the semester. Sponge cylinder exercises have a positive effect in the development of the technical performance of the skill of the human wheel on the treadmill device due to the evolution of rubber working muscles. Therefore, the researchers recommend using spongy cylinder exercises in similar new research with other sports events and other age groups. And the use of sponge cylinders in sports training curricula.

Keywords: Spongy exercises, rubber muscle and human wheel skill.

Introduction

Gymnastics is one of the individual sports activities performed by the player individually and thus depends on his muscular abilities in performing the motor duty on the gymnastic machines. The muscle elasticity of the muscles is the strength of the muscles. If the more elastic the muscles produce more muscular strength, the elasticity of the working muscles increases and the elongation of muscles towards development. The main muscle groups and achieving the congruence with the kinetic shape of the basic skills of sports activities is positively reflected in larger muscular production, wider motor range and thus skilled performance.1

Therefore, the researchers sought to pay attention to the technical performance through interest in the exercises of the preparatory and final section to prepare the working muscles and joints for the basic work and thus reflected on the technical performance of the skill of the human wheel as one of the skills of the ground movements.2

It is necessary to search for modern methods that increase the strength and elasticity of the muscles working in the students and improve the performance of the skills of the gymnastics, where researchers found many methods that increase muscle elasticity in the students, including the sponge cylinder, which occurs a kind of massage of the muscles through the movements of the massage guidance, which leads to those exercises when skating muscles, through the use of sponge cylinder as part of warm-up exercises in the preparatory section and the part etc. Which reduces the chances of injury to the joints and soft tissues and the speed of healing of muscles with increased muscle strength of those working muscles.3

The importance of this research is to invest in the characteristics and characteristics of sponge cylinders in the formation of muscles and increase elasticity to carry out the exercise with the basic goals, as well as investment to reorganize and arrange the muscle fibers resulting from the performance of basic exercises, an attempt by researchers to demonstrate the usefulness of a training
tool cost-effective, dangerous and easy to use And the application in the development of muscle strength and thus the performance skill through the development of muscle rubber working on the main joints in the body through the use of exercises sponge cylinders in the practical lecture to study the gymnastics for students.4

Research Objectives:

1. To identify the degree of elastic muscles working to perform the skill of the human wheel on the ground movements in the gymnastic art.

2. Number of exercises using sponges to increase the elasticity of the muscles working to perform the skill of the human wheel on the ground movements in the technical gymnastics.

3. To identify the differences between the tests pre and post experimental and control samples in the rubber muscle working to perform the skill of the human wheel on the ground movement in the technical gymnastics.

4. To identify the differences between the tests of the dimension of the experimental and control experimental samples in the rubber muscles working to perform the skill of the human wheel on the ground movements in the gymnastic art.

Hypothesis:

1. There are differences between the tests of pre and post experimental and control samples in the rubber of the muscles working to perform the skill of the human wheel on the ground movements in the gymnastic art.

2. There are differences between the tests of dimension in the experimental and control experimental samples in the rubber muscles working to perform the skill of the human wheel on the ground movements in the gymnastic art.

Research Methodology

Use the experimental approach and design of the equivalent groups with pre and post testing to suit the nature of problem solving.

Community and Sample Search: The research community represents the third stage students in the College of Physical Education and Sports Science for Girls - University of Baghdad for the academic year 2017-2018, the number of (38) students in the Division (A) (22) students and (B) 16 students. The random sample was selected in the control and experimental group, with Division (A) selected as the control group and (B) to be the experimental group.

The homogeneity of the sample was verified through pretests of muscle sprain and human wheel skill based on the Levine test to demonstrate the homogeneity of the sample. The value of Levin showed a level greater than the 0.05 mean, which means homogeneity of the sample. The experimental and control groups were equally validated by means of independent sample tests. No significant differences were found indicating the equivalence of the two groups. As in table (1).

Table 1: The statistical parameters between the two research groups are shown in the pretest for the purpose of homogeneity and equivalence

<table>
<thead>
<tr>
<th>Variables</th>
<th>Groups</th>
<th>Mean</th>
<th>STD. EV.</th>
<th>Levine's Test</th>
<th>Sig.</th>
<th>T-test</th>
<th>Sig.</th>
<th>Significance of differences</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quadriceps muscle</td>
<td>Experimental</td>
<td>147.62</td>
<td>23.12</td>
<td>0.55</td>
<td>0.461</td>
<td>0.71</td>
<td>0.480</td>
<td>Non sig.</td>
</tr>
<tr>
<td></td>
<td>Control</td>
<td>141.98</td>
<td>21.47</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Biceps femur</td>
<td>Experimental</td>
<td>169.03</td>
<td>26.64</td>
<td>0.53</td>
<td>0.470</td>
<td>1.66</td>
<td>0.105</td>
<td>Non sig.</td>
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<td>18.68</td>
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<td>0.226</td>
<td>0.19</td>
<td>0.849</td>
<td>Non sig.</td>
</tr>
<tr>
<td></td>
<td>Control</td>
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<td>29.2</td>
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<td></td>
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</tr>
<tr>
<td>Triceps brachial</td>
<td>Experimental</td>
<td>131.78</td>
<td>26.67</td>
<td>1.71</td>
<td>0.200</td>
<td>0.14</td>
<td>0.890</td>
<td>Non sig.</td>
</tr>
<tr>
<td></td>
<td>Control</td>
<td>130.23</td>
<td>35.17</td>
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<tr>
<td>Evaluation of the performance of</td>
<td>Experimental</td>
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<td>1.28</td>
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<td>0.866</td>
<td>0.06</td>
<td>0.826</td>
<td>Non sig.</td>
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<tr>
<td>human wheel skill/degree</td>
<td>Control</td>
<td>2.59</td>
<td>1.31</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Significantly at the level of significance 0.05
Means, tools and devices used in research:
- Arab and foreign sources and references.
- International Information Network (Internet).
- Feedback and experimentation.
- Personal interviews
- 20 cylinder sponges.
- Surface movements legal
- Simplest Gymnastic rise (1.20) m (2).
- Colored tape and sticker.
- String Sensor (Power Sensor)
- Personal mobile device (laptop type CASIO)) Japanese-made

Used tests:

**Muscle Rubber Measurement:** The muscle rubber is measured by the electronic Styr sensor by placing it on the muscle to be measured directly rubber, and the reading appears on the screen of the device to be recorded.

Evaluation of the performance of human wheel skill on the ground floor:
- The skillful performance of the human wheel skill in accordance with international law in the Gymnasium was assessed by (3) judges in the gymnasium after shooting the skill and presenting it to them and setting a score of 10.

**Pilot study:** The pilot study was conducted on 5 female students of the research sample at 10:00 am on Tuesday, 28-2-2017 at the Gymnastic Hall in the Faculty of Physical Education and Sports Science for Girls. The purpose of this experiment was to identify the difficulty of exercise for the sample and to replace some exercises that are difficult for the players to perform exercises to fit the level of the sample. As well as the obstacles and errors that may face the researchers during the tests to overcome, and know the time it takes to perform the exercise and testing.

**Procedures of the main experiment:**

**Pretests:** The pre tests were conducted on the members of the research sample on 15/3/2017 at 9:00 am and at the Gymnastic Technical Hall in the College of Physical Education and Sports Science for Girls University of Baghdad. Taking into account all temporal and spatial conditions for application in the post-test.

**Sponges Exercises:** The researchers prepared exercises with sponge cylinders and use them in the lectures of the technical gymnastic in warm up and the final section of the lesson. The curriculum included the use of exercises that contribute to the development of elastic muscles and increase the range of mobility of the special joints associated with the skills of the floor of the gymnastics movements of the third stage students. Physical properties possessed by students to achieve the required development.

The experimental group is given the exercise group according to the time allocated in the weekly lecture within the college curriculum. The control group used warm up without the spongy cylinder, while the experimental group takes (practicing with the sponge cylinder in the preparatory and closing section of the lecture). The exercise was conducted in (15) week by two lectures (2) weekly distributed on days (Sunday and Tuesday) that exercises used to target all muscles of the body.

Examples of exercises sponge cylinders

**Posttests:** The tests were carried out after taking into account that the same conditions of pretests and at 9 am and the gymnasium technical hall in the Faculty of Physical Education and Sports Science for Girls on Monday, 8/5/2017.
View, analyze and discuss results: Table (2) shows that there are significant differences between the values of the arithmetic mean and the standard deviation values of the pre and posttests in the experimental group in the rubber gauge of the muscles to perform the skill of the human wheel. The wrong level values for all the measurements reached values below 0.05. Experimental has evolved in the rubbery muscles and performance of human wheel skill as a result of the practice of sponge cylinders.

Table 2: Statistical parameters between the pre and post-test tests of the experimental group

<table>
<thead>
<tr>
<th>Rubber the muscles to perform the skill of the human wheel</th>
<th>Tests</th>
<th>Mean</th>
<th>STD. EV.</th>
<th>Mean diff.</th>
<th>STD. diff.</th>
<th>(t) value</th>
<th>Sig.</th>
<th>Significance of differences</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quadriceps muscle</td>
<td>Pre</td>
<td>147.62</td>
<td>23.12</td>
<td>31.31</td>
<td>16.60</td>
<td>7.54</td>
<td>0.000</td>
<td>Sig.</td>
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<tr>
<td></td>
<td>Post</td>
<td>178.93</td>
<td>18.82</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Biceps</td>
<td>Pre</td>
<td>169.03</td>
<td>26.64</td>
<td>28.27</td>
<td>12.47</td>
<td>9.06</td>
<td>0.000</td>
<td>Sig.</td>
</tr>
<tr>
<td></td>
<td>Post</td>
<td>197.31</td>
<td>19.28</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bronchial braces</td>
<td>Pre</td>
<td>116.04</td>
<td>18.68</td>
<td>34.26</td>
<td>16.3</td>
<td>8.40</td>
<td>0.000</td>
<td>Sig.</td>
</tr>
<tr>
<td></td>
<td>Post</td>
<td>150.3</td>
<td>22.55</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Triceps brachial</td>
<td>Pre</td>
<td>131.78</td>
<td>26.67</td>
<td>31.65</td>
<td>11.79</td>
<td>10.73</td>
<td>0.000</td>
<td>Sig.</td>
</tr>
<tr>
<td></td>
<td>Post</td>
<td>163.43</td>
<td>21.91</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Evaluation of the performance of human wheel skill/degree</td>
<td>Pre</td>
<td>2.62</td>
<td>1.28</td>
<td>3.68</td>
<td>1.16</td>
<td>12.63</td>
<td>0.000</td>
<td>Sig.</td>
</tr>
<tr>
<td></td>
<td>Post</td>
<td>6.31</td>
<td>0.70</td>
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</tr>
</tbody>
</table>

Significant at the level ≤ 0.05

Table 3: The statistical parameters between the pre and posttest of the control group

<table>
<thead>
<tr>
<th>Rubber the muscles to perform the skill of the human wheel</th>
<th>Tests</th>
<th>Mean</th>
<th>STD. EV.</th>
<th>Mean diff.</th>
<th>STD. diff.</th>
<th>(t) value</th>
<th>Sig.</th>
<th>Significance of differences</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quadriceps muscle</td>
<td>Pre</td>
<td>141.98</td>
<td>21.47</td>
<td>14.51</td>
<td>11.47</td>
<td>5.05</td>
<td>0.000</td>
<td>Sig.</td>
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<tr>
<td></td>
<td>Post</td>
<td>156.5</td>
<td>15.2</td>
<td></td>
<td></td>
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<tr>
<td>Biceps</td>
<td>Pre</td>
<td>153.37</td>
<td>26.45</td>
<td>9.67</td>
<td>4.09</td>
<td>9.44</td>
<td>0.000</td>
<td>Sig.</td>
</tr>
<tr>
<td></td>
<td>Post</td>
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<td>26.01</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bronchial braces</td>
<td>Pre</td>
<td>114.37</td>
<td>29.2</td>
<td>10.41</td>
<td>6.2</td>
<td>6.71</td>
<td>0.000</td>
<td>Sig.</td>
</tr>
<tr>
<td></td>
<td>Post</td>
<td>124.78</td>
<td>25.54</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Triceps brachial</td>
<td>Pre</td>
<td>130.23</td>
<td>35.17</td>
<td>6.98</td>
<td>3.08</td>
<td>9.06</td>
<td>0.000</td>
<td>Sig.</td>
</tr>
<tr>
<td></td>
<td>Post</td>
<td>137.22</td>
<td>33.14</td>
<td></td>
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<td></td>
<td></td>
<td></td>
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<tr>
<td>Evaluation of the performance of human wheel skill/degree</td>
<td>Pre</td>
<td>2.59</td>
<td>1.31</td>
<td>1.9</td>
<td>0.75</td>
<td>10.06</td>
<td>0.000</td>
<td>Sig.</td>
</tr>
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<td>Post</td>
<td>4.5</td>
<td>0.89</td>
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</tr>
</tbody>
</table>

Significant at the level ≤ 0.05

Table (3) shows that there are significant differences between the values of the arithmetic mean and the standard deviation values for the pre and posttests in the control group in the rubber gauge of the muscles to perform human wheel skill. The wrong level values for all the measurements reached values below (0.05). The control has evolved in the rubber of the muscles and the performance of the human wheel skill as a result of the use of exercises in the warm up and the closing section of the educational unit.

Table 4: Shows the statistical parameters between the experimental group and the control in the post-test

<table>
<thead>
<tr>
<th>Rubber the muscles to perform the skill of the human wheel</th>
<th>Tests</th>
<th>Mean</th>
<th>STD. EV.</th>
<th>(t) value</th>
<th>Sig.</th>
<th>Significance of differences</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quadriceps muscle</td>
<td>Experimental</td>
<td>178.93</td>
<td>18.82</td>
<td>3.7</td>
<td>0.001</td>
<td>Sig.</td>
</tr>
<tr>
<td></td>
<td>Control</td>
<td>156.50</td>
<td>15.2</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Biceps</td>
<td>Experimental</td>
<td>197.31</td>
<td>19.28</td>
<td>4.2</td>
<td>0.000</td>
<td>Sig.</td>
</tr>
<tr>
<td></td>
<td>Control</td>
<td>163.04</td>
<td>26.01</td>
<td></td>
<td></td>
<td></td>
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</tbody>
</table>
Conted…

<table>
<thead>
<tr>
<th></th>
<th>Experimental</th>
<th>Control</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Bronchial braces</td>
<td>150.30</td>
<td>124.78</td>
<td>22.55</td>
<td>2.9</td>
<td>0.005</td>
<td>Sig.</td>
</tr>
<tr>
<td>Triceps brachial</td>
<td>163.43</td>
<td>137.22</td>
<td>21.91</td>
<td>2.6</td>
<td>0.013</td>
<td>Sig.</td>
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<tr>
<td>Evaluation of the performance of human wheel skill/degree</td>
<td>163.43</td>
<td>137.22</td>
<td>21.91</td>
<td>33.14</td>
<td>2.6</td>
<td>0.013</td>
</tr>
</tbody>
</table>

Table (4) shows significant differences between the experimental and control groups in the values of the computational medium and the values of the standard dimensional deviations in the elasticity of the muscles to perform human wheel skill. The wrong level values for all measurements reached values below 0.05. Has developed in the rubber of the muscles and performance of the human wheel skill as a result of the practice of sponge cylinders better than the control group.

The researchers attributed the moral difference to the use of various sponges exercises (30-60) seconds for each exercise, which led to the development of muscle harmony of the muscles surrounding the joints of the body and thus improve the range of motor joints.5

MacDonald said that the use of sponges in warm-up and soothing exercises have physiological effects in increasing the elasticity of the muscles and the kinetic range of the joints of the body where the weight of the body is used to roll on the cylinder.6

This means that there is an improvement resulting from the exercise of sponge cylinders, where these exercises to mobilize the required amount of muscle fibers in different areas of the body, which increases the strength of muscle, the range of movement of the joint, as exercises sponge cylinders massage of muscle tissue.

Spongy sponge massage is very important in reducing muscle stiffness and helping to increase the range of motion. It aims to reduce muscle stiffness as well as help to increase tissue elasticity.

“The lack of muscle elasticity of the individual affects the extent to which he is acquired and mastered the performance of the basic skill, and that increased muscle stiffness makes it difficult to develop other physical qualities.”7

“The presence of muscle elasticity in the student is a prerequisite for the art of performing skills and without the presence of rubber cannot be able to obtain a strong and rapid muscle contraction, as playing muscle rubber plays an important role in the art of performance in the gymnastics, so the student needs to rubber in many working muscles On the joints of the body, the element of rubber and strength in the gymnastic of the basic elements and the task as well as other elements such as flexibility and speed agility The experimental group that used exercises sponge cylinders have evolved in rubber muscle and dynamic range better than the control group that The practice of sponges is a modern technique in the development of muscle elasticity and flexibility of the joints and thus give a wide range of movement to perform any movement that requires it.8 Sponges are working to rearrange and regulate the muscle fibers after they have been scattered as a result of effort It also provides a massage mechanism and muscle fiber drip and reduces muscle stiffness. The higher the muscle fiber is characterized by high muscle strength, the more muscle strength tests are an important indicator of the extent of muscle elasticity and lack of hardness.9

Conclusions

1. The use of sponge cylinders as part of the warm-up and closing part of the lecture process has effectively contributed to the increase of rubber muscles working short time to match the time of the semester.

2. Sponge’s exercises have a positive effect on the development of the technical performance of the human wheel skill on the treadmill device due to the evolution of rubber working muscles.

Ethical Clearance: Taken from University of Baghdad

Source of Funding: Self

Conflict of Interest: None
REFERENCES


3. Nariman K. and others; sports training - muscle prolongation. (Book Center for Publishing, Cairo, 1997).


8. Al-mashhadi RAA. The Impact of the Plan and PDEODE Strategies in Developing Awareness of Cognitive Processes and Reducing Psychological Pollution Among Students of the Faculty of Physical Education and Sports Sciences. 2018;928–35.


Seroprevalence of CMV Infection in Multi-Transfused Adult Patients with Haematological Malignancies: Single Iraqi Hematology Center Experience

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Dept. of Laboratory and Clinical Sciences, College of Pharmacy, University of Babylon, Hilla, Iraq

ABSTRACT
Transfusion-transmitted viral infections (hepatitis B (HBV), hepatitis C (HCV), human immunodeficiency virus (HIV) and cytomegalovirus (CMV) are the most common transfusion-transmitted infections. Screening for HBV, HCV, HIV are recommended by WHO to be screened for before transfusion. The aim of the study is to determine the seroprevalence of transfusion transmitted CMV infection in a subsets of hematological malignancy patients as compared to non-transfused healthy controls. A serology for the detection of CMV IgG and IgM antibodies was done for 48 multi-transfused patients with hematological malignancies and for 96 untransfused healthy controls to determine the seroprevalence of CMV in this study which showed positive CMV IgG in 84 control subjects (87.5%) and 45 patients (93.8%) with no statistically significant association in the seroprevalence of CMV IgG and history of transfusion (P value > 0.05) while positive CMV IgM was seen in 2 control subjects (2.1%) and 10 patients (20.8%) with a statistically significant association (P value < 0.05) between the seroprevalence of positive CMV IgM with exposure to the blood products. This high prevalence result of CMV infection also mandate appropriate actions include the using of leuco-depleted filters or CMV-negative blood.

Keywords: Seroprevalence, CMV Infection, Multi-Transfused Patients, Haematological Malignancy.

Introduction
Blood and blood product transfusion is an integral component of medical practice and is essential in many treatments including hospitalized surgical and medical patients [1]. It is vital for a variety of patients with chronic anemia such as haemoglobinopathies and for those with coagulopathies [2]. In addition, transfusion is critical for patients with hematological malignancies undergoing aggressive treatment regimens. Transfusion of any blood product involves the risk of an adverse reaction, including disease transmission [3]. While stringent measures are being taken to minimize the risk of transfusion-transmitted viral infection, it may never be possible to guarantee that donor blood is absolutely safe [2].

Human cytomegalovirus infections commonly are associated with the salivary glands. Human cytomegalovirus (CMV) is a wide-spread virus and its infection may be asymptomatic in healthy people, but they can be life-threatening in an immunocompromised patient [4-6]. Congenital cytomegalovirus infection can cause morbidity and even death. After infection, CMV often remains latent, but it can reactivate at any time. Eventually, it causes mucoepidermoid carcinoma, and it may be responsible for prostate cancer. CMV infects between 60% to 70% of adults in industrialized countries and close to 100% in emerging countries. Of all herpes viruses, CMV harbors the largest number of genes dedicated to evading innate and adaptive immunity in the host. CMV represents a lifelong burden of antigenic T-cell surveillance and immune dysfunction. Congenital CMV is a leading infectious cause of deafness, learning disabilities, and intellectual disability [7].
CMV is the most significant in blood transfusion, and was previously transmitted widely, with serious consequences for some patients [8]. Once CMV is transmitted, and the primary infection clears, the virus remains dormant in myeloid cells. Vital replication and reactivation are contained primarily by cytotoxic T-cell immunity. However, when reactivation occurs, virions are released into the bloodstream and other body fluids, leading to the presence of symptoms, predominantly in immunocompromised patients [7,9]. CMV can infect a wide range of cell types, including leukocytes of monocyte-macrophage lineage and their progenitors, of which the former represent the preeminent source of transfusion-transmitted infection. Consequently, cell-depleted blood components (plasma, cryoprecipitate) do not transmit CMV and infection has not been reported [10].

Primary CMV infection in immunocompetent individuals is usually community-acquired and often asymptomatic or associated with a mild, self-limited infectious mononucleosis syndrome. The incubation period generally lasts from 1 week to 1 month and antibodies appear following resolution of infection and the development of latent state of infection. However, in virtually all cases, latent virus persists permanently in cellular reservoirs, allowing lifelong reactivation infections, or in the setting of transfusion or transplantation, viral transmission via cellular blood products, or transplanted donor organs [10]. In immunosuppressed patients, CMV infection usually leads to gastroenteritis, hepatitis and pneumonitis and rarely retinitis, encephalitis and other inflammatory conditions often associated with considerable morbidity and mortality. The reported risk of (usually asymptomatic) CMV infection in seronegative immunocompetent patients who receive non-leukocyte-reduced cellular blood components unscreened for presence of CMV antibodies is approximately 1% [8]. In contrast, the historical risk of CMV infection in immunocompromised recipients receiving CMV unscreened, non-leukocyte-reduced blood components has been reported in various studies from 13.5% to 53.3% [10].

CMV seronegative tested blood is given to immunosuppressed patients who are susceptible to acquiring CMV. Selection of CMV seronegative or leukocyte-reduced blood components for susceptible patient groups have significantly reduced the risk of transfusion-transmitted CMV infection to 0-7% [16-19]. Screening for CMV is not generally applied to all donations because the percentage of patients requiring screened blood is relatively low [8].

The aim of this study was to in order to investigate the prevalence of CMV infection in immunocompromised patients by determining CMV IgG and IgM antibodies in multi-transfused adult hematological malignancies patients.

Materials and Method

A total of forty-eight patients with hematological malignancies were enrolled into this study for determination the sero-prevalence of transfusion-transmitted CMV infection by including patients in the post-transfusion period once and excluding new patients not receiving transfusion products. The baseline data requested were concentrated mainly on patient’s name, age, sex, marital status, residence, the diagnosis of hematological malignancies type, comorbidity, blood group and Rh, whether the patient donate blood before or not, the type of blood product the patient received (packed red cells, platelet transfusion, cryoprecipitate or fresh frozen plasma) and any previous CMV infection. All patients in this study were compared with a control group (96 healthy donors) obtained from our local blood bank who was not previously transfused.

Anti-CMV IgG and Anti-CMV IgM ELISA kits (Biocheck, Inc., USA) were used in this study for the quantitative determination of CMV IgG and IgM antibodies in human serum or plasma. Purified CMV antigen is coated on the surface of microwells. Diluted patient serum was added to the wells and the CMV IgG or IgM specific antibodies, if present, bind to the antigen. The intensity of the color generated (yellow) is proportional to the amount of CMV IgG or IgM specific antibody in the sample. A CMV IgG index of 1.0 or greater, IU value greater than 1.2 is seropositive, whereas, > 1.2 IU/ml indicate prior exposure to the CMV. A CMV IgM index of 1.0 or greater is positive for IgM antibody to CMV. The data were analyzed by the computer software program Statistical Package for Social Science (SPSS, version 18/IBM.US./2007).

Results

Forty-eight patients were included in this study: 22 males (mean age 37.3 ± 18.33, age range 16-69 years) and 26 females (mean age 37.7 ± 15.7, age range 15-75
years) with different hematological malignancies. From all patients, there were 19 patients with acute myeloid leukemia (AML), 11 patients with Non-Hodgkin’s lymphoma (NHL), 9 patients with acute lymphoblastic leukemia (ALL), 6 patients with chronic lymphocytic leukemia (CLL) and 3 patients with plasma cell myeloma, or called multiple myeloma (MM). Female to male ratio, number and percentage of patients under study with different hematological malignancies are shown in Table (1), and figure (1). The demographic and clinical characteristics of all patients are shown in Table (2).

<table>
<thead>
<tr>
<th>Sex</th>
<th>Number (%)</th>
<th>Age Mean ± SD</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>22 (46%)</td>
<td>37.3 ± 18.33</td>
<td>16-69</td>
</tr>
<tr>
<td>Female</td>
<td>26 (54%)</td>
<td>37.7 ± 15.7</td>
<td>15-75</td>
</tr>
<tr>
<td>Total</td>
<td>48 (100%)</td>
<td>57.5 ± 16.8</td>
<td>15-75</td>
</tr>
</tbody>
</table>

Table 1: Distribution of patients under study according to sex and age

The Seroprevalance of CMV infection in this case-control study which include 96 healthy untransfused donor population as control and 48 patients showed that positive CMV IgG was seen in 84 control subjects (87.5 %) and 45 patients (93.8%) under study. There was no statistically significant association in the seroprevalence of CMV IgG and history of transfusion (P value > 0.05). Positive CMV IgM was seen in 2 control subjects (2.1 %) and 10 patients (20.8 %) under study. There was statistically significant association (P value < 0.05) between the seroprevalence of positive CMV IgM with recent exposure to the blood products. The positive results for both CMV IgG and IgM antibodies which indicated by ELISA in all patients and control group are shown in Table (2), Figure (2).

Table 2: Sero-prevalence of CMV IgG and IgM antibodies in all patients under study compared with control group

<table>
<thead>
<tr>
<th>CMV IgG</th>
<th>Patients</th>
<th>Control</th>
<th>Total</th>
<th>P. Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>+ve</td>
<td>45</td>
<td>84</td>
<td>129</td>
<td>P value &gt; 0.05 (0.38)</td>
</tr>
<tr>
<td>-ve</td>
<td>3</td>
<td>12</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>CMV IgM</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>+ve</td>
<td>10</td>
<td>2</td>
<td>12</td>
<td>P value &lt; 0.05 (0.00044)</td>
</tr>
<tr>
<td>-ve</td>
<td>38</td>
<td>94</td>
<td>132</td>
<td></td>
</tr>
</tbody>
</table>

Figure 1: Distribution of patients under study according to the type of hematological malignancies

Discussion

World Health Organization (WHO) recommended optimal blood donation screening for hepatitis (HBV and HCV), HIV and CMV. The first three viruses are recommended to be tested for before transfusion in both immunocompetent and immunocompromised patients while CMV is no usually tested but testing is recommended in the immunocompromised patients [20-22].

This study showed higher prevalence of anti-CMV IgG and IgM antibodies among patients, and these findings are comparable to that reported by Alizi [23], who found that 99.1% of the Iraqi immune-compromised patients were positive for anti-CMV IgG, and 8.4% for IgM and Omer et al [24] who found that 96% of the Iraqi immune-compromised patients with acute leukemia were positive for anti-CMV IgG, and 12% for IgM. In Egypt, Loutfy et al [25] also found a high seroprevalence of CMV antibodies in both leukemic children (100%) and their
controls (100%). The detection of a high prevalence of CMV antibodies among patients and apparently healthy Iraqi people indicates that CMV infection is endemic in our country. This supports the suggestion of CMV reactivation particularly among immunocompromised patients including leukemic patients. These results show that there are at least 3 factors that may play a role in active CMV infection among immunocompromised patients; first receiving large amount of blood ensuring transfer of viable cells latently infected with CMV. The second factor may be the course of immunosuppressive therapy in different doses depending on their disease. Lastly, this variation may be due to the pathogenesis of their diseases [26].

Prevention of CMV infection in Iraq needs the adoption of Iraqi blood banks which still not adopt CMV for screening for blood donors and to provide leukocyte-depleted filters to high risk patients (including pregnant, neonates and immunocompromised patients receiving chemotherapy) which will significantly reduce the risk of transfusion-transmitted CMV infection to 0-7% [12, 16-19].

What is the risk of CMV transmission to an already CMV seropositive individual? Contact with blood products containing CMV may cause reactivation of latent CMV virus in a state of immunosuppression. Another possibility is reinfection with a new strain of CMV, as demonstrated in patients with the human immunodeficiency virus (HIV) and organ transplant recipients [27,28].

A higher risk for a severe CMV infection has been suggested following infection with a second strain of CMV [27]. It is very difficult to assess with certainty the importance of CMV transmission by blood products into already CMV seropositive patients.

Whether CMV disease occurring in seropositive patients is more or less frequently caused by a reactivation of a previous strain or by re-infection of a new strain is unknown but is likely to be strongly influenced by the existing CMV immunity in the patient and the donor [29, 30].

For years only blood from CMV-negative donors was used to transfuse CMV-negative patients. This policy is effective in preventing CMV infection, but because 50% of the population is positive for CMV antibodies, it may potentially lead to shortages of products that could be transfused to the patient [31]. Currently, leuko-reduced blood products are used since leuko-filteration of the blood is just as effective as transfusion of CMV-negative blood in preventing infections and allows greater use of all blood products [32].

Pathogen inactivation is the newest approach for CMV inactivation making blood safer. Several technologies are already available or in development and their efficacy in inactivating CMV has led to discussions on omitting CMV testing in the future. The final choice of a technique will most likely depend on the risk for severe CMV disease in the patient population as well as the efficacy, safety and costs of the chosen techniques [12].

Conclusion

There was a high prevalence of cytomegalovirus infection in the multi-transfused patients relative to healthy untransfused patients. High prevalence of CMV infection which also mandate appropriate actions include: Use of leuko-depleted filters, use of CMV-negative blood and viral inactivation methods.

Conflicts of Interest: None of the authors have any conflicts of interest relevant to what is written.

Source of Funding: University funding was provided for: data collection, analysis, and interpretation; trial design; patient recruitment. No public funding was received.

Acknowledgments

Author would like to express her thanks and gratitude to Prof. Alaa Al-Charrakh (University of Babylon) for critical reading of the manuscript.

Ethical Clearance: The study was conducted in accordance with the ethical principles that have their origin in the Declaration of Helsinki. The study protocol and the subject information and consent form were reviewed and approved by a local Ethics Committee.

REFERENCES


The Effectiveness of Counseling on Knowledge and Compliance Patients of Diabetes Mellitus is Measured Through HbA1c

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ABSTRACT

In 2020 patients of Diabetes Mellitus in Indonesia increase to 7 million people. Diabetes Mellitus is characterized by increased blood glucose chemical reaction with hemoglobin that is HbA1c. It need a patient compliance in the treatment of Diabetes Mellitus. Compliance can be achieved through counseling methods. This study aims to determine the effectiveness of counseling on the level of knowledge and compliance patients of Diabetes Mellitus is measured through HbA1C.

The study is a quasi experimental design using validated questionnaires with before and after one group design. Sampling was done by purposive sampling. The sample size used as many as 21 patients. The research variables measured were the level of compliance, knowledge and HbA1c. The data analysis was conducted on the Wilcoxon Signed-Rank test to analyze differences in knowledge between before and after counseling and Paired t-test to analyze differences in compliance and HbA1c (P <0.05).

The results were significantly different in increasing knowledge with p = 0.020 and a significant difference in improving HbA1c with p = 0.023. There were no significant differences in compliance with p = 0.153. Counseling improve the knowledge however does not improve compliance patient of Diabetes Mellitus measured by HbA1c values.

Keywords: diabetes mellitus, compliance, knowledge, counseling, HbA1C

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Introduction

According to a WHO report in 2003, the average patient compliance with chronic disease to long-term therapy in developed countries is only 50%, while in developing countries is even lower. Noncompliance become one of the biggest medical challenges faced by health professionals and is an obstacle to the achievement of treatment goals.¹²

Diabetes mellitus (DM) is a degenerative disease polypharmacy with a long duration of therapy and chronic asymptomatic condition.³⁴ In the treatment of DM requires knowledge and compliance. Through knowledge of illness, diabetic patients expected to avoid the complications of the disease and an increase in quality of life.⁵-six

Counseling aimed at improving treatment outcomes by maximizing the use of right medications. One of the benefits from counseling is to improve patient compliance in medication use, so the number of mortality and morbidity (both costs and loss of productivity) can be pressed.⁴In addition, patients get information and knowledge about the illness.⁷-eight

Dinoyo and Kendalsari Health Center is located in the region of 6 (six) villages, Lowokwaru District, Malang, East Java, Indonesia. The number of patients with DM who came an average of 30 people each month, but the counseling to the patient is minimal because Pharmacists just 1 (one) person. It can lower the implementation of Pharmaceutical Care and the quality of life of patients, especially patients with DM.

Material and Method

This research was conducted at Dinoyo and Kendalsari Health Center in October 2015 to February
2016 with a quasi-experimental methods, using pre-experimental design. Mechanical pengambian sample is purposive sample. This study uses a pre-test before treatment and post-test after being treated, with a design that is used is the one group pretest-posttest design. Inclusion criteria for this study were patients with DM without complications anemia, thalassemia, hemoglobinopathies, hemolytic retikulosa and accept to participate in counseling by completing the informed consent. The research instruments include video, questionnaires, leaflets, collecting pieces of data (age, gender, education, the way of drug use) and patient protocol sheet.

Step study include:
1. Selection group of patients with inclusion criteria
2. Measurement HbA1C patients and give pre-test to determine the knowledge and compliance. Pre test using a questionnaire.
3. Hold a seminar on Diabetes Mellitus.
4. After the seminar, patients received post test for knowledge, while the post-test for compliance given 2-3 months later when a re-examination of HbA1c.
5. Monitoring of treatment and the patient’s condition is conducted every month by telephone.

The questionnaires about compliance that patients use “Morisky Medication Adherence Scale” while the questionnaires about knowledge that patients also must answer the question with cross-marking the available letters below:

1. How do blood sugar levels in diabetic patients?
   A. Blood sugar levels higher than normal
   B. Lower blood sugar levels than normal
   C. Blood sugar levels under normal circumstances
   D. Blood sugar levels can be high or low

2. The main causes of diabetes are:
   A. An increase in the amount of insulin hormone in the body
   B. Decreased amount of insulin hormone in the body
   C. insulin hormone is normal in the body
   D. The amount of insulin hormone in the body can increase or decrease

3. The characteristics of diabetes are:
   A. Frequent urination
   B. Often hungry
   C. Often thirsty
   D. All of the above

4. Lifestyle changes needed for diabetics are:
   A. weight loss
   B. quit smoking
   C. Stop consuming alcohol
   D. All of the above

5. Treatment of diabetes consists of:
   A. antibiotics
   B. blood transfusion
   C. insulin
   D. Captopril

6. Diabetes can not be treated with:
   A. insulin
   B. Glibenclamide
   C. Metformin
   D. mefenamic acid

7. Complications of diseases that can arise due to diabetes are:
   A. Uric acid
   B. High blood pressure
   C. Cholesterol
   D. Influenza

8. If blood sugar levels have been good, then the use of drugs:
   A. Can be stopped immediately
   B. Can be stopped after one month
   C. Should be continued for life
   D. Consultation doctor

9. If you feel healed, will you stop taking the medicine?
   A. Stop immediately
   B. Stop after 1 month
   C. Should be continued for life
   D. Consultation doctor.
10. Normal fasting blood glucose levels for both men and women are:
   A. 200 - 300 mg/dl
   B. 105 - 230 mg/dl
   C. 70 - 110 mg/dl
   D. ≥ 110 mg/dl

11. Significant laboratory data for examination of body blood sugar levels are:
   A. HbA1C
   B. Fasting blood sugar levels
   C. Blood sugar levels 2 hours after eating
   D. Blood sugar levels are random

Results

This research obtains 25 patients of DM with appropriate inclusion criteria. Based on the scores of pre and post test knowledge, there is a difference in diabetic patients. Pre tests done before counseling, from 9 questions given through a questionnaire to get a total score of 54 while the post-test score of 69. Values are given correct =1 and incorrect = 0. Statistical tests using Wilcoxon obtained t value -2.333 with a significance level of 0.020 (p <0.05).

Based on the scores of pre and post tests HbA1c significant differences in DM patients. The difference is an increasing value of HbA1c in before and after counseling. Statistical using paired t-test obtained t value -2.471 with a significance level of 0.023 (p <0.05).

The results of pre and post scores compliance give a results of statistical test use paired t-test was data value t = 1.486 and p = 0.153 (p > 0.05) and can be interpreted no significant difference of patient compliance.

Discussion

The number that female patients (52.38%) more than male patients (47.62%). This is because most of the factors can increase the risk of type 2 diabetes experienced by women, such as pregnancy history with the baby’s birth weight> 4 kg, history of diabetes during pregnancy (gestational diabetes), obesity, use of oral contraceptives, and stress levels are high enough. Patients with gestational diabetes have a 30-50% risk to develop into type 2 diabetes mellitus.³

Factors aged 45-55 years had the highest percentage (52.38%) in this study. Age 45 years and above have a higher risk of diabetes mellitus type 2. This is mainly in older, the function of pancreatic cells and insulin secretion will be reduced, and also associated with insulin resistance due to decreased muscle mass and vascular changes, reduced physical activity.³-⁴

When viewed from the education factor, the patients of DM with elementary school have a percentage (52.38%). Lack of education can cause a person reluctant to learn science, especially the science of disease. In addition, the lifestyle of the people with elementary school are not settled, especially in terms of exercise and diet. They control the consumption of carbohydrates, fats and proteins are very rare.

Consumption OAD (Oral Antidiabetic Drug) the largest is glibenclamide (66.67%). Glibenclamide is OAD class of sulfonylureas having a reaction mechanism increases the production of insulin by the pancreas.³ Glibenclamide is used for conditions of type 2 diabetes patients with normal weight. The use of these drugs also increase the effects of hypoglycemia, althught in this riset noone(based on questionnaires ). The use of insulin also made by 2 patients with type 2 diabetes mellitus in combination with glibenclamide. A total of 19 patients received treatment OAD singly or combination. But there are 2 patients who also receive therapy Na-Diclofenac and Antalgin.

a. Analysis pre and post difference scores for the knowledge test: Increased knowledge score occur after counseling. It showed that counseling goal is reached. In accordance with the educational theory that states of the counseling should aim to educate patients. Knowledge of the patient will increase and encourage a change in behavior will be correct.³ At the time of counseling, a lot of things asked by the patient. Most questions is drug side effects and complications. There are some patients who have experienced complications up to neuropathy in their hands. Neuropathy indicates poor blood perfusion and this is supported by blood pressure data (140/80 mmHg).

b. Analysis of pre and post difference scores for HbA1c: Data retrieval HbA1c Pre and Post is 3 months. HbA1c is a substance formed by the chemical reaction of blood glucose and hemoglobin. HbA1c is formed that circulates in
the blood, such as age erytrocit is 8-12 weeks. The HbA1c is made at 3 month. The normal value for HbA1c is $\leq 5.7\%$ while the value of 5.7 to 6.4% already entered a period of prediabetes.\textsuperscript{5-10} Many of diabetic patients have a value HbA1c $> 5.7\%$ but there is 3 people have value HbA1c $\leq 5.7\%$. They was known that have DM disease 3 months ago and immediately take medication diligently and control routine to the clinic. Once a month in the health center always take measurements of fasting blood glucose (FBG). Health center does not measure HbA1c on diabetic patients because of the high price of reagents. The value of HbA1c also $> 10\%$ in 4 people (data pre). One of the DM patients with HbA1c values $> 14\%$ said that less attention to the drug has been given doctor. Patients were more likely to boiling herbal therapies or powders for its DM disease. Patients did not indicate the presence of complications because it has never perform complete blood test. High HbA1c value describes the progression of the microvascular or macrovascular complications. Any increase in the value of HbA1c can be cause of 10% the mortality of heart disease, stroke and progressive increase in the cost of therapy. HbA1c $< 7\%$ can lower the risk of complications DM.

The total value of HbA1c pre and post counseling have increase. It indicated that diabetic patients were not adherent to treatment. Noncompliance can be due to many factors such as a perception and behavior of the patient (eg, a perception of the severity of the disease, a variable sociodemographic, beliefs, attitudes and expectations that influence patient motivation to start and maintain the drinking of drugs) the interaction between the patient and doctor, interprofessional service (eg skills in giving advice can improve compliance), the policy and practice of medicine in the public created by the authorities (eg tax systems recipes, deregulation recipes), a variety of interventions that compliance in taking medication (eg pharmacist visit to the ward and ask the patient to remember about the rules in taking medication).\textsuperscript{11-12}

c. Analysis of pre and post difference scores for compliance: The absence of these differences indicate that counseling through video, information and leaflets failed to increase patient compliance. It was measured through HbA1C.

The total value of HbA1c increase after the re-measurement of 3 months later. In fact, the team provides counseling regarding the dosage, how to take the medicine, time to take medication, lifestyle and the importance of control of every month in the health center rather directly meet with the patient (at month 0) and each month over the phone.

Compliance is a patient’s level of implementing and behavioral remedies suggested by the doctor, pharmacist or by another person. Patient compliance as the extent of the patient’s behavior in accordance with the provisions given by health professionals.\textsuperscript{3} Noncompliance can be seen taking medication related to dosage, how to take medication, and the period of time to take it is not within the rules. Type of non-compliance include deliberate and accidental. Deliberate non-compliance due to limited treatment costs and patient mistrust of the effectiveness of the drug. Unintentional non-adherence due to patients forget to take medication, not understand instructions for use, errors in reading etiquette.\textsuperscript{13-14}

Some studies show that for drug efficacy can improve cure rates of patients significantly, the level of compliance in taking medication by the patient must be at least 80%.\textsuperscript{15} As a behavioral aspects of patient compliance in taking the drug can be known from the method used to measure it. The method can be used to measure compliance in taking medication is a direct and indirect method. In this study the methods used to measure patient compliance is to use indirect methods that give the questionnaire. Advantages of direct methods by giving questionnaires to patients is simple, not expensive and most widely used in the clinical setting. The weakness is very likely an error occurred and the time between visits may occur distortion.\textsuperscript{16-17}

How to improve compliance inform the patient of the benefits and the importance to achieve treatment success, reminding patients to do everything that must be done for the success of treatment by telephone and other communication tools, demonstrate to patients the drug packaging or actual show their original packaging, giving confidence to patients for an effective drug in the treatment, providing information will
noncompliance and pharmaceutical services with direct observation, visited the home immediately and medical consultation, use of compliance tools and their support of the family and friends in order to comply taking medication.18

**Conclusion**

Counseling can improve the knowledge however does not improve patient compliance measured by HbA1c values.

**Conflict of Interest:** None declared.

**Source of Funding:** The funding of this research was obtained from the research and community service faculty of the faculty

**Ethical Clearence:** This research is already getting clearance from the Ethics Committee Faculty of Medicine Brawijaya University

**REFERENCES**


Protein Kinases A (PknA), a Good Target for Vaccine Design against Tuberculosis

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ABSTRACT

The tuberculosis (TB) pandemic continues to rampage despite widespread use of the Bacillus Calmette–Guérin vaccine. Novel vaccination strategies are urgently needed to arrest global transmission and prevent the uncontrolled development of multidrug-resistant forms of Mycobacterium tuberculosis.

In this study, protein sequences of PknB were collected from GenBank database at NCBI, the immunogenic protein was chosen and its 3D structure retrieved from database to use in the steps of rational vaccine design, High antigenicity value showed in (YIAPEQALGHDASPASDV) and (EFSSDPE) epitopes.

Keywords: Tuberculosis, PknB, Epitopes

Introduction

Mycobacterium tuberculosis kills more people than any other single infectious causative; an estimated 1.674 million persons died of Tuberculosis in 2016 (1). It has the potential for hidden infection to become active and cause Tuberculosis disease. During initial infection and in reactivated disease, M. tuberculosis actively replicates in vivo. Hidden infection is thought to result from major shifts in gene expression and metabolism, allowing persistence with minimal replication (2)

Vaccination has been widely used and is the most cost-effective approach for disease prevention. BCG is a live attenuated vaccine, and the only vaccine used for TB prevention. It has made great contributions in the past, even though its efficacy is dubious. However, novel vaccines principal to BCG are urgently needed to cope with the contestation TB situation (1)

M. tuberculosis has a row of proteins to ensure its existence during the course of contagion (4). Protein kinase (PKnA) has a crucial role in cell shape and division (3), which is part of an operon encoding genes involved in cell shape control and cell wall synthesis. With continuous existence of muti drug resistance strains of M. tuberculosis, the need arose for designing a vaccine against the infections with tuberculosis. The structural analysis of PKnA protein gives it a good target for vaccine design.

Materials and Method

The following databases and softwares were used in this study:

- MEGA v.6 software: used for alignment and estimation of phylogeny (5). http://69.36.184.213/mega.php
Results and Discussion

Tuberculosis is a disease rich in contrasts. It was one of the first diseases for which the causative agent (M. tuberculosis) was identified, and one of the first for which a vaccine was evolved. The success of Mtb as a pathogen is in part because of the ways in which Mtb shirks and exploits different cell subsets, to insist and cause disease. Mtb produces several molecules to prevent its recognition and devastating by immune system cells. “Bacille Calmette-Guerin (BCG)” is the only vaccine used for about 100 years against Tb, but the reasons for protection variability in populations remain unclear (13), it is effectual at inhibiting propagated disease in infants but confers highly variable efficacy against pulmonary Tuberculosis in adults, especially in the developing countries.

<table>
<thead>
<tr>
<th>No.</th>
<th>Protein Acc. No.</th>
<th>Year of Deposition</th>
<th>Antigenicity Index</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>ALB17118.1</td>
<td>2016</td>
<td>0.5532</td>
</tr>
<tr>
<td>2.</td>
<td>CCE35558.1</td>
<td>2015</td>
<td>0.5477</td>
</tr>
<tr>
<td>3.</td>
<td>ANZ80622.1</td>
<td>2016</td>
<td>0.5441</td>
</tr>
<tr>
<td>4.</td>
<td>BAX47187.1</td>
<td>2017</td>
<td>0.5532</td>
</tr>
<tr>
<td>5.</td>
<td>BAX43120.1</td>
<td>2017</td>
<td>0.5487</td>
</tr>
<tr>
<td>6.</td>
<td>KFE92461.1</td>
<td>2014</td>
<td>0.5487</td>
</tr>
<tr>
<td>7.</td>
<td>CMA27267.1</td>
<td>2015</td>
<td>0.5532</td>
</tr>
<tr>
<td>8.</td>
<td>CLV74927.1</td>
<td>2015</td>
<td>0.5487</td>
</tr>
<tr>
<td>9.</td>
<td>CM094381.1</td>
<td>2015</td>
<td>0.5532</td>
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<tr>
<td>10.</td>
<td>CLO30006.1</td>
<td>2015</td>
<td>0.5532</td>
</tr>
<tr>
<td>11.</td>
<td>KFC53589.1</td>
<td>2014</td>
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</tr>
<tr>
<td>12.</td>
<td>CLP25791.1</td>
<td>2015</td>
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</tr>
<tr>
<td>13.</td>
<td>OMH53808.1</td>
<td>2017</td>
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<tr>
<td>14.</td>
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<tr>
<td>15.</td>
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<td>17.</td>
<td>BAX25631.1</td>
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<td>0.5487</td>
</tr>
<tr>
<td>18.</td>
<td>AOE34326.1</td>
<td>2016</td>
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<tr>
<td>19.</td>
<td>BAX39062.1</td>
<td>2017</td>
<td>0.5532</td>
</tr>
<tr>
<td>20.</td>
<td>CLR89265.1</td>
<td>2015</td>
<td>0.5565</td>
</tr>
</tbody>
</table>

The protein sequences were subjected to VaxiJen v2 (14,15) to predict the most immunogenic protein, using threshold 0.4 as shown above. The sequences were aligned using COBALT and their phylogeny was estimated using MEGA software (v7) as shown in Fig I.

![Fig. I: The Neighbor Joining phylogenetic tree](image-url)
value was so small (0.00050) and this mean the protein sequences of KnA gene for *Mycobacterium tuberculosis* are very similar except the protein sequences of Colombia, Kazakhstan, china. The alignment of the protein sequences in this study shows multiple conserved regions as shown in Fig. II.

![Fig. II: Multiple sequence Alignment results of protein sequences](image)

The protein with ID CLR89265 was chosen as it is the most antigenic protein (0.5565, Table I) for further analysis.

The characters of the selected protein were estimated using ExPASy ProtParam, shown in Table II.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Formula</td>
<td>C1999H3242N612O589S10</td>
</tr>
<tr>
<td>Molecular Weight</td>
<td>45594.08</td>
</tr>
<tr>
<td>PI</td>
<td>10.72</td>
</tr>
<tr>
<td>No. of Negatively charged residues (Asp+Glu)</td>
<td>32</td>
</tr>
<tr>
<td>No. of Positively charged residues (Arg+Lys)</td>
<td>51</td>
</tr>
<tr>
<td>Instability Index</td>
<td>44.35</td>
</tr>
<tr>
<td>Aliphatic Index</td>
<td>81.35</td>
</tr>
<tr>
<td>Grand average of hydropathicity (GRAVY)</td>
<td>-0.268</td>
</tr>
</tbody>
</table>

The results reveal that the protein is slightly positive as the residues (Arg+Lys) are more than the negatively charged residues (Asp+Glu). The isoelectric point (PI) is 10.72 i.e., slightly basic, demonstrates that the protein is non-allergen \(^{(16)}\). The GRAVY hydrophobicity is negative value 0.268 indicates that the protein is hydrophilic, other characters such as aliphatic and instability index pointed that the protein is aliphatic and stable. The immunogenic protein was analyzed for secondary structure with SPIDER2 softwares, the sequence contain high percent of B-turn and Helices structures as appeared in Fig. III.

![Fig. III: Secondary structure of immunogenic selected protein](image)

The protein sequence modeled by using I-TASSER server \(^{(17)}\) (https://zhanglab.ccmb.med.umich.edu/I-TASSER/) and choose best models which represent the tertiary structure of pkA protein as shown in fig. IV.
Fig. IV: Tertiary structure of pkA protein

As shown in the Fig the protein rich in Beta-turn (coils connected to Beta sheets), many experimental studies found that the antigenic parts of the protein belong to B-turns regions \(^\text{(18)}\).

Antigenic protein pkA was subjected to estimate the B cell and T cell (Helper and Cytotoxic) epitopes which represented the molecular targets of adaptive immune responses \(^\text{(19)}\) using the facilities provided in IEDB 3.0

**B cell epitopes:** The binding sites of antibodies to antigens sites called antigenic determinant regions, which are also called “B-cell epitopes” since antibodies are produced by B-lymphocytes. Identification of B-cell epitopes is a fundamental step for development of epitope-based vaccines \(^\text{(20)}\) and essential in several biomedical applications such as “rational vaccine design”, disease prognosis and immune therapeutics \(^\text{(21)}\).

Four epitopes resulted from using BepiPred Linear Epitope Prediction with default threshold (0.35), shown in Table III, these epitopes modeled by using PEP-FOLD 3 depending on Java Script Protein Viewer.

**Table III: Designed B cell epitopes**

<table>
<thead>
<tr>
<th>#</th>
<th>Start</th>
<th>End</th>
<th>Sequence</th>
<th>Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>73</td>
<td>89</td>
<td>IASVHDYGESQMNGEGR</td>
<td>17</td>
</tr>
<tr>
<td>2</td>
<td>183</td>
<td>200</td>
<td>YIAPEQALGHDA SPASD V</td>
<td>18</td>
</tr>
<tr>
<td>3</td>
<td>230</td>
<td>244</td>
<td>IKEPPPLPPDLPPN</td>
<td>15</td>
</tr>
<tr>
<td>4</td>
<td>259</td>
<td>269</td>
<td>MRYRS GGPFAD</td>
<td>11</td>
</tr>
<tr>
<td>5</td>
<td>413</td>
<td>422</td>
<td>VVPPTPHSRA</td>
<td>10</td>
</tr>
<tr>
<td>6</td>
<td>47</td>
<td>53</td>
<td>EFSSDPE</td>
<td>9</td>
</tr>
</tbody>
</table>

Each epitope checked for its antigenicity by using VaxiJen v2.0 with threshold 0.4 as shown in table IV.

**Table IV: Antigenicity value of Epitopes: Orange (Bad), Green (Good)**

<table>
<thead>
<tr>
<th>#</th>
<th>Epitopes</th>
<th>Antigenicity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>IASVHDYGESQMNGEGR</td>
<td>1.1821</td>
</tr>
<tr>
<td>2</td>
<td>YIAPEQALGHDA SPASD V</td>
<td>0.4277</td>
</tr>
<tr>
<td>3</td>
<td>IKEPPPLPPDLPPN</td>
<td>1.0209</td>
</tr>
<tr>
<td>4</td>
<td>MRYRS GGPFAD</td>
<td>-0.5626</td>
</tr>
<tr>
<td>5</td>
<td>VVPPTPHSRA</td>
<td>0.2806</td>
</tr>
<tr>
<td>6</td>
<td>EFSSDPE</td>
<td>0.4493</td>
</tr>
</tbody>
</table>

High antigenicity value showed in (YIAPEQALGHDA SPASD V) and (EFSSDPE). Their locations on protein sequence surfaces were displayed by using PyMOL software as showed in fig.V.
Linear epitopes are an extension of continuous amino acids are enough for binding and conformational epitopes where key amino acid residues are brought together by protein folding (22) which can easily be used to replace antigens for immunizations and antibody production (23).

Other characters for B-cell epitopes were checked by using the tools of IEDB database, “hydrophilic amino acids” are overrepresented in the middle of the antibody depth and under-represented further away and hydrophobic amino acid are over represented close to the antibody, and usually B-cell epitopes likely to be hydrophilic (24) as shown in fig.VI multi residue were found above the threshold value (3.0) for hydrophobicity and (1.05) for beta turn prediction.

**Fig. VI: Characters of B Cell epitopes according to IEDB tools**

**Conflict of Interest:** Non declare.

**Source of Funding:** Self

**REFERENCES**


The Role of Myocardial Performance Index in Assessment of Left Ventricular Function in Patients with Valvular Mitral Regurgitation

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ABSTRACT

Objective: evaluate the role of myocardial performance index (Tei index) in assessing left ventricular function in patients with valvular mitral regurgitation (VMR).

Materials and Method: A case control study conducted at Iraqi center for heart disease, Ibn Al-Naffees and Ibn Al-Bitar hospitals for cardiac disease. The study included 50 patients with VMR and 50 subjects as control. All participants were subjected to full echocardiographic study (in left lateral decubitus position including left ventricular systolic and diastolic function), myocardial performance index (Tei index) calculated

Results: Left ventricular ejection fraction (LVEF) was normal to all patients with mild mitral regurgitation (MR), 87% of patients with moderate MR had normal LVEF, and 92.2% of patients with severe MR had normal LVEF. There was an increase in left ventricular end systolic dimension with increase in grading of MR. Tei index was increased with higher level of MR severity, and in affected before the decline in EF.

Conclusion: Myocardial performance index is good and easily determined index in the assessment of left ventricular function in patients with MR and myocardial performance index has the ability to detect LV dysfunction earlier than ejection fraction.

Keywords: Myocardial performance index, mitral regurgitation, valvular, ejection fraction, Left ventricular dysfunction

Introduction

Mitral regurgitation (MR) is a common valvular disorder that can arise from abnormalities of any part of the mitral valve apparatus. These include the valve leaflets, annulus, chordae tendineae, and papillary muscles. The widespread use of color flow Doppler echocardiography, a sensitive technique for detecting valvular regurgitation, has increased the recognition of this lesion, even in healthy subjects. In a review of 3486 subjects in the Strong Heart Study, transthoracic echocardiography found moderate or severe MR in 1.9 and 0.2 percent, respectively.

The diagnosis in patients with suspected MR is generally confirmed by transthoracic echocardiogram (TTE). TTE is recommended in patients with known or suspected MR to determine the severity, etiology, and hemodynamic consequences of MR. Left atrial size is usually increased. LV size and systolic function are normal early in the disease course, but progressive ventricular dilation and a decline in ejection fraction occur with chronic severe MR.

Tei et al. described an echocardiographic index ‘myocardial performance index’ as a reliable assessment of both systolic and diastolic function of the left ventricle. The myocardial performance index is the summation of the isovolumetric contraction and
relaxation times divided by the ejection time. It reflects systolic and diastolic function of the left ventricle and correlates well with both peak positive and negative dP/dt 4,5. It is independent of loading conditions of the left ventricle and heart rate. Its measurement is reliable with little inter-and intra-observer variability 4.

Myocardial performance index has a narrow range of values in subjects with normal left ventricle function (0.37 ± 0.05) 4. Ventricular dysfunction prolongs isovolumetric contraction, isovolumetric relaxation and shortens ejection times, resulting in an increase of the index compared with normal subjects 5. Patients with moderate left ventricular systolic dysfunction (mean left ventricle ejection fraction 36 ± 6%) had measured myocardial performance index ranging from 0.59 ± 0.01 6. Patients with severe left ventricular systolic dysfunction (mean left ventricle ejection fraction 17 ± 7%) had myocardial performance index of 1.06 ± 0.24 7. The current work aimed to evaluate the role of Tei index in assessing left ventricular function in patients with valvular mitral regurgitation (VMR).

Method

Study Design and Setting: A cross sectional study conducted at Iraqi center for heart disease, Ibn Al-Naffees and Ibn Al-Bitar hospitals for cardiac disease. The study included 50 patients with VMR and 50 subjects as control.

Data Collected: The age of participants range from 18 to 65 years, all the patients were in sinus rhythm. All participants were subjected to full echocardiographic study (in left lateral decubitus position including left ventricular systolic and diastolic function), myocardial performance index (Tei index) calculated using the following formula:

\[
\text{Tei index} = \frac{\text{IVRT} + \text{IVCT}}{\text{ET}}
\]

Two dimensional and Doppler echocardiographic studies were performed using Philips (Envisor C-13) instrument with a 3,5 MHz transducer, the following measurements were obtained:

1. Left ventricular end-diastolic diameter (LVEDD)
2. Left ventricular end-systolic diameter (LVESD)
3. LA diameter
4. Left ventricular ejection fraction, calculated using the following equation:

\[
\text{EF} \% = \frac{\text{EDV} - \text{ESV}}{\text{EDV}} \times 100
\]

5. Functional echo findings (including Tei index)
6. Isovolumetric relaxation time (IVRT), isovolumetric contraction time (IVCT) measured with pulse wave, sample volume placed between mitral inflow and the left ventricular outflow tract.

Exclusion Criteria: Patients with ischemic heart diseases, cardiomyopathies, and aortic valve disease

Assessment of MR severity: MR were classified into mild, moderate, and severe according to:

1. Color Jet Area: The MR jet area, LA area in left parasternal long axis, and apical four chambers views were measured
   - Mild MR jet cover less than 20% of total LA area
   - Moderate MR jet cover more than 20% and less than 40% of total LA area
   - Severe MR jet cover more than 40% of total LA area

2. Vena Contracta Width (cm): It is the narrow neck of the MR jet as it traverses the regurgitant orifice, which is measured from the left parasternal long axis view
   - In mild MR, vena contracta width less than 0.3 cm
   - In moderate MR, vena contracta width is 0.3 – 0.6 cm
   - In severe MR, vena contracta width more than 0.7 cm

Statistical Analysis: Anderson darling test was done to assess if continuous variables follow normal distribution, if follow normal distribution than mean and standard deviation, discrete variables presented using there number and percentage. One way ANOVA used to analyze the differences between more than two groups (if they follow normal distribution with no significant outlier) after that in the results is significant post Hoc Tukey test will be used to find which pair is significant. SPSS 22.0.0 (Chicago, IL) used to make the statistical analysis, p value considered when appropriate to be significant if less than 0.05.
Results

In the present study, Tei index was significantly higher in MR compared to control, in which severe MR was significantly higher than moderate and mild MR patients, while no difference between moderate and mild MR patients, the rest of echocardiographic parameters are illustrated in table 1.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Control</th>
<th>Mild</th>
<th>Moderate</th>
<th>Severe</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number</td>
<td>50</td>
<td>3</td>
<td>34</td>
<td>13</td>
<td>-</td>
</tr>
<tr>
<td>Age (years), mean ± SD</td>
<td>32.23 ± 2.0a</td>
<td>23.33 ± 4.37b</td>
<td>31.31 ± 3.27a</td>
<td>45.84 ± 3.43c</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Tei index, mean ± SD</td>
<td>0.34 ± 0.02a</td>
<td>0.43 ± 0.03bcd</td>
<td>0.44 ± 0.03c</td>
<td>0.48 ± 0.05d</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>EF%, mean ± SD</td>
<td>66.96 ± 0.92c</td>
<td>70.66 ± 0.88b</td>
<td>60.73 ± 1.81c</td>
<td>62.0 ± 1.51d</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>LA size (mm), mean ± SD</td>
<td>2.87 ± 0.06a</td>
<td>3.2 ± 0.36b</td>
<td>3.75 ± 0.16c</td>
<td>4.52 ± 0.19d</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>LVESD (mm), mean ± SD</td>
<td>2.96 ± 0.06a</td>
<td>3.06 ± 0.23ab</td>
<td>3.33 ± 0.14a</td>
<td>3.99 ± 0.23b</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>LVEDD (mm), mean ± SD</td>
<td>4.45 ± 0.08a</td>
<td>4.76 ± 0.37bc</td>
<td>4.87 ± 0.17bc</td>
<td>6.03 ± 0.28d</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

Post hoc Tukey used to calculate pair wise comparison between each pair after performing ANOVA (note; for each row groups carrying similar litter indicate p-value≥0.05)

Table 2: relationship between echo parameters with Tei index

<table>
<thead>
<tr>
<th>Variables</th>
<th>Mild MR</th>
<th>Moderate MR</th>
<th>Moderate MR</th>
</tr>
</thead>
<tbody>
<tr>
<td>EF%</td>
<td>-0.500</td>
<td>0.667</td>
<td>-0.378</td>
</tr>
<tr>
<td>LVEDD</td>
<td>-0.840</td>
<td>0.355</td>
<td>0.118</td>
</tr>
<tr>
<td>LVESD</td>
<td>-0.945</td>
<td>0.355</td>
<td>-0.018</td>
</tr>
</tbody>
</table>

Discussion

In the current study fifty patients with chronic MR was examined of them 3 (6%) patients had mild MR, 34 (68%) patients had moderate MR, and 13 (26%) had severe MR.

All patients with mild MR had normal EF, 87% of patients with moderate MR had normal EF, and 92.2% of patients with severe MR had normal EF, Nasr et al found that left ventricular EF was preserved in all patients with MR, additionally they found a correlation between increased severity of LV dysfunction with increased degree of severity of MR.

In the present study EF and Tei index was assessed to evaluate LV systolic function; in severe MR patients 10 (76.9%) patients had EF above 60% in the same time 9 (69.2%) patients, this indicate with increased severity of MR there is increased in MR value, and this change appear before the change in EF. Manovit et al studied 53 patients with various mitral valve diseases, they found there was no difference in Tei index between different grades of MR severity, this finding was in disagreement with the present study, this disagreement may be related small number of patients.

In the present study there was an increase in LVESD which is associated with increased MR severity, however there was no significant correlation between Tei index with MR severity. Bruch e al found that there was significant correlation between LVES volume with Tei index (r = 0.71, p-value = 0.01).

In the present study mean LVEDD was higher in severe MR patients, however there was no correlation with Tei index across the MR grades, Manovit et al found that patients with severe MR had significantly higher LVEDD and LA volume than those with mild and moderate MR.
Nasr et al reported that Tei index is a simple, non-invasive, easy to estimate and reproducible measure of LV function. They assumed that Tei index would be a useful tool in the assessment of systolic function in the presence of MR. They compared the ability of EF and Tei index to assess the systolic function in patients with MR, they concluded that EF underestimates the presence of left ventricular dysfunction in these patients, however this was unmasked by Tei index which could be an additive tool for detecting early left ventricular dysfunction 8.

Conclusion

Tei index is a good and rapidly determined index in assessing the severity of left ventricular function in patients with MR and the ability to detect LV dysfunction earlier than change in ejection fraction

Conflict of Interest: None

Ethical Clearance: Informed written consent was obtained from all the participants in the study, and the study and all its procedure were done in accordance with the Helsinki Declaration of 1975, as revised in 2000. The study was approved by Ibn Al-Naffees and Ibn Al-Bitar hospitals for cardiac disease.

Source of Funding: The work were supported by authors only

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Lived Experiences of Egyptian Women with Breast Cancer Receiving Chemotherapy

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ABSTRACT

Breast cancer is the most common cancer among women worldwide. In Egypt it accounts for 34% of reported malignancies. The aim of current study was to explore the lived experiences of Egyptian women with breast cancer receiving chemotherapy. Qualitative research approach based on phenomenological perspective was utilized in this study. Purposive sample consisting of 12 participants were recruited. Three themes were emerged from the current study: unforeseen effects of chemotherapy, troubled femininity and disturbed role function. The findings revealed the resemblance between Egyptian women with breast cancer receiving chemotherapy and women from different cultures in similar situation emphasizing shared emotions and feelings between women with breast cancer in different countries.

Keywords: lived experiences, breast cancer, chemotherapy, phenomenological study.

Introduction

Breast cancer is the most common cancer in women worldwide, contributing to 25.4% of the total number of new diagnosed cases in 2018; moreover, it is the leading cause of cancer death in females as it accounts for 13.7% of their cancer related mortality1. Actually, it accounts for 34% of reported malignancies among Egyptian women with higher incidence among urban residents and those over 40 years2.

Several treatment modalities may be used for the treatment of breast cancer, depending on the individual women’s preferences and medical situation. According to American Cancer Society, surgery ranges from breast-conserving surgery to mastectomy is surgery in which the entire breast is removed, including all of the breast tissue and sometimes other nearby tissues1. Moreover, adjuvant therapy as radiation therapy, chemotherapy or hormone manipulation may be also prescribed. Often two or more modalities may be used in combination3.

Chemotherapy is one of the highly used treatment modality prescribed for women with breast cancer, nevertheless, the main distressing one for women with breast cancer. It is associated with tremendous side effects, it is considered disabling because of its negative impact on women’s physical condition, such as fatigue, changes in general appearance, loss of sense of self and potential for an early death4,5.

Generally, the side effects of chemotherapy are an individual experience, regarding both physical and emotional drawback6. It is well known that breast cancer diagnosis and treatment with chemotherapy represents crisis situation as it affects all aspects of women’s life during and after treatment. In two qualitative studies investigating side effects of chemotherapy on women with breast cancer, both cited upper extremity motion restriction, weight gain, pain and body image disturbances, in addition, impaired psychosocial wellbeing in form of anxiety, depression, cognitive dysfunction of attention, memory and psychomotor functions domains as having a profound impact on daily functioning and quality of life7,8.

Nurses are the key members of the multidisciplinary team who serve as liaisons between oncologists and patients. Oncology nurses play critical role not only in the delivery of care; but also in patient education about the importance of recognizing as well as managing potential side effects and complications of cancer treatment and by bringing patients concerns and priorities to the attention of oncologists. Reducing chemotherapy complication with supportive care measures definitely can have a positive effect on patients’ outcome and quality. Therefore the aim of this phenomenological study was to explore the lived experiences of Egyptian women with breast cancer receiving chemotherapy.

Method

Research Questions: What are the lived experiences of Egyptian women with breast cancer receiving chemotherapy? How do Egyptian women live with breast cancer and receiving chemotherapy incorporate diagnosis and management into their lives and their bodies?

Research Design: A qualitative research approach based on phenomenological perspective was utilized to explore the lived experiences of Egyptian women with breast cancer and receiving chemotherapy.

Participants: Purposive sample was utilized to explore the phenomenon under investigation, a total of twelve women that had a confirmed diagnosis of breast cancer and treating with chemotherapy constituted the study sample; sampling process was ended when the researchers got saturated with collected data.

Tools for Data Collection: Data was collected using the following three tools that were developed by the researchers.

1. Personal Background Information Form which includes data such as age, marital status.
2. Semi-structured, face to face, open ended guided interviews.
3. Researchers field notes.

Procedure: Upon obtaining official permission to proceed with the proposed study, the researchers initiated data collection. Potential participants who agreed to participate in the study and signed the consent form including the usage of voice recorder were approached individually. All participants were interviewed twice, with the exception of six where interviewed three times for more in depth. Total number of all interviews was thirties. All interviews were held in quite places where the participants reside to ensure participants’ privacy. Each interview ranged between 30 to 60 minutes, with average total hours 15 to 30 hours; each interview required between 8-10 to be manually transcribed.

The first interview started by introducing self, while explaining the purpose and the nature of the study to develop a trust relationship with the participant. Then participants were informed to ask questions for clarification or to request discontinuation when they feel emotionally laden. Within the scope of the study the researchers tried to tailor interview according to each participants’ status by asking the probing questions in different styles as well different order. The first interview was concluded when the participants became exhausted. While, the second interview started by some clarifying questions from the researchers’ side as well as checking several responses collected from the first interview. Otherwise, third interview was held for few participants as mentioned before for more crystallization of some data. During interview sessions the researchers attempted not to interrupt the participants’ thoughts, but simplifying questions, and giving enough time for the participants to express feelings. Interviews were concluded by expressing researchers’ gratitude to the participants and assuring them of the confidentiality of their responses. Further, field notes were used mainly for writing down all remarks that occurred during the interview sessions that deemed pertinent to the study such as participants crying; shouting….etc.

Trustworthiness of Data: Trustworthiness of the research established using the four criteria developed by Lincoln & Guba’s, whereas credibility was established by sharing questions about the research process with peers. Dependability was applied by reviewing the transcripts by the researcher several times. Transferability achieved through extensive description of the study sample while conformability was established by consistently reporting of the steps of the study.

Result

The current study identified three main themes covering up the lived experiences of Egyptian women with breast cancer treated with chemotherapy and each theme divided into subthemes
Unforeseen effects of chemotherapy was the first emerged theme in which all studied participants suffered from many undesirable side effects, which mostly are described by the participants as awful. This theme was dissected further into five subthemes as follows:

Seven participants expressed information deficits about chemotherapy side effects and it was eminent from their verbatim, “I had no idea about chemotherapy”; “I heard about it, but the experience was completely different”. Further ten participants had forced dietary changes which they attributed to nausea and vomiting, it was notable from their verbatim “Of course I was annoyed because the taste and odor of food were very distasteful”; “The most undesirable effect from chemotherapy was stomach ache and vomiting”; “After first session, I had continuous vomiting, I could not tolerate food odor”.

Moreover, eleven participants expressed having drained Energy, “I feel tired all the time”; “I could not do anything and I was very tired”. While nine participants declared variable body response as follows “After chemotherapy I had severe diarrhea and numbness above my eyebrows”; “I had pain and hotness all over my body”; “During treatment with chemotherapy I could not sleep at all”. Psychological troubles were the last subtheme that seven participants experienced during administration of chemotherapy, stating “My psychological status was very bad while I was receiving chemotherapy”; “I was going to the session with a bad mood”.

Troubled femininity came out to occupy the second theme; participants expressed the negative impact of breast cancer diagnosis and the associated treatment on femininity as a consequence of breast removal as well as the resulting chemo therapy. Ten participants reported that hair loss was the main cause of spoiling their appearance “I was very annoyed when my hair started to fall”; “I did not expect that my hair will completely fall from the first session”. Feeling incomplete was the second troubled subtheme for this theme, eight participants expressed the feeling of being imperfect woman, “Now I cannot wear my usual clothes at home, I feel that I missed an important thing”; “I searched for something that looks like my breast”.

Disturbed role functions is the third extracted theme expressed by almost all studied participants, this disturbances evidenced in their roles either at homes or at work. In relation to the family role, all participants reported that they had absolute disturbances in their roles either as a house wife or as a mother. “At the time of chemotherapy, I could not do anything in the house”; “I neglected my husband and my children school work”; “My daughter was being absent from her school to serve me”.

Seven participants had troubled social interaction with friends, family members and colleges at work, “I had a lot of sick leave during treatment period”; “I deprived myself from visiting my brothers when I was on chemotherapy”.

Discussion

Three main themes were emerged from the analysis of the current study findings which are: unforeseen effects of chemotherapy, troubled femininity and disturbed role function. These findings are congruent with Nizamli9, who reported four main themes which are psychological discomfort, physical problems, social dysfunction and failure in the family role. Also, matched with Beaver10 who told three themes related to information needs and decision making; needing support and empathy; and negative impact on family.

Regarding the first theme of unforeseen effects of chemotherapy, all participants in the current study denoted that they were overwhelmed with the undesirable side effects that happened right after receiving chemotherapy. Most of them were not informed about what to expect from chemotherapy session, so; these overwhelming feelings were translated into five subthemes.

First related subtheme represented that more than half of the studied participants expressed that they were startled by the side effects of chemotherapy, that they had not enough information about it. One possible explanation of this finding would be lack of communication and time spent between health care providers including nurses and women before the start of chemotherapy session. This finding is in harmony with Uysal11 who reported that participants’ experiences many symptoms in different ratio regarding side effects of chemotherapy. So, participants needed information about the effects of chemotherapy.

The second subtheme was forced dietary changes, this could be attributed to participants gastrointestinal upset in form of anorexia, nausea…etc. This finding
is symmetrical with Salihah\textsuperscript{12} who concluded that chemotherapy induced nausea and vomiting constituted a problem that adversely affects the daily lives of women with breast cancer.

Drained energy represented the third subtheme that was extracted from the studied participants; they reported being so exhausted, easily fatigue. This may be attributed to the former subtheme forced dietary changes which led to insufficient food intake. Another possible reason could be the fact that chemotherapy causes profound declining in blood components resulting in anemia which can be contributory factor to fatigue. This interpretation is in accordance with Peoples\textsuperscript{5} who demonstrated high prevalence of clinically relevant CRF in breast cancer patients following chemotherapy.

The fourth subtheme was variable body responses, in which all studied participants communicated different forms of chemotherapy side effects such as sever persistent diarrhea, inability to walk, fainting, sleeping all the time…etc, this could be attributed to various chemotherapy protocols used, health status of each participant and the nature of body response to the chemotherapy. This finding is supported by Lawrnce\textsuperscript{13} with the main emerged theme “experiences related to the body”, with subthemes dry and sensitive skin, changes in eating and bowel habits and fever.

Psychological troubles surfaced as the last subtheme of the first theme, these troubles took many different forms such as being anxious before the session and preferred to be left alone. This finding is coherent with Al-Azri\textsuperscript{14} who indicated that diagnosis of breast cancer and its treatment can be devastating and can trigger several adverse psychological reactions such as anxiety.

The second main theme in the current study was about troubled femininity. Participants uncovered the feeling of losing their identity as women, with disturbed body image, consequently, this theme has great contribution to the interpretation of previous subtheme of psychological troubles, nevertheless, two main subthemes were emerged as follows: hair loss and feeling incomplete.

Almost all participants suffered from hair loss as a result of chemotherapy treatment, they reported that this loss was the most devastating experience they ever encountered. The fact that hair loss is prominent and easy to be recognized by others and not being informed about this side effect, might partially account for this finding. It is aligned with Jayde\textsuperscript{4} who found that the women described alopecia as the most distressing corporeal symptom.

Feeling incomplete was the second feature of troubled femininity; that participants expressed the feeling of lost femininity after mastectomy. Participants used pessimistic statements about their look and negative body image. These feelings may be attributed to the fact that breast is being regarded as a sign of womanhood. This corresponded to Koçan\textsuperscript{15} who reported that most of the participants equated their breast with femininity, and beauty.

Disturbed role function was the third theme of current study; participants expressed disturbances in both family and social role functions. Two main subthemes were shown up, family role and social interaction.

The majority of studied participants experienced disturbances in family role, it could also be linked with the former subthemes as forced dietary changes and drained energy. This finding is in the same line with Mermer\textsuperscript{8} who founded that social perception and interpretations of chemotherapy by the women with breast cancer were related to the side effects of chemotherapy and the losses of physical control.

Impaired social interaction was the second subtheme of the third theme, this could be attributed to the disease process in general and chemotherapy in particular which could be explained in the light of the former subtheme drained energy as they could not interact with others. This finding matched with Günüşen\textsuperscript{16}, who reported that women with breast cancer suffered social strain and trouble in the family role.

**Conclusion and Implications**

The themes of current study implied the resemblance between Egyptian women with breast cancer receiving chemotherapy and women from different countries in similar situation emphasizing shared emotions and feelings between women with breast cancer. The main implication of this qualitative study lies in its detailed provision of evidence based information that describes the lived experiences of Egyptian women with breast cancer receiving chemotherapy. The current study is strongly recommended that mixed method design to be applied for further research.
Conflict of Interest: No conflict of interest among authors.

Source of Funding: It is a self-funding.

Ethical Clearance: A written approval was obtained from the Ethics and Research committees of the Faculty of Nursing, Cairo University. Potential participants were asked to sign on informed consent after explaining the nature and the purpose of the study. Voluntary participation and confidentiality were assured. Data as well as the recorded voice materials were kept in a safe, locked place accessible only by the researcher.

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Influence of Swallowing Exercises, Thermal Tactile Stimulation and Neuromuscular Electrical Stimulation in Treatment of Patients with Dysphagia Caused by Stroke

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¹PG Student MPT Ortho, ²PG Student MPT Ortho, ³Assistant Professor, SRM College of Physiotherapy, SRM Institute of science and technology, Kattankulathur

ABSTRACT

Background: Inability to swallow also known as Dysphagia is a common condition in clinical settings, and is known to affect 45-65% of individuals sooner or later after stroke. It is believed to be the principle predisposing factor for the development of respiratory and pulmonary conditions counting pneumonia, and deteriorating the expected prognosis of the patient.

Objective: The main purpose of this study was to determine the efficacy of surface electrical stimulation on infra-hyoid muscles in comparison with the thermotactile stimulation both combined with swallowing exercises in stroke survivors with dysphagia.

Methodology: A systematic random sampling was utilized to group the subjects, a number of Ten (n=10) that was divided into two groups of 5 each, participated in the study where by the experimental group only infrahyoid muscles were stimulated. The study setting was SRM Hospital and different outside private clinics in a period of 2 months.

Results: Results of the current study shown a significant difference in group experimental group (Group A) which had a neuromuscular electrical stimulation on Infra-hyoid muscles and swallowing exercises than the control group that had only thermotactile stimulation and swallowing exercises.

Conclusion: This study concluded that Neuromuscular Electrical stimulation on infra-hyoid muscles combined with Swallowing exercises would be more effective treatment for patients who are having difficulties in swallowing especially after stroke while comparing it with other conventional treatments including thermotactile stimulation.

Keywords: Dysphagia, Neuromuscular Electrical Stimulation, Infrahyoid muscles

Introduction

Swallowing disorders have become common in the patients mostly those affected by stroke it was demonstrated that paramedical professionals like physiotherapy and speech and language therapists have introduced treatment methods and techniques that shown a good impact in the rehabilitation of Dysphagia by improving Nutritional status as well as limitation of dysphagia complications and side effects.[1]

It is still unclear presently about how and which technique, dosage, duration of treatments as well as the anatomical landmarks and hence the efficacy of the treatment as far as the patient response and prognosis is concerned.

Swallowing center lies in the higher centers of the brain including the Brain cortex and the brainstem. Not all the brain injuries affect swallowing, but stroke is considered as the most intrinsic cause of swallowing.
disorders leading to various respiratory and airway abnormalities by the disrupted swallowing physiology.\cite{2}

According to Kil-Byung Lim 2009, Dysphagia affects about 45-65% of post stroke patients or stroke victims which is considered as the noticeable cause of dysphagia leading to significant cause of respiratory infections like pneumonia and the latency of the patient’s prognosis and functional stability. \cite{3}

Prognosis of a dysphasic patient following stroke is not definite. It is with this regard that the researchers and medical professionals strived to develop more effective treatment techniques to efficiently help these patients, among which the commonly used is Thermotactile stimulation that involves the use of Ice and a probe to stroke the specific posterior buccal cavity and the soft palate all to achieve the swallowing independency to the patient.

According to the recent studies, Surface neuromuscular electrical stimulation was stated as the efficient treatment of pharyngeal and dysphagia abnormalities. This involves the use of surface electrodes which help in transmission of electrical stimulations to the muscles producing muscle excitability and contractions to the local points of stimulations. \cite{4}

As there are less evidence on effect of swallowing exercises combined with thermal tactile stimulation and neuromuscular electrical stimulation and it’s inclusion in physiotherapy protocol for post stroke patients, this study focused on their effectiveness.

**Methods and Procedures**

The aim of this study was to evaluate the efficacy of surface electrical stimulation, Thermotactile stimulation both in conjunction with swallowing exercises among patients with swallowing disorders or dysphagia following stroke. Ten (n10) patients of both gender with a medical diagnosis of dysphagia due to stroke and admitted in SRM Hospital and research center Kattankulathur; from September 2017 to February 2018 participated in this study, and proven to participate voluntarily by signing an informed consent.

Subjects with a proven diagnosis of dysphagia and stroke by either MRI or CT scan were included basing on their admission sequence with a systematic sampling method in a period of five moths. Treatment sessions were 1 hour/session/Day divided into two phases 5 to 6 days depending on the patient hospital stay and prognosis. Tube dependent or lower scores of Functional Oral intake scale (FOIS) were included and classified according to their enrolment.

The population was divided into two groups; Experimental (A) and Control group (B). The placebo control group patients were treated with Thermotactile stimulation and swallowing exercises. While the experimental group was given Electrical stimulation along with swallowing exercises.

**Neuromuscular Electrical Stimulation:** According to Recent studies, neuromuscular surface electric stimulation is known to be the I deal management of swallowing disorders caused by the pharyngeal muscles weakness and dysphagia.

This kind of stimulation (NMES) which involves the usage of surface electrical stimulation to transfer electrical stimulation (NMES) uses surface electrodes to distribute the electric stimulations to the specific posterior buccal cavity and the soft palate all to achieve the swallowing independency to the patient.

The overall advantage of electrical stimulation is to enhance the muscle contractility, strength as well as endurance to regain their potential functioning. Electrical stimulation was applied by the researcher, using galvanic current of a four channeled muscle stimulator.

**Infrahyoid Muscles:** Infrahyoid muscle are responsible for depressing the hyoid bone while swallowing; therefore stimulating them and instructing the patient to voluntarily swallow, it creates a resistance against the pull against the suprahyoid muscles that pull up the hyoid bone while swallowing.

With the use of pen electrodes and stimulating the infrahyoid muscles on their bilateral anatomical landmarks just one inch lateral to the thyroid cartilage.

Swallowing exercises used in this study were; Effortful/Hard that focus on the functions of the tongue to be able to mix food and clear the buccal cavity while eating and Super-Supraglottic that involves
Breath holding maneuvers and swallowing as well as Mendelsohn and Shaker’s swallowing exercises.

**Thermotactile Stimulation:** With use of a dental mirror, Participants in the control group were stimulated while using a dental mirror that was kept in ice then it was used to stroke around their soft palates along with swallowing exercises. A cold mirror of a standardized size was used to stimulate the oral cavity. The stroking was extended from as low, sides and up of the faucial pillar depending on the capacity of the patient to expose it. To some participants the nearby surface of the tongue was stimulated others could not with stand as it could cause a sense of vomiting. Participants prior the intervention instructions were given to them where the researchers asked them to report any discomfort immediately. The same as the Electrical stimulation, the treatment sessions were 5 to 6 per week depending on the participant hospital stay, but the mean of treatment days were ranging from 3 to 5 in general.[5]

**Statistical Analysis:** The 21.7 version of statistical package for social sciences for windows was used to analyse the data for this study, whereas independent t-test was another statistical tool used to differentiate by comparing the two groups of this study (A and B) which shown a reasonable change and a significance of (p<.001) in group A as demonstrated in Table 1.

Table 1 Shows Pre and post values of stimulation and swallowing exercises among the stroke patients in the experimental group. This table shows that there is a significant difference between pre and post among group A treated with neuro muscular electrical stimulation and swallowing exercises in consideration of FOIS (Functional Oral Intake scale).

<table>
<thead>
<tr>
<th>Groups</th>
<th>Mean</th>
<th>S.D.</th>
<th>p- value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group A</td>
<td>2.0</td>
<td>1.0</td>
<td>.001</td>
</tr>
<tr>
<td>Pretest</td>
<td>5.8</td>
<td>1.3</td>
<td></td>
</tr>
</tbody>
</table>

Table 2 shows; Pre and post values of thermal tactile stimulation and swallowing exercise only among participants of group B (Control group).

This table shows that there is no significant difference between pretest and posttest among group B treated with thermal tactile stimulation and swallowing exercises. Variables shown here illustrates a (p<.142) which denoted a nonsignificant change among the participants who receive thermotactile stimulation and swallowing exercises.

<table>
<thead>
<tr>
<th>Groups</th>
<th>Variables</th>
<th>Mean</th>
<th>S.D.</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group b</td>
<td>Pre test</td>
<td>3.8</td>
<td>.83</td>
<td>.142</td>
</tr>
<tr>
<td>Post test</td>
<td>4.8</td>
<td>.83</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Group A versus Group B**

Table 3: demonstrates the comparison between the two groups with the use of independent t-Test which showed no significant change between the groups with a P Value of (p.

<table>
<thead>
<tr>
<th>Groups</th>
<th>Mean</th>
<th>S.D.</th>
<th>T-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>5.8</td>
<td>1.3</td>
<td>1.443</td>
</tr>
<tr>
<td>B</td>
<td>4.8</td>
<td>.83</td>
<td></td>
</tr>
</tbody>
</table>

**Discussion**

The main purpose of this current study was to evaluate the efficacy of pharyngeal muscular stimulation (infra hyoid muscles) along with swallowing exercises, while comparing it with Thermotactile stimulation with swallowing exercises a lone.

Various researchers have done more on post stroke swallowing disorders including dysphagia, but most of them were not experimental based and they did not specify the anatomic landmarks to be stimulated as well as the stimulation intensity and dosage which was elaborated in this current study.

The results of this study found that treatment with neuromuscular electrical stimulation combined with swallowing exercises (Group A) was more effective than (Group B) which was treated without neuromuscular electrical stimulation but Thermotactile stimulation and swallowing exercises only. This goes in line with the results from Freed et al 2001 which showed a considerable improvement with electrical stimulation but they did not mention specific points stimulated to improve swallowing.
Less sample size was a limitation for this study, it is therefore recommended to increase the sample size for more significant results. It is with this regard that the authors assumed the cause of the obtained discrepancy of the P-Values of the two groups (p<.001) and (p<.142) present.

**Conclusion**

The results of this study concluded that Neuro Muscular Electrical Stimulation on infra-hyoid muscles combined with Swallowing exercises is a better treatment for patients with swallowing disorders after stroke than conventional stimulations alone and Thermotactile stimulation alone.

**Conflict of Interest:** Authors of this study declare that there is no conflict of interest regarding the publication of this research paper. There was only self arrangements by the authors, without any external financial support.

**REFERENCES**


Lived Experience as Perceived by Patients with Implanted Cardiac Devices: A Phenomenological Study

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ABSTRACT

Objective: Cardiac implantable electrical devices are the most effective modality of treatment for different life-threatening dysrhythmias. However, living with these devices is associated with many multidimensional challenges.

Aim: The aim of this study was to explore the lived experience as perceived by patients with implanted cardiac devices at Cairo University hospitals.

Method: A descriptive phenomenological approach was utilized; 30 participants were interviewed; the interviews were audiotaped and transcribed verbatim, then analyzed using a phenomenological content analysis.

Results: Four main themes were emerged: feeling near to death; facing ongoing challenges; adopting coping behaviors; and Reaching adaptation.

Conclusion: Cardiac devices recipients are facing many biopsychosocial challenges that need to be addressed before and after device implantation. Therefore, provision of ongoing counseling and support are essential to help cardiac devices’ recipients achieve adaptation and continue their roles after device implantation.

Keywords: lived experience, cardiac implantable devices, challenges, adaptation, phenomenology.

Introduction

Cardiac dysrhythmias are a major type of cardiovascular diseases. They remain a source of morbidity and mortality in developing countries. Approximately 80% of deaths results from ventricular arrhythmias.1,2 Cardiac implantable electrical devices (CIEDs) such as permanent pacemakers (PM), implantable cardioverter defibrillators (ICDs) and cardiac resynchronization therapy (CRT) have become an integral part of modern cardiovascular medicine and one of the greatest important advances in treatment of cardiovascular patients suffering from acute cardiac problems.3

Problems associated CIED treatment are of particular importance to health professionals. Critical care nurses as members of the health care team must have the ability to assess and manage patients’ biophysical, emotional, and socio-cultural problems that may result from different treatment modalities. They can play a key role in improving and designing effective and comprehensive quality care that meet patients’ complex and varied needs.7 Therefore, the present qualitative study aims to explore the lived experience as perceived by patients with implanted cardiac devices at Cairo University Hospital.

Material and Method

Design, participants and setting: A qualitative phenomenological research design was utilized in the
current study. It is concerned with understanding the meanings and describing life experiences from the perspective of persons involved in specific phenomenon (8). A purposive sample consisting of 30 participants was involved according to these criteria; Adults (≥18), of both genders, and after at least three months since implantation. The current study was conducted at a follow up unit affiliated to critical care medicine department in Kasr Al Aini- Cairo University Hospitals, Egypt.

**Data Collection and Analysis:** Data collection was fulfilled over a period of eight months. Semi-structured face-to-face interviews were conducted using pre-prepared interview guide, which involved open-ended questions to help elicit and capture participants’ experiences, activities, and attitudes. Each interview lasted for 30–50 minutes. Data collection continued until data saturation was reached (the point where no new information emerged). All interviews were audio recorded and verbatim transcription was done by the researcher. A second interview via telephone were conducted after data analysis to make sure that the study findings reflects the participants’ own experiences. Data was analyzed following the guidelines for phenomenological analysis as proposed by Giorgi (2009).8

**Ethical Considerations:** Approvals were attained from the ethical committee at faculty of Nursing - Cairo university and the director of the selected critical care unit. Participation in the study was voluntarily and based on the participants’ agreement. Purpose and nature of the study were explained for all participants and informed consents were signed before recording the interviews.

**Findings**

The current study revealed that more than one half of involved participants were adults (in the age group between ≤ 40 -59 years with a mean of 51.77 ± SD 13.89), males, employees, had secondary school education, and came from urban areas in percentages of 53.3%, 60%, 50%, and 63% respectively. The great majority (83.3 %) of participants were married. As Regards medical data, the most common type of implanted cardiac devices was pacemaker. It was found among more than one half (56.6%) of participants, followed by the ICD among 20% of participants (Figure 1). More than half (56.6%) of the participants had undergone devices implantation once. The time since device implantation for nearly half of participants (48%) ranged from (one to five years) post implantation (Figure 2). Four main themes were identified through analysis and interpretation of obtained data: feeling near to death; facing ongoing challenges; adopting coping behaviors and reaching adaptation (Table 1).

![Figure 1: Percentage Distribution of the Participants As Regards Type of Implanted Cardiac Device (N = 30)](image1)

![Figure 2: Percentage Distribution of the Participants as Regards to Time Since Implantation (N = 30)](image2)

<table>
<thead>
<tr>
<th>Main Themes</th>
<th>Subthemes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feeling near to death</td>
<td>Unpredicted life event</td>
</tr>
<tr>
<td></td>
<td>The device as the only choice</td>
</tr>
<tr>
<td>Facing ongoing</td>
<td>Dependency on the device</td>
</tr>
<tr>
<td>challenges</td>
<td>Imposed life restrictions</td>
</tr>
<tr>
<td></td>
<td>Experience with ICD Shock</td>
</tr>
<tr>
<td></td>
<td>Social role change</td>
</tr>
<tr>
<td>Adopting coping</td>
<td>Avoidance Behavior</td>
</tr>
<tr>
<td>behaviors</td>
<td>Seeking information/counseling</td>
</tr>
<tr>
<td></td>
<td>Having social support</td>
</tr>
<tr>
<td>Reaching adaptation</td>
<td>Feeling of security</td>
</tr>
<tr>
<td></td>
<td>The feeling of gratefulness</td>
</tr>
<tr>
<td></td>
<td>toward the device</td>
</tr>
</tbody>
</table>

**Feeling Near to Death:** Feeling near to death is the first main theme emerged from data analysis. It describes the initial impact of diagnosis and pre-implantation time as reflected by many of participants who indicated that, the
deterioration in their heart function was considered as a near to death experience that in turn led to many life alterations and psychological disturbances. This theme covers two sub-themes: unpredicted life events; and cardiac device implantation as the only choice

Unpredicted Life Event: Involved participants reacted differently to their diagnosis and cardiac devices. Approximately, one quarter (26.6%) perceived their medical diagnosis as a serious and unpredicted event. They used different terms to describe their feelings when cardiac devices were suggested, such as getting shocked, being in crises, fear, panic and psychologically disturbed when cardiac devices were suggested. e.g. “When I knew that I need a device, I just collapsed... I didn’t expect that my condition requires a device...The doctor told me that I’ll live with device forever which made me shocked” (Participant: 17).

Cardiac Device Implantation as the Only Choice: Getting a cardiac device was not an easy choice for involved participants. More than one third (40%) indicated that, they were faced with decision making regarding getting cardiac devices or not. Participants believed that their doctors knew and selected the best for them, so they decided to accept doctors’ recommendations. One of participants reflected that: “I didn’t have another choice. ... He tells me (physician) either to die or to implant the device. What can I do? I had no choice rather than having it inserted” (Participant: 19).

Facing Ongoing Challenges: Despite providing significant benefits for many of participants, cardiac devices implantation created new challenges for different aspects of life:

Dependency on the Device: All Participants (100%) were aware that they became totally dependent on their devices forever. This caused feeling of vulnerability and uncertainty over their lives with greater emphasis on keeping and monitoring the device’s functioning for maintain surviving and facing death. For example: participants stated: ‘Sometimes my son sits next to me and asks: “Mum, won’t you remove the device and live like us?” I tell him that If I removed the device I would die” (she seemed sad) (Participant: 20).

Imposed Life Restrictions: Imposed life restrictions were emerged among approximately two thirds (60%) of participants who perceived that many routine activities of daily living, sports, and work as unsafe for their devices’ functioning. Therefore, they put limitations on activities, sleep and occupations. ‘After device implantation, I cannot carry heavy things or practice exercise. .. I like playing football, but now I cannot play even with my children... even sleeping, it (pacemaker) prevents me from sleeping on lateral side” (Participant: 16).

Experience with ICD Shock: In the current study, some of implantable cardioverter defibrillator recipients (30%) described the given electric shock as an event which is extremely painful, traumatic, anxiety-provoking and scary for both participants and who are witnesses at shock time. Participants used terms such as explosion or blow of bomb, feeling like a strong electric current, or seeing light flashes, to describe high intensity of pain associated with shocks. “I wish that shock not to be experienced by any one ... It looks like if you are holding high electricity ... anyone stands in front of me at the time of delivering shock must cry from the horror and pain that I feel” (Participant: 17); and “Shock is very strong and painful ... I felt pain like a gas tube explode in my chest” (Participant: 22).

Social Role Change: Many participants experienced significant changes in their social roles because of illness and having ICDs. Also, they felt incompetent in performing roles they had within their family or work due to imposed changes of the devices on employment or work, for example, some participants worked part-time in spite of full time, while others left their work and were concerned about finding more suitable jobs. “I stopped working because I am strictly forbidden from working as a driver... This was the decision of medical committee... and I have no other job other than driving which I had worked for 37 years” (Participant: 19).

Adopting Coping Behaviors: This third main theme implied problem-focused and emotional-focused coping strategies that were used to achieve adaptation and to tolerate the negative feelings associated with device related stressors.

Avoidance Behavior: This subtheme was indicated by 50% of participants who avoided certain behaviors as a main coping strategy for self and device protection. Therefore, they avoided engaging in certain activities that were considered risky. “I avoid things that affect the device ...I must avoid being near to towers of electricity and electronic corridors ... I always keep the mobile far from the pacemaker”. (Participant: 25)

Seeking Information/Counseling: Participants in the current study indicated their need for understanding, as well as seeking information and guidance regarding their devices’. In particular, ICD recipients indicated their
need to more detailed instructions regarding ICD shock. e.g. one participant reported that seeking information offered an opportunity to share and compare experience with others who have the same condition; “I wish I could sit with someone who has the device even if by chance to ask ‘what is happening to him/her’...when I want to know any information about pacemaker I access the internet and watch it” (Participant: 7).

**Having Social Support:** More than two thirds (63.3%) of the current study participants expressed their receiving adequate support. Family, friends, and health care professionals were the main sources of social support. e.g. “All people including my family and my colleagues or anyone who know that I have an implanted device offer me help, they always ask me not to carry or do anything”. (Participant: 7)

**Reaching Adaptation:** Approximately 70% of participants showed and clearly verbalized adaptations to life after their devices’ implantation. This appeared especially prominent after passing the first few years post implantation. Participants also expressed a sense of acceptance of their altered health status and device-imposed limitations.

**Feeling of Security:** This subtheme was frequently mentioned by many participants. They recognized the benefits of cardiac devices as “a mean of defence” and ‘source of security. This feeling seemed to be more obvious in participants who experienced loss of consciousness or previous cardiac arrest. Thus, they felt that their initial insecurity and near to death attacks changed to a feeling of security. “I was afraid to be alone at home because the doctor told me that it is possible to die at any moment to the extent that I thought to change my apartment and live next to a hospital ... But praise be to God who guided me to the device, thus it gives me reassurance ... The best thing it provided for me is a feeling of safety” (Participant: 12).

**The Feeling of Gratefulness Toward Device:** Several participants consistently showed positive emotional responses toward their devices and verbalized feeling of gratefulness to advanced technology. They described the device as a valuable life-saver which helped them for being alive. “This (pacemaker) is my breathing... one is considered as if he is living by artificial heart, this is what helps me to live Praise be to God for presence of the device” (Participant: 27)

**Discussion**

The current study showed that cardiac device implantation represented a stressful and unpredicted event. It also represented life crisis and caused a feeling of near to death among many participants. In this regards Paslar revealed that, having an ICD is considered a new situation that leads to ambiguity and surprise for patients. It results in an unknown feeling of uncertainty and leaving patients alone in permanent anxiety. ‘Cardiac illness “from the researchers’ point of view” is considered as a turning point in individual’s life, during which patients may face overwhelming feelings of fatigue, helplessness, or long-term changes in their abilities.

Facing challenges was the second main theme in participants’ experience of living with pacemakers and/or ICDs. These challenges were reported in form of different physical and psychosocial problems associated with devices. In this regards Ghojazadeh et al. reported that physical, financial and socialization problems, where participants intended to limit their physical activities to keep their devices’ functioning. In contrary, Conelius studied the experience in living with ICDs and indicated that participants described the process of device implantation as easy and nothing changed in their everyday lives. This contradiction “from the researchers’ point of view” could be related to the type of device, diagnosis, associated comorbidities, lifestyle and cultural background.

Participants reported multiple sources of anxiety and fear while living with pacemakers and/or ICDs, one of these sources was anxiety about device malfunction. Therefore, they were cautious when performing usual activities. Similarly, Abbassi et al. indicated that most participants were concerned about device’s malfunction and possible displacement of the leads. Excessive fear of device malfunction may be due to conflicting or unclear medical advice. Also, in some instances concept of having a foreign device inside of the body forever, might cause fear and insecurity feelings.

Social support was evident in every aspect of participants’ coping and contributed to better adaptation after device implantation. In this regards, previous studies have emphasized the importance of psychological support from family members, friends, peers, and health professionals. In addition, professional therapeutic relationship is beneficial for ICD recipients and found that non-constructive support is associated with increased post-traumatic stress disorder (PTSD) symptoms. However, other studies have showed contradicting
findings where they indicated that not everyone was comfortable to receive help as occasionally some participants reported their feeling of overprotection and imposed restrictions from family members, so by time they rejected family members’ overprotective behaviors and struggled for independence. Despite having contradicting findings, it is important to emphasize the role of social support resources in optimizing coping behavior and developing positive psychosocial adjustment in patients with chronic diseases.

Although Participants complained of life restrictions imposed by the device, many of them expressed positive emotional responses toward device and verbalized their appreciation to such advanced technology. Similarly, Starrenburg et al. found that participants appreciated the device for its lifesaving abilities and improvement of symptoms. Thus, when experiencing life threatening symptoms, these devices may be seen as gifts which give them a new chance for better quality of life. Hence, feeling gratefulness was prominent among many of the participants.

Conclusion

Findings of the current study have provided understanding for how patients with cardiac implantable electrical devices are affected physically, socially and psychologically after their devices’ implantation. Therefore, establishing planned discharge teaching and providing supportive care are important for this category of patients.

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

Source of Funding: This research received no specific grant from any funding agency.

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Effect of Buerger Exercises on Improving Peripheral Circulation of the Lower Extremities among Patients with Type 2 Diabetes Mellitus at Selected University Hospital–Egypt

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ABSTRACT
Diabetes Mellitus (DM) is a metabolic disorder characterized by increased glucose level in the blood, resulting from defect in the insulin secretion, insulin action, or both. In advanced stage of disease; peripheral circulation of lower extremities is impaired which increases the risk for developing peripheral arterial diseases (PAD). Buerger Exercises is a simple intervention for improving the peripheral circulation of patients with diabetes mellitus. The aim of the current study was to assess the effect of Buerger Exercises on improving the peripheral circulation among patients with type 2 DM as assessed by Ankle Brachial Index (ABI) scale. Quasi experimental design was used. A non-probability purposive sample consists of sixty male and female adult patients with type 2 DM were selected. The study findings revealed that the post intervention mean ABI scores of both legs (Rt leg =1.097, Lt leg =1.086) were significantly higher than pre-intervention scores (Rt leg =.885, Lt leg =.937) (p=0.001). The use of Buerger Exercises is effective in improving the perfusion of lower extremities. Therefore, it is recommended that Buerger Exercises can be used to improve the peripheral circulation of lower extremities among patients with type 2 diabetes mellitus.

Keywords: Peripheral circulation, Buerger exercises, type 2 Diabetes mellitus

Introduction
Diabetes Mellitus (DM) is becoming one of the increasing health problems’ concern worldwide. Half of patients with DM were undiagnosed and about 4 out of 5 patients live in low and middle income countries. According to the World Health Organization (WHO)1; Diabetes is a pandemic disease affecting more than 415 million adults worldwide. This number is expected to surge to 642 million by 2040, diabetes will become the seventh leading cause of death worldwide with diabetes deaths expected to rise by 50% during the next 10 years2.

According to the International Diabetes Federation (IDF), Egypt is one of the top 10 countries in the number of people with diabetes between 20 and 79 years of age, with 8.5 million of and around 4.5 million undiagnosed. Consequences of the compromised vascular system in DM are among the most devastating complications. Both macro and micro-vascular diseases are believed to contribute to the consequences of peripheral vascular disease(PVD) 3.

The risk of PVD is increased in patients with DM, it occurs earlier and is often more severe and diffuse, leading to ischemic ulcers, gangrene and possible amputation, it is also a marker for generalized atherosclerosis and impaired peripheral circulation of lower extremities4. The use of ankle-brachial index (ABI) provides a measure of blood flow to lower extremities. This could help in early detection, initiate early therapy and reduce the risk of limb ischemia and amputation. It is recommended that patients with DM should be screened annually for impaired peripheral circulation5.

There are many modalities to improve the lower extremities’ perfusion such, Buerger exercises which
considered one of the low cost and simple physical interventions to stimulate the development of collateral circulation in lower extremities. The exercises were proposed in 1924 by Leo Buerger and modified by Arthur Allen in 1931.

The mechanism of Buerger exercises depend on the use of gravitational changes in positions that are applied to the smooth musculature of vessels and to the vascular bed of lower extremities. Gravity helps alternately to empty and fill the blood vessels, which can eventually increase transportation of blood through it. Buerger exercises drained engorged vessels by using postural changes. However in spite of its simplicity, the application of these exercises to patients with diabetes is very rare, and the clinical significance of peripheral circulation improvement is still limited due to the lack of measuring tools.

Nurses should focus on the prevention of impaired peripheral circulation among patients with DM by early recognition and detection of those at risk. An awareness of diagnostic and treatment strategies will enable nurses to educate patients. This will help to improve both concordance with treatment and disease outcome. Therefore, the aim of the current study was to evaluate the effect of Buerger exercises on improving the peripheral circulation of the lower extremities among patients with type 2 DM.

Hypotheses:
H1: There is a statistical significant difference between the pre and post interventional mean scores of ankle brachial index (ABI) of the study participants after five days.

H2: There is a statistical significant difference between the pre and post interventional mean scores of ankle brachial index (ABI) of the study participants after fifteen days.

Method

Selection and Description of Participants: A non-probability purposive sample consists of sixty male and female adult patients who met the inclusion and exclusion criteria were selected for the study from the medical departments of a selected university hospital in Cairo, Egypt.

Inclusion and Exclusion Criteria: Patients diagnosed with type 2 DM according to WHO criteria, with regular treatment, had ABI score of 0.7 up to .99 were eligible to be included in the study. Patients who had: previous re-vascularization, hyperglycemia above 300 mg/dl, uncontrolled hypertension (BP≥160/100 mmHg, Extreme obesity (BMI ≥37.5 kg/m2, and sever edema according to level (sever edema (4): up to the groin) and severity (+4), active foot ulcer, gangrene and history of amputation, were excluded.

Data Collection Tools:

Peripheral Circulation Assessment Tool (PCAT): Tool was developed by the researcher guided by extensive literature review. It consists of three parts:

Part 1: Demographic Data: age, gender, education.

Part 2: Medical History and General Health Status: duration of diabetes, blood sugar, blood pressure, weight, height & body mass index (BMI).

Part 3: Assessment of ABI Value: The ankle-brachial index (ABI) is the ratio of the blood pressure at the ankle to the blood pressure in the upper arm (brachium).

\[
\text{Ankle Brachial Index} = \frac{\text{Highest ankle pressure}}{\text{Highest brachial arm pressure}}
\]

Interpretations of ABI:
- Normal ABI ranges from 1.0 — 1.4
- Values above 1.4 suggest a non-compressible calcified vessel.
- Value below 0.9 is considered diagnostic of peripheral arterial disease (PAD) and less than 0.5 suggests severe PAD, according to the American Heart Association (AHA) guidelines.

Tool Validity and Reliability: Tool validity was assured and was also tested for internal consistency by test-retest reliability. Cronbach’s alpha was 0.99.

Procedure: Patients who met the inclusion criteria for the study were approached by the researcher; individualized interview session was conducted to collect data related to the demographic and medical data. Ankle Brachial Index (ABI) of the lower extremities of the study participants were assessed and recorded. Buerger exercises as a study intervention (independent variable) was administered on the same day and continued 2-3
times for 15 days for each patient. Post assessment of ABI was done on the fifth and 15th day using the same scale. Buerger Exercises were performed and taught for each participant in the following position sequence:

- Elevation of lower extremities to a 45 to 90 degree and keep in position until the skin blanches (appears dead white);
- Put lower extremities below the level of the rest of the body until redness appear; Flexion, extension, and circumduction of the ankles are done during this phase of dependency.
- Finally, the lower extremities are placed flat on the bed (horizontal) for a few minutes.

The length of time for each position varies with the patient’s tolerance and the speed within which color change occurs. Usually the exercises were prescribed for about 12 -15 minutes. The final overall effect was determined by comparing ABI pre and post-test scores of the participants.

**Statistical Analysis:** Data were coded and analyzed using SPSS, version 20. Shapiro-wilk Normality test was done. Descriptive statistics including frequency distribution, mean, and standard deviations, as well as inferential statistics such as Wilcoxon test were used to examine the relationships between variables. A p-value less than 0.05 were considered statistically significant.

**Results**

**Table 1:** Frequency and Percentage Distribution of Demographic Characteristics of the Study Participants (n = 60)

<table>
<thead>
<tr>
<th>Demographic Characteristics</th>
<th>Frequency &amp; Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (in years):</td>
<td></td>
</tr>
<tr>
<td>30 to &gt; 40</td>
<td>7 11.6</td>
</tr>
<tr>
<td>40 to &gt; 50</td>
<td>22 36.7</td>
</tr>
<tr>
<td>50 and more</td>
<td>31 51.7</td>
</tr>
<tr>
<td>Mean ± SD</td>
<td>51.98 ± 10.43</td>
</tr>
<tr>
<td>Sex:</td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>23 38.3</td>
</tr>
<tr>
<td>Female</td>
<td>37 61.7</td>
</tr>
<tr>
<td>Education:</td>
<td></td>
</tr>
<tr>
<td>Illiterate</td>
<td>24 40</td>
</tr>
<tr>
<td>Can read and write</td>
<td>13 21.6</td>
</tr>
</tbody>
</table>

Table (1) shows that majority of participants were females, and aged 50 years old and above, with a mean of (51.98 ± 10.43). Near half of participants were illiterate.

**Table 2:** Frequency and Percentage Distribution of the Medical History and General Health Status of the Study Participants (n = 60).

<table>
<thead>
<tr>
<th>Medical History &amp; General Health Status</th>
<th>Frequency &amp; Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blood Pressure (mmHg):</td>
<td></td>
</tr>
<tr>
<td>Systolic</td>
<td></td>
</tr>
<tr>
<td>100 to less than 120</td>
<td>16 26.7</td>
</tr>
<tr>
<td>120 to 140</td>
<td>44 73.3</td>
</tr>
<tr>
<td>Mean ± SD</td>
<td>123.8 ± 13.4</td>
</tr>
<tr>
<td>Diastolic</td>
<td></td>
</tr>
<tr>
<td>60 to less than 75</td>
<td>34 56.7</td>
</tr>
<tr>
<td>75 to 90</td>
<td>26 43.3</td>
</tr>
<tr>
<td>Mean ± SD</td>
<td>73.3 ± 8.2</td>
</tr>
<tr>
<td>Random Blood Sugar (mg/dl)</td>
<td>Min. (102) Max. (250)</td>
</tr>
<tr>
<td>Mean ± SD</td>
<td>168.5 ± 35.9</td>
</tr>
<tr>
<td>Duration of illness:</td>
<td></td>
</tr>
<tr>
<td>1 to &gt; 5 years</td>
<td>21 35</td>
</tr>
<tr>
<td>5 to &gt; 10 years</td>
<td>20 33.3</td>
</tr>
<tr>
<td>More than 10 years</td>
<td>19 31.7</td>
</tr>
<tr>
<td>Mean ± SD</td>
<td>8.13 ± 5.20</td>
</tr>
<tr>
<td>Body Mass Index (BMI):</td>
<td></td>
</tr>
<tr>
<td>Normal (less than 23 kg/m²)</td>
<td>6 10</td>
</tr>
<tr>
<td>Over weight (23 – 27.4 kg/m²)</td>
<td>39 65</td>
</tr>
<tr>
<td>Obesity (27.5 – 37.4 kg/m²)</td>
<td>15 25</td>
</tr>
<tr>
<td>Mean ± SD</td>
<td>27.1 ± 3.4</td>
</tr>
</tbody>
</table>

Table (2) illustrates that about three quarters of participants had a systolic blood pressure ranged from 120 to 140 mmHg, while more than half had a diastolic blood pressure ranged from 60 to >75 mmHg. Participants’ random blood sugar ranged from 102 – 250 mg/dl. About one third of participants were diabetics since one to > five years, and one third were from five to > 10 years. More than half of participants were overweight.
Figure 1: Percentage distribution of ankle brachial index (ABI) scores of the Rt & Lt legs among participants in the pre intervention, 1st & 2nd post-intervention (n = 60)

The Figure depicts the changes which happened between the ABI categories for both Rt and Lt legs. Before intervention; more than half of the participants had mild ABI value in the Rt leg and borderline in Lt leg while the minority had normal ABI, whereas after performing Buerger exercises for five days (post 1): Percentage of mild category decreased while the borderline and normal ones increased. In 2nd post intervention after 15 days; the majority of participants moved to the normal category for both legs. The shift of the participants from each category to another revealed the improvement of the lower extremities’ peripheral circulation after performing Buerger exercises.

Table 3: Means, Standard Deviations and Wilcoxon test of Ankle Brachial Index (ABI) scores pre intervention and 1st post-intervention and 2nd post-intervention (n = 60)

<table>
<thead>
<tr>
<th></th>
<th>Mean ± SD</th>
<th>Mean ± SD</th>
<th>W(p) Pre Vs. 1st Post</th>
<th>Mean ± SD</th>
<th>W(p) Pre Vs. 2nd post</th>
<th>W(p) 1st post Vs. 2nd post</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre intervention</td>
<td>.885 ± .144</td>
<td>.928 ± .168</td>
<td>-1.866 (.062)</td>
<td>1.097 ± .180</td>
<td>-6.086 (.0001*)</td>
<td>-5.033 (.0001*)</td>
</tr>
<tr>
<td>1st post-intervention</td>
<td>.928 ± .168</td>
<td>.968 ± .184</td>
<td>-1.239 (.215)</td>
<td>1.086 ± .166</td>
<td>-5.057 (.0001*)</td>
<td>-3.704 (.0001*)</td>
</tr>
<tr>
<td>2nd post-intervention</td>
<td>1.097 ± .180</td>
<td>1.086 ± .166</td>
<td>-1.033 (.309)</td>
<td>1.097 ± .180</td>
<td>-6.086 (.0001*)</td>
<td>-5.033 (.0001*)</td>
</tr>
</tbody>
</table>

* significant > 0.05

There was a gradual increase of the ABI mean scores in terms of improvement of the peripheral circulation after exercises. There was no statistical difference found between the ABI mean scores of pre intervention and 1st post intervention. On the other hand, there was a high statistical difference found between the ABI mean scores of pre intervention and 2nd post intervention and also between 1st and 2nd post interventions.

Discussion

The present study results revealed that ABI mean scores before performing Buerger exercises in the right and left legs were .885 and .937 respectively, while the mean scores after were 1.097 and 1.086, in the right and left legs respectively.

According to WHO index for blood pressure; the study findings regarding blood pressure showed that participants were in the pre-hypertension category which means that they are at increased risk for developing hypertension and subsequently impaired peripheral circulation especially that they are diabetics. This is congruent with Makin10 and Priya11, who reported that the diabetic patients, with elevated blood pressure, long disease duration and obesity; are at a greater risk to develop impaired circulation of lower extremities.
Ankle brachial (ABI) mean scores after performing Buerger exercises for five days didn’t show any significant difference between pre intervention mean scores so the 1st hypothesis was not supported. It might be due to the short period to produce effect from performing the exercises. Also as any exercise program; increasing the duration and compliance might help in producing the desired results. The current study results were concurrent with some studies 12,13, While it weren’t matched with other studies 8,11 as there was a significant difference after five days.

Regarding the results related to the 2nd post intervention which was assessed after 15 days, a significant difference and acceptable level of improvement of ABI mean scores was presented as there was an observable shift from each category to another. In a simple way, the participants improved from mild-moderate ABI to borderline and from borderline to normal as shown in fig (1). This mean that performing Buerger exercises for 15 days is more effective in improving peripheral circulation. So the 2nd hypothesis was supported and verified. These results were supported and concurrent with Sathya, Vijayabarathi & Mehani12-14 who reported a significant difference after using exercises for 15 days as recommended.

The resulted change might be due to the sufficient period that help in establishing new collaterals of the lower extremities and improve the peripheral circulation, and perfusion, which was presented as acceptable ABI values. These findings were supported by the AHA9 and ADF3 guidelines which emphasized the importance of performing exercises regularly than other invasive procedures to maintain lower extremities’ perfusion.

**Conclusion and Implications**

The current study concluded that Buerger exercises are effective noninvasive intervention that helps in improving the peripheral circulation of lower extremities among patients with type 2 diabetes mellitus.

The study recommended the following:

- Replication of the study by using a large sample from different geographical areas, and different settings, and for long duration.
- A comparative study is recommended to evaluate the effectiveness of Buerger exercise with other non-pharmacological measures for improving the level of lower extremity perfusion.

- Evidence based nursing practice should be encouraged for applying Buerger exercises to prevent PAD among diabetic patients.
- There is a need for further investigation of standardized procedures of Buerger exercises.
- More studies are needed on the prevention of diabetic foot using Buerger exercises.

**Conflict of Interest:** No conflict of interest among authors.

**Source of Funding:** It is a self-funding.

**Ethical Consideration:** A written initial approval was obtained from the ethics and research committee of the Faculty of Nursing - Cairo University. Written informed consent was obtained from each patient after explaining the nature & purpose of the study. Patients were informed that participation in the study was entirely voluntary and anonymity and confidentiality of the data were assured.

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Knowledge of Female Students About Breastfeeding Issues: A School-Based Study in Wasit Province/2017

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ABSTRACT

Breastfeeding is an important issue for infant health, knowledge of new mothers has important role in their practice to breast fed their children. The objective of this study to assess the knowledge about breastfeeding issues among group of Iraqi female students in Wasit province. A total of 384 female students were enrolled in the study. Data collected using a pre-constructed data collection form (questionnaire) with 19 questions to assess the responses of students about the breast feeding issues. Total score then categorized to be adequate or inadequate. Data analysis and management were performed using statistical software and appropriate statistical tests applied accordingly. Findings revealed that 78.1% of the students had adequate knowledge. In conclusion the overall knowledge of the students about the breastfeeding issues was adequate and not affected by their age or educational level of their parents.

Keywords: Breastfeeding, Epidemiology, Knowledge

Introduction

Breastfeeding refers to the usual means for offering young infants nutrients that are essential to their healthy development and growth¹. Breastfeeding, alongside its numerous health roles to the children, mothers, and infants is the main approach to improving the general health of the community². Breastmilk creates a health, equal, and smart world. The universal breastfeeding can help to counter 823000 infant and 20000 maternal deaths that occur yearly, and assist to reduce medical costs by $300 billion. In relation to the economic and health, breastfeeding’s benefits include bolstering intelligence, reducing infection, and prevention of cancer in mothers as well as protection against diabetes and overweight¹. Breastfeeding is among the cost-effective-- and best – means of improving and saving infant lives all over the world, resulting in long-lasting health advantages to the mothers and infants. Breastfeeding does not only function as a cornerstone of an infant’s healthy growth, but also works as the basis for a nation’s growth. Therefore, embracing breastfeeding is among the best investments nations may pursue to ensure the wellbeing for people—and hence, their enduring ability ³,⁴. For instance Iraq’s nutrition information for children illustrated that timely breastfeeding, breastfeeding that is less than 6 months, breastfeeding while 2 years old, had the following proportions 19.6%, 22.7%, and 42.8% as per the period ranging from 2008 to 2012, however, these proportions are below the global and regional goals ⁵. Marriage factors such as husband’s age, age at first marriage, and consanguinity. The legally allowed age to get married in Iraq is 18 years and above, despite the fact that some people at age 12 to 14 may be already in marriage ⁶. The more educated a woman at adolescent stage is, the more probable she is to apply the best family planning approaches, delayed childbearing and marriage, be stable financially and have healthier and a few children. Registering and holding female learners in school is hence very significant when it comes to infant and maternal health, to add to all the other positive aspects of education⁷. Pre-motherhood period is a critical for health promotion and increase health awareness about maternal and child health (MCH) especially infant feeding. Several studies assessed knowledge of mothers regard breastfeeding issues in different settings but, in our province there is no one, therefore, this research aimed

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at examining the knowledge issues of Iraqi girls aged 15-19 years old about breastfeeding in education settings in Wasit it province/2017 7,8. According to the Oxford dictionary, Knowledge refer to information, skills, and facts obtained through education and experience; the practical or theoretical knowledge regarding the topic, information regarding or understanding of the topic obtained through study or experience, either common to an individual or the general public9.

**Subjects and Method**

**Study Design and Sampling Technique:** A multi-stages cross-sectional study targeted female students in 12 secondary schools in Al-kut city the Centre of Wasit Province in 2017. Sample size was 384 students calculated according to standard equation for cross-sectional studies 10.

**Measurement and Data Collection:** Data collection of socio-demographic (age of students, parents educational level) and knowledge issues of breastfeeding profile carried out by an anonymous self-administered translated questionnaire11. Written and verbal consent obtained from General Directorate of Education, school managerial personnel and all students. All data collected during period 12/3/2017 to 12/4/2017. Timeframe is 2-3 days in a week, 1-2 hours in a day.

**Scoring:** The responses in regard to knowledge were computed and scored. In relation to the responses, answers were computed through application of the model key response sheet that was created by the investigator previously. The responses of the participant students scored (one) for the correct response and (zero) for incorrect response. For every knowledge area, the outcomes of the items were totaled and the summation divided by the number of items, assigning an average score to every area. The total knowledge items was 19 and they results in a total score of 19. The poorly rated knowledge obtained < 10 scores and this transformed into 50 percent or less; they assigned as inadequate knowledge. Those obtained a score ranging from 10 to 19 (> 50 percent) assigned as adequate knowledge.

The final knowledge outcome was assigned as inadequate or adequate knowledge and compared across the age of students and their parents level of knowledge

**Statistical Analysis:** Data entered and analyzed by using SPSS V 0.17. Descriptive statistics presented as frequency, percentage, mean and standard deviation. For analytical statistics, Chi-squared test used to assess the association between age of students and the level of knowledge. Bivariate correlation test (Spearman’s test) used to assess the correlation between the mean overall knowledge score across the parents’ level of education were used, correlation coefficient was calculated \( R \).

Value of \( R \) ranged between zero and One, the larger \( R \) value close to one indicated the stronger correlation and the \( R \) value below 0.4 indicated weak correlation. Level of significance of 0.05 or less considered as a cutoff point for significant correlation or difference.

**Findings**

A total of 384 female students in 12 secondary schools were participated in this study represented the studied group in 4 school classes 1st. to 4th class. The mean age of the studied group was 16.6 ± 4.2 years. Fathers of 25 (6.5%) students were illiterate or read and write, 138 (35.9%) had primary or secondary school level, 192 (50%) with institute or college level of education and 29 fathers (7.6%) had higher education graduation. The corresponding levels of education among mothers were 12.2%, 40.9%, 43.2% and 3.6%, respectively. Most of students coming from middle socio-demographic families, (Table 1).

**Table 1: Frequency distribution of students according to age and parents level of education**

<table>
<thead>
<tr>
<th>Variable</th>
<th>No.</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age of student (years)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>76</td>
<td>19.8</td>
</tr>
<tr>
<td>16</td>
<td>100</td>
<td>26.0</td>
</tr>
<tr>
<td>17</td>
<td>129</td>
<td>33.6</td>
</tr>
<tr>
<td>18</td>
<td>57</td>
<td>14.8</td>
</tr>
<tr>
<td>19</td>
<td>22</td>
<td>5.7</td>
</tr>
<tr>
<td><strong>mean age 16.6 ± 4.2 years</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Student’s father education</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Illiterate/read and write</td>
<td>25</td>
<td>6.5%</td>
</tr>
<tr>
<td>Primary/secondary</td>
<td>138</td>
<td>35.9%</td>
</tr>
<tr>
<td>Institute/College</td>
<td>192</td>
<td>50.0%</td>
</tr>
<tr>
<td>Higher education</td>
<td>29</td>
<td>7.6%</td>
</tr>
<tr>
<td><strong>Student’s Mother education</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Illiterate/read and write</td>
<td>47</td>
<td>12.2%</td>
</tr>
<tr>
<td>Primary/secondary</td>
<td>157</td>
<td>40.9%</td>
</tr>
<tr>
<td>Institute/College</td>
<td>166</td>
<td>43.2%</td>
</tr>
<tr>
<td>Higher education</td>
<td>14</td>
<td>3.6%</td>
</tr>
</tbody>
</table>
Table 2: Frequency distribution of responses of the study participants regarding the knowledge items

<table>
<thead>
<tr>
<th>Questions</th>
<th>Response</th>
<th>Correct No. (%)</th>
<th>Incorrect No. (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Q1. Baby should be breastfed round the clock (day and night).</td>
<td></td>
<td>124 (32.3)</td>
<td>260 (67.7)</td>
</tr>
<tr>
<td>Q2. Breastfeeding can cause excessive weight gain in mother.</td>
<td></td>
<td>247 (64.3)</td>
<td>137 (35.7)</td>
</tr>
<tr>
<td>Q3. Secretion of breast milk starts after one week of childbirth.</td>
<td></td>
<td>218 (56.8)</td>
<td>166 (43.2)</td>
</tr>
<tr>
<td>Q4. When the baby is sick, should mother breastfeed the baby?</td>
<td></td>
<td>242 (63.0)</td>
<td>142 (37.0)</td>
</tr>
<tr>
<td>Q5. Breast milk doesn’t contain any factors which may improve baby’s immunity/resistance power to infections.</td>
<td></td>
<td>349 (90.9)</td>
<td>35 (9.1)</td>
</tr>
<tr>
<td>Q6. Exclusive breastfeeding protects mother from pregnancy for 4-6 months.</td>
<td></td>
<td>114 (29.7)</td>
<td>270 (70.3)</td>
</tr>
<tr>
<td>Q7. Feeding bottles can be a potential source of infection/illness for the baby.</td>
<td></td>
<td>312 (81.2)</td>
<td>72 (18.8)</td>
</tr>
<tr>
<td>Q8. Breastfeeding is good for baby but harmful to mother.</td>
<td></td>
<td>303 (78.9)</td>
<td>81 (21.1)</td>
</tr>
<tr>
<td>Q9. Cow’s milk is actually better for baby than breast milk.</td>
<td></td>
<td>334 (87.0)</td>
<td>50 (13.0)</td>
</tr>
<tr>
<td>Q10. Mothers suffering from diabetes should not breastfeed their babies.</td>
<td></td>
<td>100 (26)</td>
<td>284 (74)</td>
</tr>
<tr>
<td>Q11. Breast milk is a complete food for the baby up to six months of age.</td>
<td></td>
<td>254 (66.1)</td>
<td>130 (33.9)</td>
</tr>
<tr>
<td>Q12. The initial breast milk (the first milk) is not good for baby and should be discarded.</td>
<td></td>
<td>149 (38.8)</td>
<td>235 (61.2)</td>
</tr>
<tr>
<td>Q13. Breastfed babies suffer from diarrhea less frequently compared to babies who receive formula feeding/breast milk substitutes.</td>
<td></td>
<td>218 (56.8)</td>
<td>166 (43.2)</td>
</tr>
<tr>
<td>Q14. Sitting position is the only position mother can breastfeed the baby.</td>
<td></td>
<td>94 (24.5)</td>
<td>290 (75.5)</td>
</tr>
<tr>
<td>Q15. Breastfeeding protects mother against breast cancer.</td>
<td></td>
<td>315 (82.0)</td>
<td>69 (18.0)</td>
</tr>
<tr>
<td>Q16. If mode of delivery is cesarean section (operation), mother is not supposed to breastfeed the baby for one week.</td>
<td></td>
<td>176 (45.8)</td>
<td>208 (54.2)</td>
</tr>
<tr>
<td>Q17. Breastfeeding improves emotional bonding between mother and the baby.</td>
<td></td>
<td>364 (94.8)</td>
<td>20 (5.2)</td>
</tr>
<tr>
<td>Q18. Giving honey/water immediately after birth to baby is good for baby’s health.</td>
<td></td>
<td>115 (29.9)</td>
<td>269 (70.1)</td>
</tr>
<tr>
<td>Q19. Working mothers can express their breast milk which can be given to the babies during their absence.</td>
<td></td>
<td>230 (59.9)</td>
<td>154 (40.7)</td>
</tr>
</tbody>
</table>

Figure 1: Proportional distribution of the correct responses (adequate knowledge) of the participant students.
Findings indicated that 300 female students (78.1%) have adequate knowledge about breastfeeding, (Figure 2). Age had no effects on student knowledge (P.value > 0.05), (Table 3). On the other hand, the overall knowledge of the students did not affected by parents’ level of education (P.value > 0.05), (Table 4).

![Figure 2: Distribution of the participant female students according to their overall knowledge about breastfeeding](image)

### Table 3: Association of students’ knowledge with their age

<table>
<thead>
<tr>
<th>Age (year)</th>
<th>Knowledge Total</th>
<th>Adequate</th>
<th>Inadequate</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No.</td>
<td>%</td>
<td>No.</td>
</tr>
<tr>
<td>15</td>
<td>57</td>
<td>75.0</td>
<td>19</td>
</tr>
<tr>
<td>16</td>
<td>82</td>
<td>82.0</td>
<td>18</td>
</tr>
<tr>
<td>17</td>
<td>98</td>
<td>76.0</td>
<td>31</td>
</tr>
<tr>
<td>18</td>
<td>46</td>
<td>80.7</td>
<td>11</td>
</tr>
<tr>
<td>19</td>
<td>17</td>
<td>77.3</td>
<td>5</td>
</tr>
<tr>
<td>Total</td>
<td>300.0</td>
<td>78.1</td>
<td>84.0</td>
</tr>
</tbody>
</table>

Chi-square = 1.89, P. value = 0.755 (not significant)

### Table 4: Results of bivariate (Spearman’s correlation analysis for the knowledge score against Students’ parents education

<table>
<thead>
<tr>
<th>Variable</th>
<th>Correlation parameters</th>
<th>R*</th>
<th>P. value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Father’s education</td>
<td></td>
<td>0.142</td>
<td>0.612</td>
</tr>
<tr>
<td>Mother’s education</td>
<td></td>
<td>0.189</td>
<td>0.473</td>
</tr>
</tbody>
</table>

*Spearman’s correlation coefficient

### Discussion

Lack of information and inadequate knowledge about breastfeeding benefits lead to impairment in maternal and child health. Four out of five female students have adequate knowledge about breastmilk, even though, there were one fifth (21.9 %) have inadequate knowledge. In a study conducted by Hamade et al. from Syria in 2014, showed that students from both Syria and Lebanon had an average knowledge and almost 52% had knowledge score below the midpoint11. Other study from Pakistan was conducted by Anjum et al12 reported that the overall knowledge of medical students about breastfeeding was low furthermore, Yang et al.13 investigated the knowledge of health professional students about breastfeeding issues and found that they had limited knowledge in some setting. From other point of view, previous studies showed that among different socio-economic background, the most knowledgeable about breastfeeding were housewives and students have less knowledge12-14, so practicing and living among housewives mothers was important factor. It is essential to adopt breastfeeding enhancement approaches in female learners to motivate them to breastfeed in
future and support breastfeeding as an infant survival approach’. Breastfeeding is among the selective and significant health approaches that are very common in the developing nations and compared to the first-world countries; additionally, “less fortunate” mothers breastfeed over a lengthy period as compared to those who are rich in the developing countries15.

The teaching guide involved a training and materials that dealt with the gaps within the breastfeeding experience and sensitive parts discovered in the previous ECE providers’ survey. Information can be shared and awareness created regarding the significance of proper young child and infant feeding by other means, for instance, through incorporating school-going learners and employees in other areas15,16. The varied strategy to supporting and promoting young child and infant feeding is clearly illustrated as an effective approach in diverse backgrounds3. Physician medical education need to involve awareness regarding existing information, pass to others essential abilities, and offer know-how in the abilities needed attaining their obligations in protecting, supporting, and promoting breastfeeding 17-19

Conclusion

The overall knowledge of the female students about breastfeeding issues was adequate and not affected by their age or parents’ educational level. However, almost quarter of the students had inadequate knowledge and need further educational program to increase their knowledge.

Ethical Clearance: All ethical issues were approved by the local committee of the researches ethical fairs. Verbal informed consent obtained from each participant before they were recruited in the study in addition to signed informed consents were obtained from the parents of the students. Data were kept confidentially and were not disclosed to unauthorized personnel.

Conflict of Interest: None

Source of Funding: Self-funded

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Association between Eating Habits and Body Mass Index in a Sample of Medical College Students in Wasit University

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ABSTRACT
The prevalence of overweigh and obesity is increasing worldwide, patterns and habit of eating in terms of frequency and timing of eating have been shown to be important factors affect the body mass index (BMI) of individuals. The objective of this study to assess the nutritional status of group of Iraqi medical college students in Wasit, and to assess their eating habits and behavior to find the association between their eating habits and BMI. Therefore, 320 students of both genders were recruited. Students with chronic diseases were excluded. Data collected using a structured self-administered questionnaire collecting the demographic and the eating habits data. Findings revealed that 60.3% of the students had normal BMI, 15% overweight and only 3.1% were obese. Eating snacks frequently, Red meat, Fried food, Processed food Sweets and consumption of beverages are associated with larger BMI of the students while eating with the family, taking the breakfast, and lower number of meals were significantly associated with lower BMI. In conclusion BMI of the medical college students in Wasit was affected by their eating habits.

Keywords: Eating habits, Obesity, Epidemiology, Risk factors,

Introduction
Previous studies and literatures suggested that the patterns and habit of eating in terms of frequency of eating, timing of eating across the day, skip the breakfast meal, and fast food eating times outside the home, all are possible risk factors of being overweight or obese. On the other hand, changing the eating habit, could contributed to increasing body weight in particular among the young subjects. The prevalence of overweigh and obesity is increasing worldwide, in 2016, 39 % of population at age 18 years and above has excess weight (BMI ≥ 25 kg/m2) and 13 % were obese. About 2 billion have excess weights all over the world and over 0.5 billion are obese. Occurrence of overweight and obesity is pretty rapid in the world’s population. Obesity and overweight result in negative metabolic impacts on cholesterol, blood pressure, insulin resistance, and triglycerides. Dangers of ischemic stroke, type 2 diabetes mellitus, and coronary heart illness increased with the rise in the BMI (body mass index). Increased BMI also raises the danger cancer and mortality. A number of researches have revealed that eating behaviors, eating rate, the time-based dispersal of eating actions throughout the day, frequency of eating, and breakfast skipping have a direct impact on obesity status of an individual.

Dr. Amett J classifies the ages of 18-25 as “emerging adulthood”. Despite it being viewed as a well-being and optimum health age, the change from teenage to adulthood is a vital period for disease prevention and health promotion. The nutritional behaviors of college students is influenced by many factors including stress exposure. Some previous studies showed that majority of the students who have healthy eating habits had normal body weight. The lately examined outcome from non-communicable diseases risk influences survey carried out in Iraq in the year 2006 revealed a high rate of more than 66%, of population at age 25-65 years are overweight or obese. The overweight and obesity are more prevalent in male than female. Information on dietary behaviors in Iraq is very limited, especially for university students. So the aim of this study is to assess the relationship between eating habits and body mass index of group of Iraqi university students.
Subject and Method

This was an analytical cross-sectional study conducted among group of medical students (aged 18 - 25 years) in Wasit University chosen by random sampling method at 2015 (April-May). Students with chronic diseases were excluded.

Sample Size: The sample size was calculated according to the standard equation for cross-sectional studies and the final sample size after adding 15% was 320 students and were enrolled.

Data Collection: A self-administered structured questionnaire on eating habits was adopted from previous published studies with some modifications. The questionnaire consisted of two sections assessing the demographic data and eating behavior and dietary habits.

Other data collected were weight and height and body mass index was calculated according to standard equation in kg/m² and categorized into four categories, underweight, normal, overweight and obesity, according to the WHO classification and cutoff points.

Statistical Analysis: Data were analyzed using statistical software (SPSS) version 20. Statistical procedures and tests applied accordingly. P < 0.05 was considered statistically significant.

Findings

A total of 320 medical students (141 male (44.1%) and 179 (55.9%) female) were included with mean age 20.2 ± 1.67. Of them 94(29.4%) were residential college while 70.6% were living with their parents. Body mass index (BMI) distribution revealed that 21.6% were underweight, 60.3% normal, 15% overweight and 3.1% obese, (Figure 1). Out of the total participants, 163(50.9%) took their meals regularly (Table 1). Overweight and obesity were significantly and inversely associated with frequency of eating with the family, frequency of taking breakfast, (P<0.05) while directly associated with taking snacks, (P<0.05), (Table 2)

A significant association was found between BMI and each of Fruit and vegetables, Red meat, fried food and sweets consumption (Table 3). A significant association was found between BMI and eating Processed food and beverages consumption where within those drinking fresh fruit juice more than half were within normal weight while none of those drinking milk were obese (Table 4).

Table 1: Association of sex, living with family, number and regularity of meals with BMI among 320 medical students in Wasit University in 2015

<table>
<thead>
<tr>
<th>Variable</th>
<th>BMI category</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Underweight</td>
<td>Normal</td>
</tr>
<tr>
<td></td>
<td>N (%)</td>
<td>N (%)</td>
</tr>
<tr>
<td>Sex</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>22(15.6)</td>
<td>73(51.8)</td>
</tr>
<tr>
<td>Female</td>
<td>47(26.3)</td>
<td>120(67)</td>
</tr>
<tr>
<td>Living with family</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Residential college</td>
<td>11(11.7)</td>
<td>58(61.7)</td>
</tr>
<tr>
<td>With parents</td>
<td>58(25.7)</td>
<td>135(59.7)</td>
</tr>
<tr>
<td>No. of meals</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>5(50.0)</td>
<td>2(20.0)</td>
</tr>
<tr>
<td>2</td>
<td>17(18.1)</td>
<td>62(66)</td>
</tr>
<tr>
<td>3</td>
<td>46(22.3)</td>
<td>121(58.7)</td>
</tr>
<tr>
<td>4 - more</td>
<td>1(10.0)</td>
<td>8(80)</td>
</tr>
</tbody>
</table>
Table 2: Association of between eating with family, taking breakfast, dinner, and snacks with BMI among 320 medical students in Wasit University in 2015

<table>
<thead>
<tr>
<th>Variable</th>
<th>BMI category</th>
<th>Total</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Under weight</td>
<td>Normal</td>
<td>Over weight</td>
</tr>
<tr>
<td></td>
<td>N (%)</td>
<td>N (%)</td>
<td>N (%)</td>
</tr>
<tr>
<td>Eat with family</td>
<td>Daily</td>
<td>47(27)</td>
<td>107(61.5)</td>
</tr>
<tr>
<td></td>
<td>3 - 4/week</td>
<td>7(20)</td>
<td>18(51.4)</td>
</tr>
<tr>
<td></td>
<td>1 - 2/week</td>
<td>10(21.3)</td>
<td>31(66)</td>
</tr>
<tr>
<td></td>
<td>Rarely</td>
<td>5(7.8)</td>
<td>37(57.8)</td>
</tr>
<tr>
<td>Taking breakfast</td>
<td>Daily</td>
<td>39(24.8)</td>
<td>97(61.8)</td>
</tr>
<tr>
<td></td>
<td>3 - 4/week</td>
<td>10(28.6)</td>
<td>16(45.7)</td>
</tr>
<tr>
<td></td>
<td>1 - 2/week</td>
<td>6(11.5)</td>
<td>39(75)</td>
</tr>
<tr>
<td></td>
<td>Rarely</td>
<td>14(18.4)</td>
<td>41(53.9)</td>
</tr>
<tr>
<td>Dinner</td>
<td>Daily</td>
<td>58(22.7)</td>
<td>151(59.2)</td>
</tr>
<tr>
<td></td>
<td>3 - 4/week</td>
<td>8(19.5)</td>
<td>29(70.7)</td>
</tr>
<tr>
<td></td>
<td>1 - 2/week</td>
<td>3(17.6)</td>
<td>10(58.8)</td>
</tr>
<tr>
<td></td>
<td>Rarely</td>
<td>0(0.0)</td>
<td>3(42.9)</td>
</tr>
<tr>
<td>Snacks</td>
<td>Daily</td>
<td>29(21.6)</td>
<td>82(61.2)</td>
</tr>
<tr>
<td></td>
<td>3 - 4/week</td>
<td>24(36.4)</td>
<td>33(50)</td>
</tr>
<tr>
<td></td>
<td>1 - 2/week</td>
<td>2(4.3)</td>
<td>28(60.9)</td>
</tr>
<tr>
<td></td>
<td>Rarely</td>
<td>14(18.9)</td>
<td>50(67.6)</td>
</tr>
</tbody>
</table>

Table 3: Association of eating fruits, vegetables, red meat, fish and poultry, fried food and sweets with BMI among 320 medical students in Wasit University in 2015

<table>
<thead>
<tr>
<th>Variable</th>
<th>BMI category</th>
<th>Total</th>
<th>P.value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Under weight</td>
<td>Normal</td>
<td>Over-weight</td>
</tr>
<tr>
<td></td>
<td>N (%)</td>
<td>N (%)</td>
<td>N (%)</td>
</tr>
<tr>
<td>Fruits</td>
<td>Daily</td>
<td>27(28.4)</td>
<td>61(64.2)</td>
</tr>
<tr>
<td></td>
<td>3 - 4/week</td>
<td>27(23.3)</td>
<td>73(62.9)</td>
</tr>
<tr>
<td></td>
<td>1 - 2/week</td>
<td>8(10.3)</td>
<td>47(60.3)</td>
</tr>
<tr>
<td></td>
<td>Rarely</td>
<td>7(22.6)</td>
<td>12(38.7)</td>
</tr>
<tr>
<td>Vegetables</td>
<td>Daily</td>
<td>23(18.1)</td>
<td>80(63)</td>
</tr>
<tr>
<td></td>
<td>3 - 4/week</td>
<td>29(29.9)</td>
<td>60(61.9)</td>
</tr>
<tr>
<td></td>
<td>1 - 2/week</td>
<td>8(17)</td>
<td>22(46.8)</td>
</tr>
<tr>
<td></td>
<td>Rarely</td>
<td>9(18.4)</td>
<td>31(63.3)</td>
</tr>
<tr>
<td>Red meat</td>
<td>Daily</td>
<td>2(4.2)</td>
<td>38(79.2)</td>
</tr>
<tr>
<td></td>
<td>3 - 4/week</td>
<td>32(29.1)</td>
<td>61(55.5)</td>
</tr>
<tr>
<td></td>
<td>1 - 2/week</td>
<td>19(28.8)</td>
<td>38(57.6)</td>
</tr>
<tr>
<td></td>
<td>Rarely</td>
<td>16(16.7)</td>
<td>56(58.3)</td>
</tr>
</tbody>
</table>
### Table 4: Association of eating milk diary, fast food, cereals, processed food and beverage consumption with BMI of the studied group (N = 320)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Under weight</th>
<th>Normal</th>
<th>Overweight</th>
<th>Obese</th>
<th>Total</th>
<th>P.value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N (%)</td>
<td>N (%)</td>
<td>N (%)</td>
<td>N (%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Fish and poultry</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Daily</td>
<td>0(0.0)</td>
<td>5(62.5)</td>
<td>3(37.5)</td>
<td>0(0.0)</td>
<td>8</td>
<td>0.58</td>
</tr>
<tr>
<td>3 - 4/week</td>
<td>15(19)</td>
<td>49(62)</td>
<td>14(17.7)</td>
<td>1(1.3)</td>
<td>79</td>
<td></td>
</tr>
<tr>
<td>1 - 2/week</td>
<td>36(23.4)</td>
<td>90(58.4)</td>
<td>21(13.6)</td>
<td>7(4.5)</td>
<td>154</td>
<td></td>
</tr>
<tr>
<td>Rarely</td>
<td>18(22.8)</td>
<td>49(62.0)</td>
<td>10(12.7)</td>
<td>2(2.5)</td>
<td>79</td>
<td></td>
</tr>
<tr>
<td><strong>Fried food</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>0.01</td>
</tr>
<tr>
<td>Daily</td>
<td>36(21.7)</td>
<td>104(62.7)</td>
<td>25(15.1)</td>
<td>1(0.6)</td>
<td>166</td>
<td></td>
</tr>
<tr>
<td>3 - 4/week</td>
<td>24(20.3)</td>
<td>74(62.7)</td>
<td>16(13.6)</td>
<td>4(3.4)</td>
<td>118</td>
<td></td>
</tr>
<tr>
<td>1 - 2/week</td>
<td>5(20.0)</td>
<td>12(48)</td>
<td>4(16)</td>
<td>4(16.0)</td>
<td>25</td>
<td></td>
</tr>
<tr>
<td>Rarely</td>
<td>4(36.4)</td>
<td>3(27.3)</td>
<td>3(27.3)</td>
<td>1(9.1)</td>
<td>11</td>
<td></td>
</tr>
<tr>
<td><strong>Sweets</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>&lt; 0.001</td>
<td></td>
</tr>
<tr>
<td>Daily</td>
<td>44(31.7)</td>
<td>82(59)</td>
<td>11(7.9)</td>
<td>2(1.4)</td>
<td>139</td>
<td></td>
</tr>
<tr>
<td>3 - 4/week</td>
<td>8(8.5)</td>
<td>56(59.6)</td>
<td>25(26.6)</td>
<td>5(5.3)</td>
<td>94</td>
<td></td>
</tr>
<tr>
<td>1 - 2/week</td>
<td>12(18.8)</td>
<td>42(65.6)</td>
<td>8(12.5)</td>
<td>2(3.1)</td>
<td>64</td>
<td></td>
</tr>
<tr>
<td>Rarely</td>
<td>5(21.7)</td>
<td>13(56.5)</td>
<td>4(17.4)</td>
<td>1(4.3)</td>
<td>23</td>
<td></td>
</tr>
<tr>
<td><strong>Discussion</strong></td>
<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
</tbody>
</table>

In this study, more than half of participants had normal BMI and this agreed a previous Iraqi study in Babylon college students that found 65.9% were within normal BMI. Overweight and obesity percent in this study 15% and 3.1% respectively which is much more lower than the prevalence of overweight and obesity.
reported in a study conducted among the university students in Jordan 15, and among King Saud University students in Riyadh, Saudi Arabia which were 31%, and 23.3% respectively.

The low percent of overweight and obesity may be due to intellectual level of medical students selected in this study that made them more knowledgeable and oriented about the effect of healthy food and life style on body weight and the health in general. Female in general are more cautious about their weight status and body image than males and they are more desired to be slender as the society perception encourage and obligate them, and this is may be the cause behind the lower percent of obesity and overweight with significantly higher percent of normal and under weigh than male students.

Same finding was reported in an Iranian study where 9% of the participants had BMI above 25 and males were heavier than female students 9. The study found that around half of students were regularly taking meals and about 64% took three meals daily, the same as the finding of a study in Sudanese medical students 11, and in contrast to study conducted in Malaysian medical school 12. Half of students eating one meal per day were underweight, while the majority of those with three-four meals per day were within normal body mass index that gave the important of taking the three daily meals in their usual times. Nearly half of the students have a daily breakfast which is a little bit lower than Sudanese students 11 and higher to Malaysian 12 and Chinese medical students 17. In our study only 41% of the students consumed snacks daily, this finding was in accordance with Malaysian medical school and Sudanese students 11,12. The majority of the students (70%) in our study consumed vegetables at least three times per week, this finding was consistent to Sudanese study 11 but lower than Malaysian study (81.8%)12. We found that almost half of medical students consumed fried food daily, and near half consumed fried food at least three times per week, finding was lower than Malaysian study (73.5%) of the students consumed fried food at least twice per week12. Only one quarter of our students consumed soda or other sugared beverages, this finding was low when compared to other study that showed more than the half (57%) of the students consumed soft drinks at least three times per week13. Other dietary behavior of university students in Wasit shows that the majority of students regularly eat cereals daily, and almost 67% of students eat milk dairy more than three times per week. Significant association between body weight and consuming red meat, sweets, cereals, fried and proceed food as they approved to have their effect on the BMI.

**Conclusion**

Body mass index of students was significantly affected by their eating habits and behavior. Eating snacks frequently, Red meat, Fried food,, Processed food Sweets and consumption of beverages are adversely increase the BMI of the students while eating with the family, taking the breakfast, and lower number of meals were significant factors to maintain normal BMI.

**Ethical Clearance:** All ethical issues approved, signed informed consents of students were obtained.

**Conflict of Interest:** None

**Source of Funding:** Funded by the author (self-funded)

**REFERENCES**


Factors Related to Chronic Obstruction Pulmonary Disease in Indonesia: Analysis of Indonesian Family Life Survey-5 Data

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¹Master of Epidemiology Student, ²Department of Epidemiology, Faculty of Public Health, University of Indonesia, Depok, West Java, Indonesia

ABSTRACT

Chronic obstructive pulmonary disease (COPD) is a major health problem and now ranks 5th in terms of the global burden of disease. Although COPD is a disease that is characterized by progressive respiratory symptoms and functional decline. This study aims to determine factors associated with COPD in Indonesia. A total of 10,360 subjects which fulfill the questionnaire. Data were collected by interview in community. COPD was defined when subject have COPD diagnose by doctor and other paramedic. The data were analyzed by logistic regression. Respondents who live in urban were have a risk 1.7 times less likely to experience COPD than respondents who live in village area (OR 0.59; 95% CI 0.44-0.78). In the TB history variable, respondents who had a history of TB were 3.6 times less likely to develop COPD than respondents who did not have a history of TB (OR 0.28; 95% CI 0.14-0.55). Asthma history tends to be 2.4 times less likely to develop COPD than respondents who have no history of asthma (OR 0.42; 95% CI 0.24-0.74). In the BMI variable, respondents who had a BMI ≤18.50 tends to be 2 times less likely to develop COPD (OR 0.49; 95% CI 0.36-0.69). In the smoking status variable, respondents who smoked 2.4 times the risk of having COPD compared to non-smoking respondents (OR 2.42; 95% CI 1.78-3.28). Body mass index, air pollution, history of TB, and history of asthma had a significantly increased risk of developing COPD in Indonesia.

Keywords: COPD, risk factors, Indonesia

Introduction

COPD is a major health problem in subjects over 40 years of age. COPD is a major cause of chronic morbidity and mortality throughout the world.¹ The Global Burden of Disease Study reported 251 million COPD cases globally in 2016. Globally, it is estimated that 3.17 million deaths were caused by COPD in 2015. More than 90% of COPD deaths occur in developing countries.² In Indonesia according to the 2013 Riskesdas data COPD has a prevalence of 3.7%.³ COPD is a chronic airway disease characterized by airflow resistance, especially expiratory air and is progressive due to exposure such as smoking, indoor and outdoor air pollution, bronchial hypereactivity, and history of lower respiratory tract infections.³,⁴

Many studies have been conducted to investigate risk factors for COPD. COPD risk factors include age, smoking, body mass index (BMI), physical activity, exposure to water pollutants, history of asthma and offspring. Study examining COPD determinants in young children shows similar risk factors (age, sex, BMI) in the general population.⁵,⁶ Furthermore, COPD studies among young people revealed a relationship between behavioral or lifestyle factors such as smoking, physical activity, BMI with COPD.⁷ But the results were still inconsistent for gender and BMI variables.⁵ The purpose of this study was to determine the factors associated with COPD in Indonesia.

Method

Study Design: This analytical observational study uses a cross-sectional design. Study data source from the
Indonesian Family Life Survey (IFLS)-5 in 2014. This survey collects information on the level of individuals, households and communities with a multistage stratified random sampling approach. The IFLS is a longitudinal households survey using questionnaires and anthropometric measurements collected under the supervision of the Rand Corporation and an ethical review was conducted by Gadjah Mada University.8

Population and Sample: The study population was the subjects of the IFLS-5 study conducted in 13 provinces in Indonesia from September 2014 to March 2015 in 16,204 households and 50,148 individuals. While the sample is respondents aged ≥15 years who were willing to take interviews and have questionnaire data about risk factors and complete COPD diagnosis on each variable studied, namely a total of 10,360 individuals.

Exposure and Outcome:

Outcomes in this study were COPD defined as chronic pulmonary disease characterized by airway obstruction in the airways which was progressively nonreversible or partial reversible.4 COPD status was assessed from the subject report, based on the diagnosis of health professionals. Exposure in this study were age, education level, gender, body mass index, physical activity, smoking behavior, place of residence, history of Tb and history of asthma. Risk factors assessed such as age characteristics were categorized to be <40 years and ≥40 years, namely the age at which pulmonary function began to decline according to the Global Initiative for Chronic Obstructive Lung Disease (GOLD)5, gender, smoking status, physical activity, residence, body mass index categorized <18.50 kg/m² and ≥18.50 kg/m²5,9, history of asthma10 and TB history.11 Smoking behavior was categorized as not smoking and smoking. Physical activity was assessed through questions on the type and timing of physical activity carried out in daily life and then categorized as adequate and less physical activity. The history of TB and asthma was assessed through questions diagnosed by doctors or paramedics.

Data Collection

Height was measured by the plastic board height Seca model 213 and weight was measured using the Camry scale model EB1003. In this study measurements of weight and height were carried out by interviewers who were competent in their fields and had received previous training.8

Data Analysis

Data were analyzed using logistic regression to calculate risk on all variables including age, gender, BMI, physical activity, smoking behavior, place of residence, history of TB and history of asthma by including these variables in multivariate analysis. In this study we used the steps of a logistic regression test to identify and determine the factors that significantly associated the incidence of COPD in Indonesia. All candidate variables with p-value <0.25 in bivariate analysis will be further analyzed to be included in multivariate analysis. Variables that have a significant relationship with COPD (p value <0.05). The strength of the association between predictor and COPD variables was measured using POR with 95% CI to predict factors associated with COPD in Indonesia.

Results

Of the 50,148 individuals in IFLS-5 can be processed 36,405 individuals. Of these there were subjects who did not answer questions, answered they did not know, missing data were 26,045 individuals. Then the subjects who answered all the questions completely, especially on the variables examined amounted to 10,360. Table 1. shows more COPD in women, young age, less physical activity, and has no history of TB and asthma and has active smoking status. Most respondents were women (60.2%), <40 years old (57.2%), have a BMI ≥18.50 kg/m² (85.6%), have a history of TB (1%), have a history of asthma (2.4%), living in the village (58.7%), smoking (84.3%).
Table 1: Respondents Characteristic

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>COPD n = 10,360 (%)</th>
<th>Yes (2%) n = 205</th>
<th>No (98%) n = 10,155</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>6233 (60.2)</td>
<td>125 (61.0)</td>
<td>6108 (60.1)</td>
<td>0.810</td>
</tr>
<tr>
<td>Male</td>
<td>4127 (39.8)</td>
<td>80 (39.0)</td>
<td>4047 (39.9)</td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt; 40 years</td>
<td>5926 (57.2)</td>
<td>123 (60.0)</td>
<td>5803 (57.1)</td>
<td>0.412</td>
</tr>
<tr>
<td>≥40 years</td>
<td>4434 (42.8)</td>
<td>82 (40.0)</td>
<td>4352 (42.9)</td>
<td></td>
</tr>
<tr>
<td>Residence</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Village</td>
<td>6083 (58.7)</td>
<td>94 (45.9)</td>
<td>5989 (59.0)</td>
<td>0.000</td>
</tr>
<tr>
<td>City</td>
<td>4277 (41.3)</td>
<td>111 (54.1)</td>
<td>4166 (41.0)</td>
<td></td>
</tr>
<tr>
<td>Education</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>High</td>
<td>2641 (25.5)</td>
<td>64 (31.2)</td>
<td>2577 (25.4)</td>
<td>0.169</td>
</tr>
<tr>
<td>Middle</td>
<td>4094 (39.5)</td>
<td>73 (35.6)</td>
<td>4021 (39.6)</td>
<td></td>
</tr>
<tr>
<td>Elementary</td>
<td>3625 (35.0)</td>
<td>68 (33.2)</td>
<td>3557 (35)</td>
<td></td>
</tr>
<tr>
<td>BMI</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>≥18.50 kg/m²</td>
<td>8873 (85.6)</td>
<td>154 (75.1)</td>
<td>8719 (85.9)</td>
<td>0.000</td>
</tr>
<tr>
<td>&lt; 18.50 kg/m²</td>
<td>1487 (14.4)</td>
<td>51 (24.9)</td>
<td>1436 (14.1)</td>
<td></td>
</tr>
<tr>
<td>Physical Activity</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Enough</td>
<td>2430 (23.5)</td>
<td>48 (23.4)</td>
<td>2382 (23.5)</td>
<td>0.989</td>
</tr>
<tr>
<td>Less</td>
<td>7930 (76.5)</td>
<td>157 (76.6)</td>
<td>7773 (76.5)</td>
<td></td>
</tr>
<tr>
<td>TB History</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>10255 (99.0)</td>
<td>194 (94.6)</td>
<td>10061 (99.1)</td>
<td>0.000</td>
</tr>
<tr>
<td>Yes</td>
<td>105 (1.0)</td>
<td>11 (5.4)</td>
<td>94 (0.9)</td>
<td></td>
</tr>
<tr>
<td>Asthma History</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>10112 (97.6)</td>
<td>190 (92.7)</td>
<td>9922 (7.7)</td>
<td>0.000</td>
</tr>
<tr>
<td>Yes</td>
<td>248 (2.4)</td>
<td>15 (7.3)</td>
<td>233 (2.3)</td>
<td></td>
</tr>
<tr>
<td>Smoking Status</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>1629 (15.7)</td>
<td>359 (3.6)</td>
<td>1 (0.5)</td>
<td>0.000</td>
</tr>
<tr>
<td>Yes</td>
<td>8731 (84.3)</td>
<td>9518 (96.4)</td>
<td>199 (99.5)</td>
<td></td>
</tr>
</tbody>
</table>

The proportion of respondents who experienced COPD was more in women (61%) than men (39%), more at age <40 years (60%) compared to age ≥ 40 years. Although COPD was higher in women and the age category <40 years but the results of statistical tests showed no significant relationship (p 0.810) and (p 0.412) between sex and age with the incidence of COPD. The proportion who experienced COPD was greater in respondents who lived in the city (54.1%) than those who lived in the village (45.9%), the results of statistical tests showed that there was a significant relationship between smoking status and the incidence of COPD with a value (p 0.000). The proportion who experienced COPD was more at the basic education level (35.5%) than the higher education level (25.5%), more so for respondents whose BMI was ≥18.50 kg/m² (75.1%) than underweight (24.9%), less physical activity (76.6%). Statistically there was a significant relationship between BMI and the incidence of COPD (p 0.000). The proportion of respondents who experienced COPD was more in those who did not have a history of TB (94.6%) than those who had a history of TB (5.4%), more in those who did not have a history of asthma (92.7%) than those who had a history of asthma (2.7%). Statistically there was a relationship between history of TB and a history of asthma with COPD with a value (p
0,000) and (p 0,000), more smoking (96.4%) than not smoking (3.6%), statistical test results showed there is a significant relationship between smoking status and COPD with a value (p 0,000) (Table 1).

Table 2: Multivariate Analysis of Predictive Models of COPD

<table>
<thead>
<tr>
<th>Determinant</th>
<th>POR</th>
<th>CI 95%</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residence</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Village</td>
<td>1.00</td>
<td>Ref</td>
<td>0.000</td>
</tr>
<tr>
<td>City</td>
<td>0.59</td>
<td>0.44-0.78</td>
<td></td>
</tr>
<tr>
<td>TB History</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tidak</td>
<td>1.00</td>
<td>Ref</td>
<td>0.000</td>
</tr>
<tr>
<td>Ya</td>
<td>0.28</td>
<td>0.14-0.55</td>
<td></td>
</tr>
<tr>
<td>Asthma History</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tidak</td>
<td>1.00</td>
<td>Ref</td>
<td>0.003</td>
</tr>
<tr>
<td>Ya</td>
<td>0.42</td>
<td>0.24-0.74</td>
<td></td>
</tr>
<tr>
<td>BMI</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>≥18.50 kg/m²</td>
<td>1.00</td>
<td>Ref</td>
<td>0.000</td>
</tr>
<tr>
<td>&lt; 18.50 kg/m²</td>
<td>0.49</td>
<td>0.36-0.69</td>
<td></td>
</tr>
<tr>
<td>Smoking Status</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>1.00</td>
<td>Ref</td>
<td>0.000</td>
</tr>
<tr>
<td>Yes</td>
<td>2.42</td>
<td>1.78-3.28</td>
<td></td>
</tr>
</tbody>
</table>

Note: -2 Likelihood = 85.162 > (p 11.7)

Based on the multivariate analysis above, it was seen that a significant predictor of COPD in Indonesia was place of residence, history of TB, history of asthma, BMI and smoking status. Respondents who live in cities have 1.7 times less risk of COPD than respondents who live in villages (POR 0.5; 95% CI 0.44-0.78). In the TB history variable, respondents who had a history of TB were 3.6 times less likely to experience COPD than respondents who did not have a history of TB (POR 0.28; 95% CI 0.14-0.55). In the history of asthma variables tended to be 2.4 times less risk for COPD than those who did not have a history of asthma (POR 0.42; 95% CI 0.24-0.74). In the BMI variable, respondents who had a BMI of ≥18.50 kg/m² tended to be 2 times less likely to experience COPD (OR 0.49; 95% CI 0.36-0.69). In the smoking status variable, respondents who smoke are 2.4 times more likely to experience COPD than non-smoking respondents (OR 2.42; 5% CI 1.78-3.28).

Discussion

In this study we found that the prevalence of COPD in Indonesia was 2.0%. We found the prevalence of COPD associated with women aged <40 years, primary and secondary education, living in a village, BMI ≥18.50 kg/m², having smoking habits, no history of asthma and TB. In the results of the research respondents who smoke were 2.4 times more at risk for COPD than respondents who do not smoke. This was because smokers experience inflammation in the respiratory tract and pulmonary parenchyma to cause irreversible airway obstruction. Previous studies also found that the number of smoked cigarettes was positively correlated with macrophages in bronchial biopsies which caused irreversible inflammation and airway obstruction.

Respondents who live in cities were 1.7 times less likely to experience COPD than respondents who live in villages. This is likely related to the prevalence of smokers in cities smaller than in villages based on 2013 Riskesdas data. In previous COPD studies in developing countries, Rwanda also found that COPD prevalence in cities was lower than in cities.

Respondents who have a history of TB with a risk of 4.5 are less likely to experience COPD. This can happen if respondents who have COPD with a previous history of TB are not smokers. In eligible populations taken from the IFLS 5 data, it was found that 84% of respondents were smokers so the historical association of TB with COPD was distorted by the presence of potential confounders, smoking, thus requiring further research on the historical association of COPD in smokers. Asthma was characterized by chronic airway inflammation with respiratory symptoms such as wheezing, shortness of breath, coughing and an expansion of expiratory air flow but can heal spontaneously or vice versa can also experience chronic airway obstruction.

The results of this study also found that asthma was 2.4 times less risky for COPD than respondents without a history of asthma. In this study the possibility that happened was that asthma experienced did not develop into COPD. This is also in accordance with previous studies with a cohort design in asthma populations in Sweden with conclusions of asthma experienced not developing into COPD (OR 0.97; CI 0.76-1.25).

In other variables respondents who have a BMI of ≤18.50 have a 2 times lower risk of experiencing COPD. The results of this study are different from previous studies which found that a low BMI increases the risk for COPD. This is probably caused by the majority of
respondents who experienced COPD mostly 75.1% BMI (≥18.50 kg/m²) with a mean (22 kg/m²) making the study sample not comparable. As found in previous studies there was no significant difference between the distribution of BMI and the incidence of COPD in populations with a high BMI. Several previous studies found that patients with emphysema tended to experience low BMI, and patients with chronic bronchitis were more likely to be obese. Thus, the temporal relationship between abnormal BMI and COPD onset is uncertain. There are several limitations in this study, namely outcome measures based on reports of respondents who have been diagnosed with COPD by doctors and/or paramedics. Accurate outcome measures for COPD are clinicians’ diagnoses or investigations such as spirometry. In addition, it uses a cross sectional design so that it is very difficult to determine the variables that are the cause and effect to fulfill the requirements of causality. However, this research has several strengths, including data obtained from IFLS 5 covering all regions of Indonesia.

Conclusion

The prevalence of COPD based on the IFLS survey is 2%. Predictors of COPD prevalence in Indonesia were residence, history of TB, history of asthma, BMI and smoking status. Respondents who smoke were 2.4 times more at risk for COPD than non-smoking respondents.

Acknowledgement

Thank you to the Department of Epidemiology at the University of Indonesia, 2018 PITTA grand from University of Indonesia and the Academy of Nursing Dharma Wacana Lampung. Thanks to RAND labor and corporation for providing IFLS data.

Conflict of Interest: Both author declared no conflict of interest.

Source of Funding: This study was support by 2018 PITTA grand from University of Indonesia.

REFERENCES


The Effectiveness of Environmental Health Behavior in the Community through Coastal Community Empowerment Program in Kendari City Southeast Sulawesi Province, Indonesia

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¹Faculty of Public Health, University Halu Oleo, Green Campus Bumi Tridharma, Anduonohu, Kendari, Southeast Sulawesi, Indonesia

ABSTRACT

Generally, coastal area settlements are areas that have very complex health problems with very limited availability of basic health services and facilities. The limitations of health facilities and environmental health facilities have resulted in the low health status of coastal area. The aim of study was to determine the determinant model of behavior of coastal communities through the empowerment of coastal communities in Kendari City. The type of study was qualitative research. The results showed that the factors that led to the behavior of coastal communities towards environmental health besides being influenced by knowledge, attitudes and behavior, the determinants that shape clean and healthy living behavior were the availability of infrastructure, stakeholder intervention, routine monitoring by stakeholders, threats of health risks due to unhealthy behavior, and habits of coastal communities thus enhancing the environmental health behavior of coastal communities through the findings of these behavioral determinants, the form of empowerment of coastal communities includes the provision of housing assistance through proper housing program and meeting health standards, latrines, procurement of clean water; do routine controlling every day by stakeholders; reprimand sanctions raised by stakeholders for communities who behave unhealthy and health education by health workers to improve healthy behavior of the community. Conclusion: to change the healthy behavior of the community it will not be effective if it only changes knowledge, but it needs stakeholder commitment, cooperation between community leaders and health workers as well as policy support from the government in order to improve the environmental health of coastal communities. Suggestion: It is a need for socialization, education, and training for community based on community employment for health, advocacy and collaboration across sectors of government agencies in the preparation and improvement of policies through structuring the management of environmental resources and institutional health facilities

Keywords: Health environmental behavior; community empowerment; coastal area

Introduction

The degree of public health is closely related to people’s behavior in the management and use of environmental resources and health resources. Creation of a clean and healthy environment by human activities, thus enabling humans to avoid the occurrence of diseases both from non-living beings and living things. The role of human behavior is important to note in terms of clean and healthy behavior, especially in environmental management¹.

Generally environmental health facilities such as drinking water sanitation, family latrines, waste management, household waste management, and food beverage security, including personal hygiene are important factors in life, even becoming determinants.

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of public health. The environmental conditions of sanitary housing are needed not only to improve public health status, but also can improve living comfort, work efficiency and work productivity.

Behavior is related to environmental health, that environmental behavior becomes a determinant of human health. These environmental health issues are specifically examined from the aspects of community knowledge, attitudes, and actions. Actions include the availability of healthy latrines, sewerage, waste management, clean water supply, healthy and clean living behavior, and healthy home arrangements.

Future health development programs require environmental engineering by focusing on integrated environmental management, emphasizing changes in community behavior through socialization, education, training guidance, provision of environmental health facilities, related sector involvement and policy improvement, need for continuous monitoring of the quality of community environmental health, easy, cheap, and objective, so that the results of the supervision can understand and find the problems and solutions in the future. Community empowerment is intended to facilitate and encourage the community to be able to position themselves professionally and become the main actors in utilizing their strategic environment to achieve sustainability in the long term. The purpose of this study was to create a model of environmental health behavior through the study of coastal community empowerment in Kendari City.

**Method**

This type of study was qualitative study. Qualitative study uses instruments in the form of interview guides that have been prepared in advance. In this case, to obtain supporting data, in-depth interviews and focus group discussions (FGD) were proposed. Qualitative research is intended to gain an understanding using a particular methodology principle that is able to explore social or human problems where environmental health problems actually have problems interacting with behavioral problems, socio-cultural, and environmental issues that are quite influential on environmental health (Creswell, 2009)². This study was conducted in 2017 in the Coastal Region of Kendari City, Southeast Sulawesi Province, Indonesia

**Results**

**Guarantee of Infra Structur Eavailability:** One of the obstacles in healthy behavior was that the facilities were not available. Basically, coastal communities realize that the presence of healthy latrines, sewerage, garbage, clean water, clean and healthy living behavior, and the arrangement of healthy houses are very important to be held by every household. This is indeed an obstacle for the community because there are still some people who do not have latrines because they prefer to dispose of their latrines in the sea, this community behavior is also like throwing out trash and sewerage. It is in a small part because they house is usually not habitable.

From the interview, it can be concluded that to ensure healthy behavior of the community environment, one of the social policies that needs to be executed is the provision of facilities through the mechanism of family latrines, sewerages, trash cans, proper housing repair program. People’s behavior also is very much determined by the availability of infrastructure that meets or does not meet health requirements.

**Routine Monitoring:** The results showed that one of the factors that drives healthy behavior society is the supervision carried out by stakeholders towards the community in controlling the cleanliness of the environment around the residents’ homes by asking them to clean the surrounding pages when they get rubbish scattered or give warning if they don’t follow directions. The form of social control is intended as an individual behavior of the community by creating a moral burden through directing the apparatus as part of the community through attitudes and behavior if a group of people do not behave well through environmental health efforts.

**Health Risk Threats:** The threat of health risk is based on fear of the risk resulting from deviant behavior which is a health condition that has the potential to threaten human life as an implication of deviant healthy behavior. All of these are deviant behaviors that can threaten health. The form of community empowerment to overcome deviant behaviors such as dispose of trash, dispose of feces, waste, and unhealthy environment, the efforts made by stakeholders are to involve the community in health education and outreach activities carried out by health workers or from the Environmental Agency Life.

**Ease of Sccessibility:** The results of this study indicate that the factors that encourage healthy behavior are
ownership and ease of access in their use. Ownership of family latrines will support the behavior of family members to dispose of feces in available latrines and not dispose of them in places that cause diseases such as diarrhea and cholera. The availability of garbage cans, the availability of clean water and other facilities that support healthy behavior can make it easier for people to behave in a healthy manner. Therefore, bringing access through the provision of facilities such as family latrines, garbage cans, the availability of clean water, sewerage and the availability of livable houses is the right strategy to improve healthy behavior for the whole community and provide awareness of the importance of having such facilities and improving the potential of the community to have it. Based on the interview above to overcome the problem of people’s ability to have decent houses and meet health standards, the form of community empowerment programs includes the provision of assistance in the form of materials for home repairing program.

**Habits of Coastal Communities:** Community habits are intended as a pattern of activities that carried out in a sustainable manner because it is supported by environmental conditions.

Based on the interview showed that the behavior of throwing garbage at any places, the ability to provide healthy latrines, sewerage is an implication of the usual patterns of community practice. It is conducted more easily. To prevent the bad habits that have an impact on the environmental health of coastal communities, efforts made include: an invitation to participate in community service activities through healthy Friday to familiarize the community; make a routine program to do a health education program by public health center officers, the involvement of public health students in providing education and practice of clean and healthy living behavior.

**Discussion**

**Guarantee of Infrastructure Availability:** The results of the study showed that one of the obstacles in healthy behavior was the facilities were not available. Basically, coastal communities realize that the presence of healthy latrines, sewerage, garbage, clean water, clean and healthy living behavior, and healthy home arrangements is very important for every household, because it will encourage healthy behavior such as blending feces in healthy latrines, removing trash in garbage bins, providing clean water, clean and healthy living behavior and structuring decent homes. According to Green (1980), there are three factors a person does in a clean and healthy lifestyle, namely: enabling factors that trigger behaviors that allow a motivation or action to take place. This factor includes the availability of infrastructure or health facilities for households such as the availability of healthy homes, clean water, landfills, healthy latrines and so on.

Saputro D., Peduk Rintayati and Siti Supeni (2016), stated the results of their research that there is a positive attitude and significant relationship between knowledge about the environment with an attitude of caring for the environment, socio-economic level with environmental awareness, level of education with environmental awareness, and environmental knowledge, level education, and socio-economic level together towards concern for the environment. Triyono (2014), in his study found that factors related to behavior including open defecation behavior were economic factors. Based on the results of the study, the emergence of public health problems is one of the triggers of financial factors by looking at the ability to have livable houses and facilities that support healthy behavior such as the availability of latrines, sewerage, garbage, clean water, clean and healthy living behavior, and habitable homes. This is because most people have a source of non-permanent income so that they have the limitation to own a house with all the ingredients that meet health requirements. Mardikanto (2012), the condition of various infrastructure facilities that need to be considered by each facilitator in his working area is the requirement for reliable quantity and quality as well as timely distribution.

**Stakeholder Modeling and Interventions:** Green (1980), Reinforcing factor is a factor that determines whether health actions get support or not. This factor is manifested in the form of attitudes and behavior of health officers and religious leaders or community leaders who are community role models as examples of health cadres providing health education or health information, support and direction of community leaders to maintain and preserve environmental hygiene.

Based on this research, it is seen that participatory cultural approaches built by stakeholders are more effective compared to violent approaches or forms of emphasis. Ife (2008), one way to encourage healthy
communities is to encourage broad participation in various social activities. Promoting building communication between the local government and the community with a family approach, providing exemplary, understanding and personal awareness. Mardikanto (2012)⁹, community empowerment activities will be more efficient if applied only to a few community members, especially those recognized by their environment as good “role models” and a communication approach is one method to communicate innovations in the community development process.

Ease of Accessibility: Based on the concepts and definitions of the Millennium Development Goals (MDGs) which in 2016 were continued by the Sustainable Development Goals (SDGs), households were said to have access to proper sanitation if sanitation facilities used met health requirements including a goose neck latrine, septic tank, sewerage, that is used alone or together. The percentage of households in Indonesia that have access to proper sanitation in 2013 is 60.05% and increased in 2014 to 61.08% and in 2015 it increased to 62.14% (Ministry of Health, 2015)¹⁰.

Routine Monitoring: The results of the study showed that the involvement of community leaders as people who are role models for community groups is able to mobilize all citizens, provide motivation, and desire to do something that is desired by these figures, namely implementing healthy behaviors to realize the vision and mission of a Healthy City. Exemplary and persuasion and control from the community encourage people to act. According to Tanto (2012)¹¹, community leaders are prominent and famous people in various fields of people’s lives. A person who is identified usually has an example. This means that it can be used as an example and imitated its good qualities, having charisma, following, being wise in making decisions that are always beneficial for all members of the community in their groups. Mardikanto & Soebiato (2012)¹² therefore the facilitator must be professional, in the sense of having certain good qualifications concerning personality, knowledge, attitudes and skills facilitating community empowerment.

Health Risk Threats: The results of the study showed that giving a description of unhealthy behavior that results in health hazards can increase concerns and efforts to improve healthy behavior. The Health Belief Model theory states that individuals will behave if they feel themselves vulnerable to a problem and consider a serious problem (Machfoedz, Suryani, 2006)¹³.

From this study it was found that the effectiveness of the dissemination of information and health counseling was emphasized more on the picture of the disease caused by unhealthy behavior of the community. With the approach taken to motivate and provide an overview of the experience of health hazards to deviant community behavior towards health. According to Widayati (2011)¹⁴, attitudes toward behavior are influenced by the belief that the behavior will result in desired or unwanted results. Beliefs about behavior that are normative or expected by others and motivations to act in accordance with normative expectations form subjective norms in individuals. Azwar (2005)¹⁵, states that attitudes obtained through experience, will cause a direct influence on the next behavior.

Green (1980)¹⁶ Facilitating factor (predisposing factor) which includes knowledge and attitudes of the family towards clean and healthy behavior. these factors become triggers or antecedents of behavior that forms the basis or motivation for actions due to tradition, habits, beliefs, education level and socio-economic level. Social factors as external factors influence behavior such as: social structure, social institutions, and other social problems. Cultural factors as external factors that influence a person’s behavior include: values, customs, beliefs, community habits, traditions, and so on. Internal factors that influence the formation of behavior such as: attention, motivation, perception, intelligence, fantasy and so on.

Conclusion

The effectiveness of changing healthy behavior of coastal communities is not only influenced by knowledge factors, but also supported by the availability of facilities that support healthy behavior; exemplary and encouraging stakeholders in the form of the ability to arouse enthusiasm in overcoming their own health problems; instilling awareness of the health consequences of unhealthy behavior; regular monitoring of community environmental hygiene carried out by stakeholders and health care conducted to prevent potential unhealthy behavior habits that endanger environmental health.
Suggestion

There is a need for socialization and counseling, education, training based on community employment for health, advocacy and collaboration across sectors of government agencies in the preparation and improvement of policies through structuring the management of environmental resources and institutional health facilities, as well as continuous supervision.

Ethical Clearance: The ethical clearance was taken from Faculty committee and community agreement.

Source of Funding: The of this research comes from all authors’ contribution.

Conflict of Interest: Authors declares that there is no any conflict of interest within this research.

REFERENCES


Factors Related to Good Glycemic Control among Type 2 Diabetic Patients at Jimma Medical Center and Shanan Gibe Hospital, Jimma, Ethiopia

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ABSTRACT

Background: Ultimate outcome of diabetes management is to achieve controlled glycemic level and to prevent or delay complications related to diabetes. Understanding the factors associated with achieving good glycemic control for diabetic patients will help to improve the treatment and prevents complications of diabetes. Therefore, the aim of this study was to identify related factors of good glycemic control among adult diabetic patients in Jimma Medical Center and Shanan-Gibe Hospital, Jimma.

Method and Material: Institutional based cross-sectional study was employed and proportionate systematic sampling was followed to select 308 participants. Data were collected using semi-structured questionnaire and client chart review then descriptive and logistic regression analyses were conducted.

Results: One third (33.9%) of study participants had good glycemic control. Multiple logistic regression revealed that males (AOR=4.96, 95%CI (1.8,14.1)), having longer duration of diabetes (AOR=1.12, 95%CI (1.02,1.23)), being younger (AOR=0.07, 95%CI (0.02,0.22)), who tested their blood glucose at home (AOR=6.1, 95%CI (1.75,21.4)), and took a combinations of insulin and oral medication (AOR=7.3, 95%CI (3.1,17.5)) were key related factors of good glycemic control.

Conclusion: To attain target level of fasting blood glucose health information concerning components of diabetic care like self-monitoring of blood glucose and combination of drugs without changing the regimen should be provided by healthcare providers.

Keywords: Glycemic control, Type-2 diabetes, Jimma Medical Center, Shanan-Gibe Hospital

Introduction

Diabetes mellitus refers to a grouping of metabolic diseases characterized by prolonged excess BG level caused by the inadequate secretion of insulin, poor insulin action, or a combination of the two causes1. Diabetes is a globally chronic disease which affecting 366 million people, a number which has been estimate to rise to 552 million by 20302. Diabetes has been ravaging millions of people from all over the world3. More than 77% of morbidity4 and 88% of mortality because of DM occur in low and middle income countries5. Like the rest of the world, Sub-Saharan Africa is experiencing an increasing prevalence of diabetes beside to other non-communicable diseases where rapid socio-demographic, socio-cultural, and economic transitions are increasing risk and prevalence of diabetes6. Ethiopia, which is one of the developing nations, is at a risk of increased diabetes prevalence, and the number of people due to diabetes deaths reached over 21,000 in 2007. This estimate has increased to about 25,000 in 201 and T2D is the most common form of diabetes, accounting for >90% of cases of all diabetes7.
Diabetes management aims to delay the onset of diabetes complications, and to hinder its progression, mostly by improving glycemic control and controlling the risk of disease. It is known that achieving glycemic control for patients with diabetes prevents complications. Prior researches have reported many factors as contributing to poor control among patients, including their age, gender, level of education, family history, marital status, duration of diabetes, medications taken, and numerous other factors. However, it has been proved difficult to confirm which of these factors are most directly associated with poor glycemic control. This is because the prior findings indicated that glycemic control and the factors affecting it vary across the countries and between different ethnic groups and lifestyle variations. In addition, all previous studies in Jimma did not address factors contributing for achieving good glycemic control. Therefore the aim of this study was to identify related factors with good glycemic control among T2D patients in Jimma.

Method and Materials

Study Design, Setting, and Participants: An institution-based cross sectional study was employed from January 22-February 24, 2018 in two public hospitals located in Jimma zone: JMC and SGH which are located in Jimma town. All adult (>=18years) T2D patients, those who agreed to participate and give patient-signed informed consent, and those who attended regular follow up for at least 3 months were eligible. However, those who were critically ill and unable to participate in the interview were excluded. Ethical clearance was obtained from ethical review committee of JU, Institute of Health and this was communicated to hospitals to have their permission and undertake the study.

Sample Size and Sampling Procedure: Required sample size was determined using the single population proportion formula \(n = \left(\frac{Z_{a/2}}{d}\right)^2 \times p(1-p)\) with the following assumptions: since prevalence of poor glycemic control among adult T2 diabetic patients of Jimma University Teaching Hospital (JUTH) was 70.9%, which in turn gives proportion of good glycemic control of 29.1%, confidence level of 95%, and 5% degree of precision.

Calculated sample size was 280, with an additional 10% estimated non-response rate, giving a final sample size of 308 T2D patients. A proportionate systematic sampling was followed to select patients and \(k\)th interval was 5. Permission and verbal consent were obtained from each participant and confidentiality also assured before conducting data collection. All information that was obtained from the individual was not used to the determinant of the subject and their right was guaranteed to stop or refuse participation.

Variables and Measurements: After getting patient-signed informed consent from patients, data were collected by four nurses holding BSc. degree by interviewer-administered approach using pre tested questionnaire and reviewing client chart. Questionnaire composed of four parts: socio-demographic characteristics, clinical characteristics, behavioral factors, and self-management and drug utilization. Type of anti-diabetic medications used and last readings of fasting blood glucose (FBG) measurement taken on the day of visit and two last readings of FBG obtained from the patient records. Height and weight of patient measured on day of visit.

For the purpose of this study SMBG was defined if the patient performed it in 5 or more days in previous seven days. BMI was calculated as weight in Kg divided by height in meter squares and it categorized as normal (BMI<25kg/m²), overweight (BMI 25-29.99kg/m²), and obese (BMI≥30kg/m²). Patients FBG readings were computed by taking the mean value to classify the respondents as “good” and “poor”. Glycemic status was categorized as good glycemic control if FBG<130mg/dl and poor control if FBG ≥130mg/dl.

Questionnaire was prepared in English, translated into Afaan-Oromo, and back translated English to check consistency. Instrument was pre-tested on 5% of sample size (15) at Agaro Hospital. Any constraint was corrected promptly. Training was given to data collectors and supervisors for one day before the actual data collection period about data collection tool, how to collect data, and taking informed consent. Principal investigator was supervised the overall activity of data collection, checked used questionnaire at the end of each data collection day.

Data Analysis

Data were coded and entered to computer using Epi Data software version 3.1 and exported to SPSS version 20.0 for further analysis. Descriptive result presented using frequency and proportions for all variables and we
performed bivariate regression to determine association between factors of good glycemic control at 95%CI and p-value of <0.2. To identify the independent predictors of good glycemic control, we performed multivariate logistic regression and variables with p-value <0.05 were considered as statistically significant predictors of outcome variables.

Results

From a total of 314 T2D patients who were identified, 304 of patients were involved in study with a response rate of 96.8%.

Baseline Information of the Participants: More than half (52.6%) of participants were males. The mean age was 50.3 (± 10.1) years (range 28-80 years). Large numbers of patients were older age group (40-59 years) by account 201 (66.1%). Above two-thirds (74.4%) of participants were married, 168 (55.3%) were Christian, 88 (28.9%) were housewife, and 137 (45.1%) had completed primary education.

The mean BMI of participants was 23.1 (± 3.1) kg/m² (range 17.3-31.8 kg/m²) and 210 (69.1%) of patients had normal BMI. Mean disease duration was 2.9 ± 1.08 years (range 1-23 years) and 120 (39.5%) of patients had confirmed T2D for longer than 5 years. One hundred eighty-four (60.5%) of patients didn’t get support from their families and 189 (62.2%) had family history of diabetes. Ninety (29.6%) of patients had co-morbidity. Majority of participants, 296 (97.4%), 282 (92.8%) and 276 (90.8%) have never smoked cigarettes, drunk alcohol, and chewed chat respectively.

Two hundred fifty-seven (84.5%) patients weren’t tested their BG at home and 248 (81.6%) patients didn’t participate in regular physical activity for controlling diabetes. Concerning type of diabetic medications, 168 (55.3%), 112 (36.8%), and 24 (7.9%) of participants were taking oral medications, insulin, and combination of oral medication and insulin respectively. Of the patients on oral medication therapy, 136 (44.7%) were on monotherapy while 32 (10.5%) of patients were on combination therapy of oral medications. Two hundred sixty-four (86.8%) of patients were taking medications as prescribed.

Good Glycemic Control and Contributing Factors:

Overall, this study found that among those participants in JMC and SGH, 103 (33.9%) of diabetic patients did attain target level of FBG of <130 mg/dL. We performed logistic regression to identify the effect of factors on good glycemic control with 95%CI and P-value <0.05. The final model showed that gender, age, SMBG, duration of disease, and type of drug used were statistically associated with good glycemic control (Table 1).

Thus, the odds of good glycemic control were 4.96 times higher on male patients as compared to female patients [(AOR = 4.96, 95% CI (1.8, 14.1)]. Duration of diabetic disease was also related factor of good glycemic control and result showed that per a unit increase in total score of diabetic disease duration, the odds of good glycemic control is increased by 1.12 and the observed difference was statistically significant [(AOR = 1.12, 95% CI (1.02, 1.23))]

However, per a unit increase in total score of age of participants, the odds of good glycemic control is decreased by 2.5 and the observed difference was statistically significant [(AOR = 0.9, 95% CI (0.87, 0.96)]. Compared to participants who hadn’t tested their blood glucose at home or SMBG, participants who had tested their BG at home were six times [(AOR = 6.1, 95% CI (1.75, 21.4))] more likely to have good glycemic control. The odds of good glycemic control among patients who took insulin only and combinations of insulin and OHA were 7.3 [(AOR = 7.3, 95% CI (3.1, 17.5))] and 6.6times (AOR = 6.6, 95% CI (1.97, 22.23)) more than patients who took oral medication only respectively.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Glycemic control level</th>
<th>COR (95%CI)</th>
<th>AOR (95%CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Poor N(%)</td>
<td>Good N(%)</td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>88(43.8)</td>
<td>72(69.9)</td>
<td>2.9 (1.8, 4.9)***</td>
</tr>
<tr>
<td>Female</td>
<td>113(56.2)</td>
<td>31(30.1)</td>
<td>1</td>
</tr>
<tr>
<td>SMBG</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>184(91.5)</td>
<td>73(70.9)</td>
<td>1</td>
</tr>
<tr>
<td>Yes</td>
<td>17 (8.5)</td>
<td>30 (29.1)</td>
<td>4.5 (2.3, 8.6)***</td>
</tr>
</tbody>
</table>
Discussion

Diabetes control comprises practices and comprehensive management approach therefore; understanding factors associated with achieving good glycemic control for patients with diabetes will help to improve treatment and prevents complications of diabetes. We assessed prevalence and related factors with achieving good glycemic control.

Generally, our study revealed that one third (34%) of participants did attain target level of FBG (<130mg/dL). Consistent with study done in Jimma (35%)15, while, this finding is higher compared to findings from Malaysia16 and Saudi-Arabia17 that showed the prevalence of good glycemic control were 24% and 27%, respectively; probably the variations in prevalence of glycemic control could be attributed to the presence or absence of practices that are necessary for management of diabetes. This might be because of chronic disease in Ethiopia increased from time to time, due to this patients’ awareness on controlling and management of chronic illness could increase, and difference in the study period and behavioral change of the current patients.

There is a clear visible effect of gender on level of glycemic control; male patients had good glycemic control compared to females. There is also a statistically significant association between gender and glycemic control. This goes in line with finding in Dares Salaam18. This might be due to high proportion of good glycemic control in male patients in this study area in addition females roles such as; married women at home such as motherhood and taking care of children may affect BG controlling.

When the age of participants increased, the odd of good glycemic control is decreased and the observed difference was statistically significant. This is coherent with study done by Lipska et al19 stated that, as the person get older mitochondria activity in muscles is diminished, also fat started to accumulate in muscles and liver tissues leading to a defect in insulin secretion and insulin resistant. This could be related to development effect.

In this study, good glycemic control was more likely among patients with longer duration of diabetes than short duration. Consistent with study done by Turner R, Holman R, and Cull C.20, possibly because of patients becomes more familiar with disease treatment and prevention by controlling glycemic level to optimum due to getting high understanding on the importance of glycemic control and self-management practices.

Good glycemic control appeared to be greater among patients who treated with insulin only or combination of insulin with OHA when compared with oral medication only, which agrees with findings of a study by Benoit, et al21. This might be because of high proportion of patients with good glycemic control was observed in group of patients using insulin and combination of OHA and insulin (69.9%). Good glycemic control appeared to be greater among participants who were tested their BG at home compared to who weren’t tested. This finding was supported by study in Pakistan22. This might be because of SMBG is essential component of self-management in achieving glycemic control.

This study was strengthened by the incredible response rate; therefore, generalization could possibly be applied to all diabetic patients. However, our study had few limitations, which relates to the use of self-reported questions on some related factors, could lead to social desirability biases. Again a cross-sectional nature of the study precluded determining causal relationship.

Conclusion

Significant segment of T2D patients did attain target level of FBG. The key and related factors to achieve controlled glycemic level among diabetic patients were male, younger, had shorter duration of diabetes, SMBG, and took combination of drugs. Patients that
had access to SMBG should be taught about importance of more intensive monitoring of BG. Patients that had a combination of drugs therapy should be encouraged to take their prescribed medication without changing the regimen, particularly in those patients who presented with shorter duration of disease and have poorly controlled glycemia.

Acknowledgement

We would like to acknowledge to all of study participants and officials working in JMC and SGH that really deserves acknowledgement for their cooperation.

Ethical Clearance: Institutional review board of JU, Institute of Health approved the study and a formal letter of support written to JMC and SGH administrator’s office, and the procedures were in compliance with Helsinki Declaration.

Conflict of Interest: None.

Source of Funding: This research was funded by JU, Institute of Health.

REFERENCES


Pathological Fractures: Main Causes, Sites and Outcomes a Prospective Clinical Study in Najaf City

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ABSTRACT

The rate of pathologic fractures is increasing due to increased longevity on the one hand and the development of diagnostic techniques on the other hand, which makes any fractures diagnosed and treated well. To assess the causes and clinical profile of pathological fractures in Najaf City. A prospective study conducted at two main hospitals in Najaf city, The study included 79 cases with pathological fractures who were admitted to Al-Sader Teaching medical city and Al-Hakeem general hospital during the period 2017 to 2018. Findings revealed that, out of 892 fracture cases, 79 had pathological fractures, giving a prevalence among all fractures of (8.95%), 11 cases were unfit for surgery and excluded. The 68 cases underwent operative treatment had a median age of 54 years (range 13-82), additionally, majority of the patients aged more than 30 years. Males were 32 (47.1%), females were 36 (52.9%). Femur was the more frequent site accounted for (52.9%) followed by humerus in (25%), while fibula was the least frequent site contributed only (1.5%). Osteoporosis was the more frequent cause, (38.2%), followed by primary bone malignancy (14.7%), metastatic carcinoma (13.2%), metabolic bone diseases (13.2%), while bone atrophy was the least frequent in only2 cases (2.9%). The overall complication rate was 10.3% and mortality rate was 2.9%. In conclusion, pathological fractures represented almost 9% of all fractures in Najaf city. Osteoporosis and malignancies were the more common causes. Complications and mortalities reported in our study were comparable to other studies concerned with this problem.

Keywords: Pathological Fracture, etiology, epidemiology, outcome.

Introduction

Fractures are one of the significant health problems that humankind has experienced. It has been more encountered in the present life due to industrialization. Societies and vehicle upgrades to the extent of fractures with impact has been added more than once. Along with the increase in the incidence of fractures worldwide, the prevalence of pathological type of fracture is also increased dramatically. The rate of pathologic fractures is increasing due to increased longevity on the one hand and the development of diagnostic techniques on the other hand, which makes this fractures more easily diagnosed and reported where it is easily been encountered1,2. Pathologic fracture is occur secondary to an underlying illness where the bones is weak and more liable to fractures even with simple trauma. These fractures might be localized or generalized due to different etiological factors; One of the most important are benign and malignant tumors 3. Additionally, many systemic, infectious and congenital causes could lead to pathological fractures4. In the past because of lack of appropriate treatment and because of not well understood etiology, these fractures represented a challenge to orthopedics5. However, with advancing diagnostic and treatment techniques, a great transformation was occur in the management of these fractures in addition to better outcome and prognosis6,7. However, proper management mainly based on the
underlying cause, age of patients, location of fracture, type of fracture (Openness or closure), the presence or absence of complications, and other clinical and technical factors. Osteoporosis where it contributes for 80 to 90 percent of this type of fracture. Metastatic cancers are also one of the causes of pathological fractures where bone is the third most common site of metastasis in cancer patients. Lung, thyroid, prostate, kidney and breast tumors are the most likely to be metastasized to the bones and almost fifty percent of patients died from cancer have bone metastasis. Other causes of pathological fractures include osteomyelitis, osteomalacia, Paget's disease and osteogenesis imperfecta. In children, the pathological fractures usually associated with benign bone tumors and congenital or genetic disorders, and caused by a spectrum of underlying conditions that differ from that in adults. The diagnosis of pathological fractures based on clinical history and examination in addition to other investigations such as X-ray, CT scanning, MRI, nuclear bone scans, laboratory testing often to estimate the calcium levels and blood counts and biopsy. The treatment choice in pathological fracture management depends on the involved bone and the patient's clinical status. However, indications for surgical procedures include a survival duration of more than 6 weeks (in metastatic cancers), the ability to perform internal fixation, and the absence of comorbidities and factors that preclude early mobilization. The main objective of this study is to investigate the prevalence of pathological fractures, main causes, sites, mode of treatment and outcome of cases with pathological fracture admitted to our hospitals.

**Patients and Method**

This was a prospective study conducted at two main hospitals in Najaf city, included 79 cases with pathological fractures out of 892 bone fractures cases who were admitted to Al-Sader Teaching medical city and Al-Hakeem general hospital during the period 2017 and 2018. Data were collected using a data collection sheet prepared for the purpose of this study to gather demographic and clinical data, additionally, operative, postoperative and follow up notes of the patients were reported. Out of the 79 cases with pathological fractures, 11 patients had multiple medical comorbidities and were unfit for surgery, they treated conservatively and excluded from the study. The remaining 68 patients were treated operatively. Pathological fracture was suspected and considered according to the history if the fracture occurred with minimal trauma or during normal activities, Also in cases with history of recurrent fractures, multiple fractures, known metabolic disorders, or carcinomas are more likely to have pathological fractures. Complete clinical examination was performed, checking for swollen lymph nodes near the site of fracture, evidence of signs of carcinoma, osteoporosis, metabolic disorders. Laboratory investigations and studies were done including complete blood count, ESR, chemistry studies, serum protein electrophoresis, tests for Paget’s disease, thyroid function, parathyroid hormones and other necessary investigations. All patients were evaluated pre-operatively with plain X-ray, and chest X-ray to check for evidence of metastatic cancers. In some cases, CT and MRI were performed to determine the optimal surgical intervention that will applied and to check the extent of tumor (in cases with malignancies) near the fracture site and the surrounded soft tissues. Patients were followed up for a period of 9 to 12 months. Operation and surgical procedure and the decision about them applied for each individual case accordingly; intramedullary nail, plate, prosthesis and Dynamic hip screw (DHS) were used to fix such fractures. During the follow up period, complication and the outcome were reported. All statistical procedures and analysis performed using the SPSS software version 25 and appropriate statistical tests applied accordingly using descriptive statistics and cross tabulation with a level of significance, P. value, of 0.05.

**Findings**

Out of 892 fracture cases, 79 had pathological fractures, giving a prevalence among all fractures of (8.95%), 11 cases were unfit for surgery and they were excluded. The 68 cases underwent operative treatment had a median age of 54 years (range 13-82), additionally, majority of the patients aged more than 30 years. Males were 32 (47.1%), females were 36 (52.9%). Patients of urban origin were 45 (66.2%), (Table 1). The anatomic sites of fractures are shown in (Table 2), where femur was the more frequent site accounted for (52.9%) followed by humerus in (25%), while fibula was the least frequent site contributed only (1.5%).

Osteoporosis was the more frequent cause, it was reported in 26 cases (38.2%), followed by Primary bone malignancy (14.7%), Metastatic carcinoma (13.2%), metabolic bone diseases (13.2%), other causes included Paget’s disease in 5 cases (7.4%), hematopoietic disorders in 3 cases (4.4%), benign tumor in 4 cases (5.9%), while bone atrophy was the least frequent in only2 cases (2.9%), (Table 3). Intramedullary nail fixation, plate fixation, prosthesis and DHS were used in 41, 19, 3 and 5 patients, respectively, (Table 4). Regarding the
complications, two patients had surgical site infection, 2 patients had recurrence after 6 months follow up, One patient with DHS was converted to total hip arthroplasty after DHS lag screw cut out of the femoral head. Nail Breakage in one patient and one patient end with amputation, however the overall complication rate was 10.3%. (Table 5). Unfortunately two patients died and the mortality rate was 2.9%, (Figure 1).

Table 1: Demographic characteristics of 68 cases with pathological fractures

<table>
<thead>
<tr>
<th>Variable</th>
<th>No.</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (year)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt; 30</td>
<td>4</td>
<td>5.9</td>
</tr>
<tr>
<td>30 - 39</td>
<td>8</td>
<td>11.8</td>
</tr>
<tr>
<td>40 - 49</td>
<td>9</td>
<td>13.2</td>
</tr>
<tr>
<td>50 - 59</td>
<td>17</td>
<td>25.0</td>
</tr>
<tr>
<td>60 - 69</td>
<td>24</td>
<td>35.3</td>
</tr>
<tr>
<td>70 and above</td>
<td>6</td>
<td>8.8</td>
</tr>
<tr>
<td>Median age:</td>
<td>54</td>
<td>(range 13-82) years</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>32</td>
<td>47.1</td>
</tr>
<tr>
<td>Female</td>
<td>36</td>
<td>52.9</td>
</tr>
<tr>
<td>Residence</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Urban</td>
<td>45</td>
<td>66.2</td>
</tr>
<tr>
<td>Rural</td>
<td>23</td>
<td>33.8</td>
</tr>
</tbody>
</table>

Table 2: Distribution of cases according to the anatomic site of pathological fracture

<table>
<thead>
<tr>
<th>Anatomic site</th>
<th>No.</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Femur</td>
<td>36</td>
<td>52.9</td>
</tr>
<tr>
<td>Humerus</td>
<td>17</td>
<td>25.0</td>
</tr>
<tr>
<td>Calcaneus</td>
<td>4</td>
<td>5.9</td>
</tr>
<tr>
<td>Pelvis</td>
<td>6</td>
<td>8.8</td>
</tr>
<tr>
<td>Tibia</td>
<td>2</td>
<td>2.9</td>
</tr>
<tr>
<td>Spine</td>
<td>2</td>
<td>2.9</td>
</tr>
<tr>
<td>Fibula</td>
<td>1</td>
<td>1.5</td>
</tr>
<tr>
<td>Total</td>
<td>68</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Table 3: Distribution of main causes of pathological fracture (N = 68)

<table>
<thead>
<tr>
<th>Main Cause</th>
<th>No.</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Osteoporosis</td>
<td>26</td>
<td>38.2</td>
</tr>
<tr>
<td>Metabolic bone diseases</td>
<td>9</td>
<td>13.2</td>
</tr>
</tbody>
</table>

Table 4: Distribution of operative procedures for treatment of pathological fractures (N = 68)

<table>
<thead>
<tr>
<th>Procedure</th>
<th>No.</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intramedullary Nail</td>
<td>41</td>
<td>60.3%</td>
</tr>
<tr>
<td>Plate</td>
<td>19</td>
<td>27.9%</td>
</tr>
<tr>
<td>Prosthesis</td>
<td>3</td>
<td>4.4%</td>
</tr>
<tr>
<td>DHS</td>
<td>5</td>
<td>7.4%</td>
</tr>
<tr>
<td>Total</td>
<td>68</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

Table 5: Complications and outcome of the 68 cases with pathological fractures

<table>
<thead>
<tr>
<th>Complication</th>
<th>No.</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Surgical site infection</td>
<td>2</td>
<td>2.9</td>
</tr>
<tr>
<td>Recurrence</td>
<td>2</td>
<td>2.9</td>
</tr>
<tr>
<td>Conversion to total hip arthroplasty</td>
<td>1</td>
<td>1.5</td>
</tr>
<tr>
<td>Nail Breakage</td>
<td>1</td>
<td>1.5</td>
</tr>
<tr>
<td>Amputation</td>
<td>1</td>
<td>1.5</td>
</tr>
<tr>
<td>Total</td>
<td>7</td>
<td>10.3</td>
</tr>
</tbody>
</table>

Figure 1: Mortality and survival of 68 cases with pathological fractures

Discussion

The prevalence of pathological fractures is increasing due to increased longevity of population and the development of diagnostic techniques. The present...
study assessed the prevalence, main causes, main sites, complications and outcome of 68 of Iraqi patients with pathological fractures treated in two main hospital in Najaf, Iraq. The total number of cases admitted for different fractures during the study period was 892 cases of them 79 had pathological fractures giving a prevalence of almost 9% of all fractures. The prevalence of pathological fractures reported in previous studies ranged 8-30% of patients with bone metastasis 19,20.

In the present study, those who were fit for operation and surgically treated were 68 cases and were operated on using different surgical procedures accordingly. Evaluation of the patients showed that majority of those 68 cases (94.1%) aged more than 30 years with a median of 54 years, proportion of males among the cases was not much different than females, (47.1%) vs. (52.9%), respectively. These findings consistent with the clinical and epidemiological picture of pathological fractures as that reported in previous studies and literatures 2,19,21,22.

The present study found that the main anatomic site affected was femur, (52.9%), followed by humerus in (25%), while fibula was the least frequent site contributed only (1.5%). Narazaki et al and other studies reported almost close findings 6,17,23.

In our study we found that osteoporosis was the more frequent cause, it was reported (38.2%), followed by primary bone malignancy (14.7%), metastatic carcinoma (13.2%), metabolic bone diseases (13.2%), other causes included Paget’s disease (7.4%), hematopoietic disorders (4.4%), benign tumor (5.9%), while bone atrophy was the least frequent (2.9%), these findings were not unexpected as these factors are mainly cause pathological fractures particularly in elderly. Nonetheless, a variation is found in the frequencies and proportions of these causes in different studies and population due to variation in the prevalence risk factors and disease in different countries 3,7,20,23,24.

Intramedullary nail fixation, plate fixation, prosthesis and DHS were used in our patients and each individual case evaluated and the decision made accordingly. Management options and operative procedures depend on many factors including patients related factors such as age, gender, medical history, underlying cause and risk factors, the presence of malignancy and the affected bone 3,8,15,16,18,22. Regarding the complications, we reported 7 complications among our cases with an overall complication rate of 10.3%. Complications varies in different studies because development of complications affected by many factors, however, previous studies reported an overall complication rates ranged from as low as 5% to 25% 16,26. Choy, et al reported an overall complication rate of 16% while Yan xiong et al reported 17% 17,23. The mortality rate was 2.9% and it was low compared to mortality rates reported in previous studies, however, both died cases were postoperatively and were not related to operative technique or treatment procedures but due to other factors such as advanced malignancy status, on the other hand, wide variation in mortality rates was found among different studies 27–31.

Conclusion

Pathological fractures represented almost 9% of all fractures in Najaf city. Osteoporosis and malignancies were the more common causes of pathological fractures. Complications and mortalities reported in our study were comparable to other studies concerned with this problem.

Ethical Clearance: All ethical issues were approved. Signed informed consents obtained from all patients. Data of the patients collected in accordance with the World Medical Association (WMA) declaration of Helsinki statement of ethical principles for medical research involving human subjects.

Conflict of Interest: None

Source of Funding: Self-funded

REFERENCES


Effects of Biomass Fuel Smoke on Pulmonary Functions in Rural Women of Southwest Ethiopia

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ABSTRACT

Introduction: Biomass fuel is used commonly for domestic cooking by most of the rural Ethiopian housewives, in an enclosed space with poor ventilation. Incomplete combustion of biomass produces harmful products which may exert various adverse effects on lung functions.

Aim: To assess the adverse effects, if any, on pulmonary functions and respiratory symptoms in rural women using biomass fuel for cooking and compared to housewives who were not exposed.

Materials and Method: A comparative cross-sectional study was conducted with a total of 132 study participants (66 women exposed to biomass fuel smoke and 66 controls), from September 5 to October 5, 2018. Anthropometric and spirometric measurements were carried out. SPSS version 20.0 was used for data analysis. Frequencies, means, percentage and chi-square were used for descriptive analysis. Independent sample t-test, bivariate and multivariate logistic regression was used to compare mean and relevant associations.

Results: The mean age of biomass fuel smoke exposed and non-exposed group were 29.12 ± 8.40 and 29.21 ± 6.51 respectively. The mean of BMI among exposed group was 22.90 ± 2.47 while 23.37 ± 2.55 was in non-exposed group. Among biomass fuel smoke exposed group mean of 3.56 ± 0.70 for FVC, 2.87 ± 0.77 for FEV1, 80.40 ± 11.36 for FEV1 %, 3.77 ± 1.09 for FEF25-75% and 6.60 ± 1.90 for PEFR was recorded while 3.95 ± 0.77 for FVC, 3.33 ± 0.68 for FEV1, 84.38 ± 9.19 for FEV1 %, 4.33 ± 1.15 for FEF25-75 % and 7.55 ± 2.31 for PEFR was recorded among controls. A significant reduction was found in pulmonary function parameters among biomass fuel smoke exposed group compared to non-exposed. The prevalence of abnormal lung function is 37.9% and 15.2% among exposed and controls respectively. Biomass fuel smoke exposed women for greater than 5 years were six times (AOR=6.321; 95%CI=2.100, 19.022; P=0.035) more likely to have pulmonary function impairment compared to those exposed for less than or equal to 5 years. The prevalence of cough, phlegm, wheeze, breathlessness and chest pain was 39.4%, 22.7%, 30.3%, 19.7% and 16.7% for exposed group respectively while 21.2%, 13.1%, 15.2%, 6.1% and 12.1% for non-exposed respectively.

Conclusion: This study concluded that biomass fuel smoke exposed women are at greater risk of pulmonary function impairment than non-exposed group. The prevalence of adverse respiratory symptoms was higher among biomass fuel smoke exposed compared to non-exposed.

Keywords: Pulmonary function test, Body mass index, Respiratory symptoms, Indoor biomass cooking.

Introduction

Biomass fuel is derived from plants or animals and humans from very beginning of civilization. Most common is wood, but the use of animal dung and crop residues is also used widely¹. Half of the domestic energy demand is fulfilled by biomass fuel in most developed countries and more than 90% in developing countries. Low combustion efficiency of biomass fuel...
leads to incomplete combustion and production of harmful substances which may induce various harmful effects on the lung function. In sub-Saharan Africa, where the majority of women rely on biomass fuel, burden of affiliated respiratory diseases has not been well documented. The studies conducted on the effects of indoor air pollution in African countries are very rare in available literature. Ethiopia, one of the country in East Africa having more than 100 million people, is one of the poorest country in the world. Majority of the population in Ethiopia lives in a rural environment.

The biomass fuel is widely used as a primary source of cooking fuel in every part of Ethiopia. Available literature reveals that 80% of housewives having indoors cooking environment and using biomass as fuel in rural northern Ethiopia moreover, are using inappropriate devices in pitiful ventilated kitchen resulting in high exposure to toxicants.

Indoor air pollution because of biomass fuels is ranked 10th amongst most preventable risk factors globally and among developing countries it ranked fourth. In communities with poor access to green fuels in rural setting of developing countries, burden of disease is high and it constitute a 2.7% of overall health risks.

Epidemiological studies have shown that pulmonary functions are decreased with long term/short term exposure to polluted air. Therefore, the current study was carried out to evaluate the effects of biomass fuel combustion on pulmonary function in the women of Alemyehu Mecha village and compared the pulmonary function between biomass fuel users and non-users i.e. those using clean fuels like liquefied petroleum gas or electricity for cooking.

**Materials and Method**

**Study Setting:** This study was conducted in Alemyehu Mecha kebele which is located 15 km to Jimma town, south west Ethiopia. Approximately 2500 people live in the Village.

**Study Design and Participants:** A comparative cross-sectional study was employed from September to October 2018. The sample size was calculated using the method of Dupont & Plummer, where the confidence interval was set as 95%. The study was conducted with 66 subjects in each group which was greater than computed sample size, subjects were randomly selected for the study using systematic sampling methods. Eligibility criteria for exposed group were being greater than 18 years old and responsible for household cooking. Convenient sampling technique was used to select control group. 66 women with same age, BMI, and educational status were selected from residents of Jimma University apartments who used electricity, LPG and had separate ventilated room for cooking. The purpose of the study was explained clearly in local language to all potential participants and informed consent was also obtained. Each subject filled up one questionnaire to record their personal demographic data, health status and consent to participate in the study.

The subject’s height measured in standing position without shoes in centimeters and weight measured in kg were taken as continuous variables.

Using the digital spirometer, Forced vital capacity (FVC), Forced Expiratory Volume in one second (FEV\textsubscript{1}), FEV\textsubscript{1}/FVC ratio, FEF\textsubscript{25-75} and Peak Expiratory Flow Rate (PEFR) were measured. All pulmonary function tests were carried out from 08:00-10:30 AM as per guidelines of American Thoracic Society.

**Data Analysis Procedures:** Data were analyzed using the SPSS Version 20. Descriptive statistics were used to summarize socio-demographic characteristics and anthropometric measurements of subjects. Chi-square test was used to compare the prevalence of respiratory symptoms among exposed and non-exposed group. Independent sample t-test was used to compare the mean respiratory scores of exposed and non-exposed groups. Logistic regression was used to evaluate relationship between respiratory function test and independent variables.

**Ethical Consideration:** This study was approved by Institute of Health Science Ethical Review committee of Jimma University vide Ref. No. IHRPGD/587/2018 dated 14/05/2018.

**Results**

A total of 132 (66 from each exposed and control group) study participants were involved in this study. Age of study participants ranged from 19 to 60 years with a mean age of 29.12 ± 8.40 for biomass fuel smoke exposed women and 29.21 ± 6.51 for controls. Regarding educational status, 47% and 53% of exposed; 42.4%
and 57.6% of controls educated to primary school level and high school and above respectively. Majority of the participants from both study groups were not married. Cooking experience among exposed participants ranged from 1 to 19 years. 62.1% of cases were having 1-5 years of exposure to biomass fuel smoke while the remaining 37.9 % were having greater than 5 years of exposure. Matched variables for age, BMI, and Educational Status showed that there was no significant difference among exposed and their matched controls [Table/Fig-1].

**Table/Fig-1: Characteristics of respondents**

<table>
<thead>
<tr>
<th>Variables</th>
<th>Exposed N (%)</th>
<th>Non-exposed N (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td></td>
<td></td>
</tr>
<tr>
<td>≤25 year</td>
<td>25(37.9)</td>
<td>23(34.8)</td>
</tr>
<tr>
<td>26-29 year</td>
<td>22(33.3)</td>
<td>18(27.3)</td>
</tr>
<tr>
<td>&gt;30 year</td>
<td>19(28.8)</td>
<td>25(37.9)</td>
</tr>
<tr>
<td>Marital status</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single</td>
<td>41(62.1%)</td>
<td>47(71.2%)</td>
</tr>
<tr>
<td>Married</td>
<td>25(37.9%)</td>
<td>19(28.8%)</td>
</tr>
<tr>
<td>Educational status</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Primary school</td>
<td>31(47%)</td>
<td>28(42.4%)</td>
</tr>
<tr>
<td>High school &amp; above</td>
<td>35(53%)</td>
<td>38(57.6%)</td>
</tr>
<tr>
<td>Cooking experience</td>
<td></td>
<td></td>
</tr>
<tr>
<td>≤5 years</td>
<td>41(62.1%)</td>
<td>47(71.2%)</td>
</tr>
<tr>
<td>&gt;5 years</td>
<td>25(37.9%)</td>
<td>19(28.8%)</td>
</tr>
</tbody>
</table>

**Pulmonary Function Test:** An independent sample t-test was used to compare Spirometric measurement of pulmonary function (FVC, FEV1, FEV1%, FEF25-75% and PEFR) of exposed and non-exposed group. Accordingly, FVC, FEV1, FEV1%, PEFR and FEF25-75% were higher in control respondents than exposed respondents and the mean difference was found to be statistically significant (p<0.05) [Table/Fig-2].

**Table/Fig. 2: Comparisons of Spirometric measurements**

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Exposed Mean ± SD</th>
<th>Non-exposed Mean ± SD</th>
<th>t-value</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>FVC(L)</td>
<td>3.56 ± 0.70</td>
<td>3.95 ± 0.77</td>
<td>-3.034</td>
<td>0.003*</td>
</tr>
<tr>
<td>FEV1(L)</td>
<td>2.87 ± 0.77</td>
<td>3.33 ± 0.68</td>
<td>-3.640</td>
<td>0.000**</td>
</tr>
<tr>
<td>FEV1/FVC(%)</td>
<td>80.40 ± 11.36</td>
<td>84.38 ± 9.19</td>
<td>-2.207</td>
<td>0.029*</td>
</tr>
<tr>
<td>FEF25-75%(L/s)</td>
<td>3.77 ± 1.09</td>
<td>4.33 ± 1.15</td>
<td>-2.883</td>
<td>0.005*</td>
</tr>
<tr>
<td>PEFR(L/s)</td>
<td>6.56 ± 1.90</td>
<td>7.55 ± 2.31</td>
<td>-2.603</td>
<td>0.010*</td>
</tr>
</tbody>
</table>

SD: Standard Deviation, CI: Confidence Interval, * p value < 0.05, **p value < 0.001

**Respiratory Symptoms:** The self-reported prevalence of respiratory symptoms were analyzed among the study participants. Cough was the most prevalent respiratory symptom among biomass fuel smoke exposed (39.4%) participants. Prevalence of respiratory symptoms was compared using chi-square test between exposed and controlled. The result showed significant difference (p< 0.05) for cough, wheezing and breathlessness with p-value of 0.023, 0.038 and 0.019 respectively [Table/Fig-3].

![Table/Fig. 3: Respiratory symptoms among exposed and control group](image-url)
Pulmonary Impairments: The prevalence of abnormal lung function is 37.9% and 15.2% among biomass fuel smoke exposed women and controls respectively. The type of lung disorder mostly evident in biomass fuel smoke exposed women was restrictive. About 3(4.5%), 16(24.2%), 6(9.1%) and 4(6.1%), 4(6.1%), 2(3%) develop obstructive, restrictive and mixed type of lung disorder in exposed and controls respectively. FVC and FEV1 were affected in all three lung disorders but FVC and FEV1 were more affected in restrictive and obstructive impairment respectively [Table/Fig-4].

Table/Fig-4: Ventilatory impairment among exposed and non-exposed participants

Factors Associated with Pulmonary Function: The variables that showed statistically significant association (p<0.25) in the bivariate analysis were transferred and further analyzed in multivariable logistic regression to adjust for potential confounders and to identify factors associated with pulmonary function. In multivariable logistic regression, variables with p<0.05 were considered as factors for pulmonary function. The model was tested for multicollinearity (VIF=1.012-1.799 for exposed and VIF=1.083-2.036 for non-exposed) and goodness of fit was tested by Hosmer-Lemeshow test (p=0.678 for exposed and p=0.443 non-exposed). The model was fit and no multicollinearity existed.

The result of multivariable logistic regression indicated that cooking experience was the only variable independently associated with pulmonary function. Women who cooked with biomass fuel for greater than 5 years were six times (AOR=6.321; 95%CI=2.100, 19.022; P=0.035) more likely to have lung function impairment compared to those who worked for less than or equal to 5 years [Table/Fig-5].

Table/Fig. 5: Factors associated with pulmonary function pattern

<table>
<thead>
<tr>
<th>Variable</th>
<th>Lung function pattern</th>
<th>COR (95%CI)</th>
<th>AOR</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Abnormal</td>
<td>Normal</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age</td>
<td>&lt;=25 years</td>
<td>6(24)</td>
<td>19(76)</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>26-29 years</td>
<td>6(27.3)</td>
<td>16(72.7)</td>
<td>6.861[1.808, 26.033]</td>
</tr>
<tr>
<td></td>
<td>&gt;=30 years</td>
<td>13(68.4)</td>
<td>6(31.6)</td>
<td>5.778[1.501, 22.234]</td>
</tr>
<tr>
<td>BMI</td>
<td>&lt;=24.9</td>
<td>17(32.7)</td>
<td>35(67.3)</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>&gt;=25</td>
<td>8(57.1)</td>
<td>6(42.9)</td>
<td>2.745 [0.821,9.175]</td>
</tr>
<tr>
<td>Cooking experience</td>
<td>&lt;=5 years</td>
<td>11(25.6)</td>
<td>32(74.4)</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>&gt;5 years</td>
<td>14(60.9)</td>
<td>9(39.1)</td>
<td>4.525 [2.100, 19.022]</td>
</tr>
<tr>
<td>Average time spent per day</td>
<td>4 hours</td>
<td>18(46.2)</td>
<td>21(53.2)</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>&gt;4 hours</td>
<td>7(25.9)</td>
<td>20(74.1)</td>
<td>0.408 [0.141, 1.186]</td>
</tr>
<tr>
<td>Educational status</td>
<td>Primary school</td>
<td>8(25.8)</td>
<td>23(74.2)</td>
<td>0.368 [0.130, 1.044]</td>
</tr>
<tr>
<td></td>
<td>High school &amp; above</td>
<td>17(48.6)</td>
<td>18(51.4)</td>
<td>1</td>
</tr>
</tbody>
</table>

* Statistically significant at 95% CI, P-value ≤ 0.05; 1.00-reference; COR- Crude odds ratio; AOR-Adjusted odds ratio
Discussion

The effect of biomass fuel on pulmonary functions in current study showed that, FVC, FEV1, FEV1%, FEF25-75% and PEFR values in the exposed group were significantly decreased (p<0.05) when compared to that of control. This finding is in line with study conducted in Karnataka India and Cameroon. Authors observed that the pulmonary function parameters were significantly lesser in the study subjects as compared to group exposed to biomass fuel13. Recently another study on pulmonary function in rural women exposed to biomass fumes also conducted which reported that pulmonary function parameters \{FEV1 in liters (1.44 ± 0.36), FVC in litres (1.62 ± 0.38), PEFR in liters/second (3.11 ± 1.05), MVV in litres/minute (49.70 ± 14.11)\} were significantly reduced in biomass fuel subjects as compared to green fuel users. The mean exposure in hours was 3.5 hours/day with duration of exposure ranging from 8 to 30 years in the above-mentioned study14. Similarly, other studies show FEV1, FEV1/FVC%, FEF 25-75%, PEFR values were decreased statistically among the biomass affected subjects15. This attribute may be due to exposure of high concentration of pulmonary toxicants emitted during incomplete biomass fuel combustion and poorly ventilated environment. These alteration in pulmonary function parameters in biomass fuel exposed women may be avoided by improving adequate household ventilation, by improvement in stoves and change of the fuel type for cooking and heating.

The present study revealed the prevalence of respiratory symptoms of cough (39.4% vs. 21.1%), phlegm (22.7% vs. 13.1%), wheeze (30.3% vs. 15.2%), and breathlessness (19.7% vs. 6.1%) in biomass fuel affected group and controls, respectively. In this study, the higher prevalence of respiratory symptoms in biomass fuel exposed group may be due to unhygienic conditions, and poorly ventilated workplaces of the study areas as compared to the controls.

A study conducted in India reported cough as the common presenting symptom16, similar results was reported in Port Adelaide Australia17, where the presence of wood heaters at home was significantly associated with increased prevalence of respiratory symptoms in females.

Even if a study conducted in India shows obstructive pattern of pulmonary dysfunction in biomass fuel exposed females18, the present study indicates restrictive pulmonary dysfunction as the most evident lung disorder in biomass fuel smoke exposed women. The alteration in pulmonary function could be due to chronic inhalation of high concentration of respiratory toxicants present in biomass fumes. There are plenty of studies which reported ill effects of biomass fuel smoke on quality of life19.

Limitations of the Present Study: This was an interviewer administered cross sectional study which may be subjected to error in interpretation of terms by the interviewer and accurate recall by the participants. The study was unable to measure indoor emissions, indoor concentrations, outdoor concentration of air pollutants and amount of smoke exposure of the individual.

Conclusion

The findings of this study suggest the deteriorating effects of biomass fuels on the various pulmonary function parameters. High prevalence of abnormal lung function (37.9%) was indicated among biomass fuel smoke exposed women. Our study also indicates negative health consequences due to exposure from biomass smoke and other solid fuels in Ethiopia. These negative effects should not be ignored because such fuels will continue to be used by a large number of rural households in the predictable future in Ethiopia. Further research is recommended to investigate the biochemical and molecular mechanism if any, responsible for various pulmonary alterations due to biomass smoke.

Acknowledgments

We greatly extend our sincere thanks to local health authorities and the community female health extension workers of Alemayehu Mecha district who helped to collect data.

Conflict of Interest: The authors declare no conflict of interests.

Source of Funding: Jimma University College of Health Sciences

REFERENCES


Clinical Manifestation of Singleton Pregnancy Complicated by Diabetes Mellitus

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1MBChB, FICOG, Assistant Professor; 2MBChB, FICOG, Lecturer; Gynecology and Obstetrics Department, 3Professor, Community Medicine, Al- Kindy College of Medicine, Baghdad University, Iraq

ABSTRACT

Diabetes mellitus is one of the most frequently encountered medical disorders complicating pregnancy course. Some pregnant women are poorly control or unaware of having diabetes mellitus. We aimed to study clinical presentation and complications of different types of diabetes mellitus during pregnancy in women with variable glycemic control and awareness. Therefore, a randomized cross sectional study-research initiated in Baghdad, Elwiya-Teaching Hospital of Maternity, from the January, 1st. 2017, to Jan.1st 2018. Included 222 pregnant women with singleton pregnancies. Findings revealed that more frequent adverse maternal clinical presentations, maternal and neonatal complications and adverse outcome were associated with the poor glycemic control and unawareness about having diabetes mellitus. In conclusion, higher incidence of complications were seen in pregnant women who failed to reach an accepted glycemic control.

Keywords: Singleton pregnancy, diabetes mellitus, epidemiology, complications, Gestational diabetes, glycemic control

Introduction

The presence of Diabetes Mellitus (DM) is a significant and utmost frequently met health problem with its impact in term of complicating pregnancies. DM may be pre-gestational in onset, or gestational (GDM), which is diagnosed during pregnancy for the first time. Carbohydrate intolerance is a condition induced by the metabolic stress of pregnancy, resolves on its own after giving birth1,2. Diabetes mellitus represented a significant problem worldwide, particularly in developing countries due to the alteration in these countries towards industrialization with its effect on the life-styles diet-habits and higher prevalent obesity. The incidence of DM is increasing worldwide 3,4. Globally, 6 countries in the middle east among the top 10 countries in the world that have the higher prevalence rates of DM. A previous study in Iraq, reported high prevalence rates among Iraqi population in Basraah where almost 20% were affected, this higher prevalence had a significant burden on the health system, population life and economic resources of healthcare services 5. In Iraq, lack of education and sociocultural limitations represented the major hurdles, lead to inadequate ANC, failed risky pregnancies screening and failure of referral to appropriate healthcare services at right time6. In our country we have an increasing burden of facing a significant number of pregnant women with complications of undiagnosed diabetes 4, making our aim to raise the women awareness about these risks in order to decrease the adverse maternal, fetal and neonatal outcome. Therefore, in this study, we aimed to study clinical presentation and complications of different types of diabetes mellitus during pregnancy in women with variable glycemic control and awareness.

Patients and Method

The study was a random-cross-sectional design initiated in Baghdad, Elwiya-Teaching Hospital of Maternity, from the January, 1st. 2017, to Jan.1st 2018. Included 222 pregnant women with singleton pregnancies. All were either known cases of diabetes
during pregnancy or not aware of having impaired glucose tolerance at their first clinical presentation. All cases with other medical and obstetrical disorders were excluded. Detailed history and clinical examination findings were reported. Blood samples were sent for hemoglobin level, one hour postprandial blood sugar for those who were not known to be diabetic. Ultrasound was done to all women to ensure viability, gestational age, congenital anomalies, intrauterine growth restriction or death, accelerated fetal growth, and polyhydramnios. Doppler ultrasound performed at third trimester to exclude placental insufficiency. Participants were sub grouped according to their glycemic control to have good glycemic or poor control. Findings of clinical examination, ultrasonography and other variables were compared. Data analysis was performed using MINITAB soft. Appropriate statistical tests and procedures were applied accordingly with a level of significance of 0.05 (two tailed)

**Results**

Out of the 222 participants, 110 (49.5%) had good and 112 (50.5%) had poor glycemic control. One hundred fifteen ladies were unaware of having diabetes and 107 had different types of diabetes, with no significant difference in glycemic control between both sub groups. A significant association was found between good ANC and good glycemic control, (P<0.05). Poor glycemic control groups had more frequent history of macrosomia, (P<0.05). No significant differences were found regarding other variables(Table 1). Table 2 shows the clinical presentation according to glycemic control; women with poor glycemic control experienced more, fatigability and malaise, abdominal pain., premature contractions, preterm labor and Premature rupture of membranes, moniliasis, headache, decreased fetal movement, antepartum hemorrhage and hypertension, (P.value < 0.05). Table 3 shows the ultrasound findings in both groups; macrosomia and polyhydramnios and intrauterine growth restriction were significantly more frequent in poor glycemic control group. From other point of view, headache, preterm labor, urinary tract infection and decreased fetal movement were significantly more frequent among unaware sub group, (P<0.05), (Table 4). In (Table 5), on ultrasonography, unaware women had more frequent macrosomia and polyhydramnios compared to other subgroup, (P<0.05). Other findings were insignificantly different, (P>0.05). Finally, women who achieved higher levels of education were significantly more aware about their glycemic control, (P<0.05), (Table 6)

**Table 1: Maternal characteristics of studied groups according to glycemic control**

<table>
<thead>
<tr>
<th>Maternal characteristic</th>
<th>Details</th>
<th>Controlled</th>
<th>Uncontrolled</th>
<th>Total</th>
<th>P. value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>(n = 110)</td>
<td>(n = 112)</td>
<td>(n=222)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>No.</td>
<td>%</td>
<td>No.</td>
<td>%</td>
<td></td>
</tr>
<tr>
<td>Diagnosis of DM</td>
<td>Known</td>
<td>60</td>
<td>54.5</td>
<td>47</td>
<td>42.0</td>
</tr>
<tr>
<td></td>
<td>New</td>
<td>50</td>
<td>45.5</td>
<td>65</td>
<td>58.0</td>
</tr>
<tr>
<td>Age</td>
<td>&lt;35</td>
<td>68</td>
<td>61.8</td>
<td>70</td>
<td>62.5</td>
</tr>
<tr>
<td></td>
<td>≥35</td>
<td>42</td>
<td>38.2</td>
<td>42</td>
<td>37.5</td>
</tr>
<tr>
<td>BMI</td>
<td>&lt;30</td>
<td>62</td>
<td>56.4</td>
<td>70</td>
<td>62.5</td>
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<td>≥30</td>
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<td>37.5</td>
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<td>No</td>
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<td>Previous macrosomia</td>
<td>Yes</td>
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<td>54.5</td>
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<td>15</td>
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<tr>
<td></td>
<td>&gt;2</td>
<td>12</td>
<td>10.9</td>
<td>10</td>
<td>8.9</td>
<td>22</td>
<td>9.9</td>
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Table 2: Maternal clinical presentations according to glycemic control

<table>
<thead>
<tr>
<th>Clinical presentation</th>
<th>Controlled (n = 110)</th>
<th>Uncontrolled (n = 112)</th>
<th>Total (n = 222)</th>
<th>P. value</th>
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<tr>
<td></td>
<td>No.</td>
<td>%</td>
<td>No.</td>
<td>%</td>
</tr>
<tr>
<td>Fatigue &amp; malaise</td>
<td>73</td>
<td>66.4</td>
<td>96</td>
<td>85.7</td>
</tr>
<tr>
<td>Abdominal pain</td>
<td>50</td>
<td>45.5</td>
<td>84</td>
<td>75.0</td>
</tr>
<tr>
<td>Premature contractions</td>
<td>32</td>
<td>29.1</td>
<td>54</td>
<td>48.2</td>
</tr>
<tr>
<td>Preterm labor</td>
<td>5</td>
<td>4.5</td>
<td>18</td>
<td>16.1</td>
</tr>
<tr>
<td>Premature rupture of membranes</td>
<td>2</td>
<td>1.8</td>
<td>10</td>
<td>8.9</td>
</tr>
<tr>
<td>Moniliasis</td>
<td>32</td>
<td>29.1</td>
<td>54</td>
<td>48.2</td>
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<tr>
<td>Urinary tract infection</td>
<td>69</td>
<td>62.7</td>
<td>76</td>
<td>67.9</td>
</tr>
<tr>
<td>Headache</td>
<td>12</td>
<td>10.9</td>
<td>27</td>
<td>24.1</td>
</tr>
<tr>
<td>Blur vision</td>
<td>5</td>
<td>4.5</td>
<td>13</td>
<td>11.6</td>
</tr>
<tr>
<td>Decreased fetal movement</td>
<td>38</td>
<td>34.5</td>
<td>71</td>
<td>63.4</td>
</tr>
<tr>
<td>Antepartum hemorrhage</td>
<td>3</td>
<td>2.7</td>
<td>11</td>
<td>9.8</td>
</tr>
<tr>
<td>Hypertension</td>
<td>4</td>
<td>3.6</td>
<td>12</td>
<td>10.7</td>
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<tr>
<td>KETOACIDOSIS</td>
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<td>6</td>
<td>5.4</td>
</tr>
<tr>
<td>Abortion</td>
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<td>5</td>
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Table 3: Ultrasound findings according to glycemic control

<table>
<thead>
<tr>
<th>Ultrasound finding</th>
<th>Controlled (n = 110)</th>
<th>Uncontrolled (n = 112)</th>
<th>Total (n = 222)</th>
<th>P. value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No.</td>
<td>%</td>
<td>No.</td>
<td>%</td>
</tr>
<tr>
<td>Macrosomia</td>
<td>29</td>
<td>26.4</td>
<td>55</td>
<td>49.1</td>
</tr>
<tr>
<td>Polyhydramnios</td>
<td>35</td>
<td>31.8</td>
<td>79</td>
<td>70.5</td>
</tr>
<tr>
<td>Intrauterine growth restriction</td>
<td>13</td>
<td>11.8</td>
<td>46</td>
<td>41.1</td>
</tr>
<tr>
<td>Congenital anomalies</td>
<td>1</td>
<td>0.9</td>
<td>7</td>
<td>6.3</td>
</tr>
<tr>
<td>Intrauterine death</td>
<td>0</td>
<td>0.0</td>
<td>13</td>
<td>11.6</td>
</tr>
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</table>

Table 4: Maternal clinical presentations in pregnant women according to their awareness of diabetes

<table>
<thead>
<tr>
<th>Clinical presentation</th>
<th>Known diabetic (n = 107)</th>
<th>Newly diagnosed (n = 115)</th>
<th>Total (n = 222)</th>
<th>P. value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No.</td>
<td>%</td>
<td>No.</td>
<td>%</td>
</tr>
<tr>
<td>Fatigue &amp; malaise</td>
<td>83</td>
<td>77.6</td>
<td>86</td>
<td>74.8</td>
</tr>
<tr>
<td>Abdominal pain</td>
<td>60</td>
<td>56.1</td>
<td>74</td>
<td>64.3</td>
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</table>
Conted…

<table>
<thead>
<tr>
<th>Ultrasound Findings</th>
<th>Known diabetic (n = 107)</th>
<th>Newly diagnosed (n = 115)</th>
<th>Total (n=222)</th>
<th>P. Value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No.</td>
<td>%</td>
<td>No.</td>
<td>%</td>
</tr>
<tr>
<td>Macrosomia</td>
<td>27</td>
<td>25.2</td>
<td>57</td>
<td>49.6</td>
</tr>
<tr>
<td>Polyhydramnios</td>
<td>47</td>
<td>43.9</td>
<td>67</td>
<td>58.3</td>
</tr>
<tr>
<td>Intrauterine growth restriction</td>
<td>25</td>
<td>23.4</td>
<td>34</td>
<td>29.6</td>
</tr>
<tr>
<td>Congenital anomalies</td>
<td>2</td>
<td>1.9</td>
<td>6</td>
<td>5.2</td>
</tr>
<tr>
<td>Intrauterine death</td>
<td>7</td>
<td>6.5</td>
<td>6</td>
<td>5.2</td>
</tr>
<tr>
<td>Abnormal Doppler</td>
<td>5</td>
<td>4.7</td>
<td>8</td>
<td>7.0</td>
</tr>
</tbody>
</table>

Table 6: Association between level of education and awareness of DM among pregnant ladies

<table>
<thead>
<tr>
<th>Education</th>
<th>Known diabetic (n = 107)</th>
<th>Newly diagnosed (n = 115)</th>
<th>Total (n = 222)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No.</td>
<td>%</td>
<td>No.</td>
</tr>
<tr>
<td>Not-educated</td>
<td>35</td>
<td>32.7</td>
<td>52</td>
</tr>
<tr>
<td>Educated</td>
<td>72</td>
<td>67.3</td>
<td>63</td>
</tr>
<tr>
<td>Total</td>
<td>107</td>
<td>100.0</td>
<td>115</td>
</tr>
</tbody>
</table>

P. value = 0.026

Discussion

In our study we confirmed that almost half of the studied group had poor glycemic control and they were unaware about their status. We confirmed that participants better glycemic control was more in women who were more attending the ANC units. Murphy et al, demonstrated also that preconception approaches improve preparation for pregnancy reduce the risks of adverse pregnancy outcomes. Early detection and prompt management of diabetes during pregnancy can decrease maternal and fetal adverse outcomes. Vaginal moniliasis may be higher in diabetic pregnant women compared to non-diabetics, due to the increased levels of glucose in DM and the suppression in the immune system during pregnancy. Jodhpur city, Rajasthan, India from November 2012 to July 2013 and 50 pregnant women included as a control group without diabetes. All specimen from three sites (Vaginal swab, Throat swab & Urine, we found, higher prevalence of vaginal candidiasis, among pregnant women with poor glycemic control and also found to be more frequent in those who
were unaware of their diabetes. Similar findings reported in previous studies where a significant association had been documented between DM and higher incidence of vaginal candidiasis.

However, Sopian et al. found no association between diabetes and vaginal yeast infection in pregnant women. Higher prevalence of UTI in women with uncontrolled DM compared to the controlled cases was found, however, the difference did not reach the statistical significance. In 2016 and 2017 two studies reported that, no significant differences in the incidence of UTI between diabetic pregnant women and non-diabetics. Regarding clinical presentations, majority of these presentations were more frequent in poorly controlled group.

Mimouni F, et al. found that diabetic women were more likely to give pre-term birth. However, the relationship between DM and pre-term labor, is still under debate by many investigators, endocrinologists and obstetricians. However, Biswas R, found that preterm labor and birth weight >3.5 kg were independently associated with diabetes.

We found that PET & hypertension is increased more in diabetic women with poor glycemic control.

Kari et al. reported in 2017 that the occurrence of DM may possibly increase the likelihood of incidence of premature rupture membrane, that may result in an intense rise in the proportion of pregnancies related complications, which in turn, could lead to a dramatic escalation in the rate of pregnancy-related complications. The available data, however, are not sufficient in this regard in the literature. This study aims to examine pregnancy outcome in pregnant women with simultaneous diabetes mellitus/gestational diabetes and PPROM.

Materials and Methods: A total of 134 pregnant women with gestational diabetes (n = 99). According to our results we found that polyhydramnios in (51.35%) women and macrosomia affected (73.84%) neonates, and were more in pregnant women with uncontrolled DM and more frequent in those who were unaware of having diabetes. Adam et al. found in 2015 that

Almost 12% of non-diabetic normal women and up to 45% of diabetic women may have newborns with Macrosomia and that polyhydramnios in 56% of cases, and the majority were diabetics.

The higher risk of Macrosomias among diabetic women, could be attributed to the increase insulin resistance. The increased risk of macrosomia in DM is mainly due to the increased insulin resistance among these women, which lead to passing of larger amount of glucose via placenta to the circulation of fetus that later stored as fat tissue and lead to macrosomias.

Intrauterine growth restriction (IUGR) is diagnosed in DM is usually caused by placental dysfunction related to vasculopathy. IUGR is a common cause of iatrogenic prematurity, IUD, and predispose the child to cardiovascular disease and type 2 DM in the future. In our study, IUGR & IUD were both found in the studied diabetic pregnant women especially women with uncontrolled DM. Although more cases of IUGR were collected from the studied pregnant patients with newly diagnosed DM but without statistically significance. Similar results found in previous study of Corocran et al. in 2015.

Fetal congenital anomalies were more frequent in poor control and unaware subgroups, but the difference was statistically insignificant, however, some investigators found that infants malformation were more frequent by almost 2-3-folds in women with IDDM however, this higher rates are not documented in women with GDM. There was no statistical differences regarding the results of Doppler U/S in our study. Other studies found that uterine and umbilical artery vascular impedance in pregnancies complicated by gestational DM is related to birth weight and placental weight, but not to maternal HbA1c levels.

We found that women who achieved higher levels of education were more aware about their glycemic control and clearly had less obstetrical complications as discussed above. Liu showed that health education has positive effects on pregnancy outcomes of patients with GDM.

Conclusion

Patient’s education and awareness about the symptoms of diabetes was associated with less maternal and fetal complications and higher incidence of these complications are still seen in pregnant women who failed to reach an accepted glycemic control.

Ethical Clearance: All ethical issues were approved by the local ethical committee and the administration office of the hospital. Patients consents were obtained prior to their participation according to WMA Helsinki declaration, WMA 2013.

Conflict of Interest: Authors declared none.

Source of Funding: Self-funded.
REFERENCES


Association between SES, Health behavior and Periodontal Disease

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1Research Scholar, Department of Public Health Sciences, Graduate School, Korea University, Seoul, Korea; 2Professor, Department of Dental Hygiene, College of Health Sciences, Sunmoon University, Asan, Korea

ABSTRACT

Objective: The study was to use data from the Korea National Health and Nutrition Examination Survey (KNHANES) to association between SES, health behavior and periodontal disease.

Method: The survey selected a total of 5,677 adults aged 19 years. Dependent variable of oral health was based on presence of periodontal disease. Independent variable was childhood, adulthood SES and heath behavior. Complex sample logistic regression analysis was performed on the effects of SES and health behavior on oral health.

Findings: All variables were adjusted and the factors that affect periodontal disease were identified as demographic factors (gender and age) and health behavior factors (floss, brush, mouth rinse, and smoking). using dental floss, as compared to not using dental floss (OR=1.63, 95% CI: 1.31-2.01); daily tooth brusing of ≥3 times, as compared to ≤1 time (OR=2.76, 95%CI: 2.33-3.28); using dental rinse, as compared to not using (OR=0.76, 95%CI: 0.61-0.94); and smoking, as compared to not smoking (OR=0.46, 95%CI: 0.36-0.59) were found to affect periodontal disease.

Improvements: Independent association between SES and periodontal disease was identified and the oral health behavior and smoking status were the factors with the most significant influence on periodontal diseases. Based on reports of SES-associated oral health inequalities, policy intervention by the government is needed to promote oral health through active oral health education programs.

Keyword: adulthood SES, childhood SES, health behavior, oral health behavior, periodontal disease

Introduction

Despite efforts to promote oral health in citizens of countries worldwide, oral diseases still remain a burdensome issue that affects the entire population, and especially, the vulnerable population.1 Various social, economic, and environmental factors are known to affect oral health.2 In particular, there is a growing interest in the significance of socioeconomic status (SES) in the etiology of diseases. Health-related behavior, health service utilization, degree of stress, and psychosocial resources have been suggested as the mediating mechanism for explaining the association between SES and health, while income and education levels have been reported as variables that can explain SES.3

SES refers to the total measure of economic ability and social status of an individual or a household based on income and education level.4 People with higher SES are known to be healthier than those with lower SES;5 6 and Petersen claimed that socioeconomic factors have a direct impact on oral health through their effects on dental care utilization and oral health behavior.7 Watt reported that among the significant influencing factors of oral health status of individuals or groups, SES was associated with poor oral health status of groups.8

Case et al. reported that the association between SES and oral health is present even during childhood and the association increases with aging.9 Generally, parents
play a major role since they are involved in health care of children in most cases. Oral health is a phenomenon that appears to result from cumulative effects over time, and previous studies have shown that inequalities in oral health were identified through the association of oral health and SES of the parents.\textsuperscript{10-13} Health behavior has a major impact on the health of an individual and plays a definitive role in the acceptance and maintenance of preventive health behavior.\textsuperscript{14} Among the indicators of personal health, oral health-related behavior plays an important role in prevention and onset of chronic diseases;\textsuperscript{15} to date, the association between oral health behavior and oral health has been reported to include variables such as tooth brushing, use of dental floss, dental care utilization, and smoking.\textsuperscript{16, 17}

Few studies have investigated SES, a major influencing factor of oral health, in childhood and adulthood, and studies that identified by effect size of health behavior on oral health are also rare. Therefore, it is necessary to investigate oral health according to social polarization, while also identifying the effect size of health behavior.

The present study aims to assess the association between SES, health behavior and periodontal disease.

**Materials and Method**

**Subjects and data collection:** The present study used data from Korea National Health and Nutrition Examination Survey (KNHANES) VI-2 (2014). This data was approved by the Institutional Review Board of Korea Centers for Disease Control and Prevention (2013-12EXP-03-5C). The target population in data included 9,701 people, of whom 7,550 people participated in the survey (participation rate, 77.8%). The survey selected a total of 5,677 adults aged 19 years and older who completed the health questionnaire and health examination.

**Study materials:** Childhood SES consisted of questions about the education level of the parents: paternal education level (<10 years or ≥10 years) and maternal education level (<10 years or ≥10 years). For adulthood SES, education level were binary variable (<10 years or ≥10 years). Personal income level were converted to low level(<50%) and high level(50-100%).

Demographic factors included gender and age (19 years or older).

Health behaviors included the following factors: frequency of tooth brushing, use of dental floss, use of interdental brush, use of mouth rinse, use of electric tooth brush, and drinking, and smoking. Frequency of tooth brushing was categorized as ≤1, 2, and ≥3 times/day. For the use of oral hygiene products (dental floss, interdental brush, mouth rinse, and electric tooth brush), response was given as either “Yes” or “No.” Drinking status was categorized as “Yes” for consumption of at least one serving of alcohol in the past one year and “No” for otherwise. Smoking status was categorized as “Yes” for current smokers and “No” for non-smokers.

Oral health was based on presence of periodontal disease. Based on the community periodontal index (CPI) measured by a dentist during an oral examination, CPI 3 and 4 were defined as periodontal disease; whereas, CPI 0, 1, and 2 were defined as non-periodontal disease.

**Methods of Analysis:** KNHANES used rolling survey sampling to ensure that the sampled data for each year were highly representative. For accurate data analysis, weighted value was applied to each individual using primary sampling unit (PSU) and K strata. Accordingly, the present study used complex sampling analysis. Complex sample chi-square test was performed on oral health according to SES and health behavior. Complex sample logistic regression analysis was performed on the effects of SES and health behavior on oral health. The effects of childhood and adulthood SES on periodontal disease were established as Models 1 and 2, respectively; the effects of demographic factor and health behavior on periodontal disease was established as Model 3; and the model with all factors adjusted was established as Model 4. Odds ratio (OR) and 95% confidence interval (CI) were derived. Statistical analysis on the collected data was performed using PASW Statistics 22.0 version (IBM Co., Armonk, NY, USA). Statistical significance level was set to 0.05.

**Results**

**Childhood SES, adulthood SES, and periodontal diseases:** In the association between periodontal diseases and demographic characteristics, males (35.7%) showed statistically significantly higher incidence of periodontal diseases than females (22.9%; p<0.001). With respect to periodontal diseases by age, the mean age of those with periodontal disease was 54.0 years, which was statistically significantly higher than 42.4 years for those without
periodontal disease (p<0.001). In the association between childhood SES and periodontal diseases, incidence of periodontal disease was 16.3% and 35.6% in those with paternal education level of ≥10 and <10 years, respectively. Lower paternal education level showed higher incidence of periodontal disease and the difference was statistically significant (p<0.001). Lower maternal education level also showed higher incidence of periodontal disease and the difference was statistically significant (p<0.001). In the association between adulthood SES and periodontal diseases, lower education level showed statistically significantly higher incidence (incidence rate, 45.8%) of periodontal disease(p<0.001). Likewise, lower income showed significantly higher incidence (incidence rate, 31.3%) of periodontal disease (p=0.01). In the association between health behavior and periodontal diseases, daily tooth brushing of ≤1 time showed the highest incidence of periodontal disease (incidence rate, 40.9%), while daily tooth brushing of ≥3 times showed an incidence of periodontal disease of 23.7%. Lower frequency of daily tooth brushing showed higher incidence of periodontal disease and the differences were statistically significant (p<0.001). Not using dental floss showed statistically significantly higher incidence of periodontal disease with 32.7% (p<0.001). Similarly, not using interdental tooth brush showed significantly higher incidence of periodontal disease with 30.1% (p=0.002). Smokers also showed statistically significantly higher incidence of periodontal disease with 40.8% (p<0.001) (Table 1).

**Effects of childhood SES, adulthood SES, and health behavior on periodontal diseases:** In Model 1, Paternal education and periodontal diseases were statistically significant. In Model 2, SES and periodontal diseases were statistically significant. In Model 3, Sex, age, brushing, floss, smoking and and periodontal diseases were statistically significant. In Model 4, all variables were adjusted and the factors that affect periodontal disease were identified as demographic factors (gender and age) and health behavior factors (floss, brush, mouth rinse, and smoking). Being a male, as compared to being a female (OR=1.63, 95% CI: 1.31-2.01); being of higher age, as compared to being of lower age (OR=2.76, 95%CI: 2.33-3.28); using dental floss, as compared to not using dental floss (OR=1.63, 95% CI: 1.31-2.01); daily tooth brushing of ≥3 times, as compared to ≤1 time (OR=2.76, 95%CI: 2.33-3.28); using dental rinse, as compared to not using (OR=0.76, 95%CI: 0.61-0.94); and smoking, as compared to not smoking (OR=0.46, 95%CI: 0.36-0.59) were found to affect periodontal disease (Table 2).

**Table 1: Periodontal diseases according to Characteristics and SES, health behavior (% Weighted)**

<table>
<thead>
<tr>
<th>Factor</th>
<th>Variable</th>
<th>Category</th>
<th>Non-periodontal disease</th>
<th>Periodontal diseases</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Demographic factor</strong></td>
<td>Sex</td>
<td>Male</td>
<td>64.3</td>
<td>35.7</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Female</td>
<td>77.1</td>
<td>22.9</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Age*</td>
<td>&lt;10 year</td>
<td>42.4 ± 0.57</td>
<td>54.0 ± 0.53</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td><strong>Childhood SES</strong></td>
<td>Father education</td>
<td>&lt;10 year</td>
<td>64.4</td>
<td>35.6</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td></td>
<td></td>
<td>≥10 year</td>
<td>83.7</td>
<td>16.3</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mother education</td>
<td>&lt;10 year</td>
<td>65.4</td>
<td>34.6</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td></td>
<td></td>
<td>≥10 year</td>
<td>87.9</td>
<td>12.1</td>
<td></td>
</tr>
<tr>
<td><strong>Adulthood SES</strong></td>
<td>Education</td>
<td>&lt;10 year</td>
<td>54.2</td>
<td>45.8</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td></td>
<td></td>
<td>≥10 year</td>
<td>76.8</td>
<td>23.2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Income</td>
<td>Low level</td>
<td>68.7</td>
<td>31.3</td>
<td>0.010</td>
</tr>
<tr>
<td></td>
<td></td>
<td>≥1 level</td>
<td>73.0</td>
<td>27.0</td>
<td></td>
</tr>
<tr>
<td><strong>Health behavior</strong></td>
<td>Brush</td>
<td>≤1</td>
<td>59.1</td>
<td>40.9</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td></td>
<td></td>
<td>2</td>
<td>68.6</td>
<td>31.4</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>≥3</td>
<td>76.3</td>
<td>23.7</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Floss</td>
<td>No</td>
<td>67.3</td>
<td>32.7</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Yes</td>
<td>84.9</td>
<td>15.1</td>
<td></td>
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Conted…

<table>
<thead>
<tr>
<th>Variable</th>
<th>Model 1</th>
<th>Model 2</th>
<th>Model 3</th>
<th>Model 4</th>
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</thead>
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<tr>
<td></td>
<td>OR</td>
<td>95% CI</td>
<td>OR</td>
<td>95% CI</td>
</tr>
<tr>
<td>Father education</td>
<td>&lt;10 year</td>
<td>1.64***</td>
<td>1.29-2.08</td>
<td>1.11</td>
</tr>
<tr>
<td>Mother education</td>
<td>&lt;10 year</td>
<td>2.63***</td>
<td>1.96-3.53</td>
<td>2.76***</td>
</tr>
<tr>
<td>Education</td>
<td>&lt;10 year</td>
<td>2.76***</td>
<td>2.33-3.28</td>
<td>0.96</td>
</tr>
<tr>
<td>Income (ref. high level)</td>
<td>Low level</td>
<td>1.05</td>
<td>0.89-1.24</td>
<td>1.64***</td>
</tr>
<tr>
<td>Sex (ref. female)</td>
<td>Male</td>
<td>1.64***</td>
<td>1.37-1.95</td>
<td>1.63***</td>
</tr>
<tr>
<td>Age</td>
<td>Male</td>
<td>1.05***</td>
<td>1.05-1.06</td>
<td>1.05***</td>
</tr>
<tr>
<td>Brush (ref. ≥3)</td>
<td>≤1</td>
<td>1.55**</td>
<td>1.19-2.02</td>
<td>1.53**</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>1.18</td>
<td>0.99-1.41</td>
<td>1.17</td>
</tr>
<tr>
<td>Floss (ref. yes)</td>
<td>No</td>
<td>1.79***</td>
<td>1.43-2.24</td>
<td>1.76***</td>
</tr>
<tr>
<td>Interdental (ref. yes)</td>
<td>No</td>
<td>0.96</td>
<td>0.75-1.24</td>
<td>0.94</td>
</tr>
<tr>
<td>Mouth rinse (ref. yes)</td>
<td>No</td>
<td>0.74**</td>
<td>0.61-0.89</td>
<td>0.76*</td>
</tr>
<tr>
<td>Elector tooth brush (ref. yes)</td>
<td>No</td>
<td>1.07</td>
<td>0.76-1.51</td>
<td>1.05</td>
</tr>
<tr>
<td>Drink (ref. yes)</td>
<td>No</td>
<td>1.12</td>
<td>0.94-1.34</td>
<td>1.14</td>
</tr>
<tr>
<td>Smoking (ref. yes)</td>
<td>No</td>
<td>0.47***</td>
<td>0.37-0.58</td>
<td>0.46***</td>
</tr>
</tbody>
</table>

*p<0.05, **p<0.01, ***p<0.001

**Table 2:** Results of logistic regression analysis for association between periodontal disease and childhood SES, Adults SES, health behavior factor

Discussion

The present study investigated the effects of SES categorized into childhood and adulthood SES, and health behavior on oral health. With regard to oral health, investigation of incidence of periodontal diseases showed the following results. The prevalence of periodontal diseases among Korean adults aged 19 years or older was found to be approximately 29%. The reported prevalence of periodontal diseases varies according to different countries around the world, and various epidemiological associations have been reported to reduce the prevalence of periodontal diseases. This study results (Model 4), which included childhood SES, adulthood SES, and health behavior, SES and periodontal diseases did not show statistically significant association, while health behavior alone appeared to be associated with periodontal diseases. Other studies on SES and periodontal diseases have reported that the independent influence of SES on periodontal diseases was found to be sufficient, but when the behavior of smoking was introduced, smoking had a greater influence on periodontal disease than SES, which supported the findings of the present study. In a study by Marcheasan JT et al., use of dental floss was reported to improve oral health, which was consistent.
with the finding of the present study. Various studies have reported that use of oral hygiene products can help improve oral health, which supported the findings of the present study. The incidence of periodontal diseases increases with age, and as a result, social costs associated with periodontal diseases increase. Oral health programs at national or community level are required to reduce such social costs. Efforts should focus on the development and promotion of education programs on oral health behavior and prevention of smoking, which were found to have the most significant influence on periodontal diseases.

Our study had the following limitations. First, childhood SES was associated with the paternal and maternal education level, but association with economic income levels could not be identified. Second, the models were established with the risk factors of periodontal disease limited to SES and health behavior, hence, other risk factors could not be adjusted. However, despite such limitations, the present study showed that the association between SES and periodontal disease was independent, and oral health behavior and non-smoking were factors with the biggest influence on periodontal diseases.

**Conclusion**

In this study, we confirmed the positive relationship between SES and periodontal disease was identified with following details:

1. Independent association between SES and periodontal disease was identified.
2. Oral health behavior and smoking status were the factors with the most significant influence on periodontal diseases.

**Ethical Clearance:** Not required

**Source of Funding:** Self

**Conflict of Interest:** SES, health behavior and periodontal disease

**REFERENCES**


The Effects of Job Satisfaction on Organizational Commitment in Korea Dental Hygienist: Organizational Communication Mediation Model

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ABSTRACT

Objectives: This study aimed to assess the relationship between job satisfaction, organizational communication, and organizational commitment in dental hygienists, and understand the mediating effect of organizational communication.

Method: The study was conducted with dental hygienists from the Chungnam region, selected using non-random convenience sampling. Measures were 5 items of job satisfaction, 12 items of organizational communication, and 5 items of organizational commitment. The analysis was performed on the participants’ general characteristics, frequency of the study variables and correlation analysis. Researchers also analyzed the structural model combining CFA and Path analysis.

Findings: Job satisfaction affects organizational commitment (β=.292, p<.001), job satisfaction affects organizational communication satisfaction (β=.670, p<.001), and organizational communication satisfaction affects organizational commitment (β=.546, p<.001). The effect of job satisfaction on organizational commitment was statistically significant (Direct effect=.292, p<.001). For the effect of job satisfaction on organizational commitment, organizational communication was a partial mediating factor (indirect effect=.366, p<.001, total effect=.658, p<.001).

Conclusions: The fact that the indirect effect using organizational communication as a mediating factor was greater for the effect of job satisfaction on organizational commitment shows the importance of organizational communication in organizational commitment. To increase organizational commitment, active communication within an organization is necessary.

Keyword: Dental hygienist, Job satisfaction, Organizational commitment, Organizational communication

Introduction

Dental hygienists are professional workers that can facilitate the prevention of oral disease via clinical and educational interventions. They perform dental scaling and educate patients on oral health in dental clinics and have direct interactions with patients. ¹ Undoubtedly, dental hygienists are an important part of the dental clinic, performing various roles. ²³ However, organizational commitment of dental hygienists – who are professional workers as mentioned above – tends to be on the lower. In the Korean Healthcare Employee Satisfaction Survey 2016, turnover intention of dental hygienists was 61.8%, which consequently affected average length of service. ⁴ Dental hygienists’ job satisfaction and employment status are important research issues. ⁵⁶ It is important to note that this subject arouses interest is a must for the organizational commitment of dental hygienists.
Organizational commitment was defined as the individual’s psychological attachment to the organization. That’s shows the employee’s voluntary active attitude towards working, and not being limited to fulfilling what has been outlined by the organization. Increasing the organizational commitment level allows recruitment of talented individuals, which consequently brings the company ahead in corporate-level competition. The most important factor of organizational commitment is job satisfaction.

Job satisfaction indicates the level of satisfaction that individuals experience related to their work. Defined job satisfactions as people’s thoughts on their job that affect work performance, and as their emotional response to the outcomes of their work. There have been many studies on job satisfaction, also within healthcare-related jobs. There have been studies on job satisfaction of dental hygienists there was also a study on the relationship between job satisfaction and education level. However, only a few studies have assessed the relationship between job satisfaction and organizational commitment in dental hygienists.

Organizational communication is one of the key factors affecting organizational commitment. Organizational communication was associated with better organizational commitment. Many of the studies confirming the role of organizational communication on the relationship between job satisfaction and organizational communication were large-scale studies focusing on large organizations. Dental hygienists work at bigger, general hospitals as well, but many of them work in smaller-sized dental clinic settings. Therefore, the effect of organizational communication of dental hygienists on their organizational commitment needs to be validated.

In the healthcare field, the most active area of research was the relationship between job satisfaction and organizational communication, commitment, and turnover. Rarely any studies have focused on the organizational commitment of dental hygienists. It is necessary to confirm that it affects the enhancement of organizational commitment of dental hygienist. Therefore, this study aimed to assess the relationship between job satisfaction, organizational communication, and organizational commitment in dental hygienists, and understand the mediating effect of organizational communication.

Materials and Method

Study Design and Participants: The study was conducted with dental hygienists from the Chungnam region, selected using non-random convenience sampling, and who agreed to participate in the study after receiving an explanation on the purpose of the study. The participants completed self-administered surveys between May 20, 2013 – July 23, 2013. A total of 234 surveys were collected, and 217 surveys – after excluding 17 surveys that contained insufficient responses or information – were used for the final analyses. Our study was carried out in accordance with the ethical principles of the Helsinki Declaration.

Data Collection: The survey used in this study is a modified version of the survey used in studies by Mowday et al. to better reflect the purpose of this study. There were 5 questions related to job satisfaction. The responses – based on 7-point Likert scales – ranged from “Strongly disagree (1)” to “Strongly agree (7).” With Cronbach’s α=.883, higher scores indicated higher job satisfaction.

There were 12 questions related to satisfaction in organizational communication. Cronbach’s α=.930, higher scores indicated higher satisfaction in organizational communication.

Lastly, there were 5 questions related to organizational commitment. Cronbach’s α=.916, higher scores indicated higher organizational commitment.

Statistical Analysis: The analysis was performed on the participants’ general characteristics, frequency of the study variables, and descriptive statistics. Correlation analysis was performed among organizational communication, job satisfaction, and organizational commitment. To create a structural model, the correlations were assessed after setting satisfaction in organizational communication, job satisfaction, and organizational commitment as latent variables. In other words, a Structural Equation Model (SEM) – a model combining Confirmatory Factor Analysis (CFA) and Pathway Analysis – was created. Goodness of fit was assessed using the Tucker-Lewis index (TLI), comparative fit index (CFI), and root mean square error of approximation (RMSEA). Values of TLI>.9, CFI >.9, and RMSEA<.05 were indicative of good fit. All analyses were performed using SPSS version 22, and the structural equation model was analyzed using Mplus 7.0 software.
Results

Study Participants’ Characteristics: General characteristics of the study participants are outlined in Table 1. The range and average of the age of the participants were 21 – 42 years and 26.0 years respectively. The range and average of the work career of the participants were 1 – 17 years and 3.2 years respectively. It was found that 66.4% of the participants had ≤3 years of education level, and the remaining 33.6% had ≥4 years of education level. For the monthly income, 24.0% had ≤1,500,000 KRW, 34.1% had 1,510,000 – 2,000,000 KRW, and 25.8% had ≥2,010,000 KRW.

Correlations between key variables: The average scores for job satisfaction, organizational communication satisfaction, and organizational commitment were 23.33 ± 5.17, 50.65 ± 13.0, and 20.9 ± 7.57 respectively. Looking at the correlations or associations in Table 2, the following variables showed statistically significant relationships: Job satisfaction and Organizational communication satisfaction (r=.565, p<.001); Job satisfaction and Organizational commitment (r=.547, p<.001); and Organizational communication satisfaction and Organizational commitment (r=.634, p<.001). In other words, higher job satisfaction was associated with higher organizational communication satisfaction and organizational commitment, and higher organizational communication satisfaction was associated with higher organizational commitment. The correlations observed were positive.

Correlations in structural model: The CFA results showed moderate levels of factor loading (≥.5) (Table 3). Goodness of fit assessment for the Job satisfaction model showed values of CFI=1.000 TLI=1.000, RMSEA=.000, and SRMR=.001, indicating good model fit. Goodness of fit assessment for the organizational communication satisfaction model showed values of CFI=.968 TLI=.946 RMSEA=.0820, and SRMR=.037, also indicating good model fit. Lastly, goodness of fit assessment for the organizational commitment model showed values of CFI=1.000 TLI=1.000 RMSEA=.044, and SRMR=.001, again indicating good model fit. Table 4 shows the regression coefficients and statistical significance of the structural model. Job satisfaction affects organizational commitment (β=.292, p<.001), job satisfaction affects organizational communication satisfaction (β=.670, p<.001), and organizational communication satisfaction affects organizational commitment (β=.546, p<.001). Goodness of fit assessment for the structural model showed values of CFI=.942, TLI=.927, RMSEA=.073, and SRMR=.049, indicating good model fit. Table 5 shows direct and indirect effects of the structural model. The effect of job satisfaction on organizational commitment was statistically significant (Direct effect=.292, p<.001). For the effect of job satisfaction on organizational commitment, organizational communication was a partial mediating factor (indirect effect = .366, p<.001, total effect = .658, p<.001) (Fig. 1). Therefore, not only does job satisfaction have a direct effect on organizational commitment, it also has an indirect effect on organizational commitment using organizational communication satisfaction as a mediating factor.

Table 1: Study participants’ characteristics (N = 37)

<table>
<thead>
<tr>
<th>Category</th>
<th>Variable</th>
<th>N (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age* (21-24)</td>
<td>26.0 (4.28)</td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td>Male</td>
<td>2 (5.4)</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>35 (94.6)</td>
</tr>
<tr>
<td>Education level</td>
<td>≤College 3year course</td>
<td>144 (66.4)</td>
</tr>
<tr>
<td></td>
<td>≥University 4year course</td>
<td>73 (33.6)</td>
</tr>
<tr>
<td>Monthly</td>
<td>≤1,500,000 won</td>
<td>52 (24.0)</td>
</tr>
<tr>
<td></td>
<td>1,510,000-2,000,000</td>
<td>74 (34.1)</td>
</tr>
<tr>
<td></td>
<td>≥2,010,000 won</td>
<td>56 (25.8)</td>
</tr>
<tr>
<td></td>
<td>No response</td>
<td>35 (16.1)</td>
</tr>
</tbody>
</table>

*Mean (Standard deviation)

Table 2: Correlation analysis of variables

<table>
<thead>
<tr>
<th>Job satisfaction</th>
<th>Organizational communication satisfaction</th>
<th>Organizational commitment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Job satisfaction</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Organizational communication satisfaction</td>
<td>.565***</td>
<td>1</td>
</tr>
<tr>
<td>Organizational commitment</td>
<td>.547***</td>
<td>.634***</td>
</tr>
</tbody>
</table>

*** p<0.001
Table 3: Factor loadings of variables (CFA)

<table>
<thead>
<tr>
<th>Factor</th>
<th>Question number</th>
<th>Non-standardized factor loading</th>
<th>SE</th>
<th>Factor loading</th>
</tr>
</thead>
<tbody>
<tr>
<td>Job satisfaction</td>
<td>Q1</td>
<td>1.000</td>
<td>0.000</td>
<td>0.741</td>
</tr>
<tr>
<td></td>
<td>Q2</td>
<td>1.029</td>
<td>0.078</td>
<td>0.771</td>
</tr>
<tr>
<td></td>
<td>Q3</td>
<td>1.033</td>
<td>0.098</td>
<td>0.800</td>
</tr>
<tr>
<td></td>
<td>Q4</td>
<td>0.983</td>
<td>0.113</td>
<td>0.684</td>
</tr>
<tr>
<td></td>
<td>Q5</td>
<td>1.131</td>
<td>0.107</td>
<td>0.818</td>
</tr>
<tr>
<td>Organizational communication satisfaction</td>
<td>Q1</td>
<td>1.000</td>
<td>0.000</td>
<td>0.627</td>
</tr>
<tr>
<td></td>
<td>Q2</td>
<td>1.178</td>
<td>0.093</td>
<td>0.698</td>
</tr>
<tr>
<td></td>
<td>Q3</td>
<td>1.097</td>
<td>0.098</td>
<td>0.691</td>
</tr>
<tr>
<td></td>
<td>Q4</td>
<td>0.109</td>
<td>0.097</td>
<td>0.719</td>
</tr>
<tr>
<td></td>
<td>Q5</td>
<td>1.118</td>
<td>0.127</td>
<td>0.712</td>
</tr>
<tr>
<td></td>
<td>Q6</td>
<td>0.899</td>
<td>0.132</td>
<td>0.539</td>
</tr>
<tr>
<td></td>
<td>Q7</td>
<td>1.117</td>
<td>0.135</td>
<td>0.663</td>
</tr>
<tr>
<td></td>
<td>Q8</td>
<td>1.142</td>
<td>0.130</td>
<td>0.729</td>
</tr>
<tr>
<td></td>
<td>Q9</td>
<td>1.288</td>
<td>0.136</td>
<td>0.807</td>
</tr>
<tr>
<td></td>
<td>Q10</td>
<td>1.288</td>
<td>0.140</td>
<td>0.775</td>
</tr>
<tr>
<td></td>
<td>Q11</td>
<td>1.184</td>
<td>0.140</td>
<td>0.686</td>
</tr>
<tr>
<td></td>
<td>Q12</td>
<td>1.115</td>
<td>0.120</td>
<td>0.779</td>
</tr>
<tr>
<td>Organizational commitment</td>
<td>Q1</td>
<td>1.000</td>
<td>0.000</td>
<td>0.914</td>
</tr>
<tr>
<td></td>
<td>Q2</td>
<td>0.955</td>
<td>0.058</td>
<td>0.858</td>
</tr>
<tr>
<td></td>
<td>Q3</td>
<td>0.950</td>
<td>0.067</td>
<td>0.783</td>
</tr>
<tr>
<td></td>
<td>Q4</td>
<td>0.815</td>
<td>0.062</td>
<td>0.749</td>
</tr>
<tr>
<td></td>
<td>Q5</td>
<td>0.932</td>
<td>0.086</td>
<td>0.774</td>
</tr>
</tbody>
</table>

Confirmatory factor analysis (CFA)

Table 4: The result of path coefficient

<table>
<thead>
<tr>
<th>Path</th>
<th>β</th>
<th>SE</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Job satisfaction → organizational commitment</td>
<td>0.292</td>
<td>0.104</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Job satisfaction → organizational communication satisfaction</td>
<td>0.670</td>
<td>0.191</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Organizational communication satisfaction → organizational commitment</td>
<td>0.546</td>
<td>0.121</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

Table 5: Direct and indirect effects

<table>
<thead>
<tr>
<th>Path</th>
<th>Direct effect</th>
<th>Indirect effect</th>
<th>Total effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Job satisfaction → organizational commitment</td>
<td>0.292***</td>
<td>0.366***</td>
<td>0.658***</td>
</tr>
<tr>
<td>Job satisfaction → organizational communication satisfaction</td>
<td>0.670***</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Organizational communication satisfaction → organizational commitment</td>
<td>0.546***</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*** p<0.001
Discussion

In this study, the effect of job satisfaction and organizational communication of dental hygienists on organizational commitment, as well as the mediating effect of organizational communication, were validated. The following discussion points can be made from the above results.

First, there were statistically significant correlations between job satisfaction, organizational communication satisfaction, and organizational commitment. Looking at the correlation between job satisfaction and organizational communication, the results from the study by Deriba BK et al. 12 which indicated a correlation between job satisfaction and organizational communication support our findings. In addition, high correlation between organizational communication and job satisfaction, again supporting our findings.13,14 Looking at the correlation between job satisfaction and organizational commitment, some studies confirmed the effect of job satisfaction on organizational commitment.27,28 Again supporting the results of our study. A correlation between organizational communication and organizational commitment was reported in our study. Also, according to our study, dental hygienists’ job satisfaction was high, similar to previous studies.6,16 Dental hygienists can be considered to value their careers.

Second, when job satisfaction had an effect on organizational commitment, there was a partial mediating effect coming from organizational communication. Looking at the correlation between organizational communication and organizational commitment, previous studies by Postmes et al.19 and Putti et al.20 showed that the effect of organizational communication on organizational commitment was greater for communication with management or the board of directions compared to co-workers, partially supporting the findings of this study. From this study, the indirect effect when organizational communication was mediating exhibited stronger effectiveness compared to the direct effect. job satisfaction on organizational communication, indicating that organizational communication plays an important role in organizational commitment. Therefore, to increase organizational communication, active communication within the organization is necessary. The communication ability of individual workers is crucial within their work environment. Communication ability of the dental hygienist likely contributes to organizational commitment. A comparably high turnover rate for dental hygienists is not only a problem of the individuals, but also a problem of a manpower shortage for opening clinics. It is important to enhance individuals’ communication ability so that active organizational communication and consequently increased organizational commitment can be achieved for dental hygienists.

This study was limited by its cross-sectional nature. Therefore, it would be difficult to describe the cause-and-effect relationship between job satisfaction and organizational commitment. Moreover, the study was completed on a cohort of dental hygienists, and generalization of the findings must be done with caution. However, the study was meaningful in that it provided significant outcomes confirming the mediating effect of organizational communication through the structural model of correlations among job satisfaction, organizational communication, and organizational commitment of the dental hygienist cohort.

Conclusion

The fact that the indirect effect – using organizational communication as a mediating factor – was greater for the effect of job satisfaction on organizational commitment shows the importance of organizational communication in organizational commitment. To increase organizational commitment, active communication within an organization is necessary.

Ethical Clearance: Not required

Source of Funding: Self

Conflict of Interest: None declared.
References
22. Lambert EG, Qureshi H, Klahm C, Smith B, Frank J. The effects of perceptions of organizational structure on job involvement, job satisfaction, and organizational commitment among Indian police


Effectiveness of the Otaria’s Postpartum Gymnastic Model and Caregiver Assistance on Decreasing of Uterine Fundal Height in Postpartum Mothers

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ABSTRACT

Postpartum gymnastic is one of the efforts to restore the postpartum mother’s womb, therefore the development of postpartum gymnastic to get an effective gymnastic model is still needed. The purpose of this study was to assess the effectiveness of the Otaria postpartum gymnastic model and caregiver assistance to reduce of postpartum maternal uterine fundal height, using matching pretest-posttest with control group, involved 160 postpartum maternal. The final results based on the General Linear Model-Repeated Measures (GLM-RM) for the difference (∆) between of uterine height in the intervention group and the control group showed that a very significant difference occurred on the 6th day to the 7th day postpartum with a difference of 1.65 cm (p<0.05). Conclusion, that by implementing Otaria’s postpartum gymnastic model and caregiver assistance, the uterine height will return to its normal form on the 7th day postpartum.

Keywords: Postpartum, Gymnastic, Caregiver, Uterine Fundal Height

Introduction

The maternal mortality rate has decreased since 2002 at 307 per 100,000 live births, and in 2008 it was 228 per 100,000 live births, but the MMR increased again in 2012 to 359 per 100,000 live births. Based on the evaluation of the Millennium Development Goals (MDGs) in 2015, cases of maternal deaths in Indonesia are still 305 per 100,000 live births, even though the target set by the United Nations is 102 per 100,000 live births, the program has not been implemented properly so that the program is currently being continued through Sustainable Developments Goals (SDGs) with the target is to reduce maternal mortality to below 70 per 100,000 live births by 2030.(1) The cause of maternal death in Indonesia is still dominated by bleeding, namely 32%, hypertension 25%, followed by 5% infection, 5% prolonged labor and 1% abortion. One of the causes of the bleeding is uterine atony.(2)

Uterine involution is the process of the uterus returning to the condition before pregnancy. Uterine involution in postpartum mothers must return well, so that there is no uterine sub involution or delayed uterine return to normal size which caused bleeding, and occurs diastasis recti abdominis or separation of the right and left side of the rectus abdominis.(3) To restore reproductive organs, postpartum mothers need effective postpartum care, including early mobilization and exercise. Contraction of the abdominal muscles will help the process of uterine involution, with ambulation as soon as possible and frequency is often very necessary in the process of uterine involution,(4) (there was relationship between early mobilization and involution). The results of similar the study in Lampung showed that the factors associated with a decreased in uterine fundal height in postpartum mothers were early mobilization.(5)
The cause of diastasis recti is the softening of the ligament due to hormones resulting in very rapid stretching of the abdominal wall due to uterine enlargement. The results of the study on the application of transversus abdominis muscle strengthening exercises in postpartum mothers have a significant relationship with a high decrease in uterine.

South Jakarta Health Center has the highest number in performing postpartum services by health workers, which is 35,588/year. South Jakarta is ranked the second highest in capital city of Jakarta, which is 38,832. Whereas in Lampung Province there are 115 Public Health Center units inpatient care and 85 units (73.9%) there are basic essential obstetric neonatal health service center.

The purpose of this study is assessing the effectiveness of the Otaria postpartum gymnastic model and caregiver assistance to decrease in the height of the uterine fundal in postpartum mothers.

**Method**

The study design was matching pretest-posttest with control group. The population was all postpartum mothers who gave birth in health centers of South Jakarta and Bandar Lampung. The intervention group were 80 postpartum mothers who gave birth at Pasar Minggu Health Center, South Jakarta and Kota Karang Health Center, Bandar Lampung. They were treated with the Otaria’s postpartum gymnastic model from 1st day to 10th day. The control group were 80 postpartum mothers who gave birth at Jagakarsa Health Center, South Jakarta and Kemiling Health Center, Bandar Lampung. They were treated with early mobilization. Sample restriction: the age of the mother during childbirth 20-35 years. Matching samples: multiparous mothers 2 and or 3, normal BMI values (18.5-22.9), normal Hb (11-12 gr/dL). Inclusion criteria: postpartum mothers who gave birth normally, did not experience labor complications, gestational age ≥ 37 weeks, were born alive, by informed consent. A sample size of 160 people, calculated using the sample size formula with 95% of CI, 80% of power, selected by accidental sampling. Data was collected in May to October 2018, then analyzed by GLM-RM.

**Results**

Table 1 shows that based on measurements in centimeters unit the average value of uterine fundal height in the intervention group was lower than the control group and it’s began to occur on day 3 to day 7 and it was not palpable on the 8th day. Whereas in the control group until the 10th day the average of uterine fundal height was still as high as 1.01 cm.

**Table 1: Data of uterine fundal height Based on Postpartum Time Period**

<table>
<thead>
<tr>
<th>Group</th>
<th>Postpartum Period</th>
<th>Frequency</th>
<th>Centimeter Unit</th>
<th>Finger Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Mean</td>
<td>Range</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Min</td>
<td>Max</td>
</tr>
<tr>
<td>Interven</td>
<td>2 hours</td>
<td>80</td>
<td>15.18</td>
<td>13</td>
</tr>
<tr>
<td></td>
<td>6 hours</td>
<td>80</td>
<td>14.68</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>24 hours</td>
<td>80</td>
<td>13.76</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>2nd day</td>
<td>80</td>
<td>12.44</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>3rd day</td>
<td>80</td>
<td>10.84</td>
<td>5</td>
</tr>
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<td></td>
<td>4th day</td>
<td>80</td>
<td>8.58</td>
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<tr>
<td></td>
<td>5th day</td>
<td>80</td>
<td>6.09</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>6th day</td>
<td>80</td>
<td>3.55</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>7th day</td>
<td>80</td>
<td>0.32</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>8th day</td>
<td>80</td>
<td>0.00</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>9th day</td>
<td>80</td>
<td>0.00</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>10th day</td>
<td>80</td>
<td>0.00</td>
<td>0</td>
</tr>
<tr>
<td>Control</td>
<td>2 hours</td>
<td>80</td>
<td>14.81</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>6 hours</td>
<td>80</td>
<td>14.16</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>24 hours</td>
<td>80</td>
<td>13.49</td>
<td>9</td>
</tr>
</tbody>
</table>
Conted…

<table>
<thead>
<tr>
<th></th>
<th>2nd day</th>
<th>3rd day</th>
<th>4th day</th>
<th>5th day</th>
<th>6th day</th>
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<th>8th day</th>
<th>9th day</th>
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<tbody>
<tr>
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<td>80</td>
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<td>80</td>
<td>80</td>
</tr>
<tr>
<td>Control</td>
<td>11.76</td>
<td>11.33</td>
<td>9.70</td>
<td>8.30</td>
<td>5.51</td>
<td>3.94</td>
<td>3.00</td>
<td>1.81</td>
<td>1.01</td>
</tr>
<tr>
<td></td>
<td>11</td>
<td>10</td>
<td>9</td>
<td>7</td>
<td>8</td>
<td>5</td>
<td>3</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>13</td>
<td>12</td>
<td>10</td>
<td>9</td>
<td>8</td>
<td>5</td>
<td>3</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>5</td>
<td>4</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>0.5</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>5</td>
<td>4</td>
<td>2</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>

Table 2, it appears that the average of difference of uterine fundal height reduction based on measurements in centimeters in the intervention group was greater than the control group began to occur in the period of the 3rd day to the 10th days postpartum.

**Table 2: The Difference of Decrease of Uterine Fundal Height Based on Period of Postpartum**

<table>
<thead>
<tr>
<th>Research Group</th>
<th>Postpartum Period</th>
<th>Frequency</th>
<th>Centimeter Unit</th>
<th>Finger Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Mean</td>
<td>Range</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Min</td>
<td>Max</td>
</tr>
<tr>
<td>Intervention</td>
<td>2 hours to 6th hour</td>
<td>80</td>
<td>0.50</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>2 hours to 24th hour</td>
<td>80</td>
<td>1.48</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>2 hours to 2nd day</td>
<td>80</td>
<td>2.73</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>2 hours to 3rd day</td>
<td>80</td>
<td>4.34</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>2 hours to 4th day</td>
<td>80</td>
<td>6.59</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>2 hours to 5th day</td>
<td>80</td>
<td>9.10</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>2 hours to 6th day</td>
<td>80</td>
<td>11.65</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>2 hours to 7th day</td>
<td>80</td>
<td>14.88</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>2 hours to 8th day</td>
<td>80</td>
<td>15.19</td>
<td>13</td>
</tr>
<tr>
<td></td>
<td>2 hours to 9th day</td>
<td>80</td>
<td>15.19</td>
<td>13</td>
</tr>
<tr>
<td></td>
<td>2 hours to 10th day</td>
<td>80</td>
<td>15.19</td>
<td>13</td>
</tr>
<tr>
<td>Control</td>
<td>2 hours to 6th hour</td>
<td>80</td>
<td>0.65</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>2 hours to 24th hour</td>
<td>80</td>
<td>1.36</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>2 hours to 2nd day</td>
<td>80</td>
<td>3.06</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>2 hours to 3rd day</td>
<td>80</td>
<td>3.49</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>2 hours to 4th day</td>
<td>80</td>
<td>5.11</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>2 hours to 5th day</td>
<td>80</td>
<td>6.51</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>2 hours to 6th day</td>
<td>80</td>
<td>9.30</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>2 hours to 7th day</td>
<td>80</td>
<td>10.88</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>2 hours to 8th day</td>
<td>80</td>
<td>11.81</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>2 hours to 9th day</td>
<td>80</td>
<td>13.00</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>2 hours to 10th day</td>
<td>80</td>
<td>13.80</td>
<td>10</td>
</tr>
</tbody>
</table>

Table 3, the results of the independent samples statistical analysis of delta difference T-Test decreases based on centimeter measurement showed that there was a significant difference (p<0.05) the mean of delta decrease in uterine height in the intervention group was greater than the control group on the 3rd day to 7th days. Whereas in the measurement of the first 6 hours postpartum, 24 hours and the 2nd day, there was no significant difference (p> 0.05).
Table 3: Difference of Decreasing of Uterine Fundal Height

<table>
<thead>
<tr>
<th>Time Period</th>
<th>Frequency</th>
<th>Mean Diff and Standard Deviation Value Group</th>
<th>Value of t Count</th>
<th>Probability</th>
<th>Interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td>6 hours</td>
<td>80</td>
<td>Intervention: 0.50 (± 0.60) Control: 0.65 (± 0.89)</td>
<td>-1.26</td>
<td>0.21</td>
<td>No difference</td>
</tr>
<tr>
<td>24 hours</td>
<td>80</td>
<td>Intervention: 1.48 (± 0.91) Control: 1.36 (± 1.15)</td>
<td>0.69</td>
<td>0.49</td>
<td>No difference</td>
</tr>
<tr>
<td>2nd day</td>
<td>80</td>
<td>Intervention: 2.73 (± 1.61) Control: 3.06 (± 1.28)</td>
<td>-1.47</td>
<td>0.14</td>
<td>No difference</td>
</tr>
<tr>
<td>3rd day</td>
<td>80</td>
<td>Intervention: 4.34 (± 2.02) Control: 3.49 (± 1.29)</td>
<td>3.18</td>
<td>0.00</td>
<td>There is a difference</td>
</tr>
<tr>
<td>4th day</td>
<td>80</td>
<td>Intervention: 6.59 (± 2.30) Control: 5.11 (± 1.18)</td>
<td>5.11</td>
<td>0.00</td>
<td>There is a difference</td>
</tr>
<tr>
<td>5th day</td>
<td>80</td>
<td>Intervention: 9.10 (± 2.97) Control: 6.51 (± 1.32)</td>
<td>7.14</td>
<td>0.00</td>
<td>There is a difference</td>
</tr>
<tr>
<td>6th day</td>
<td>80</td>
<td>Intervention: 11.65 (± 2.49) Control: 9.30 (± 2.95)</td>
<td>5.46</td>
<td>0.00</td>
<td>There is a difference</td>
</tr>
<tr>
<td>7th day</td>
<td>80</td>
<td>Intervention: 14.88 (± 1.31) Control: 10.88 (± 1.27)</td>
<td>21.87</td>
<td>0.00</td>
<td>There is a difference</td>
</tr>
</tbody>
</table>

Table 4, results of the independent samples median statistical analysis of the delta difference based on finger measurements showed that there was a significant difference (p<0.05) that the decrease in uterine fundal height in the intervention group was greater than the control group occurred on the 3rd day to 6th days. Whereas in the first 6 hours postpartum, 24 hours, 2nd day and 7th day there were no significant differences (p>0.05).

Table 4: Difference Statistic Test of Decreasing in Uterine Fundal Height Based on Finger Measurement

<table>
<thead>
<tr>
<th>Time Period</th>
<th>Frequency</th>
<th>α = 0,05</th>
<th>Interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td>6 hours</td>
<td>80</td>
<td>1.00</td>
<td>No difference</td>
</tr>
<tr>
<td>24 hours</td>
<td>80</td>
<td>0.08</td>
<td>No difference</td>
</tr>
<tr>
<td>2nd day</td>
<td>80</td>
<td>0.85</td>
<td>No difference</td>
</tr>
<tr>
<td>3rd day</td>
<td>80</td>
<td>0.01</td>
<td>There is a difference</td>
</tr>
<tr>
<td>4th day</td>
<td>80</td>
<td>1.00</td>
<td>No difference</td>
</tr>
<tr>
<td>5th day</td>
<td>80</td>
<td>0.01</td>
<td>There is a difference</td>
</tr>
<tr>
<td>6th day</td>
<td>80</td>
<td>0.00</td>
<td>There is a difference</td>
</tr>
<tr>
<td>7th day</td>
<td>80</td>
<td>0.28</td>
<td>No difference</td>
</tr>
</tbody>
</table>

Table 5 show that the average difference in the decreased in uterine fundal height in the intervention group compared to the very significant control group occurred on the 6th day to the 7th day postpartum with a difference of 1.65 cm.

Table 5: The Final Results

<table>
<thead>
<tr>
<th>Delta</th>
<th>Measurement Time</th>
<th>Intervention</th>
<th>Control</th>
<th>Mean Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level 1 vs Level 2</td>
<td>2 hours vs 6 hours</td>
<td>0.50</td>
<td>0.65</td>
<td>-0.50</td>
</tr>
<tr>
<td>Level 2 vs Level 3</td>
<td>6 hours vs 1st day</td>
<td>0.92</td>
<td>0.67</td>
<td>0.24</td>
</tr>
<tr>
<td>Level 3 vs Level 4</td>
<td>1st day vs 2nd day</td>
<td>1.32</td>
<td>1.73</td>
<td>-0.40</td>
</tr>
<tr>
<td>Level 4 vs Level 5</td>
<td>2nd day vs 3rd day</td>
<td>1.60</td>
<td>0.44</td>
<td>1.16</td>
</tr>
</tbody>
</table>
Conted…

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Level 5 vs Level 6</td>
<td>3rd day vs 3rd day</td>
<td>2.26</td>
</tr>
<tr>
<td>Level 6 vs Level 7</td>
<td>4th day vs 5th day</td>
<td>2.48</td>
</tr>
<tr>
<td>Level 7 vs Level 8</td>
<td>5th day vs 6th day</td>
<td>2.54</td>
</tr>
<tr>
<td>Level 8 vs Level 9</td>
<td>6th days vs 7th day</td>
<td>3.23</td>
</tr>
</tbody>
</table>

**Discussion**

Based on centimeter unit measurements, the average of fundal height reduction of intervention group is faster than control group. This is in line with the opinion of Kenneth, that the process of decreasing uterine fundal height was fast if on the 3rd day the uterine fundal height was >3 fingers below the center. On the third to fourth day uterine fundal height was 2 cm below umbilicus, on the fifth to the seventh day uterine fundal height was half the symphysis, and on the tenth day the uterine fundal height was not palpable. Immediately, after removal of the placenta the fundal drops 1-2 cm every 24 hours and after 6 days the fundal will be between the symphysis pubis and the umbilicus.\(^{(11)}\)

Based on measurements in the fingers unit it appears that the intervention fundal height was lower than the control group began to occur on the 5th, 6th, 7th, and on the 8th day all were not palpable. Whereas in the uterine fundal height control group on the 9th and 10th day some were still half finger high.

The results of research in Kupang, measurement of day 2 uterine height there were 38 respondents (86%) experienced a decrease of 3 fingers below the center in mothers with primiparous age <35 years, there was a relationship between mobilization early with a decreased in uterine height where mothers who did early mobilization did not experience sub involution or failure in uterine involution.\(^{(12)}\)

Based on delta analysis, the average decreased in uterine height based on centimeter showed that the average decreased in uterine height in the intervention group was greater than that of the control group, starting at the 3rd to 10th day. The biggest difference in the decrease in uterine height in the intervention group compared to the control group occurred at the time period of the 7th day postpartum with a difference of 4 cm.

After labor, the abdominal wall is loose because it is stretched for so long, but usually recovers within 6 weeks. Exercises carried out on certain muscles will give effect to increased muscle blood flow so that the transport of oxygen and other nutrients to the muscles also increases, this will give maximum strength to the muscles.\(^{(13)}\)

Otaria puerperal exercise carried out from the first 2 hours, 6 hours and 24 hours postpartum as initial mobilization and continued until 7 days postpartum. With early mobilization the mother will be more active in moving so that it will accelerate the process of involution of uterine devices, expedite the release of lockhea, and increase the smooth circulation of blood.\(^{(14)}\)

A study found that there was a difference in the decrease in uterine fundus height between groups who performed a combination of abdominal and pelvic muscle exercises with a group that only performed pelvic floor muscle exercises.\(^{(15)}\) A Quasi-Experimental revealed that there were significant differences between pre-intervention and post-interventional scores of uterine involution in the experimental group and controls among postnatal mothers with p-value<0.05.\(^{(16)}\) Strengthening the transversus abdominis muscle is an exercise by providing a stimulus to the part by contracting so that it can increase intra-abdominal pressure. The benefit of strengthening the transversus abdominis muscle is to tighten the uterine wall, accelerate uterine involution and facilitate the removal of lockhea.

**Conclusion**

The results of this study concluded that by implementing Otaria’s postpartum gymnastic model and caregiver assistance, the uterine involution process and/ or High Uterine returned to its original form as before pregnancy occurred on the seventh day postpartum.

**Conflict of Interest:** No

**Source of Funding:** Authors

**Ethical Clearance:** No.226/EC/KEP/TJK/VII/2018 from Health Polytechnic of Tanjungkarang
REFERENCES


Legal Protection of Health Rights for Indonesian Migrant Workers Abroad

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¹Muhammadiyah University of Ponorogo; ²Muhammadiyah University of Surakarta; ³Sultan Ageng Tirtayasa University; ⁴Health Politechnic of Makassar

ABSTRACT

The right to work and the right at work are part of the human rights. The fulfillment of these rights for the citizens who work gives an important sense to reach a good living standard. Health rights of Indonesian migrant workers are regulated in the Constitution No.18, 2017 on the Protection of Indonesian Migrant Workers. This legal protection for Indonesian migrant workers includes rather wide aspects, such as the protection of safety, health, the maintenance of work ethics, also rightful treatments according to the human dignity and the religious morals. Legal protection of health for the migrant workers are part of the efforts to maintain and to increase their physical and mental health, as well as letting them reach social welfare. The host country of the Indonesian migrant workers must give insurance of health rights. The five favorite destination countries of Indonesian migrant workers are Malaysia, Singapore, Taiwan, Hongkong, and Saudi Arabia. Those five countries have regulations in giving health rights insurances for Indonesian migrant workers.

Keywords: Legal protection, Health rights, Indonesian migrant workers.

Introduction

The 1945 Constitution states that every person has the right to work, to receive wages, and to obtain just treatments in work relations. This normative stipulation confirms the constitutional rights to work and the rights in work(1). The right to work and the right in work are part of the human rights. Legal protection and fulfillment for the citizens who work give an important sense to achieve a good standard of living, (2) the government has the obligation to realize the rights to work for the citizens.

Work is an application of the mandate of human existence. Work can be chosen freely, whether it is within the country or overseas. The country has the obligation to provide work for the citizens well and give positive influence for their survival without discrimination. (3) Indonesia is one of the largest senders of workers. Formerly, the term Indonesian migrant workers were called Indonesian work force (TKI). They are every Indonesian citizen who fulfill the requirement to work overseas in work relations for a certain period of time and they must also receive wages for their work⁴, both based on the request of the sending country or from the initiative of the destination country.⁵

Indonesia’s contribution in sending work forces overseas, in the social aspect and in the development aspect have some positive impacts. It aids the country’s foreign exchange, it opens up new work fields, it minimizes the pressure of problems, it lets citizens experience obtaining high wage, and it decreases the number of unemployment. If we see the meaning and the aim of sending Indonesian migrant workers overseas in the wider sense, it does not only solve the pressuring problem of the Indonesian work force, yet it is also a form of the migrant workers’ financial improvement. Working overseas is an effort to resolve the workforce’s problems in their country⁶.

The existence of Indonesian workers is one of the sectors which can drive the economy of Asian countries. The high number of workers overseas on one hand has some positive impacts (increasing the country’s foreign exchange and resolving unemployment), though
it also has some negative impacts (risk of inhumane treatment to the migrant workers) (7). A legal protection insurance for the migrant workers is very important. Parallel to the increasing interest of citizens to become migrant workers, the number of inhumane treatment to those migrant workers overseas have also increased (8). Cases which have to do with the migrant workers’ fate increasingly varies, and they have even developed towards a form of human trafficking which may be categorized as a violation of human rights.

The insurance for health rights (9) of Indonesian workers is regulated in the Constitution No.18, 2017 regarding the protection of Indonesian migrant workers. The legal protection for Indonesian workers include a wide array of aspects, such as the protection of safety, health, the maintenance of work morals, and also the treatment according to the human dignity and the religious morals. The protection for the workers’ health is an effort to maintain and to increase the degree of physical and mental health, as well as the social welfare of all workers as high as possible (10).

The effort for legal protection in the aspect of occupational health and safety, in the aspect of humanity, is based on the fact that taking care of health and safety is the basic right which must be obtained by workers. The principle of occupational health and safety is a principal factor which cannot be negotiated, as mentioned in one of the rules of fiqh, where all kinds of harm must be eliminated.

Method

This research used a doctrinal analysis. The first stage was undergoing legal inventory to find legal norms which regulate the health rights of migrant workers, in which the sources were the constitutional laws or policies, then continued with a normative analysis, to find the in-concerto law (which comes from an analysis of secondary data with the legal constitutions which apply) and the legal principles (which come from the analysis of secondary data with the islamic laws) which regulate the health rights of Indonesian migrant workers (11).

Findings and Discussion

The favorite destination of Indonesian migrant workers are Malaysia, Singapore, Taiwan, Hongkong, and Saudi Arabia. These are their policies to fulfill the health rights of the Indonesian migrant workers.

First is Malaysia. The protection of the health rights of Indonesian migrant workers are covered by the workmen's compensation act 1952 and insurance policies which will be paid by the employers. It will soon be abolished, and it will be substituted by the sosco regulation. This discourse is planned for the Indonesian migrant workers in the aspect of health insurance, by paying the amount of around rm14 to rm15 every month. The workers will receive plenty of benefits as they are protected by the insurance, and they will receive compensations for the rest of their lives. The payment to sosco for the migrant workers will be the burden of the employer. Socso owns one of the best hospitals in Southeast Asia in Melaka, and if there occurs an occupational accident, it is expected that the victim will receive full treatments until they recover their health. (12)

Second is Singapore. The Indonesian migrant workers, both in the domestic and in the non-domestic sector are obliged to obtain insurance from the employers. This insurance is an obligation of the employers, based on the governmental decree of Singapore. The right of health for Indonesian migrant workers are clearly stated in the employment act chapter 91 in part XI health, accomadation and medical care, therefore the health rights of the migrant workers are covered well. The health insurance and the accidental insurance are included as some of the requirements to employ the Indonesian migrant workers. The health insurance is used to give basic protection such as inpatient or surgery. Apart from that, it can be used for conditions which are perhaps unrelated to work. If the Indonesian migrant workers experience sickness while on holidays or on resting days, thus the employer must be responsible for the disease treatment payment. Compensation for occupational accident insurance must be paid to the indonesian migrant workers or their family. The occupational accident consists of death insurance, accidental insurance or permanent disability. These compensations can be given if the occupational accident happens while their stay in singapore. (13) The employers who do not give nor do not take burden of the occupational health and accident insurance for the indonesian migrant workers are regarded as having violated the rule. If proven guilty, the employer who did not pay for the insurance will receive a fine or they will be sent to prison.
Requirements of the employment contract which must be fulfilled by the employers include occupational accident insurance, making sure of the rights to undergo religious rituals, and not giving work tasks which endangers the safety of the workers. The abundant cases of where the health insurance of the Indonesian migrant workers are not covered triggers the application of these new policies. The main aim of these policies are to “give better protection for the Indonesian citizens”. These policies will not decrease the interest of recruiters in singapore to employ Indonesian migrant workers. The government of Singapore, through the ministry of labor, also implements a similar policy in which its target is to give protection to the migrant workers who work in the lion state, with the total insurance of 5,000 Singaporean dollars. The distributors of the migrant workers admit to feeling burdened with the scheme of this insurance policy, which are implemented by singapore as well as the origin country of the Indonesian migrant workers. (14)

Third is Taiwan: The Indonesian migrant workers receive health insurance in which its premiums are paid by the employers. The health is insured by the Taiwan government. The national health insurance (NHI) program is one of the benchmarks of the international health insurances, as it offers treatment with high media which is also cost effective, and which applies to every citizen.

The policy of the labor system obliges all employers to register their workers to the health insurance. Even though the insurances in taiwan are given by independent companies, all Indonesian migrant workers who are employed both legally and illegally are protected in the access of healthcare through insurance. (15) The requirements of the insurance: (a) the migrant workers experience accidents which stops them form working, so that they do not receive wages according to the employment contracts, so the migrant workers have the right to obtain treatment, starting from the fourth day of the healing process. (b) inpatient in hospitals which makes the migrant workers unable to obtain the righs of wages, thus they will receive accidental help, starting from the fourth day of the treatment. These requirements can be obtained by the migrant workers if proposed by the employer or by the agencies.

Fourth is Hongkong: This is one of the countries which have the best healthcare treatment(1). The healthcare services can be accessed with low budget. HHSAR allocates the budget of 7 million people 5.8 billion USD (830 USD per-capita), 250% higher per-capita than the healthcare budget allocated in the usa(17).

The system copies the healthcare services in England. Hongkong establishes healthcare services which are coordinated through the food and health beureau. This beureau establishes holistic health services which may be accessed by all parties in Hongkong. It insures that there will be no late treatments in medical emergencies. The migrant workers, in emergency cases which risk their survival, may access this service without discrimination. The services consist of comprehensive services which may be accessed through the CSSA scheme. It includes 90% of hospitals and 29% of non-hospital services. It provides cheap hospital services, which is only 13 USD/ day with a 95% subsidy from HKSR (with the subsidy, the estimated rate per day is only 1-2 USD).

This grand subsidy makes healthcare services in Hongkong easy to be accessed by migrant workers who need health services(18) apart from the subsidized services from the HKSR healthcare insurances, there are also private health services with premium payment. The migrant workers may choose the service which is most suitable, but only 11% of migrant worker patients choose to access the premium healthcare services without healthcare insurance, with the market price of around ten times more expensive compared to the subsidized services with the cssa scheme. This private service provides better access in terms of medical equipments(19).

There are two healthcare services in Hongkong which may be accessed by migrant workers. First is the subsidized public healthcare service with the social welfare scheme from CSSA, which may be accessed limitedly with the requirement of having lived in the country for a minimum of 1 year and the complete social welfare which may be accessed freely after having lived in the country for at least 7 years. The CSSA system may be accessed by migrant workers who own valid visas, and complete work permits. Complete social insurances can be accessed with HKSR PIC (permanent id card). Illegal workers, in emergency situations, also have the right to access healthcare services until they are saved. The healthcare institutions which treat the illegal migrant worker patients are obliged to report to the authorities so that a legal process may be done and to pay for the healthcare services. The police will inspect the illegal migrant workers after they are claimed healthy by the healthcare instances.

Fifth is Saudi Arabia: Kafeel have the responsibility for the fees of recruitment, thorough health checkups, and the ownership of Iqama (the Saudi Arabian identity card). The mentioned thorough health checkup includes checking for hiv/aids as well as giving meningitis immunizations, which are part of the requirements for migrant workers to enter saudi. Article 117 of the royal decree states that if the migrant workers are sick, they must still receive full payment for 1 month. The Indonesian migrant workers in Saudi Arabia who experience sickness for two months may be terminated from the contract, migrant workers for three months or 90 days.

The migrant workers may receive the sponsors’ permit to access healthcare services. This permit includes work permit documents in saudi arabia. This access regards the Kafeel’s access as the local citizen. The healthcare fee in saudi is usually very affordable, as the kingdom’s government provides a large amount of subsidy. The kafeel may easily abolish the visa permits of the migrant workers if there exists a problem, such as if the migrant workers run away from their work, even if their rights as migrant workers are not fulfilled, for example if they are not paid, or if they are not given healthcare insurances in which according to the regulation must be paid by the kafeel. The migrant workers may access healthcare services without discrimination and with the same fee as what must be paid by the saudi arabian citizens.

Conclusion

Legal protection for health rights of the indonesian migrant workers is a form of effort for legal protection in the aspect of occupational health and safety. It is based on the fact that the protection of health and safety are basic rights which must be obtained by the indonesian migrant workers. The principle of occupational health and safety is the main factor which is unegotiable, as it is a form of humanity, that all kinds of harmful actions must be eliminated. The fulfillment of health rights (20) is a requirement of employing indonesian migrant workers overseas, with the destination countries such as Malaysia, Singapore, Taiwan, Hongkong, and Saudi Arabia. So far, these countries have sufficiently taken care of the health rights as regulated in each of the country’s regulations. The deal in the fulfillment of health rights for Indonesian migrant workers in the destination country have been agreed upon together through the employment contracts between the employers and the Indonesian migrant workers.

Conflict of Interest: No

Ethical Clearance: Yes

Source of Funding: Authors

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Elaboration of the Joint Community Forest Management Policy with the Policy of Managing Forest Village Community Health Insurance in Ngawi District

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ABSTRACT

The Policy for Community-based Forest Resources Management (PHBM) aims to realize the welfare of the community in forest areas by no longer placing forest area communities as legal objects, but as legal subjects in forest management in Indonesia, through strengthening and empowering Forest Village Community Institution (LMDH) as stated in the constitution of the Republic of Indonesia in 1945, Article 33, paragraph 3: “The earth, water and natural resources contained therein are controlled by the State and used for the greatest prosperity of the people.” Implementation of PHBM is carried out by optimizing the involvement of local community resources in around the forest by empowering forest village communities in a synergistic and participatory manner. One manifestation of the elaboration of strengthening local institutional forest village communities is through the management of the Forest Village Community Health Care Insurance (JPKMDH) in Ngawi District, East Java Province, Indonesia.

Keywords: Elaboration, Forest Village Community Institution, Forest Village Community Health Insurance

Introduction

Indonesian forestry area which has been widely known as part the world’s lungs, currently experience conditions such as deforestation and land degradation, which raises concerns both nationally and internationally. The context of forest resource management in Java is managed by Perum-Perhutani as stated in Government Regulations No.72, 2010 about Indonesian State-owned Enterprise on Forestry. Perhutani’s position represents the state in the context of property rights, which was stated as both policy maker and executor in managing the State’s forest for the State’s foreign exchange income and to gain optimal advantages for the company, communities and national economic development, also forest authorization ideology.

By today there are numerous problems regarding deforestation whose quantities are gradually growing higher. Historically, forest resources management in Java, since the colonization era until this modern day, has not yet been able to give expediency for citizen prosperity. The increasing amount of deforestation and damages caused by deforestation is not solely caused by wood thievery and destroying plants, but instead the main issue is that there has not been any agreements regarding the preservation of forest resources and forest village communities’ prosperity-who are by average still under the poverty line.

Community-based forest resource management model through the instrument of Perum-Perhutani Director Decree Number SK 136/Kpts/Dir/2001 concerning Joint Forest Management (PHBM) by making those who live in the forest area as legal subjects instead of legal objects in managing forest resources in Indonesia. Community-based forest resource management is based on following principles: (a) justice and democracy; (b) openness and togetherness; (c) mutual learning and understanding; (d) distinctness of rights and obligations; (e) populist economic empowerment; (f) institutional cooperation; (g) participative planning; (h) simple system and procedures; (i) the company as facilitator; (j) management compatibility with regional characters.

DOI Number: 10.5958/0976-5506.2019.01371.8
Providing active role within the villagers with all wisdom, yet making the forest as the main component of community development (ecosystem) which is able to provide prosperity for all Indonesian citizens (7).

PHBM was born from the transformation paradigm from Forest Timber Management to Forest Resource Management and State-Based Forest Management to Community-Based Forest Management. On 2017, the instruments of PHBM was updated and adjusted according to the demands of an increase in Human Development Index (IPM) which was legalized as a PHBM plus program through Perum Perhutani General Director Decree Number SK 268/Kpts/Dir/2007. The support for increasing IPM within PHBM plus is reviewed from three indicators which include purchasing power level, education level and health level.

The said program is expected to be able to fulfill the needs of the forest villagers. Unfortunately, the existing facts state otherwise, as it did not give any significant impact for them. This matter then brought forth the Forest Village Community Organization (LMDH) which was initiated by Perum-Perhutani and Ngawi Regency Governments on 2004. The initial aim of the LMDH was to assist PHBM in implementing their programs which include empowering local resources in forest areas and assisting the increase of the forest villagers’ prosperity. Various efforts were made for LMDH to become a well-organized and a stable institution to assist PHBM in implementing their programs. One of their forms of strategy for institutional strengthening through the health sector is the management of Forest Village Community Health Care Insurance Services (JPKM) which is also an embryo of Forest Village Community Institution (LMDH), whose aim is to both form and reanimate the forest resources management body in each village, including planning the agreements between forest villagers representatives and Perum Perhutani in forest resource management in the village, including planning the agreements between Perhutani officers to formulate Statutes and Bylaws of PHBM management plan in their

### Materials and Method

This study used the approach of socio-legal research of analysis. With this approach, the law was positioned as a social phenomenon. Law was seen from the outside perspective and associates with the reality of individual or community behavior in relation to the law. With this socio-legal approach, one phenomenon will not be resolved by merely giving information on the rule of law, but also integrating with approaches from the other perspectives (9). This was a qualitative research which analyzes data deeply and comprehensively (9).

### Findings and Discussion

Perum-Perhutani, as an Indonesian State-Owned Enterprise which is designated by the central government to manage forests in Java Island, reforms the previous forest management system by optimizing the involvement of the forest villagers. (10) Through the instrument of Perum-Perhutani Director Decree Number SK 136/Kpts/Dir/2001, Joint Forest Resources Management (PHBM) program was launched. PHBM is a forest resource management system by Perum-Perhutani alongside the forest villagers with the partnership and profit-sharing principles, which means managing the forest by taking into account the empowerment of forest villagers in a participatory manner (11).

PHBM was born from the transformation paradigm from State-Based Forest Management to Community-Based Forest Management. In Ngawi Regency, PHBM is executed in 59 forest villages in 16 sub-regencies. The implementation of PHBM was announced through several stages starting with the formation of the Forest Support Village (DPH) initiation. This activity focuses on the forest villagers institutional maturity process which is also an embryo of Forest Village Community Institution (LMDH), whose aim is to both form and reanimate the forest resources management body in each village, including planning the agreements between forest villagers representatives and Perum Perhutani in forest resource management, which involves planning, planting, maintaining, harvesting, protecting, profit sharing, to evaluation monitoring (12).

The first step of forming LMDH is to form an institutional management on an orchard scale which is the Forest Farmer Workgroup (KKP). The members of KKP are chosen from local residents because of their characters are believed to be of ace in the growth of their own orchards. This work group then joins in with the village governments (village head and its officials), Village Representative Body, respectable figures, accompanied by non-governmental organization and Perhutani officers to formulate Statutes and Bylaws of LMDH including agreements of width, location and map boundaries between Perhutani’s forest land gap which can be utilized to plant intercropping crops such as bulbs, vegetables, and other food crops.

The next step involves the local forest villagers independently set out PHBM management plan in their
own region. For the last part, after all preparations for the PHBM execution are ready, a Notarial Deed of LMDH would then be made alongside the cooperation agreement on PHBM implementation between the Perhutani party and the forest villagers who joined the LMDH\textsuperscript{(13)}.

To strengthen the Human Resources quality, through assistance from Non-Governmental Institution (LSM) and related agencies, LMDH members obtain training in productive economic businesses, post-harvest processing, organizational administration management as well as conflict management. Whereas in terms of developing productive economic businesses, LMDH seeks to optimize its potential as a leading productive economic business center which is tailored to the characteristics of the local areas.

The existence of LMDH has begun to be able to overcome local problems, including the forest villagers’ health care. On 2008, LMDH in the Ngawi Regency, specifically in Bringin sub-Regency, has been able to initiate the Forest Village Community Health Insurance Services (JPKMDH) program, which is the health care program for the forest villagers, whose financial support is in the form of claim. The background of this program is based on the inaccessibility of forest villagers by the Health Care for the Poor program and the National Health Insurance, and also the independence of the forest villagers in financing the health services needed, according to the principle of togetherness and guarantee of legal certainty.

There are several components within the JPKMDH, which includes the JPKMDH Implementing Agency, whose members consist of forest villagers in the LMDH meeting. After an agreement on the organizational structures for the Implementing Agency is made, the Health Office of Ngawi Regency facilitates the legalization in the form of cooperation with the Community Health Center. After being formed and legalized, next is running the membership and financial management functions, including accepting collective dues from its citizens in the amount of IDR 40.000 per head of family within the period stated in the mutually agreed contract.

Those who have paid the dues, namely the JPKMDH participants, will then be entitled to acquire services from Health Care Provider (PPK) who are none other than medical personnel in five Community Health Center in the Ngawi Regency, which includes Padas, Bringin, Karangjati, Kasreman, and Ngawi Purba Community Health Centers. JPKMDH participants who are in need of health services will have to report to the Implementing Agency and then propose for an examination claim to the local Puskesmas. The said examination claim includes the services which are verified by the JPKMDH Implementing Agency and Community Health Center, including outpatient services (dental and general examinations included), laboratorium, Emergency Room, and Maternal and Child Health. Until today, there are 1,217 JPKMDH participants in the Ngawi Regency from approximately 300 head of families\textsuperscript{(14)}.

For families with rather low financial condition and who feel burdened by the amount of the dues, the collective due system sought by JPKMDH Implementing Agency can be cross-subsidized and coordinate the dues in the social gathering arranged by Forest Village Women’s Association (KPDH). This gender-based association is one of the institutions which is also the substitution (part) of LMDH and the thought of institutionalizing forest villagers’ women because women, especially mothers, are considered to play an important role in intensively communicating with their family members (children).

The response of the Ngawi Regency Government on PHBM program, specifically in the strengthening of LMDH, is cooperative partnership, which means that the regency government takes the role of an equal partner of LMDH, which is realized through the involvement of an integrated work unit or agency\textsuperscript{(15)}. Planning, management, as well as solving problems which are executed independently through the LMDH forum, are then followed up by the regency government in the form of elaborating integrated and sustainable forestry development programs in each government work unit.

Specifically, for the JPKMDH program, the Health Office of Ngawi Regency acts as the Community Health Center services provider which is used as a reference by JPKMDH participants. The results of the agreement are then followed up by the Regency Government alongside the medical personnels and other supporting facilities in Puskesmas, as the closest health service available near the forest village community.

The amount of the dues and claim payment method which are also conducted independently is determined
through the mechanism of JPKMDH. The forest village communities are trying to gain funds for their health care services alongside with the cross-subsidy guarantee for the poor (16).

The Ngawi Regency Government has also changed the paradigm of utilizing forest products, which is not always approached with an orientation of increasing the regional income, but through strengthening institutional capacity of LMDH and empowering the local forest villagers by still providing assistance from the strength of civil society, by building synergies with the regency government to facilitate in strengthening local institutional forest village communities, including utilization of JPKMDH program (17).

Re-optimization of forest villager local institutions such as LMDH is one of the forms of social engineering which was initially a stimulus to change the paradigm of the communities and the State (read: Regency Government and Perum-Perhutani) by including a design which shows the multi-stakeholder involvement in the management of forest resources. The increase of forest village community institutional capacity is present to put LMDH as an independent institution which is partnered with external forces around it (18).

The forms of cooperation (elaboration) between various parties in strengthening the LMDH institutions that are based on trust have also utilized the potential of social capital. The provision of space by Perhutani for local residents to implement the use of inter-land as well as a system of profit sharing between them, is a resource of the mutual trust to emerge. It gives Perum Perhutani a sense of guarantee, when local forest villagers are entrusted with a management space for their prosperity, hence the conflict is reduced as minimum as possible (19).

JPKMDH was initiated after LMDH institutional empowerment topic was emerged which also directly strengthen social trust and social collaboration among local residents, as well as those without institutional power within. This strengthening of collaboration then shapes out patterns of interactive and intensive communication among the local forest villagers in determining the kind of health services needed for them; including the shape of participation in monitoring the practice of providing health service they receive.

Conclusion

The strengthening of forest village institutions through the LMDH forum in Ngawi Regency, is one of concrete examples where the Regency Government synergizes with Perum-Perhutani in designing a pattern of elaboration of forest resources management with the local residents, based on strengthening the forest villagers’ participation through the Forest Village Community Health Care Insurance Services (JPKMDH). The principles of partnership and togetherness which bring the local government and is citizens closer in various feedback processes lead to the presence of responsive public policies. In this condition, the participation of local insitutions to connect the interests of local governments with its citizens directly has also conceived a new spirit of trust which also opens up space for public access and control in the local field.

Conflict of Interest: No

Ethical Clearance: Yes

Source of Funding: Ministry of Research and Higher Education PDD Research Grant

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Clinicopathological and Immunohistochemical Study of Fascin-1 Expression as a Predictive Factor for Invasiveness in Transitional Cell Carcinoma of Urinary Bladder

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ABSTRACT

Background: Urothelial carcinoma of the urinary bladder represents 90% of all primary tumors of this structure. It is one of the most common ten malignancy in Iraq and worldwide. The depth of invasion, particularly for muscularis propria is the most important prognostic and therapeutic determinators. Fascin-1 is an actin bundling protein involved in cell migration and motility and up-regulated in transformed and aggressive epithelial carcinomas like urothelial carcinoma and overexpression is associated with advance stage. The aim of the present study is to evaluate the fascin -1 expression as a predictive marker for assessment of depth of invasion and as prognostic and therapeutic purposes. Methods: Fifty five patients were of age range from 16-95 years with mean age ± SD of 65.8 ± 13.7 years and with different grades and stages were taken from laboratory of histopathology of Al-Hilla Teaching Hospital. Histological sections of paraffin embedded tissue were be taken for H and E staining for assessing grades and stages according to WHO grading system and AJCC staging system, respectively. Immunohistochemical staining by using mouse monoclonal antibody for fascin-1, then correlation between clinicopathological parameters and marker expression were done. Results: The fascin-1 expression was found not related to age, gender, tumor grade and perineurial invasion (P>0.05). The intense expression was noted predominantly in the invasive component. Tumor size, lympho-vascular invasion and necrosis were noted to be associated with aggressive tumor with increased fascin expression (P<0.05), Conclusion: fascin-1 can be used as a predictive marker for recurrence and invasion and as a therapeutic target.

Keywords: Urothelial carcinoma, Fascin-1, Invasion, Tumor grade, Tumor necrosis.

Introduction

Urothelial carcinoma represents 90% of primary urinary bladder tumors. The age of incidence is usually more than 50 years with male to female ratio about 3:1 [1]. It is one of the ten most common cancers in Iraq and worldwide. In Iraq, it represents the fifth most common tumor; it is the second most common cancer in males and the tenth most common cancer in females[2]. Females have more aggressive tumor behavior than males [3]. It is two folds higher in white people than blacks [4]. Worldwide, bladder cancer represents the ninth most frequent cancer with the highest incidence in men from Southern and Western Europe as well as North America. Bladder cancer ranks 13th in terms of deaths ranks. Bladder cancer occurs predominantly in heavy smokers and occupational exposure to chemicals such as benzidine, beta-naphthylamine, painters and ingestion of analgesics, parasitic infections, bladder calculi, and chemotherapy [5]. Pathogenesis is complex and recent mRNA sequencing studies identified two molecular subtypes: luminal and basal bladder cancers[6]. It presents grossly either exophytic or endophytic growth [7]. According to WHO/ISUP (2016), urothelial carcinoma is divided microscopically into infiltrative and non invasive urothelial neoplasms [8]. The non-invasive papillary tumors graded into low grade and high grade papillary urothelial carcinomas. About 75%
are non invasive of low grade. The infiltrating urothelial tumors include tumors with divergent differentiation toward squamous, glandular, trophoblastic, nested, microcystic, micropapillary, lymphoepithelioma-like, sarcomatoid, plasmacytoid [9]. In this study, only the papillary urothelial tumors were included. The treatment depends on age, grade, stage and presence of dysplasia or carcinoma in situ [10]. Low grade and non muscle invasive treated by transurethral resection, while high grade and muscle invasive are treated by radical cystectomy with or without preoperative radiation therapy or chemotherapy [11]. The invasion of muscularis propria is either superficial invasion (submucosa and inner half of muscle) or deep (outer half of muscle and perivesical tissue and lymphatic) [12]. Fascin-1 (FSCN1) is a 55 KD monomeric actin filament bundling protein that plays a role in cell adhesion and motility. Three forms of fascin are found in vertebrates; Fascin-1 (most common) present in specialized cells with extensive surfaces or migratory potential such as neurons, glial cells, dendritic cells, macrophages, skeletal and smooth muscle cells and endothelial cells [13]. The level of fascin-1 is low or undetectable in normal epithelial cells; overexpression was seen in transformed epithelial cells and associated with high grade and aggressive tumors. Fascin binds beta-catenin and colocalizes with it at the leading edges and borders of epithelial and endothelial cells so it has a role in the maintenance of cell adhesion, coordinating motility and invasion [13]. Fascin-1 localizes to actin-rich protrusions at the cell surface called filopodia. A recent study showed that fascin also localizes to invadopodia, membrane protrusions formed at the adherent cell surface that facilitates extracellular matrix (ECM) invasion, this provide a mechanism for how fascin increases the invasiveness of cancer cells [15]. Studies have shown that fascin plays a major role in immune suppression. T regulatory cell adhesion to antigen presenting dendritic cells causes sequestration of Fascin-1, which is essential for immunological synapse formation, and skewes Fascin-1-dependent actin polarization in antigen presenting dendritic cells toward the T regulatory cell adhesion zone, this sequestration of cytoskeletal components causes a lethargic state of dendritic cells leading to reduced T cell priming [16, 17].

The aim of the present study is to evaluate the fascin-1 expression as a predictive marker for assessment of depth of invasion and as prognostic and therapeutic purposes.

**Materials and Method**

This study was carried out in the Department of Pathology and Forensic Medicine, Faculty of Medicine/Babylon University. The samples were taken from the laboratory of histopathology at Al-Hilla Teaching Hospital. Fifty-five paraffin embedded blocks were included. The clinical data were obtained from the reports at Al-Hilla Teaching Hospital, these included age, gender, tumor size, grade, stage, vascular invasion, perineurial invasion and tumor necrosis. The age of patients ranged from 16-95 years with mean age ± SD of 65.8 ± 13.7 years. Subjects were 46 males and 9 females, cases with tumor size <1cm were (40) and those >1cm were (15 ) cases; low grade tumor cases were (30) and high grade cases were (25). In addition, (35) cases were stage Ta, (8) cases stage T1, (8) cases were stage T2 and 1/8 case was with squamous differentiation and of high grade, (2) cases were stage T3, (2) cases were T4 and all cases from T2-T4 were high grade except one case. The cases without vascular invasion were (48) cases and those with vascular invasion were (7) cases. Also, (53) cases were without perineurial invasion and (2) cases with perineurial invasion, (49) cases were negative for tumor necrosis, while (6) cases were positive for tumor necrosis.

Fascin-1 is a monoclonal mouse anti-human fascin-1 protein of isotype IgG2a/k, Bio SB, Santa Felida, USA. The detection system was mouse/rabbit poly detector plus HRP/DAP kit. The positive immunoreaction is evaluated by the diffuse brownish staining of the cytoplasm and two parameters were evaluated semi-quantitatively according to [18] scoring system:

1. The extent of immunostaining according to the percentage of stained neoplastic cells.
2. The intensity of immunostaining according to the staining of endothelial cells as positive internal controls.

Then for each case, a combined immunoreactivity score was evaluated by multiplying the score for extent by the score for intensity so the combined immunoreactivity score (CIS) ranged from( 0-12) as the following:

Score 0: Absent (no staining).
Score 1: Mild staining 1-4 (≤25% of cells with Weak (less than that of endothelial cells)).
Score 2: Moderate staining 5-8 (25%-50% with moderate (equal to endothelial cells staining)).
Score 3: Intense staining 9-12 (50%–≥75% of cells with intense (more than of endothelial cells staining)).

The statistical analysis was done with SPSS software version 22. P-value less than 0.05 was considered statistically significant and less than 0.01 as highly significant.

**Results**

Fascin-1 overexpression was reported in 35(63.6%) of 55 cases while 20(36.3%) were negative. Also, 46(83.6%) of total cases were males with 28(60.9%) positive staining and 18(39.1%) cases were negative; females totally were 9(16.3%) with 7(77.8%) positive and 2(22.2%) negative and there was no relation between gender and fascin-1 expression (P= 0.3). According to age groups (Figure 1), there were only 2 cases (3.6%) of 16-35 years group and all were positive, 8(14.5%) of 36-55 years group and 4(50.0%) positive, 32(58.1%) of 56-75 years group with 22(68.8%) cases were positive, 13(23.6%) of 76-95 years group and 7(53.9%) cases were stained with fascin and there was no correlation found between expression and age groups (P= 0.4). Tumor size <1cm was 40(72.7%) and ≥1cm 15 (27.3%) of cases (Table 1) and a strong association between increased fascin expression and tumor size (P=0.007) (Table 2). Low grade were 30(54.5%) cases and high grade were 25(45.5%) cases (Table 1) and no correlation was found between expression score and grade (P=0.08) (Table 2). Cases of stage Ta were 35(63.6%),T1 were 8(14.5%), T2 were 8(14.5%) and one case of T2 with squamous differentiation, T3 were 2(3.6%), T4 were 2(3.6%) and all T2-T4 cases were stained and no negative cases (Table 1) and there was a strong relation between fascin expression score and stage of tumor (P= 0.001; Table 2). Vascular invasion was only present in 7(12.7%) cases and was absent in 48(87.2%) of cases (Table 1) and a relation was found between vascular invasion and score (P= 0.04). Moreover, all 7 cases stained moderately and intensely with no negative staining (Table 2). Perineurial invasion was reported in only 2(3.6%) of cases and was absent in 53(96.3%) of cases (Table 1), both 2 cases were score 3 and of high grade (stage pT2) and there was no correlation between expression and invasion (P=0.1; Table 2). Tumor necrosis was reported in 6 (10.9%) of cases (Table 1),1/6 of cases were score 2; whereas 5/6 of cases were score 3 without negative staining and there was a relation between score and necrosis (P= 0.01; Table 2).

**Table 1: Fascin-1 expression in relation to tumor size, grade, stage, vascular invasion, perineurial invasion and necrosis**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Total no of cases No.(%)</th>
<th>Negative staining No.(%)</th>
<th>Positive staining No.(%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Tumor size</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;1cm</td>
<td>40(72.7)</td>
<td>19(47.5)</td>
<td>21(52.5)</td>
</tr>
<tr>
<td>≥1cm</td>
<td>15(27.3)</td>
<td>1(6.6)</td>
<td>14 (93.3)</td>
</tr>
<tr>
<td><strong>Grade</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>30(54.5)</td>
<td>14(46.6)</td>
<td>16(53.4)</td>
</tr>
<tr>
<td>High</td>
<td>25(45.4)</td>
<td>6(24.0)</td>
<td>19(76.0)</td>
</tr>
<tr>
<td><strong>Stage</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ta</td>
<td>35(63.6)</td>
<td>20(57.1)</td>
<td>15(42.9)</td>
</tr>
<tr>
<td>T1</td>
<td>8(14.5)</td>
<td>0(0.0)</td>
<td>8(100)</td>
</tr>
<tr>
<td>T2</td>
<td>8(14.5)</td>
<td>0(0.0)</td>
<td>8(100)</td>
</tr>
<tr>
<td>T3</td>
<td>2(3.6)</td>
<td>0(0.0)</td>
<td>2(100)</td>
</tr>
<tr>
<td>T4</td>
<td>2(3.6)</td>
<td>0(0.0)</td>
<td>2(100)</td>
</tr>
<tr>
<td><strong>Vascular invasion</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Negative</td>
<td>48(87.2)</td>
<td>20(41.6)</td>
<td>28(58.3)</td>
</tr>
<tr>
<td>Positive</td>
<td>7(12.7)</td>
<td>0(0.0)</td>
<td>7(100)</td>
</tr>
<tr>
<td><strong>Perineurial invasion</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Negative</td>
<td>53(96.3)</td>
<td>20(37.7)</td>
<td>33(62.2)</td>
</tr>
<tr>
<td>Positive</td>
<td>2(3.6)</td>
<td>0(0.0)</td>
<td>2(100)</td>
</tr>
<tr>
<td><strong>Tumor necrosis</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Negative</td>
<td>49(89.0)</td>
<td>20(40.8)</td>
<td>29(59.1)</td>
</tr>
<tr>
<td>Positive</td>
<td>6(10.9)</td>
<td>0(0.0)</td>
<td>6(100)</td>
</tr>
</tbody>
</table>
Table 2: Relation of tumor size, grade, stage, vascular invasion, perineurial invasion and necrosis with score of fascin expression

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Fascin expression score No.(%)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Score 0</td>
<td>Score 1</td>
</tr>
<tr>
<td><strong>Tumor size</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;1cm</td>
<td>7(17.5)</td>
<td>14(35.0)</td>
</tr>
<tr>
<td>≥1cm</td>
<td>0(0.0)</td>
<td>1(6.6)</td>
</tr>
<tr>
<td><strong>Grade</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low</td>
<td>6(20.0)</td>
<td>8(26.6)</td>
</tr>
<tr>
<td>High</td>
<td>1(4.0)</td>
<td>5(20.0)</td>
</tr>
<tr>
<td><strong>Stage</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ta</td>
<td>7(20.0)</td>
<td>13(37.1)</td>
</tr>
<tr>
<td>T1</td>
<td>0(0.0)</td>
<td>0(0.0)</td>
</tr>
<tr>
<td>T2</td>
<td>0(0.0)</td>
<td>0(0.0)</td>
</tr>
<tr>
<td>T3</td>
<td>0(0.0)</td>
<td>0(0.0)</td>
</tr>
<tr>
<td>T4</td>
<td>0(0.0)</td>
<td>0(0.0)</td>
</tr>
<tr>
<td><strong>Vascular invasion</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Negative</td>
<td>7(14.6)</td>
<td>13(27.08)</td>
</tr>
<tr>
<td>Positive</td>
<td>0(0.0)</td>
<td>0(0.0)</td>
</tr>
<tr>
<td><strong>Perineurial invasion</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Negative</td>
<td>7(13.2)</td>
<td>13(24.5)</td>
</tr>
<tr>
<td>Positive</td>
<td>0(0.0)</td>
<td>0(0.0)</td>
</tr>
<tr>
<td><strong>Tumor necrosis</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Negative</td>
<td>7(14.3)</td>
<td>13(26.5)</td>
</tr>
<tr>
<td>Positive</td>
<td>0(0.0)</td>
<td>0(0.0)</td>
</tr>
</tbody>
</table>

**Discussion**

In the present study there was no detectable fascin immuno-reactivity in normal urothelium which was agreed with [18-20].

It was found that there was no correlation between age and gender with fascin expression (P>0.05). A similar correlation was observed by [21-23].

Tumor size was also evaluated and a strong expression of fascin-1 was found with large tumor size (P=0.007) which may be related to the aggressive behavior of the tumor, this also observed by [23, 3].

Tumor grade was found not related to fascin expression (P=0.08). In variance, the only study of [24] found positive correlation between fascin expression and histological grade (P=0.02).

Regarding the tumor stage, there was strong correlation between fascin expression intensity and tumor stage (P=0.001) with the depth of invasion and only 3/35 (8.6%) of non-invasive tumors (pTa) showed intense staining and 1/8(12.5%) of pT2 was urothelial with squamous differentiation (Table 2). There is no difference within the same stage between low and high grade tumors. This result was also reported by [19] who found that 42% of superficial papillary urothelial carcinomas (pTa) and 95% of invasive urothelial carcinomas (pT2 and higher) demonstrated strong staining for fascin-1. Also, they found the micro-invasive foci in the lamina propria were positive for fascin-1 but not strongly as the deeply invasive tumors. In agreement with findings is the study of [21] who found that the expression of fascin correlated with invasive carcinomas in low and high grade tumors, and staining was intense in the invading tumor cells lamina propria or the muscularis propria and absent or very low expression in tumors pTa stage.

However, in contrast to these findings are those reported by [18,25] who found that none of pTa tumors showed intense staining.
Vascular invasion was associated with fascin-1 overexpression which may be related to advanced tumors, this was similar to [23].

The perineurial invasion was evaluated and no association was found between fascin expression and perineurial invasion (P= 0.1) which may be due to very small sample size and no previous study to compare with it.

On the other hand, tumor necrosis shown a correlation with fascin expression although there was no similar study to compare with it.

**Conclusions**

The fascin-1 overexpression by tumor cells is associated with advanced stage and can be used as predictive marker for recurrence and invasion. Fascin level reduction can be used as therapeutic target in the future.

**Ethical Clearance:** The study was approved by the Research Ethics Committee at College of Medicine/University of Babylon, Iraq.

**Financial Disclosure:** There is no financial disclosure.

**Conflict of Interest:** None to declare.

**REFERENCES**


Effects of Infrared Radiation on *Escherichia coli* Isolated from Appendectomy

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¹Microbiology, ²Medical Physics, ³Nuclear Physics, Northern Technical University, Iraq

ABSTRACT

**Background:** *Escherichia coli* belongs to the genus of Escherichia which can cause many diseases to humans including gastrointestinal diseases and appendicitis. The aims of study were to determine and evaluate the effects of infrared radiation on *E. coli* isolated from appendectomy.

**Method:** In this study, we had 10 tubes contained known numbers of bacterial colonies in Nutrient Broth. These tubes were irradiated by infrared from a source emits infrared at wave length 700-1200nm with 50watt ans at different exposure times, constant energy rate.

**Results:** The results showed that the number of *E. coli* bacterial colonies were significantly (P<0.01) decreased at each increasing in exposure time at constant energy rate. The number of *E. coli* bacterial colonies died in first tube after irradiation at 10min was 11 and in the seventh tube at 70min were 110. So, all bacterial colonies died at infrared radiation wave length 700-1200nm in 150watt within 70min. We concluded that the infrared radiation can kill *E. coli* bacteria by stimulating oxidation, breaking chemical bonds and producing free radicals.

**Keywords:** Infrared radiation, *E. coli*, free radicals, Bacterial colonies, Nutrient Broth.

**Introduction**

Infrared radiation (IR) is a type of electromagnetic radiation with wave length range between (750nm-1mm) and frequency range between 300GHz-400THz. Main bands of IR are: near IR (215THz-430THz) visible to human eye and Mid IR (100THz-215THz) and Far IR (300GHz-100THz), which are natural sources; whereas artificial source include luminous-non luminous [¹]. When infrared radiation strikes the skin, it will be scattered, refracted, reflected, absorbed or penetrate the tissues. The latter is regulated by many factors such as: 1- Frequency of radiation, 2- Tissue thermal conductivity, 3- Thickness of tissue, 4- Arndt-Schultz principle, 5- Grotthous Draper law, 6- cosine law, 7- Inverse square law, 8- Tissue vascularity and 9- Type of the skin [²-⁴].

Infrared radiation can improve healing of skin wounds, relieving pain, fatigue, stiffness and blood pressure regulation, treatment of skin tumors, vascular diseases and hemophilia [⁵].

**Biological effects of infrared:** These effects result from interaction between IR and biological structures in the cell (such as DNA, cell fluids–water, cell membranes and proteins) and all functioning living systems. The biophysical mechanisms of the interaction can be framed in terms of altered mitochondrial metabolism and altered cell membrane potentials [⁶].

*Escherichia coli:* These are one type of the bacteria that live normally in intestines and in the gut of some animals. They were discovered by German bacteriologist, Theodor Escherichia, in the human colon in 1885. There are about 700 serotypes of *E. coli* that have been specified [⁷].

*E. coli* is coli form bacterium of the genus Escherichia, Gram-negative, rod-shaped and anaerobic. Many types of *E. coli* are harmless and part of normal flora of gut. They benefit their hosts by producing vitaminK₂ and inhibiting colonization of intestine with pathogenic bacteria. However, some strains may cause diarrhea when drinking contaminated fouled water or eating contaminated food. Some types of *E. coli* produce toxin called Shiga which damages the lining of intestine [⁸]. In addition, these bacteria are one of the causes of urinary tract infection and appendicitis [⁹].

The early symptoms of *E. coli* infections appear within 1-10 days after the person had ingested the
bacteria. The symptoms include diarrhea, stomach cramps, fever (37.7°C–38.3°C), vomiting, mild dehydration and loss of appetite [10]. On the other hand, late symptoms include severe dehydration, pale skin, hemorrhagic diarrhea, reduced urine output, anemia, severe abdominal pains, shortness of breath, renal failure, jaundice, mental changes and death [11]. Perfect cooking and fluids pasteurization can prevent infection with *E. coli* [12].

**The Appendix:** It is a small tube-like structure attached to the large intestine. It has no known function and removing it does not have an effect on digestive function. It is located in the lower right part of the abdomen [13].

Appendicitis is one of the most common acute surgical emergencies of the appendix can burst and cause infection in the abdominal cavity then death. Appendicitis occurs in any age, but most often between ages of 11 and 31 years. When the inflammation starts, there is no any medical therapy can affect it, so appendicitis is a medical emergency case [14].

**Causes of Appendicitis**

*These include:* 1- Blockage inside the lumen of appendix. When the blockage occurs, the pressure increases due to blood flow impairment, inflammation, gangrene of the appendix can cause [15], 2- blockage of feces inside the appendix so that *E. coli* or viral infection can cause lymph nodes swelling which may squeeze the appendix and cause obstruction [16].

Aims of study were to determine and evaluate the effects of infrared radiation on *E. coli* isolated from appendicectomy.

**Material and Method**

In this study, samples were taken from patients underwent appendectomy. The samples isolated from appendix then cultivated in MacConkey agar medium and incubated for 24h at 37°C, the *E. coli* diagnosed by APi20 system Figure (1). We took loop from bacterial colonies added to tube contains 10ml of Nutrient Broth media, the tube had shaken to homogenize the cells then we added 10μl of media in each tube (ten tubes) contained 10ml of Nutrient Broth media. Before infrared irradiation, we cultivated 10μl of Nutrient Broth form one tube in Nutrient agar with pour plate method and incubated for 24h at 37°C. After this step, the number of bacterial colonies will be known by (colony counter instrument).

![Figure 1: Api 20 system for E. coli diagnostic](image)

**Samples Irradiation:** We had 10 tubes contained known numbers of bacterial colonies in Nutrient Broth. These tubes were irradiated by infrared from a source emits infrared at wave length700-1200nm with 150watt (the rabulb) design with different exposure time at constant energy rate. The distance between sample and infrared source was 20cm. After samples being irradiated, we took 10μl from each tube and cultivated in Nutrient agar. The numbers of bacterial colonies growing in media after 24h incubation will be counted.

**Result**

Our study was carried out on *Escherichia coli* bacteria isolated from appendectomy. We had ten tubes each tube contained *E. coli* colonies in Nutrient agar. Each tube contained 110 of *E. coli* bacterial colonies for each 10μl of Broth media, then irradiated by infrared radiation with different exposure times at constant energy rate. The results showed that the number of *E. coli* bacterial colonies were significantly (P<0.01) decreases at each increasing in exposure time at constant energy rate. The number of *E. coli* bacterial colonies died in first tube, after irradiation for 10min, was 11and in the seventh tube, for 70min, was 110. So, all bacterial colonies died at infrared radiation wave length 700-1200nm in 150watt within 70min (Table 1).

**Table 1: The relation between infrared radiation and number of *E. coli* colonies before and after irradiation at wave length 700-1200nm and 150watt**

<table>
<thead>
<tr>
<th>Sample number</th>
<th>Number of <em>E. coli</em> colonies before irradiation in 10μl of media</th>
<th>Exposure time/ minutes</th>
<th>Number of <em>E. coli</em> colonies after irradiation in 10μl of media</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>110</td>
<td>10</td>
<td>99</td>
</tr>
<tr>
<td>2</td>
<td>110</td>
<td>20</td>
<td>87</td>
</tr>
</tbody>
</table>
Discussion

This study was aimed to determine and evaluate the effects of infrared radiation on *E. coli* bacteria isolated from appendectomy. The results showed that the number of *E. coli* bacterial colonies significantly (P<0.01) decreased with increasing exposure time at constant energy rate (Table 1). The results were in agreement with many studies such as [17,18], *E. coli* bacterial cell has a single chromosome of 4,600kb [19]. The infrared radiation can cause physical and chemical changes lead to stimulate oxidation, IR effects on chemical bonds of biomolecules in the cell and lead to breakdown of strong bonds (O-H, N-H ) in proteins and DNA as well as (P-O) bonds in nucleic acids. When these bonds are broken, they cause damage in proteins and DNA and can produce free radicals that lead to killing of *E. coli* bacteria [20,21].

Conclusion

We concluded that infrared radiation can kill *E. coli* bacteria by stimulating oxidation, breaking chemical bonds and producing free radical.

Ethical Clearance: The study was approved by the Research Ethics Committee at Northern Technical University, Iraq

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

REFERENCES


Isolation and Identification of Some Bacterial Strains Isolated from Throat Infections in Hilla Province, Iraq

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¹Dept. of Microbiology, ²Dept. of Surgery, ENT, College of Medicine, University of Babylon, Iraq

ABSTRACT

Background: Sore throat, also known as throat pain, is pain or irritation of the throat. It is usually caused by pharyngitis or tonsillitis. These infections are usually self-limiting with symptoms typically resolving within 1–2 weeks and complications are rare for the vast majority of throat infections. The present study was aimed to isolation of bacteria from throat infections, identification by routine bacteriological, biochemical tests, vitek, API20, and molecular detection of bacteria by using PCR technique with use of specific primers.

Method: The present study included, (204) samples which were collected from patients with throat infections, who were visiting AL-Hilla Teaching Hospital and private clinic of superadviser for the period from February to December (2017). Two swabs were collected one for culturing and the other for direct DNA extraction for swabs of Moraxiella catarrhils and Haemophilus influenza.

Results: Only 190(93.1%) were positive cultures; whereas 14(6.9%) samples showed no bacterial growth. Gram-positive bacteria constituted 116/190(61.1%) from the total isolates and Gram-negative bacteria constituted 74/190(38.9%). Streptococcus pyogenes was appeared with percentage 78(67.2%), and Staphylococcus aurous constituted 38(32.8%), and out of the 74(100%) the Moraxiella catarrhils was the most predominant as gram negative bacteria with percentage 44(60%), Klebsiella pneumonia was 12(16%), E. coli appeared with 10(13%) and Haemophilus influenzae had 8(11%) positive isolates.

Keywords: throat infections, DNA extraction, Epi20, E, Haemophilus influenza, PCR.

Introduction

Sore throat, also known as throat pain, is pain or irritation of the throat. It is usually caused by pharyngitis or tonsillitis. These infections are usually self-limiting with symptoms typically resolving within 1–2 weeks and complications are rare for the vast majority of throat infections. The most common cause (80%) is acute viral pharyngitis. Other causes include streptococcal pharyngitis, trauma, and tumors. Group A beta-haemolytic Streptococcus infections are the most common bacterial cause of sore throat. However, in clinical practice it is notoriously difficult to distinguish between URTIs of viral and bacterial origin. Factors associated with an increased risk include advanced age, respiratory or immuno-compromising and long duration of symptoms.

There are many other bacteria which play an important role in the infection of throat such as S. aurous which is responsible for about 38% of throat infection, Klebsiella, E. coli, Haemophilus and Moraxella which also causes URT infection. Pharyngitis is inflammation of the back of the throat, it typically results in a sore throat and fever. Most cases are caused by a viral infection streptococcal sore throat is the cause in about (25%) of children and 10% of adults. Tonsillitis refers to inflammation of the pharyngeal tonsils. Peritonsillar abscess is a collection of pus between the fibrous capsule of the tonsil. The present study was aimed to isolation of bacteria from throat infections, identification by routine bacteriological, biochemical tests, vitek, API20, and molecular detection of bacteria by using PCR technique with use of specific primers.
**Materials and Method**

Samples Collections[15]. A total of (204) swab samples were obtained from patients had throat infections diagnosed as throat infections who were visiting Al-Hillah Teaching Hospital were subjected for culturing on different types of culture media, Vitek$_2$ system to detect Gram positive bacteria, API$_{20}$E System: For Gram-negative bacteria and molecular detection during the period from February to December (2017).

Microscopic properties depend on [16]. Biochemical tests depend on [17], API$_{20}$E System: For Gram-negative bacteria

Identification bacterial isolates with Vitek$_2$ System

Molecular Identification (16S rRNA and P4) genes for identification of *Haemophilus Influenzae* and *Moraxella catarrhalis*:

**Results and Discussion**

**Isolation and Identification:** Out of the (204) clinical samples, only 190(93.1%) showed positive cultures; whereas 14(6.9%) samples showed no bacterial growth, which might have been treated with antibiotics or due the presence another types of causative agents. Gram-positive bacteria constituted 116/190(61.1%) from the total isolates and were considered the predominant etiological agents to Gram-negative bacteria which constituted 74/190(38.9%; Figure 1). Table (2) showed distribution of bacterial isolates from patients. *Strep. pyogenes* was the most common bacterial species isolated (41.1%). These results were in agreement with [18] who had emphasized group A *Streptococcus* (GAS) as the most common bacterial cause of pharyngitis that reach to (37%). Moreover, current data were in agreement with [19,20] who demonstrated that (30-40%) of throat infections were due to group A *Streptococcus*. These bacteria possess protein M which is a potent virulence factor that inhibits bacterial phagocytosis, hyaluronic acid and capsule that enhances its ability to invade tissues. Multiple exotoxins, hemolysins (Streptolysin S and Streptolysin O). on the other hand, [21] found that (2%) belong to *Strep. pyogenes*. *M. catarrhalis* was the second type of bacteria isolated from throat infections 44(23.2%). This result agreed with [22] who found that (32%) had *M. catarrhalis*, and with [21] who mentioned that the *Moraxella* was responsible for about (20% to 30%) of infections of upper respiratory tract.

DNA was extracted from all (204) specimens; conventional PCR was carried out using the amplification of specific 16S rRNA primer; according to the sequences and program listed in Table (1). Gel electrophoresis showed that, out of the (204) samples, only 44/150 (23.3%) produced the specific 600bp DNA fragment when compared with allelic ladder (Figure 2). Moreover, [24] found that *Moraxella* caused (63.1%) of upper respiratory tract infection. The recognition of *M. catarrhalis* as an important human respiratory tract pathogen. The isolation rate of *M. catarrhalis* from the respiratory tract in study published by [25] was (9.8%); whereas [26] showed that the isolation rate was about (3.6%). The rates of *M. catarrhalis* carriage in children and adults differed considerably, about two-thirds of children were colonized within the first year of life by these bacteria [27]; whereas it was estimated to be represented in about (10-15%) of adults [28] or may be more as in the case of [29] who reported that the prevalence of *M. catarrhalis* in respiratory tract of adults has been detected in (15-32%) of the samples. The carriage of this organism is probably due to bacterium antibiotics resistance properties and there is a correlation of *M. catarrhalis* carriage with seasonal fluctuations [25] although this organism was regarded as commensal for a long period in the mucosal surfaces of upper respiratory tract [30;31]. *S. aurous* was the third type of bacteria isolated from throat infection 38(20%), this frequency may be due to firstly; it may enter the throat from nasal canal as a normal flora and by reflux otitis media when the tympanic membrane was not intact. Also, it contains teichoic and lipoteichoic acids as well as capsular material which facilitates the adherence of these bacteria to epithelium. Furthermore, [32] showed that *S. aurous* was the most common bacteria isolated from tonsillitis (83%). In addition, [33,34] showed that (42.7%) of *S. aurous* from throat swabs in prison population. Also, [35] showed that *S. aurous* was isolated from throat swabs that were taken from patients (20.13%) and [36] reported that (16.83%) of isolates from pharyngitis and tonsillitis were *S. aurous*. In current study *H. influenzae* subjected to molecular detection method using conventional PCR. Gel electrophoresis showed that, out of the (204) samples, only 8/150 (4.2%) produced the specific (1500bp) and (1100bp) DNA fragments, respectively, when compared with allelic ladder (Figures 3 and 4). The increased isolation of *H. influenzae* (in APT only) and *M. catarrhalis* in association with GABHS may be due to a synergistic relationship between these organisms [37,38].
On the other hand it was reported that *H. influenza* was involved in various infections including otitis media [39], conjunctivitis and meningitis and also frequently isolated from patients with chronic infections of the upper and lower respiratory tracts. Moreover, [40] had evaluated different rates from different sites as they reported the percentage of isolation from CSF was (78%), while from nasal swabs, throat swabs and sputum to be (80%), (55%) and (53.3%), respectively. In contrast to the results of this study, [41] found that 80 isolates of *H. influenza* were based on their growth requirement and serotype distribution. The other gram-negative bacteria, *E. coli*, was isolated from throat infection represented 10(5.2%) [42]. In a previous study, [44] found that this microorganism represented (28%), while [42] mentioned that *E. coli* represented (12.5%) of throat infections. Our results, if compared with previous studies, was approximately similar to those carried by [43] who reported that the prevalence of *E. coli* was (3%) among throat infections. *Haemophilus Influenzae* was presented in (4.2%). These results indicated that isolation of these bacteria differs according to the site of isolation and method applied and this can be attributed to different virulence factors expressed by *H. influenzae* in different sites of human body as its natural host and can be correlated with the severity and invasiveness of the disease.

### Table 1: Primer sequences, amplicon size (bp) and PCR conditions

<table>
<thead>
<tr>
<th>Bacteria</th>
<th>Genes</th>
<th>Primer sequence (5’-3’)</th>
<th>Size (bp)</th>
<th>PCR conditions</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>H. Influenza</em></td>
<td>16S rRNA</td>
<td>F-TGACATCCTAAGAAGAGC R-GCAGGTTCCCTACGGTTA</td>
<td>1500</td>
<td>5min 1x</td>
<td>(Wiklund et al., 2000).</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>95°C 30sec</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>53°C 30sec 30x</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>72°C 30sec</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>72°C 10min 1x</td>
<td></td>
</tr>
<tr>
<td><em>H. Influenza</em></td>
<td>P4</td>
<td>F-GATCCGAAAATCCTTTAAAGGAAT R-ATTAAATATGGATCCCAGTAAAAACTGAAC</td>
<td>1100</td>
<td>94°C 5min 1x</td>
<td>(Reidl and Mekalanos, 1996).</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>94°C 1min</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>50°C 1min 35x</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>72°C 2min</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>72°C 10min 1x</td>
<td></td>
</tr>
<tr>
<td><em>M. catarrhalis</em></td>
<td>16S rRNA</td>
<td>F-AGAGTTTGATCCTGTCCTAG R-CTTTACGCCCATTAAAACTCCG</td>
<td>600</td>
<td>95°C 2min 1x</td>
<td>(Bootsma et al., 2000).</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>95°C 30sec</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>55°C 30sec 29x</td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>72°C 60sec</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>72°C 5min 1x</td>
<td></td>
</tr>
</tbody>
</table>

![Figure 1: Percentages of Gram positive and Gram negative bacterial isolates from throat infections](image-url)
Table 2: Distribution of bacteria isolated from throat infections

<table>
<thead>
<tr>
<th>Bacteria</th>
<th>No. of isolates</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Streptococcus pyogenes</em></td>
<td>78</td>
<td>41.1</td>
</tr>
<tr>
<td>Moraxella catarrhalis</td>
<td>44</td>
<td>23.2</td>
</tr>
<tr>
<td><em>Staphylococcus aureus</em></td>
<td>38</td>
<td>20</td>
</tr>
<tr>
<td>Klebsiella pneumonia</td>
<td>12</td>
<td>6.3</td>
</tr>
<tr>
<td>E. coli</td>
<td>10</td>
<td>5.2</td>
</tr>
<tr>
<td>Haemophilus influenzae</td>
<td>8</td>
<td>4.2</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>190</strong></td>
<td><strong>100%</strong></td>
</tr>
</tbody>
</table>

Figure 2: Agarose gel (1%) electrophoresis at 70 volt for 50min for 16SrRNA PCR products visualized under UV light at 301nm after staining with Ethidium bromide. L: 1500bp ladder; lines (1-11) were positive for this gene, the size of product is 600bp.

Figure 3: Agarose gel (1%) electrophoresis at 70 volt for 50min for 16SrRNA PCR products visualized under UV light at 301nm after staining with ethidium bromide. L: 1500bp ladder; lines (1-8) were positive for this gene, the size of product is 1500bp.

Figure 4: Agarose gel (1%) electrophoresis at 70 volt for 50min for *OMP(p4)* PCR products visualized under UV light at 301nm after staining with ethidium bromide. L: 1500bp ladder; lines (1-8) were positive for this gene, the size of product is 1100bp.
Ethical Clearance: The study was approved by the Research Ethics Committee at College of Medicine/University of Babylon, Iraq.

Financial Disclosure: Self-funded.

Conflict of Interest: None to declare.

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Appraisal of Iraqi Women’s Knowledge Related to Breast Cancer and their Performance of Breast Self-Examination in Al-Diwanyia City

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1Assistant Instructor, M.Sc. Maternal and Neonatal Health, 2Assistant Instructor, M.Sc. Nursing Administration, Nursing Department, 3Assistant Professor, College of Nursing, University of Al-Qadisiyah, Iraq

ABSTRACT

Background: Breast cancer is one of the important diseases that intimidate woman’s sexual life and her well-being. Early diagnosis and successful therapeutic intervention would prevent morbidity and death of such patients. The latter can be achieved through raising women’s awareness of risk factors, preventive measures and screening techniques, such as Breast Self-Examination, related to breast cancer. The aim of current study was to appraise knowledge and performance related to breast cancer among women in AL-Diwaniyah City, Iraq.

Method: Cross-sectional descriptive questionnaire-based study involved 50 women attending Breast Oncology Clinic at AL-Diwanyia Teaching Hospital between November 2016 and March 2017. Data were analysed using descriptive and inferential statistics and tested for significance at P≤ 0.05.

Results: Current study revealed that the 50 women participated were aged 20 to 60 years, (64%) of them were between 40 and 59 years. Also, 72% were married, 72% were highly educated and 96% were urban women. However, they had below average level of knowledge concerning breast cancer. Also, they had poor practice regarding breast self-examination.

Conclusion: The reported results in current study could be attributed to cultural issues, limited availability and/or access to information resources and screening techniques for this disease. A well-planned nationwide health-promoting programme is required to raise awareness of this disease. Also, research in this area of medicine needs to be highly encouraged.

Keywords: breast cancer, knowledge, practice, breast self-examination.

Introduction

Breast cancer (BCA) develops when malignant cells generate within breast tissue. It can affect males and females, yet it is much more common in females [1]. Also, it can be classified into sub-types that have distinctive genetic, histopathological and clinical characteristics.

BCA can intimidate woman’s sexual life and her well-being [1]. It is the most common cancer affecting women all over the world as it accounts for approximately 25% of all newly diagnosed cancer cases every year [3]. In Iraq, BCA represents approximately one third of malignant diseases affecting women [1].

Early diagnosis and successful treatment of BCA would prevent life-long morbidity and death of patients [4-5]. To achieve this objective, it is essential to raise awareness of women regarding risk factors, preventive measures and screening techniques of BCA [6-8] using mass media, healthcare workers and/or books.

Risk factors for BCA [1] include radiation, family history, advanced woman age, early menarche, use of hormonal contraceptives, obesity and late menopause. However, preventive measures of BCA include increasing

DOI Number: 10.5958/0976-5506.2019.01375.5
physical activity, changing life style, consumption of high-fiber diet and regular intake of phytonutrients and antioxidants [1].

The symptoms suggestive of BCA include presence of a palpable breast lump, unusual discharge from the nipple, tenderness and redness of the breast, breast skin appearance is similar to that of an orange with/without nipple retraction [1].

Moreover, screening techniques for BCA include mammography, physical examination conducted by specialist doctors and Breast Self-Examination (BSE) performed by the individual herself at home [6-8]. The first two techniques maybe unavailable, unaccessible and/or expensive. In contrast, BSE technique is cost- and time-effective, straightforward to perform, does not require hospital visit, reliable and can be performed on regular basis as it involves self palpation and inspection of both breasts and axillary regions at home [9,10].

Women’s knowledge regarding BCA and their practice of BSE were the focus of a number of local and international studies [5-7,11,12], however, there was no published study that had investigated these topics among women in AL-Diwanyia City.

Therefore, current study was designed to appraise background information about BCA and performance of BSE among women attending Breast Oncology Clinic at AL-Diwanyia Teaching Hospital in Iraq.

**Methodology**

Current study was descriptive cross-sectional questionnaire-based. It was conducted at AL-Diwanyia Teaching Hospital from 1\textsuperscript{st}, November 2016 to 17\textsuperscript{th}, March 2017. Ethical clearance was obtained from Research Ethics Committee in the hospital before contact with patients. The study targeted women attending Breast Oncology Clinic in the Hospital. Participants were informed that their participation is voluntary, anonymous and confidential and data will be only used for research purposes. Verbal consents were obtained before administration of questionnaires. Following evaluation of relevant literature and questionnaires employed in comparable studies [5-8,11,12], a questionnaire was developed and critically appraised by a panel of expertes. It was administered by face-to-face interview with participants. The questionnaire consisted of three sections that covered demographic data of subjects, their knowledge regarding breast cancer and their background and practice of breast self-examination.

Data were analysed using descriptive, inferential and chi-squared statistics and tested for significance at \( P \leq 0.05 \).

**Results**

Out of the 50 women participated in the study, 64% were 40-59 years old, 72% of them were from educated background, 72% were married, 60% were employed and 96% were living in urban areas (Table 1).

<table>
<thead>
<tr>
<th>Demographics data</th>
<th>Range</th>
<th>Frequency</th>
<th>%</th>
<th>Cumulative %</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age/yr</strong></td>
<td>20-29</td>
<td>5</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>30-39</td>
<td>9</td>
<td>18</td>
<td>28</td>
</tr>
<tr>
<td></td>
<td>40-49</td>
<td>17</td>
<td>34</td>
<td>62</td>
</tr>
<tr>
<td></td>
<td>50-59</td>
<td>15</td>
<td>30</td>
<td>92</td>
</tr>
<tr>
<td></td>
<td>60+</td>
<td>4</td>
<td>8</td>
<td>100</td>
</tr>
<tr>
<td><strong>Education</strong></td>
<td>Intermediate</td>
<td>7</td>
<td>14</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td>Secondary school</td>
<td>7</td>
<td>14</td>
<td>28</td>
</tr>
<tr>
<td></td>
<td>College or institute</td>
<td>26</td>
<td>52</td>
<td>80</td>
</tr>
<tr>
<td></td>
<td>Higher education (PG)</td>
<td>10</td>
<td>20</td>
<td>100</td>
</tr>
<tr>
<td><strong>Marital status</strong></td>
<td>Single</td>
<td>14</td>
<td>28</td>
<td>28</td>
</tr>
<tr>
<td></td>
<td>Married</td>
<td>36</td>
<td>72</td>
<td>100</td>
</tr>
<tr>
<td><strong>Occupation</strong></td>
<td>House wife</td>
<td>15</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td></td>
<td>Student</td>
<td>5</td>
<td>10</td>
<td>40</td>
</tr>
<tr>
<td></td>
<td>Employed</td>
<td>30</td>
<td>60</td>
<td>100</td>
</tr>
<tr>
<td><strong>Residence</strong></td>
<td>Urban</td>
<td>48</td>
<td>96</td>
<td>96</td>
</tr>
<tr>
<td></td>
<td>Rural</td>
<td>2</td>
<td>4</td>
<td>100</td>
</tr>
</tbody>
</table>
Data revealed that the majority of participants (84%) had poor knowledge about this life-threatening disease (Table 2). In addition, none of BCA symptoms included in the questionnaire could be recognised by ≥50% of participants (Table 2).

Moreover, only 28%, 44%, 22% and 20% of participants acknowledged that high fat diet, exposure to radiation, reduced physical activity and early menarche, respectively, may contribute to development of BCA (Table 2). Interestingly, 68% and 78% of participants, respectively, recognised that consumption of oral contraceptives and having breast biopsies could contribute to development of BCA (Table 2).

On the other hand, 58% of participants agreed that increased physical activity would prevent development of BCA. However, only 20% and 48% of participants, respectively, acknowledged the potential efficacy of high-fiber diet and regular breast self-examination in putting-off progression of this disease (Table 2).

Table 2: Participants’ knowledge about risk factors, clinical features and preventive measures related to breast cancer

<table>
<thead>
<tr>
<th>Women’s knowledge of the clinical features of breast cancer</th>
<th>Rating</th>
<th>Frequency</th>
<th>%</th>
<th>M.S</th>
<th>Evaluate</th>
</tr>
</thead>
<tbody>
<tr>
<td>It is the form of cancer disease that affect the breast tissue and usually appears in the pipeline channels that carry milk to the nipple and the milk glands</td>
<td>No</td>
<td>33</td>
<td>66</td>
<td>1.34</td>
<td>Fail</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>17</td>
<td>34</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Solid bumps under the skin of the breast or underarm area</td>
<td>No</td>
<td>35</td>
<td>70</td>
<td>1.3</td>
<td>Fail</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>15</td>
<td>30</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The skin of the breast look like the skin of an orange</td>
<td>No</td>
<td>26</td>
<td>52</td>
<td>1.48</td>
<td>Fail</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>24</td>
<td>48</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Abnormal discharge from the nipple</td>
<td>No</td>
<td>36</td>
<td>72</td>
<td>1.28</td>
<td>Fail</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>14</td>
<td>28</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Breast pain and stiffness</td>
<td>No</td>
<td>42</td>
<td>84</td>
<td>1.16</td>
<td>Fail</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>8</td>
<td>16</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Withdrawal of the nipple retraction</td>
<td>No</td>
<td>27</td>
<td>54</td>
<td>1.46</td>
<td>Fail</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>23</td>
<td>46</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Women’s knowledge about risk factors of breast cancer

<table>
<thead>
<tr>
<th></th>
<th>Rating</th>
<th>Frequency</th>
<th>%</th>
<th>M.S</th>
<th>Evaluate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Exposure to radiation</td>
<td>No</td>
<td>28</td>
<td>56</td>
<td>1.44</td>
<td>Fail</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>22</td>
<td>44</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Family history of breast cancer</td>
<td>No</td>
<td>41</td>
<td>82</td>
<td>1.18</td>
<td>Fail</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>9</td>
<td>18</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aging (50 years old)</td>
<td>No</td>
<td>42</td>
<td>84</td>
<td>1.16</td>
<td>Fail</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>8</td>
<td>16</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Early menarche(&lt;12 years)</td>
<td>No</td>
<td>40</td>
<td>80</td>
<td>1.2</td>
<td>Fail</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>10</td>
<td>20</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Use of oral contraceptives or hormone replacement therapy</td>
<td>No</td>
<td>16</td>
<td>32</td>
<td>1.62</td>
<td>Pass</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>34</td>
<td>68</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Women who conducted biopsies of the breast(whether positive or negative)</td>
<td>No</td>
<td>11</td>
<td>22</td>
<td>1.72</td>
<td>Pass</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>39</td>
<td>78</td>
<td></td>
<td></td>
</tr>
<tr>
<td>High-fat diet</td>
<td>No</td>
<td>36</td>
<td>72</td>
<td>1.28</td>
<td>Fail</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>14</td>
<td>28</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Never breast fed a child</td>
<td>No</td>
<td>37</td>
<td>74</td>
<td>1.26</td>
<td>Fail</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>13</td>
<td>26</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Results of current study showed that 60% of participants had heard about BSE (Table 4), of whom 42% knew from mass media, 38% learnt from healthcare workers, 8% read about it in books, 2% heard from their friends and 10% had their knowledge from multiple sources (Figure 1). In addition, only 16% of participants performed BSE in a systematic manner. The others either did not know how to perform BSE (32%) or they (52%) carried out it however they want (Table 3). Also, results showed that 22% of participants had never performed BSE before, 36% practiced it irregularly, 8% on weekly basis and 34% on monthly basis (Table 3).

![Figure 1: Sources of women’s information about BCA and BSE.](image-url)
Table 3: Summery Distribution regarding knowledge and practices of breast self-examination domain

<table>
<thead>
<tr>
<th>Knowledge and practices about breast self-examination</th>
<th>Rating</th>
<th>Frequency</th>
<th>%</th>
<th>Cumulative %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Women’s Knowledge about breast self-examination</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Do you have information about breast self-examination</td>
<td>Yes</td>
<td>30</td>
<td>60</td>
<td>60</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>20</td>
<td>40</td>
<td>100</td>
</tr>
<tr>
<td>How is BSE performed?</td>
<td>Don’t know</td>
<td>16</td>
<td>32</td>
<td>32</td>
</tr>
<tr>
<td></td>
<td>Using the palm of the hand and three fingers</td>
<td>8</td>
<td>16</td>
<td>48</td>
</tr>
<tr>
<td></td>
<td>However I want</td>
<td>26</td>
<td>52</td>
<td>100</td>
</tr>
<tr>
<td>Do you practice BSE?</td>
<td>No</td>
<td>11</td>
<td>22</td>
<td>34</td>
</tr>
<tr>
<td></td>
<td>Irregular</td>
<td>18</td>
<td>36</td>
<td>56</td>
</tr>
<tr>
<td></td>
<td>weekly</td>
<td>4</td>
<td>8</td>
<td>64</td>
</tr>
<tr>
<td></td>
<td>Monthly</td>
<td>17</td>
<td>34</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>50</td>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>

Data obtained from current study revealed no association between demographic criteria of participants and their knowledge concerning BCA (Table 4).

Table 4: Statistical correlation between demographic data and overall assessment about breast cancer domain

<table>
<thead>
<tr>
<th>Demographic data</th>
<th>Rating</th>
<th>Overall Assessment</th>
<th>X²</th>
<th>d.f</th>
<th>p- value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Fail</td>
<td>Pass</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age/years</td>
<td>20-29</td>
<td>4</td>
<td>1</td>
<td>5.133a</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>30-39</td>
<td>7</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>40-49</td>
<td>16</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>50-59</td>
<td>13</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>60+</td>
<td>2</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Education</td>
<td>Intermediate</td>
<td>6</td>
<td>1</td>
<td>3.632a</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Secondary school</td>
<td>5</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>College/institute</td>
<td>24</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Higher education (PG)</td>
<td>7</td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Occupation</td>
<td>House wife</td>
<td>13</td>
<td>2</td>
<td>.149a</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Student</td>
<td>4</td>
<td>1</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Employ</td>
<td>25</td>
<td>5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Residence</td>
<td>Urban</td>
<td>40</td>
<td>8</td>
<td>.397a</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Rural</td>
<td>2</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>No.</td>
<td>24</td>
<td>5</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Discussion

Results of current study suggested that participants were representative of women at risk for BCA as 72% of our study sample were ≥ 40 years old and 96% were urban women (Table 1). The risk of BCA is growing up to the age of 50 years and rises as age increases and it is higher among urban women than countryside-resident women [6,13].

Moreover, only 60% of participants had information about BCA and BSE (Figure 1). This figure is similar to the 69.1% from Kirkuk City [12], but lower than the 91.5% from Baghdad [13]. These differences could be due to different living circumstances and diverse life styles of residents in these cities which greatly affect individuals’ thinking, experiences and priorities [18].
Furthermore, 42% of participants got their information from mass media (Figure 1). Similar data were reported by previous studies [6,13,15] indicating the importance of mass media in dissemination of knowledge, education and health promotion. However, unavailability of relevant books about BCA as potentially sensitive issue accounted for the findings that books and friends were poor sources of information about BCA in AL-Diwanyia City. Moreover, healthcare workers were in the second rank (38%) as a source of information about BCA and BSE (Figure 1). Similar findings were reported in India [6]. This finding indicated that healthcare personnel at AL-Diwanyia Teaching Hospital do not allot enough time for education of people at risk of this potentially fatal disease.

Reasons for the insufficient knowledge about BCA and BSE our participants have may include unemployment (40% of participants) and probably insufficient incomes for those who were employed (60%) as it has been concluded that individual’s education is greatly influenced by his/her income [16]. In addition, lack of ineffective local or nationwide [12] health promotion programmes concerning BCA and its screening techniques might have contributed to the reported level of knowledge. Also, participants viewed healthcare workers as being inexperienced and/or so busy to provide relevant information [17]. Moreover, breast disease is a culturally sensitive issue [12], therefore, presentation of relevant data via mass media and discussions with friends or within families are somewhat restricted.

The poor practice of BSE by our participants maybe because they prefer other screening techniques like mammography [19], they were unsure about their abilities to perform BSE and/or they were panic from discovering a lump in the breast [12]. Also, they might have not heard about BSE.

Data from current study revealed that the insufficient level of knowledge concerning BCA did not associate with any of the demographic variables of interest (Table 3). Nonetheless, an association between participants’ knowledge and their age, employment and family history has been documented in other studies [12,18].

Current study was conducted for the first time in AL-Diwanyia City. Also, most of participants were urban women and ≥ 40 years old. However, the nature of their jobs and the sufficiency of their earnings were not reported in this study. Also, it had better recruit more participants to ensure generalizability of results.

Research is needed to get an insight into the actual reasons that influence practice of BSE among women of different age groups and to suggest the optimal age-related screening method in Iraqi population.

### Conclusions

The reported low level of knowledge and limited practice concerning BCA and BSE among women at risk of this disease in the AL-Diwanyai City could be attributed to cultural issues and limited availability as well as accessibility to information resources and screening techniques for this disease. However, adoption of a national health-promoting programme, training of healthcare workers and encouraging scholarship in this field would make it possible win the battle against this potentially fatal disease.

### Acknowledgement

The authors are very grateful for participants and healthcare workers at the Breast Oncology Clinic in AL-Diwaniyah Teaching Hospital.

### Ethical Clearance: The study was approved by the Research Ethics Committee at AL-Diwaniyah Teaching Hospital Iraq.

### Financial Disclosure: There is no financial disclosure.

### Conflict of Interest: None to declare.

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Molecular Detection of RIF Resistance in Pulmonary and Extrapulmonary Specimens in Misan Province–South of Iraq

Zainab Mohammad Edi, Sanaa Basheer Kadhem, Mayssa Ghazi Jumaa

1Department of Microbiology, College of Medicine, University of Misan, Misan, Iraq

ABSTRACT

Background: Tuberculosis remains an important public health problem especially in the developing world. The tuberculosis burden is worsened by the emergence and spread of multi-drug resistant bacteria. The aim of current study was to evaluate detection of Mycobacterium tuberculosis in respiratory and non-respiratory specimens and mutations associated with rifampicin (RIF) resistance directly from specimens in less than 2 hours by using GeneXpert MTb/RIF.

Method: A total of 511 patients attended to the TB center in Misan/Iraq from January 2016 to February 2018. These patients were clinically diagnosed or suspected to have TB. The samples were examined by GeneXpert assay. For extra pulmonary fluid samples, the same test was done.

Results: Out of 511 cases, 90 (17.6%) were detected as having M. tuberculosis—86 (95.5%) were rifampicin sensitive and 4 (4.4%) were rifampicin resistant. Also, 79 (87.7) were pulmonary samples and the remaining 11 (12.2) cases were extrapulmonary specimens (lymph node aspirate, pleural fluid, saliva, abscess and bronchoalveolar lavage).

Conclusions: GeneXpert assay is a new rapid molecular test in the detection of Mycobacterium tuberculosis directed from pulmonary and extra pulmonary specimens and detection of resistance to antibiotics(Rifampicin).

Keywords: GeneXpert assay, MTB, Rifampicin, Drug resistant, Extra pulmonary.

Introduction

Tuberculosis (TB) is an infectious disease caused by the bacillus Mycobacterium tuberculosis (MTB). It spreads from person to person predominantly through an airborne route. It remains a major global health problem as it causes ill-health among millions of people. After the human immunodeficiency virus (HIV), TB ranks as the second leading cause of death from an infectious disease worldwide [1,2].

Worldwide, there are estimated 9 million new cases and 1.4 million deaths caused by Mycobacterium tuberculosis (MTB) infections [3]. These numbers are increasing due to the increasing emergence and spread of multi-drug resistant M. tuberculosis strains (MDR-TB). The latter are now a serious threat for public health control systems and do not have effective treatment regimens [4]. Rifampicin is a very important component of the current tuberculosis treatment regimen and has proved to be effective to both susceptible strains and strains resistant to streptomycin and isoniazid [5]. Drug resistance in MTB has been characterized by a number of mutations in genes that are involved in drug targets/metabolism. Mutations in rpo B and kat G genes of MTB have been shown to be responsible for resistance to rifampin (RIF) and isoniazid (INH), respectively [6]. Ninety-five percent of mutations for RIF resistance are located in 81-bp region of the rpoB gene that codes for the β subunit of RNA polymerase. Mutations in codon 315 of the katG [7].

Rapid detection of drug resistance is crucial in choosing the most effective treatment to avert morbidity and mortality of infected individuals and reduce...
the risk of MDR tuberculosis transmission. Xpert MTB/RIF assay is a new rapid molecular test that was asserted that it was able to overcome many of the current operational difficulties in TB diagnosis. WHO endorsed Xpert MTB/RIF assay in 2010 for use in TB prevalent resource limited countries as a first line diagnostic test for rapid diagnosis of TB in HIV infected patients or for management of MDR-TB suspect.

In this study, we aimed for detection of Mycobacterium tuberculosis in respiratory and non-respiratory specimens and mutations associated with rifampicin (RIF) resistance directly from specimens in less than 2 hours by using GeneXpert MTb/RIF (Cepheid GeneXpert® System, USA).

**Material and Method**

**Clinical samples:** In total, 511 specimens were included in the study. They originated from patients with suspected TB between January 2016 to February 2018 at TB center in Misan Governorate, Iraq. A total of 90 samples (79) respiratory and (11) non-respiratory specimens) that were determined as positive for *M. tuberculosis* complex by Xpert MTb/RIF (Cepheid GeneXpert® System, USA) were included in the study.

**Procedures for Xpert assay:** Xpert MTb/RIF testing was performed on samples according to the manufacturer’s recommendations. The Xpert assay sample reagent (containing NaOH and isopropanol) was added in a 1:3 ratio to the tubes to kill the mycobacteria and liquefy the sample. The mixture was vigorously shaken and allowed to sit for 15 min before being shaken again and allowed to sit for another 5 min. Finally, 2 mL were pipetted into the Xpert assay cartridge and inserted into the GeneXpert instrument for polymerase chain reaction (PCR) testing. The measurement and analysis were conducted automatically and reported by the GeneXpert Dx software.

Fluid samples from non-respiratory sites were centrifuged at 400xg for 15 minutes then the deposit was dealt with exactly like sputum samples. The tubes were incubated at room temperature for at least 15 minutes during that they were shaken manually twice then 2 mL of this suspension was aspirated using Pasteur pipette and loaded into the GeneXpert cartridge for PCR test.

**Results**

A total of 511 specimens were run in the Xpert MTb/RIF assay. MTb was detected by GeneXpert in 90 (17.6%) specimens, while MTb was not detected in 421 (82.38%) specimens (Table 1). Rifampicin resistance among MTb detected cases was observed by GeneXpert in 4 (4.4%) out of 90 MTb cases (Table 2). Among 90 (17.6) MTb detected cases 50 (55.6) were males and 40 (44.4) were females (Table 3).

The pulmonary specimens were detected in GeneXpert assay 75 (84.3), and extra-pulmonary specimens (plural fluid, lymph node aspirate, saliva, abscess, bronchoalveolar lavage) were detected in GeneXpert assay 11 (12.2) (3,1,1,2,4), respectively, (Table 4).

<table>
<thead>
<tr>
<th>No. of Specimens</th>
<th>MTB detected (%)</th>
<th>MTB not detected (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>511</td>
<td>90 (17.6)</td>
<td>421 (82.38)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>MTB detected (n=90)</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. of samples</td>
</tr>
<tr>
<td>------------------</td>
</tr>
<tr>
<td>90</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Age Group/yr</th>
<th>Males n (%)</th>
<th>Females n (%)</th>
<th>Total n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;25</td>
<td>6</td>
<td>11</td>
<td>17</td>
</tr>
<tr>
<td>25–34</td>
<td>10</td>
<td>8</td>
<td>18</td>
</tr>
</tbody>
</table>
Table 4: According types of specimens (pulmonary and extra-pulmonary specimens)

<table>
<thead>
<tr>
<th>Types of samples</th>
<th>Sputum n (%)</th>
<th>Pleural fluid n (%)</th>
<th>Lymph node aspirate n (%)</th>
<th>Saliva n (%)</th>
<th>Abscess n (%)</th>
<th>Bronchoalveolar lavage n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>79 (87.7)</td>
<td>3 (3.3)</td>
<td>1 (1.1)</td>
<td>1(1.1)</td>
<td>2 (2.2)</td>
<td>4 (4.4)</td>
</tr>
</tbody>
</table>

Discussion

This study demonstrated that the Xpert MTb/RIF assay system can rapidly detect the presence of *M. tuberculosis* and identify the mutations most frequently associated with rifampin resistance directly from sputum samples.

In this study, GeneXpert assay detected *M. tuberculosis* in 90 (17.6%) of cases. In another study, [10] detected *M. tuberculosis* in 283 (94.33%) of samples out of 300, which disagreed with the findings of this study. GeneXpert MTB/RIF assay detected 4 (4.5%) of MTB positive cases resistant to rifampicin therapy, which was very close (agreed) to what was found by [11], who reported a prevalence for Rifampicin resistance rate of 6.9%, and by [12] who reported 3.1% in Iran. However, [13] detected 20 (14.2%) rifampicin-resistant cases out of the total positive MTB cases which disagreed with the findings of our study. This discrepancy in results could be attributed mostly to existence of mixed bacterial strains in sputum sample particularly in retreated patients, or due to gene mutations in MTB especially rpo B gene [14].

In our study, among 90 clinically suspected pulmonary and extra pulmonary tuberculosis cases, 50 (55.6%) were males and 40 (44.4%) were females. Another study, [15] reported that out of 107 pulmonary tuberculosis patients, 64 (59.81%) were males and 43 (40.19%) were females, this was almost similar to our study. The reason of higher male tuberculosis cases than female cases might be explained by the fact that males are actively populated in the community and may come in contact with TB infected persons more frequently, and the associated habits of alcoholism and smoking among the males which may imply an increased susceptibility of males to respiratory illnesses. But female members still reside at home and, therefore, the chance of exposure is comparatively less. Thus, it is recommended to use the GeneXpert assay to prevent prevalence MDR-TB and provide sufficient quantity of GeneXpert kits to examine all the negative and positive samples that attended the tuberculosis centers.

Conclusion

The current study proved the high incidence and prevalence rates of TB in Misan province. The GeneXpert can be rapid and helpful assay for the diagnosis of rifampicin resistant TB that needs minimal technique and can be operated by non-specialist laboratory staff. Furthermore, GeneXpert can provide results in a short period of time, as it is not necessary to wait for smear results like in the traditional method. As a result, treatment can be started more quickly.

Acknowledgment

We would like to thank Prof. Majed Shyal Rahima (Microbiology, University of Misan, College of Medicine) for his valuable advices. Also, we would like to thank all members in TB center in Misan for assisting our in collecting the data as well as their kind technical support.

Ethical Clearance: The study was approved by the Research Ethics Committee at College of Medicine/University of Misan, Iraq.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.
REFERENCES


Effect of Laser Diode 820Nm on the Levels of Lactate Dehydrogenase, Creatin Phosphokinase, and Lactic Acid in Muscles of Students

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¹Department of Conservative Dentistry, ²Department of Basic Sciences, College of Dentistry, University of AL-Qadisiyah, Diwaniyah City, Iraq

ABSTRACT

Background: Lactic acid is the end product of glycogenolysis. Glycogen is converted to pyruvic acid in the deficiency of oxygen. The creatin phosphokinase enzyme activity is important to change AMP to ATP in glycogenolysis. However, in the deficiency of CPK, the pyruvic acid is changed to lactic acid with the lactate dehydrogenase (LDH) enhancement. Low level laser treatment (LLLT) is one of the most important research aspects targeting the cellular level. The output laser should be low and do not make thermal changes inside tissues. The aim of this study was to see the effect of laser diode 820nm on the levels of lactic acid and body enzymes, lactate dehydrogenase (LDH) and creatin phosphokinase (CPK), in the after physical activity of facial muscles which are considered important for various activities. Methods: The sample was taken from the 1st-year dentistry students, College of Dentistry/Kufa University in 2014-2015 in collaboration with Al-Saddar Teaching Hospital, Kufa City, Iraq. This study was based on retrospective studies that are related to our research. The protocol of this research was based on clinical studies on three groups of students. Each group contained 30 patients. All the samples were based on same biological qualification of age, weight, and length. The first two groups were submitted into pre and post evaluation of the lactic acid, LDH, and CPK except the control group. From all the groups, each subject was asked to chew a gum of frankincense continuously for a half hour. The weight of the gum was 1.5gm. Results: The result of this study was positive toward the laser group. After mouth muscle activity, lactic acid and enzymes accumulated in the muscle cells. The laser effect reduces muscle fatigue and pain due to reorientation the chemical levels to normal values.

Keywords: Creatin phosphokinase, facial muscles, lactate dehydrogenase, laser diode 820nm, lactic acid.

Introduction

Lactic acid is the end product of glycogenolysis (GCS). Glycogen is converted to pyruvic acid in the deficiency of oxygen. The creatin phosphokinase (CPK) enzyme activity is important to change AMP to ATP in the GCS. However, in the deficiency of CPK, the pyruvic acid is changed to lactic acid with the lactate dehydrogenase (LDH) enhancement. The anaerobic GCS increases lactic acid, LDH, and CPK in the body especially in muscles affected by intense exercise.

CH₃–C–COOH* + NADH + H↔CH₃–C–COOH** + NAD
Without O2

*pyruvic acid
**Lactic acid

Equation Glycogenolysis without Oxygen.

The concentration of lactic acid in normal people at rest position equals 10mg/100ml of blood. The maximum concentration after intense exercise, within 1-3 minutes, in arterial blood stream for normal men and ladies is 10-15mg/100ml of blood. The normal persons can’t tolerate more than 112mg/100ml in blood while the concentration in rest position is 10-12 mg/100ml.

DOI Number: 10.5958/0976-5506.2019.01377.9
The CPK is considered as one of the transport enzymes. This enzyme is found in the skeletal muscles, smooth muscles, and cardiac muscles. This enzyme is found in blood stream when the body has an accident or muscle spasm\textsuperscript{[6,7]}.

The LDH is an enzyme that can stimulate the reverse reaction between lactic acid and pyruvic acid according to the equation shown below:

\[
\text{CH}_3\text{C-COOH} \quad \text{LDH} \quad \text{CH}_3\text{CH-COOH} \quad \text{OH}
\]

\[
\text{Pyruvate} \quad \text{Lactate}
\]

This enzyme is found in all body cells of liver, heart, skeletal muscles, kidneys, and red blood cells in high concentrations\textsuperscript{[8,10]}.

Low level laser treatment (LLLT) is one of the most important research aspects targeting the cellular level\textsuperscript{[11]}. The output laser should be low and do not make thermal changes inside tissues. For laser output to be as LLL, the output should be between 300-9000mj/cm². The laser–tissue interaction explains how the electromagnetic field can change electrolyte elements like sodium and potassium in and out of the cell\textsuperscript{[12]}. Rather than who activates Crip’s cycle to increase ATP production from ADP, the cytochrome alpha is the last chain in Crip’s cycle of the electron transport chain. Laser, especially in red and near infrared is absorbed by this cytochrome. This cytochrome lets the O\textsubscript{2} electrons to potentially be attracted to this magnetic component of the Crip’s chain\textsuperscript{[13]}. The end result is a lot of O\textsubscript{2} electrons with end result of much ATP\textsuperscript{[14,15]}. Finally, the cells will be enriched with energy that is necessary for their activities. Figure 1 summarizes the LLLT-tissue interaction\textsuperscript{[16]}.

The aim of this study was to see the effect of laser diode 820nm on the levels of lactic acid and body enzymes, lactate dehydrogenase (LDH) and creatin phosphokinase (CPK), after physical activity of facial muscles which are considered important for various activities.

![Figure 1: Flow chart of the LLLT-tissue interactions\textsuperscript{[16]}](image)

Materials and Method

Diode laser 820nm: It’s a semiconductor laser 820nm (OMEGA Co., UK). It consists of two parts; control part (time, frequency and output) and laser delivery part. These two parts are connected by cable to allow the operator reach different areas on the patient face.

The gum: For all students, the gum (frankincense) was chewed continuously for a half hour. The weight of the gum was 1.5gm.

Sampling: In the College of Dentistry, 1st-year dentistry students, 90 healthy students with an average age of 28 years old, were divided into three groups; laser treatment, no laser treatment and control groups.

Measurement of lactic acid: Blood samples, obtained via fingers, were taken from each student pre and post experiment to measure lactic acid concentration (Lactic acid measurement device, mmol/100ml, Figure 2), LDH and CPK enzymes [17].

Stimulation program by laser 820nm: The laser group was exposed to a laser session applied on the facial muscles bilaterally. The laser parameter was 100mJ output. The laser delivery system had 100 laser apertures. Each laser spot area was at 2.07mm². When it was divided to change it to cm² and multiply to sum all areas of laser apertures, it became the same area but in cm² to calculate the power density divided by the output over area, that was 500mJ/cm² irradiance. To reach the maximum therapeutic dose, the time was 2 minutes, the total session time. The final dose was between 9000-10000mJ flounce. After the laser session was done, blood samples from all groups were taken for laboratory tests.

Results and Discussion

According to the Tables 1 and 2, shown below, laser exposure showed significant differences between the control group and the laser-treated group. That can be explained due to the laser effect on biology of the cells. However, it restored back the normal activities of the cells getting rid of the fatigue and made much difference on the muscles. The laser was very effective in improving and changing the CPK levels by regeneration of ATPs. The ATPs normally produced by cells are few and can be consumed quickly. However, when the cells are affected by laser, they can produce more ATP energy in a period of two sessions per week according to the response of the cells. When a living being is exposed to a low power laser in organized sessions, the laser supports to rebounce the activities of the LDH, CPK, and lactic acid [18]. Moreover, the activity of muscles is subscribed with enzymes as co-enzymes, so it raises the activity of the coenzymes. The unexposed samples to laser showed no changes. Lactic acid is accumulated inside the cells. Normally, lactic acid already exists in muscles and elevates during muscle activity. Though, lactic acid is the final image of the anaerobic metabolism. In conclusion, the reaction of laser at low power with living tissue is very energetic and ends with clinical results such as healing of injuries, pain relief, biological stimulation, and many others. Laser light has special physical properties that do not exist in the ordinary light (mono chromatic, coherence, brightness and/or one direction).

Table 1: Explains the groups of lactic acid, CPK, and LDH with and without laser stimulation

<table>
<thead>
<tr>
<th>No.</th>
<th>Group</th>
<th>Unit</th>
<th>Before</th>
<th>After</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>Mean</td>
<td>SD</td>
</tr>
<tr>
<td>1.</td>
<td>Lactic Acid</td>
<td>Millimol</td>
<td>26.5</td>
<td>2</td>
</tr>
<tr>
<td>2.</td>
<td></td>
<td></td>
<td>26.5</td>
<td>2</td>
</tr>
<tr>
<td>3.</td>
<td>CPK</td>
<td>MI/IU</td>
<td>69.56</td>
<td>12.5</td>
</tr>
<tr>
<td>4.</td>
<td></td>
<td></td>
<td>69.54</td>
<td>11.5</td>
</tr>
<tr>
<td>5.</td>
<td>LDH</td>
<td>I/U</td>
<td>158.52</td>
<td>36.5</td>
</tr>
<tr>
<td>6.</td>
<td></td>
<td></td>
<td>158.49</td>
<td>37.5</td>
</tr>
</tbody>
</table>

Welcokson value is (0) in temperature 5C under level (0.05)
Table 2: Comparison between laser and no-laser groups

<table>
<thead>
<tr>
<th>Test groups</th>
<th>No laser group</th>
<th>Laser group</th>
<th>Mann–Whitney</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>SD</td>
<td>Mean</td>
</tr>
<tr>
<td>Lactic acid</td>
<td>25.5</td>
<td>1.5</td>
<td>23.5</td>
</tr>
<tr>
<td>CPK</td>
<td>69.57</td>
<td>12.5</td>
<td>70.25</td>
</tr>
<tr>
<td>LDH</td>
<td>158.56</td>
<td>36.5</td>
<td>159.5</td>
</tr>
</tbody>
</table>

**Ethical Clearance:** Obtained from the Research Ethics Committee at College of Dentistry/Kufa University in collaboration with Al-Saddar Teaching Hospital, Kufa City, Iraq.

**Source of Funding:** Self-funded.

**Conflict of Interest:** Nil.

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16. Herigemblong. Protein synthesis flow chart key best of easy to understand flow chart of LLLT or How laser therapy makes; 2018.


Genotypic Study of Hepatitis Type B in Al-Diwaniya Province, Iraq

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1Department of Microbiology, Faculty of Medicine, University of Al-Qadisiyah, Iraq

ABSTRACT

Hepatitis B virus (HBV) with its possible serious sequels of liver cancer and cirrhosis is a well recognized worldwide health problem. These problems are particularly occurring as complications of the chronic form of the disease. Relying on the sequence homogeneity, there are ten HBV genotypes (A-J). The aim of current study was to establish the main genotypes of HBV in clinical cases from Al-Diwaniyah City/middle of Iraq.

Methods: A total of 80 blood samples were collected from patients clinically suspected to have HBV hepatitis and diagnosed basically as Hbs Ag positive. The study sample included 59 males and 21 females with age range of (12-75 years). Nested PCR assay was performed for HBV genotyping. Results: Recorded results for HBV DNA were as follows: 33(41.25%) samples were positive for HBV DNA while 47 (58.75%) samples were negative for HBV.

Nested PCR results done on the positive samples for HBV genotyping showed that genotype E was the only single genotype at a percentage of (3%), while most of the samples showed mixtures of more than one genotype as follows: A+E (3%), C+D+e (12.12%), B+C+D+E (15.15%), A+D (3%), A+B+C+D+E (18.18%), A+B+D+E (18.18), B+D+e (3%), A+C+D+E (3%), B+C+D (6%), A+B+D (3%), A+B+C+D (6%), D+E (6%). Genotype F was not found in any sample in this study. There was no significant difference in distribution of genotypes between males and females (P = 0.369).

Keywords: Hepatitis B Virus, nested PCR, genotyping, serology, prognosis.

Introduction

Variable Hepatitis B genotypes have different geographical distribution, different ways of disease progression and variable prognosis. These factors justify the importance of genotyping of the virus [1]. Several studies were conducted In Iraq that had studied Hepatitis B Virus (HBV) prevalence and genotyping. For example, in Wasit Governorate all the tested samples were of mixed genotypes and no single genotype was found [2]. The main mixture was “A +B+ C+ D+ E” in a percentage of (77.7%) and the other combinations were of less percentages; “A+ B+ D+ E”, “A+ B+ C”, “A+ B+ E” and “A+ D+ E” of 16.6%, 2.7%, 1.3% and 1.3%, respectively, [2]. In Duhok, North of Iraq, a study stated that genotype D is the main genotype and the second genotype was B. Also, high percentage of chronic hepatitis type B patients who exhibited genotype D, were HBe Ag positive [3]. A similar study was conducted in Basra/South of Iraq, found that the main single genotype was genotype D and the main mixture of genotypes was of D+E [4]. The aim of current study was to establish the main genotypes of HBV in clinical cases from Al-Diwaniyah City/middle of Iraq.

Materials and Method

The primer for detection of the virus and the primers used for genotyping were supplied by “Bioneer. Korea” with the design described by Naito [5] (Table 1).

<table>
<thead>
<tr>
<th>Primer</th>
<th>Sequence (5’-3’) and Amplicon size</th>
</tr>
</thead>
<tbody>
<tr>
<td>HBV-PCR</td>
<td></td>
</tr>
<tr>
<td>P1 (universal, sense)</td>
<td>“TCA CCA TAT TCT TGG GAA CAA GA” (1063bp)</td>
</tr>
<tr>
<td>S1-2 (universal, anti sense)</td>
<td>“CGA ACC ACT GAA CAA ATG GC”</td>
</tr>
</tbody>
</table>
A blood sample of 5ml of venous blood was collected from each of the 80 patients enrolled in current study. The serum was collected in Eppendorf tubes then stored at -20°C to be used for DNA extraction and nested PCR technique.

**Extraction of DNA:** Genomic viral DNA was extracted from utilizing “gSYAN Genomic DNA Mini Kit” (Geneaid, USA).

**Detection of HBV:** PCR master mix was prepared for direct detection of HBV by using (AccuPower® PCR PreMix Kit). The resultant mixture was 20µl which is constituted of P1 gene primer 1µl (10pmol), S1-2 gene primer 1µl (10pmol), PCR water 13µl and DNA template 5µl (DNA extraction).

After that, these PCR master mix components were placed in standard AccuPower PCR PreMix Kit that contained all other components needed for PCR reaction such as (Taq DNA polymerase, dNTPs, Tris-HCl pH: 9.0, KCl, MgCl₂, stabilizer and tracking dye). Then, all the PCR tubes transferred into Exispin vortex centrifuge at 3000rpm for 3 minutes. The Thermocycler program was as follows: Primary denaturation step by incubation at 94°C for 5 minutes, proceeded for 40 cycles. Each cycle included the following: 1- Denaturation at 94°C for 30 seconds, 2- Annealing at 55°C for 1 minute, 3- Elongation at 72°C for 1.5 minute and 4- Extension at 72°C for 5 minutes.

**Genotyping Method:** Direct detection of HBV genotypes was performed by means of two mix reactions: Mixed A reaction for the detection of the genotypes (A, B and C) and Mixed B reaction for genotypes (D, E and F). Each positive serum sample was subjected for both reactions A and B. The master mix constituents were supplied by “(AccuPower® PCR PreMix Kit)”. The nested PCR master mix was composed of B2, BA1R, BB1R, B2, BA1R, BB1R (5µl) or BD1, BE1, BF1 bb, B2R primers (10pmol), PCR water (15µl), DNA template with addition of 1µl aliquot DNA product of the primary PCR step from each positive sample.

The thermocycler conditions of nested PCR were programmed for 40 cycles; 20 cycles of 1- 94°C for 30 seconds, 2- 58°C for 30 seconds, 3- 72°C for 40 seconds and another 20 cycles of 1- 94°C for 20 seconds, 2- 60°C for 30 seconds, 3- 72°C for 40 seconds and with the final extension at 72°C for 5 minutes.

Electrophoresis of the products was performed using 1% agarose gel stained with ethidium bromide followed by visualization under UV transillumination. A ladder of 100bp DNA was used for the prediction of the PCR products size and consequently determining the genotypes for each sample.

**Results and Discussion**

**HBV DNA detection by PCR:** Out of the (80) serologically positive samples for HBV tested by PCR technique for HBV DNA, thirty three samples (41.25%) were found to be positive, while forty seven (58.75%) were found to be negative (Table 2 and Figure 1).

<table>
<thead>
<tr>
<th>Gender</th>
<th>No. of sample</th>
<th>No. of positive sample</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>59</td>
<td>24</td>
<td>27.27</td>
</tr>
<tr>
<td>Female</td>
<td>21</td>
<td>9</td>
<td>10.23</td>
</tr>
<tr>
<td>Total</td>
<td>80</td>
<td>33</td>
<td>37.50</td>
</tr>
</tbody>
</table>
The discrepancy between the results of the screening ELISA test and PCR does not deny the occurrence of infection with HBV in these 47 patients. HBs Ag is still regarded the main HBV serological indicator in the confirmation of the occurrence of the HBV infection [6,7]. This may be explained by the presence what is termed “non-replicative phase” in the chronic HBV disease course since its natural course is known to pass through four phases that are HBs Ag positive, but some are “non-replicative” [8,9]. Furthermore, it is recognized that seroconversion of HBe Ag positive into HBe Ab positive is common in patients at the “non-replicative” phase. HBV DNA during this phase is merely undetectable in serum HBV DNA levels referring to an immunological response to the infection [9,10]. This conclusion was agreed by other studies in other areas in Iraq were similar results were obtained [2,12]. The present study established no significant difference between female and male patients.

**HBV Genotypes:** Although different genotypes were all presented in different mixed forms, there were different percentages for each genotype. According to this study, the different percentages of the different genotypes were as follows: genotype D in a percentage of (93.94%), followed by genotype E in a percentage of (81.82%). In addition, genotype B percentage was (69.70%) and C was (60.61%) while A percentage was (54.55%) as shown in Figure 2.
In this study, only genotype E (3%) was found as a single form among other genotypes which were all present in mixed forms (Figures 3, 4 and 5).

The distribution of different mixtures of the different HBV genotypes reported in this study were at the following percentages: A+E (3%), C+D+E (12.12%), B+C+D+E (15.15%), A+D (3%), A+B+C+D+E (18.18%), A+B+D+E (18.18%), B+D+E (3%), A+C+D+E (3%), B+C+D (6%), A+B+D (3%), A+B+C+D (6%) and D+E (6%). Genotype F was the only genotype not discovered in any of the patients’ samples studied in current study (Figure 3).

Figure 3: Distribution of the different mixtures of HBV genotypes reported in this study.

Figure 4: Agarose gel electrophoresis of PCR assay products for HBV genotypes A, B, and C from positive samples. M “Marker ladder at 1500-100bp”. Lanes 1 and 2 at 28bp (genotype B). Lanes 2, 4, 6, 7 and 8 at 122bp (genotype C). Lanes 1-4 and 6-8 at 86bp (genotype A).
HBV is known to be differentiated into 8 genotypes (A to H) [13]. These genotypes have some variation in pathogenesis, virulence, and other factors affecting the outcome of the disease and response of the immune system to the infection as well as treatment [1,5]. Genotypes (A, C and D) are the most common in Asia [14]. The 6 major genotypes (A-F) were chosen to search for in this study using nested PCR technique described by Naito [5]. This method is approved to be highly sensitive for recognition of HBV genotypes [15].

In current study, the majority of patients having HBV were confirmed to have a mixture of more than one genotype (96.97%), while it was found that only small proportion showed a single genotype infection (3.03%) which is E genotype. These results were consistent with the conclusion of a study in Sulaimania (North of Iraq) where same technique was technique. The latter study reported that all the examined samples were of mixed genotypic viruses [16]. In Wasit province, a similar study were conducted and reported that that 100% of the samples were of mixed genotypes. The combination of genotypes (A, B, C, D and E) was the major cause (77.7%); whereas the mixture (A, D and E) was found to be the least (1.3%). Furthermore, no single genotype was recognized and no sample was found to contain genotype F neither single nor mixed [2]. In Duhok (North of Iraq) a study reported that the predominant genotypes causing HB infection were genotype D and genotype B, respectively [3]. Another study in Baghdad stated similar results [17].

In Asia, the main well documented genotypes to be predominant are (A-G), mainly (A, C and D). (A, C, D and G) genotypes are the predominant genotypes in Europe. Mixed genotypes (A+C and C+D) are the main mixtures in Asia, while (C+D) are in Europe and (A+D) are recognized in Africa [14].

The opportunity of the occurrence of mixture of multiple genotypes may be explained by the assortment between multiple digenotypes [18]. In Wasit (Mid of Iraq), a researcher found a high incidence of mixed genotypic infections [2]. Patterns of genotypic mixtures were documented in Sulaimaniya (North of Iraq) where they attributed this high percentages to the emigration movements of refugees to Europe and longstanding periods in refugee camps at which many opportunities to get infection from other nationalities within same camps [16]. In addition, low hygienic levels may enhance disease transmission particularly in dental clinics, hairdressing and tattoo salons are other important risk factors to HBV transmission.

**Ethical Clearance:** Obtained from the Research Ethics Committee at AL-Qadisiyah Health Directorate, Diwaniyah City, Iraq.

**Source of Funding:** Self-funded.

**Conflict of Interest:** Nil.

**REFERENCES**


Immunological and Molecular Detection of Hepatitis E Virus in AL-Samawah City, Iraq

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ABSTRACT

Background: Hepatitis E virus is an emerging disease with a high incidence globally. Acute hepatitis is related to high mortality rates in pregnant women, particularly throughout the third trimester of pregnancy as a result of fulminant liver disease. The aim of this study was to identify the prevalence of anti-HEV within human population and its relationship with age and gender so as to support the implementation of future methods that can enhance national and international surveillance.

Method: The blood samples (63 samples; 32 females and 31 males) were obtained from blood donated by other people in AL-Samawah City, Iraq. The study was conducted during the period from January 2017 to January 2018. Serological tests for anti-HEV antibodies by ELISA, HEV-RNA detection by PCR and phylogenetic analysis were performed. Results: Data from current study showed that 26 samples were positive for anti-HEV antibodies and 37 samples were negative. In addition, the total prevalence of anti-HEV antibodies in humans was higher in female (57.6%) than in male (42.3%). On the other hand, the prevalence of HEV seemed higher in people aged ≥50 (34.6%) than within the age group 1-9 years (26.9%).

Keywords: HEV, antibodies, ELISA, PCR, blood donors, genotyping.

Introduction

Hepatitis E virus (HEV) may be a pathological state in many regions of the world and it seems to be the second most frequent reason for the enteric hepatitis after hepatitis A viral infection. Acute hepatitis is related to high mortality rates in pregnant women, particularly throughout the third trimester of pregnancy as a result of fulminant liver disease [1].

HEV has been represented for many populations with high levels especially in India [2]. Investigations showed that HEV may be a serious public health problem in the developing countries of Asia, Africa and Mexico [3]. HEV endemicity within the world is presently below investigation and an additional complete picture of the worldwide distribution and seroprevalence of HEV infections is emerging [4].

The aim of this study was to identify the prevalence of anti-HEV within human population and its relationship with age and gender so as to support the implementation of future methods that can enhance national and international surveillance.

Materials and Method

Laboratory Assay: Blood samples (63) were collected from blood donated by other people and stored in the blood bank of AL-Samawah City.

The sera were tested for anti-HEV IgG and anti-HEV IgM by Enzyme Linked Immuno-Sorbent Assay (ELISA) kit (Dia-pro from Milan, Italy) according to the manufacturer’s method.

RNA Extraction and Primer Designing: RNAs were extracted by using the QIAmp viral RNA Extraction Kit (QIAGEN, Switzerland).

There are two sets of primers i.e primer set for 1–9 is designed from ORF2 and is used to distinguish between the four genotypes of HEV (Table 1).
Table 1: HEV primer set for genotypes (1–9)

<table>
<thead>
<tr>
<th>Name</th>
<th>Sequence (5’-3’)</th>
<th>Size (Nts.)</th>
<th>Nucleotide Position</th>
</tr>
</thead>
<tbody>
<tr>
<td>HEV cDNA</td>
<td>CCGTCCTGGCCCTTCTCGACCA</td>
<td>22</td>
<td>4066–4088</td>
</tr>
<tr>
<td>HEV G1FP</td>
<td>CCCAGGCCCTTTTCGCTACCCGG</td>
<td>22</td>
<td>1978–2000</td>
</tr>
<tr>
<td>HEV G1RP</td>
<td>GAGCCCCACCCAGGGCCGGTGCC</td>
<td>23</td>
<td>2431–2454</td>
</tr>
<tr>
<td>HEVG2 RP</td>
<td>GCCCGCCACCAGGGCCGGTGCC</td>
<td>22</td>
<td>2424–2446</td>
</tr>
<tr>
<td>HEVG3 FP</td>
<td>CCAGCCTTCTGAGCCTCCACC</td>
<td>23</td>
<td>2324–2346</td>
</tr>
<tr>
<td>HEVG3 RP</td>
<td>GCTCATCggccggccggcggtgcc</td>
<td>20</td>
<td>2769–2789</td>
</tr>
<tr>
<td>HEVG4 FP</td>
<td>CCCGG GTA ATCTGA TTGAGT CTG TTC</td>
<td>30</td>
<td>2001–2031</td>
</tr>
<tr>
<td>HEVG4 RP</td>
<td>GGCCACCCACGCGGGCGGTGCGGGGCGCC</td>
<td>23</td>
<td>2491–2514</td>
</tr>
</tbody>
</table>

PCR amplification and genotyping of HEV: The extracted RNA was used to amplify HEV genome segment using specific primers as described above. The PCR amplification was performed according to the program described previously and its products of positive samples were run on 2% agarose gel prepared in 0.5× TBE buffer then it was purified by gel purification kit (Invitrogen, USA) according to manufacturers’ protocol (5).

Statistical Analysis: Chi–squared test was used for statistical analysis of data using a computer-based software (Statistical Package for Social Sciences; SPSS).

Results

A total of 63 human sera were collected from January 2017 to January 2018. Human sera were 26 positive and 37 negative for anti-HEV. The distribution of positive samples according to gender was 15(57.6%) and 11(42.3%) for females and males, respectively. Statistical analysis of these data showed non-significant differences (P>0.05; Table 2).

HEV increased with age from 34.6 %, in over 50 years old, to 26.9 % in children aged 1-9 years. Then percentages were (15.3%, 11.5%, 7.6% and 3.8%) for the age groups 30-39, 10-19, 20-29 and 40-49 year, respectively. The results of the statistical analysis showed non-significant differences (P>0.05; Table 3).

<table>
<thead>
<tr>
<th>Gender</th>
<th>HEV-AB test</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Positive</td>
</tr>
<tr>
<td>Female</td>
<td>15</td>
</tr>
<tr>
<td>Male</td>
<td>11</td>
</tr>
<tr>
<td>Total</td>
<td>26</td>
</tr>
</tbody>
</table>

X² (calculated) = 0.50 d.f=1 P> 0.05; X² (tabulated) = 0.20 Non significant

<table>
<thead>
<tr>
<th>Age group (years)</th>
<th>HEV-AB test</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Positive</td>
</tr>
<tr>
<td>1-9</td>
<td>7</td>
</tr>
<tr>
<td>10-19</td>
<td>3</td>
</tr>
<tr>
<td>20-29</td>
<td>2</td>
</tr>
<tr>
<td>30-39</td>
<td>4</td>
</tr>
<tr>
<td>40-49</td>
<td>1</td>
</tr>
<tr>
<td>≥ 50</td>
<td>9</td>
</tr>
<tr>
<td>Total</td>
<td>26</td>
</tr>
</tbody>
</table>

X² (calculated) = 6.18 d.f=5 P> 0.05; X² (tabulated) = 3.29 Non significant
Genotyping of HEV: PCR primers were used specific for the molecular detection of HEV from the blood samples. Current study revealed that HEV genotype 1 was the most prevalent genotype in this study. Lanes 1 to 5 showed 375bp of HEV bands, lanes 6 and 7 showed negative control, lane 8 represented the HEV positive sample with 375bp amplification, Lane M showed the 100bp molecular marker (Figure 1).

![Figure 1: Amplification of HEV genome from a blood sample](image)

**Discussion**

The seroprevalence of HEV in patients of current study was 41.26% which was higher than the 13.1% reported [6]. In addition, HEV was detected in 13.5% of the samples analyzed in earlier of the randomly selected patient population in Ekiti State, Nigeria [7].

The rates of HEV infection documented in other studies were lower than that reported in current study. For example, in the general population in Pakistan it was 17.5%, in Iraqi-Kurdish refugees was 14.8% and in Ankara, Turkey was 3.8% [8-10]. Also, in Turkey, different results were reported in the several regions and the percentages ranged from (2.1%-12.8%) [11]. In other parts of the world, anti-HEV antibody had been reported at 3.4% in the preschool children of Taiwan, 10.5% in Mexicans aged 1 to 29 years, 11.9% within Korean population and 17.2% in a village (Nile Delta) in Egypt [12-13].

In developed countries, HEV is lower as in example, it had been reported at a rate of 2.6% in Italia, 2.8% in Israeli Jews and 1.8% in Israeli Arabs [14,15]. Alizadeh et al. [14] reported, in Nahavand-Iran, a 9.6% incidence of anti-HEV antibody and it was higher among females aged 30—50 years than in males within other age groups. In the other study [17], anti-HEV antibodies were detected in the blood donors in Tehran-Iran, where anti-HEV antibodies were detected in the blood of 7.8% of them.

The optimal concentration of the antigen and serum dilution was assessed for ELISA of the human serum. This study additionally demonstrated the potential risk of HEV transmission from the animal reservoir host to individuals who have regular contact with the secretions and excretions from these animals. The situation could also be worse by the poor sanitation and hygiene that should be considered to prevent zoonotic transmission of HEV at the human-animal interface. This was also the view of the World Health Organization during a report on the zoonotic transmission of HEV from the animals to human where exposure to infectious body fluids of infected animals was a major risk factor [18,19]. Globally, the highest percentages of HEV were discovered in the regions where low standards of sanitation increase the danger of transmission of the virus by the fecal-oral route [20].

PCR techniques are one of the most reliable and sensitive tools for the detection of HEV in blood samples [20-21]. HEV mostly affects adult population and all of the small epidemics were reported because of poor sanitary conditions [14].

Current study showed that out of 63 total samples, only 26 samples were found positive for HEV which belonged to genotype 1 as shown in Figure 1. Contaminated food and water supplies increase the possibilities of outbreaks within the heavily-populated low socioeconomic areas. For example, HEV in Pakistan had remained at a stable nonexpanding stage from (1970-2005) then followed by an explosive emergence of the recent HEV variants [21,22].

**Ethical Clearance:** Obtained from the Research Ethics Committee at College of Sciences/University of AL-Muthana and the Health Directorate at AL-Muthana City, Iraq.

**Source of Funding:** Self-funded.

**Conflict of Interest:** Nil.

**REFERENCES**


Comparison of High Molecular Weight Beta Trace Protein and Low Molecular Weight Beta Trace Protein for the Assessment of Kidney Function in Patients with Chronic Kidney Disease

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ABSTRACT

Background: Chronic kidney disease (CKD) can be defined as either decreased kidney function (GFR < 60ml/min/1.73m²) or persistent kidney damage (indicated by markers of kidney damage) for 3 or more months. BTP is a monomeric glycoprotein with 168 amino acids and a molecular mass variation. Low beta trace protein isoform (L-BTP), the smaller “brain” origin isoforms, predominate in the CSF; whereas, high beta trace protein isoform (H-BTP), the larger “plasma” type glycoforms, predominate in serum and urine. These multiple isoforms certainly have implications for BTP measurement.

Aim of Study: Current study was aimed to compare the clinical usefulness of serum levels of H-BTP isoform for the detection of renal dysfunction in patients with chronic kidney disease (CKD) and making a comparison with levels of L-BTP.

Method: The study included 150 patients divided into three groups with a wide range of renal dysfunction that encompassed CKD stages from (I-IV).

Results: The obtained data showed that H-BTP was highly correlated (Pearson test) with measured GFR (mGFR) (r= 0.86) in logarithmic linear model, and correlated with L-BTP (r= 0.209). The results of this study showed that H-BTP had a significant higher concentration and strongest correlation with mGFR in comparison with L-BTP isoform.

Conclusion: H-BTP (and not the L-BTP isoform of brain origin) may be a useful and reliable serum marker for identifying the magnitude of renal dysfunction in patients with CKD and may have its place besides serum cystatin C and creatinine as an alternative endogenous GFR marker.

Keywords: H-BTP, L-BTP, Chronic kidney disease, mGFR, Cystatin C.

Introduction

Chronic kidney disease (CKD) can be defined as either decreased kidney function (GFR <60ml/min/1.73 m²) or persistent kidney damage (indicating by markers of kidney damage) for 3 or more months [1]. A variety of congenital and acquired conditions that represent the underlying etiologies [2]. CKD is associated with high incidence of morbidity and mortality because of the poor outcomes. The major outcomes of CKD, whatever the cause, include progression to end stage renal disease (ESRD) and kidney failure, complications of decreased kidney function, and cardiovascular disease (CVD). Many efforts had been done for early detection of this condition to prevent or at least delay some of these adverse outcomes [3]. However, CKD is not easily diagnosed early or treated properly which may due to a lack of agreement on a definition and classification of stages in the progression of CKD [4]and a lack of uniform application of simple tests for detection and evaluation, and this can result in a lost opportunity for prevention[5-7].

Beta Trace Protein (BTP): BTP, or prostaglandin D₂ synthase (PGDS) is a low molecular weight

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heterogeneous monomeric glycoprotein with 168 amino acids. Its micro heterogeneity is the consequence of post-translational N-glycosylation resulting in different glycoforms of varying molecular weights (23-29 kDa) \[8,9\], (18.5-29 kDa) \[10\]. BTP almost “completely” is excreted by kidneys \[9,11,12\]. BTP has a low molecular mass, constant production rate and constant stability. So, for all these reasons BTP has been proposed as a new endogenous marker of GFR \[13,14\], and, compared to the conventional methods, serum BTP has been shown to be more helpful for estimating GFR and measurement of serum BTP can be a reliable tool for assessment of kidney function in neonates \[15\].

The aim of current study was to compare the clinical usefulness of serum levels of H-bTP isoform for the detection of renal dysfunction in patients with chronic kidney disease (CKD) and making a comparison with levels of L-bTP.

**Materials and Method**

**Subjects Samples:** The study was performed in a population of 150 patients (43 females and 107 males) with chronic kidney disease. Serum samples were collected from each patient. Serum concentrations of creatinine and cystatin C were measured on the day of blood collection, and BTP was measured later in serum samples stored at (–80) °C. All study participants gave written informed consent.

**Method**

High molecular weight BTP (H-BTP) “24 kDa” was measured by enzyme linked immunosorbent assay (ELISA) Cat. No.: RD191113100R by BioVendor – laboratorní medicína a.s. Low molecular weight BTP brains origin (L-BTP) “18.5 kDa” was measured by enzyme linked immunosorbent assay (ELISA) Cat. No.: EH3560 by Wuhan Fine Biotech-China. H-BTP and L-BTP were also measured in the sera of 50 healthy volunteers (18 females and 32 males) with mean ± SD age of 29.76 ± 13.1 years and the mean concentrations (SD) were 0.460.07mg/L, 0.003 ± 0.0013, respectively.

Measured GFR (mGFR), by using \(^{99m}\text{Tc-DTPA}\) radio isotopic technique as a standard method.

**Statistical Analysis:** All statistical calculation were carried out by the aid of SPSS software (IBM Corp. Released 2012. IBM SPSS Statistics for Windows, Version 21.0. Armonk, NY: IBM Corp. USA) and Microsoft Excel (2010, Microsoft Corp. USA). Taking P<0.05 as a significant result. One way ANOVA was employed to evaluate the presence of significant difference of measured parameters among studied groups.

**Results**

General characteristics of study groups are summarized in Table 1.

**Table 1: Study groups characteristics**

<table>
<thead>
<tr>
<th>Group</th>
<th>Sample Size</th>
<th>Age/yr (Mean ± SD)</th>
<th>Males n (%)</th>
<th>Females n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>50</td>
<td>29.76 ± 13.1</td>
<td>32(64)</td>
<td>18(36)</td>
</tr>
<tr>
<td>CKD</td>
<td>50</td>
<td>33.14 ± 22.7</td>
<td>28(66)</td>
<td>22(44)</td>
</tr>
<tr>
<td>RT</td>
<td>50</td>
<td>45.8 ± 12.8</td>
<td>50(100)</td>
<td>0(0)</td>
</tr>
<tr>
<td>DM</td>
<td>50</td>
<td>46.6 ± 14.8</td>
<td>29(57)</td>
<td>21(43)</td>
</tr>
</tbody>
</table>

Serum concentrations of H-BTP and L-BTP in control and renal disease groups were presented in Table 2. As shown in Table (2), the mean ± SD of H-BTP in control group was 0.46 ± 0.07mg/l, while it was 0.003 ± 0.0013 mg/l concerning L-BTP.
Pearson correlation shown that there was a significant negative correlation (P<0.05, $r = -0.799$) between serum concentrations of H-BTP and mGFR (using ${}^{99m}$Tc-DTPA as an exogenous standard marker). In addition, the analysis shown that, the logarithmic linear model of correlation represents the best prediction of mGFR ($r = 0.86$). At the same time, Table (3) illustrated that L-BTP provided only minimally diverging results ($r = 0.166$) comparing to the performance of H-BTP ($r = 0.799$). However, a significant negative correlation (P<0.05) between L-BTP and mGFR were presented in this study. As the mGFR decreased, the H-BTP had increased in serum of patients groups (Figure 2).
Figure 2: Mathematical linear model correlation between L-BTP (A), and H-BTP (B), with mGFR.
Discussion

Markedly increased serum levels of H-BTP had been shown in patients with various renal diseases. The mean ± SD of BTP serum concentration (mg/l) in RT was 1.36 ± 0.36, in CKD was 0.88 ± 0.26, and in DM was 0.69 ± 0.22. These data had been shown significant higher levels than their serum concentration in control group (0.46 ± 0.07). At the same time, H-BTP concentration was elevated in the serum of all renal disease groups in this study compared to control group and more than L-BTP. These data indicated that plasma BTP differs from brain origin BTP isoform (Figure 3).

H-BTP had a higher value of correlation with mGFR (r= 0.799) compared to L-BTP (r= 0.166). H-BTP is superior in performance to L-BTP in detecting mild reduction in GFR in children [16] (Table 4).

Table 4: Pearson correlation among GFR and BTP-isoforms

<table>
<thead>
<tr>
<th></th>
<th>mGFR</th>
<th>H-BTP</th>
<th>L-BTP</th>
</tr>
</thead>
<tbody>
<tr>
<td>mGFR</td>
<td>r value*</td>
<td>1</td>
<td>-0.799*</td>
</tr>
<tr>
<td>P value*</td>
<td>0.000</td>
<td>0.033</td>
<td></td>
</tr>
<tr>
<td>H-BTP</td>
<td>r value*</td>
<td>-0.799*</td>
<td>1</td>
</tr>
<tr>
<td>P value*</td>
<td>0.000</td>
<td></td>
<td>0.003</td>
</tr>
</tbody>
</table>

Figure 3: Fold increment of the two BTP isoforms in all renal disease groups compared to control group (mean ratio)

Patients were stratified into 5 groups according to the CKD stage. H-BTP was significantly increased from CKD stage I to stage IV (P<0.05); whereas it was non-significant for LBTP and overlap had occurred to its level among stages (Figure 4).

Figure 4: Serum level of H-BTP and L-BTP (mg/l) in groups of patients stratified according to CKD stage. Data are presented as box-plots.

In general, BTP is a low molecular weight protein (18.5-29 kDa) that is removed from plasma by the kidneys as main route of excretion by glomerular filtration and the renal handling can be finished by tubular reabsorption and catabolism inside tubular cells [10,17,18]. It is freely filtered through the glomerular basement membrane with minimal non-renal elimination. Hence, it has been proposed as a new endogenous marker of...
glomerular filtration rate (GFR). Studies have confirmed a good correlation between serum BTP levels and GFR measurement based on inulin clearance and nuclear medicine methods [19].

L-BTP, the smaller “brain” origin isoforms, predominates in the CSF and has truncated oligosaccharide side chains with absent sialylation; whereas H-BTP, the larger “plasma” type glycoforms, predominates in serum and urine and has more fully sialylated oligosaccharide chains [20]. These multiple isoforms certainly have implications for BTP measurement.

BTP is a monomeric glycoprotein with 168 amino acids and a molecular mass variation depends on whether it is N-glycosylated at three positions: Asn⁵¹, Asn⁵⁶ and Asn⁷⁸ [21]. The polypeptide amino acid sequence is unique at the amino-terminal of BTP which is APEAQVSVPNFQDKFLGRWFSA [9]. The N-glycosylation sites of the polypeptide have been occupied by carbohydrate. Carbohydrate compositional and methylation analysis indicated that Asn⁹ and Asn⁵⁶ exclusively bear complex-type oligosaccharide structures—(partially sialylated with alpha 2–3- and/or alpha 2–6-linked N-acetylneuraminic acid)―that are almost quantitatively alpha 1–6 fucosylated at the proximal N-acetylglucosamine; about 70% of these molecules contain a bisecting N-acetylglucosamine, but agalacto structures and those with a peripheral fucose are also present [9]. Although both brain (L-BTP) and serum (H-BTP) are composed of an identical amino acid sequence, variations in molecular size can be caused by differences in oligosaccharide structure and N-glycosylation. For example, serum and urine BTP (H-BTP) have longer sugar chains and higher sialylation than BTP in CSF (L-BTP) [20]. It is believed that the sialylated glycoforms have been derived from resorbed CSF fluid and cleared by kidneys, while there are no asialo-oligosaccharides in blood as a result of hepatic clearance (at least five carbohydrate-specific receptor systems have been found in the liver and recognize non-reducing monosaccharides. The asialo-oglycoprotein receptor of hepatocytes is specific for terminal galactose and N-acetylgalactosamine. Also, there are N-acetylgalactosamine- and mannose-receptors on Kupffer and endothelial liver cells. Only glycoproteins circulating in blood which do not bear such sugar residues can persist. Especially, glycoforms lacking N-acetylmuraminic acid residues are rapidly eliminated. Thus, glycoproteins in serum must be protected from degradation “masked” by such sugar molecules. Tissue-specific glycosylation may, on one side, have a special biological function, on the other side, it may also be used as a “marker” for elucidating the origin of a selected glycoprotein, for example, its site of biosynthesis or for following its way throughout the body. The human CSF-BTP has been cleared by hepatic glycoprotein receptors. However, those BTPs bearing “serum compatible,” i.e., fully sialylated oligosaccharide chains do persist and are probably eliminated from the circulation into the urine. In the case of functional disturbances of protein elimination in the kidney, they accumulate in the blood as demonstrated here by analysis of serum from patients with terminal renal failure [20]. The interest in studying BTP as a marker of kidney function was based on the finding that the physiological clearance of these sialylated glycoforms is “impaired” in CKD. BTP is slightly negatively charged [22] and its serum concentration in a healthy patient is about 40ng/mL (0.4mg/l) [20], Figure (5).

Figure 5: BTP of CNS origin theory. “brain” and “serum” isoforms are produced in the CNS and then traffic to the serum where the liver rapidly metabolizes the smaller, “brain type” isoforms, leaving the larger serum type intact. (A) Intact liver that leaves only serum isoforms; (B) Cirrhotic liver with accumulation of both isoforms, potentially leading to higher serum concentrations depending on which epitopes the assay antibodies recognize [8].

Ethical Clearance: The study was approved by the Research Ethics Committee at College of Medicine/University of Babylon and The Health Directorate in Babylon Governorate, Iraq.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.
REFERENCES


A Comparative Study of Serum Levels of the Anti-inflammatory Cytokines IL-35 in Allergic Asthma and H. pylori Infected Patients


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ABSTRACT

Background: IL-35 is an inhibitory cytokine, produced by Treg cells, smooth muscle cells, monocytes and vascular endothelial cells and has multiple functions to produce various phenotypic features. The aim of current study was to investigate the role of serum IL-35 concentration and other clinical parameters in allergic asthma patients and the role of treatment with corticosteroids on IL-35 concentration. Patients and methods: Clinical samples were obtained with informed consent from 54 allergic asthma patients (32 with treatment and 22 without treatment), 14 patients with Helicobacter pylori (H. pylori) infection and 22 healthy controls. The serum IL-35 has been detected according to the manufacturer’s instruction with commercial human IL-35 ELISA Kit (My biosource, USA). Results: The mean concentration of plasma IL-35 in allergic asthma patients with treatment, allergic asthma patients without treatment, healthy control, and H. pylori patients, were 35.34, 71.4, 94.5 and 68.1 pg/ml, respectively, and the highest concentrations were 104.62, 310.3, 241.3, and 229.1 pg/ml, the lowest concentrations were 9.10, 11.6, 29.1, and 19.3 pg/ml, respectively, and no significant correlations were found between IL-35 levels and total serum IgE levels, white blood cell count, and the percentage of eosinophils count in two groups of patients. Conclusion: This study supported previous studies in that serum IL-35 level is reduced in allergic asthma patients.

Keywords: H. pylori, allergic asthma, interleukin-35, eosinophils, correlation.

Introduction

Interleukin (IL)-35 is a member of interleukin 12 family (which consists of IL-12, IL-23, IL-27 and IL-35). They participate in receptor and ligand chains and functions that due to the expression of different cell types and different receptor chains [1]. IL-35 was known as a regulatory cytokine, anti-inflammatory and immuno-suppressive cytokine [2]. It has the ability to induce the response against inflammatory stimuli which leads to suppressing the inflammation and make balancing in the immune response [3]. The mechanisms of allergic asthma involve activation of innate immune system through Toll-like receptors and Th2 pathways and release of Th2 cytokines. Also, Th17 cells or macrophages produce IL-17 that promotes infiltration of neutrophils into the lung and contributes in the development of allergic asthma [4]. Moreover, it acts synergistically with Th2 cytokines to promote airways hyperresponsiveness, then Tregs secrete IL-35 which in turn suppresses Th1, Th2, and Th17 effector responses to control the inflammatory responses by reducing or suppressing airway hyperresponsiveness and inflammation. The immune response involves various mechanisms in H.pylori infection that includes both innate and adaptive immune responses and the latter includes humoral and cellular immune responses which lead to inflammatory as well as anti-inflammatory responses that permit for a continuation of many H. Pylori infections [5,6]. It plays a role in host immunity by activation of T- helper (Th) cell subsets (Th1, Th2, Th17, and T regulatory (Treg) cells). Th1 and Th17 are responsible for pathogenic and protective effects, while Th2 and Treg are responsible for anti-inflammatory effects [7]. Many studies indicated an association between H. pylori and asthma [8-10].

The aim of current study was to investigate the role of serum IL-35 concentration and other clinical
parameters in allergic asthma patients and the role of treatment with corticosteroids on IL-35 concentration.

Material and Method

All patients had been diagnosed by a physician, and clinical samples were obtained with informed consent from 54 AAPs, 32 of them on corticosteroids treatment (AAPsT) and 22 without corticosteroids treatment (AAPsOT). Also, the study involved 14 patients with *H. pylori* infection and 22 healthy controls (HC). After collection of blood samples, serum was separated by centrifugation and stored at −20°C in Eppendorf tubes till analysis was done. For each subject, pulmonary function test was measured by computerized Spirometry (SPIROLAB COLOUR SPIROMETER, Roma-Italy) according to American Thoracic Society. The serum IL35 has been detected according to the manufacturer’s instruction with commercial human IL-35 ELISA Kit, My Biosource, USA.

In addition, serum total IgE was detected by total IgE ELISA Kit, Euroimmun, Germany.

The prevalence of *H. pylori* was detected according to the *H. pylori* (IgA) ELISA Kit, Euroimmun, Germany.

Total and differential WBC counts were performed CELL-DYN Ruby Auto-analyzer.

The Body mass index was calculated for study subjects from their weights and heights; [weight/kg/(height/m)²].

Statistical Analysis: Parametric data were analysed using ANOVA test to find any differences between the groups and the correlation between study variables was explored using Pearson’s bivariate test (Minitab version 13).

Non-parametric data were expressed as percentages of the total and compared using chi-squared test.

For statistical significance, a P value <0.05 was considered statistically significant, while a P value <0.01 was considered highly significant.

Results

Table 1 displayed the general characteristics of the studied groups as mean ± SD values. Significant differences were found among the study groups for FEV1, FVC, FEV1/FVC, serum total IgE concentration, total count of WBCs and eosinophils percentage (Table1).

There was an inverse relation between *H. pylori* and asthma (Table 1) as there was reduced prevalence of *H. pylori* in tow asthma patient groups compared with controls.

### Table 1: Demographic characteristics of the asthmatic patients groups and healthy controls

<table>
<thead>
<tr>
<th>Variables</th>
<th>AAPsT (Mean ± SD)</th>
<th>AAPsOT (Mean ± SD)</th>
<th>HC (Mean ± SD) NO = 24</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>33.5 ± 9.49</td>
<td>32.6 ± 12.3</td>
<td>34.7 ± 11.3</td>
<td>0.8</td>
</tr>
<tr>
<td>FVC(%predicted)</td>
<td>69.7 ± 14.5</td>
<td>53.7 ± 11.24</td>
<td>68.4 ± 13</td>
<td>0.07</td>
</tr>
<tr>
<td>FEV1(%predicted)</td>
<td>55.7 ± 9.4</td>
<td>51.2 ± 15.2</td>
<td>78.3 ± 14.7</td>
<td>0.001**</td>
</tr>
<tr>
<td>FEV1/FVC(%predicted)</td>
<td>87.5 ± 16.7</td>
<td>98 ± 17</td>
<td>118.7 ± 6.1</td>
<td>0.000**</td>
</tr>
<tr>
<td>BMI</td>
<td>27.8 ± 4.9</td>
<td>26.8 ± 5.3</td>
<td>25.8 ± 5.1</td>
<td>0.45</td>
</tr>
<tr>
<td>Total IgE UI/ml</td>
<td>293.7 ± 213.8</td>
<td>291.7 ± 202.5</td>
<td>48.6 ± 45.6</td>
<td>0.000**</td>
</tr>
<tr>
<td>WBC count×10³/µl</td>
<td>8.9 ± 3.1</td>
<td>8.6 ± 2.9</td>
<td>6.9 ± 1.5</td>
<td>0.023*</td>
</tr>
</tbody>
</table>

**Differential count**

|                   | 4.23 ± 3.7          | 3.4 ± 2.6           | 2.1 ± 1.3               | 0.036*  |
| Basophil%         | 1 ± 0.75            | 1.34 ± 0.5          | 1.2 ± 0.65              | 0.14    |
| Neutrophil%       | 53.6 ± 11.6         | 54.2 ± 11           | 54.8 ± 9               | 0.93    |
| Monocytes%        | 5.3 ± 1.2           | 5.6 ± 1.6           | 5.5 ± 1.7              | 0.85    |
| Lymphocytes%      | 35.9 ± 9.2          | 34.6 ± 8.3          | 36.3 ± 7               | 0.7     |
| Prevalence of H. pylori% | 36.4%              | 28.1%              | 57.1%                  | 0.152   |
The mean plasma concentrations of IL-35 in AAPsT, AAPsOT, HC, and H. pylori patients were 35.34, 71.4, 94.5 and 68.1pg/ml, respectively (Table 2) and the highest concentrations were 104.62, 310.3, 241.3, and 229.1pg/ml, while the lowest concentrations were 9.10, 11.6, 29.1, and 19.3pg/ml, respectively. Also, there was significant difference in plasma IL-35 concentrations between AAPsT and HC groups, on the one hand, and between AAPsOT and AAPsT, on the other hand.

Table 2: IL-35 serum levels in allergic asthma patients groups and healthy controls

<table>
<thead>
<tr>
<th>Plasma concentration of IL-35 plasma according to study group (Mean ± SD) [maximum-minimum]</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>HC (94.49 ± 48.34) [29.08-241.31]</td>
<td>0.161</td>
</tr>
<tr>
<td>AAPsOT (71.42 ± 68.9) [11.6-310.3]</td>
<td>0.000**</td>
</tr>
<tr>
<td>AAPsT (35.34 ± 19.2) [9.10-104.62]</td>
<td>0.204</td>
</tr>
<tr>
<td>H. pylori patient (68.14 ± 65.6) [19.3-229.1]</td>
<td>0.021*</td>
</tr>
<tr>
<td>AAPsOT (71.42 ± 68.9) [11.6-310.3]</td>
<td>0.899</td>
</tr>
<tr>
<td>AAPsT (35.34 ± 19.2) [9.10-104.62]</td>
<td>0.03*</td>
</tr>
<tr>
<td>H. pylori patient (68.14 ± 65.6) [19.3-229.1]</td>
<td>0.096*</td>
</tr>
<tr>
<td>Pooled P value = 0.006*</td>
<td></td>
</tr>
</tbody>
</table>

*: Significant difference. **: Highly Significant Difference.

Further statistical analysis was done to investigate the effect of H. pylori infection on the concentration of IL-35 (Table 3). There were significant differences between control group and each of the AAPsT and positive H. pylori groups, AAPsT and negative H. pylori patients, AAPsOT and negative H. pylori groups, AAPsT negative H. pylori groups, and AAPsOT and positive H. pylori groups.

Table 3: IL-35 serum levels in allergic asthma patients (AAPs) groups and HC according to presence/absence of H. pylori infections

<table>
<thead>
<tr>
<th>Study Groups</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>AAPsT and PHP</td>
<td>0.001**</td>
</tr>
<tr>
<td>AAPsT and NHP</td>
<td>0.000**</td>
</tr>
<tr>
<td>AAPsOT and PHP</td>
<td>0.713</td>
</tr>
<tr>
<td>AAPsOT and NHP</td>
<td>0.018*</td>
</tr>
<tr>
<td>H. pylori patients</td>
<td>0.225</td>
</tr>
<tr>
<td>AAPsT and PHP</td>
<td>0.139</td>
</tr>
<tr>
<td>AAPsT and NHP</td>
<td>0.121</td>
</tr>
<tr>
<td>AAPsOT and PHP</td>
<td>0.377</td>
</tr>
<tr>
<td>AAPsOT and NHP</td>
<td>0.658</td>
</tr>
<tr>
<td>AAPsT and PHP</td>
<td>0.024*</td>
</tr>
<tr>
<td>AAPsT and NHP</td>
<td>0.149</td>
</tr>
<tr>
<td>AAPsOT and PHP</td>
<td>0.092*</td>
</tr>
</tbody>
</table>


There was no statistically significant correlation between serum IL-35 serum and total serum IgE levels, WBCs count and the percentage of eosinophils in two groups of patients (Table 4).

Table 4: Correlations between IL-35 levels, total IgE, total WBC count and eosinophils percentage in the study groups

<table>
<thead>
<tr>
<th>Variables</th>
<th>Study groups</th>
<th>IL-35 levels</th>
<th>Total serum IgE</th>
<th>Eosinophils %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total WBC count x10^9/µl</td>
<td>AAPsOT</td>
<td>r= 0.076; P= 0.737</td>
<td>r= 0.278; P= 0.21</td>
<td>r= 0.348; P=0.112</td>
</tr>
<tr>
<td></td>
<td>AAPsT</td>
<td>r= 0.118; P= 0.521</td>
<td>r= 0.073; P= 0.691</td>
<td>r= -0.268; P= 0.137</td>
</tr>
<tr>
<td></td>
<td>HC</td>
<td>r= -0.134; P= 0.541</td>
<td>r= 0.047; P= 0.831</td>
<td>r= 0.43; P= 0.041</td>
</tr>
</tbody>
</table>
Conted…

<table>
<thead>
<tr>
<th>Eosinophil %</th>
<th>AAPsOT</th>
<th>r= 0.096; P= 0.67</th>
<th>r= - 0.213; P=0.341</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>AAPsT</td>
<td>r= 0.19; P= 0.298</td>
<td>r= - 0.147; P=0.423</td>
</tr>
<tr>
<td></td>
<td>HC</td>
<td>r= 0.332; P=0.122</td>
<td>r= 0.413; P= 0.05</td>
</tr>
<tr>
<td>Total serum IgE UI/ml</td>
<td>AAPsOT</td>
<td>r= 0.191; P=0.394</td>
<td></td>
</tr>
<tr>
<td></td>
<td>AAPsT</td>
<td>r= 0.088; P= 0.633</td>
<td></td>
</tr>
<tr>
<td></td>
<td>HC</td>
<td>r= 0.016; P= 0.942</td>
<td></td>
</tr>
</tbody>
</table>

**Discussion**

It has been shown that in patients with allergic asthma, serum levels of IL-35 were decreased compared with healthy controls, and no significant correlations were found between IL-35 levels and total serum IgE levels, white blood cell count, and the percentage of eosinophils count in two groups of patients.

Allergic asthma is an inflammation caused by the innate and adaptive responses and mediated by Dendritic cells and IgE antibodies, then dendritic cells which present antigens through MHC II to T- and B-lymphocytes [11-13], which lead to the release of mediators, including prostaglandins, histamine, cytokines, leukotrienes, and chemokines [13,14].

These mediators cause contraction of airway muscle cells which lead to attracting inflammatory cells like eosinophils, macrophages, neutrophils. Th2 induce IgE production by B cells due to cytokines secretion [13], and allergy includes the Treg and Th1 responses to suppress Th2 activity in atopy [15], and expansion of Th2 cells and Th17 cells which act synergistically with Th2 cytokines to promote airway hyperresponsiveness, then Tregs secrete IL-35 which in turn suppresses Th1, Th2 and Th17 effector responses to control the inflammatory responses by reducing or suppressing airway hyperresponsiveness and inflammation.

After the encounter of challenges such as infections from certain pathogens, the key role for restoring immune system homeostasis is regulatory T cells. IL-35 is the essential mediator of T cell function and [16] were the first to conclude that, in a mouse model, *H. pylori* infection is protective against allergic asthma. In addition, there are many studies demonstrated that *H. pylori* infection induces Treg, Th1 and Th17 responses in both humans and mouse models [17-19], while IL-35 increases the differentiation and proliferation of Treg cells and inhibits the differentiation of Th1 and Th17 cells [20].

Our result agreed with many studies that reported a decrease in serum concentrations of IL-35 in asthmatic patients in comparison with healthy controls [22-23] and the previous studies showed that they were inversely related to asthma.

However, [23] found that the concentration of IL-35 slightly decreased in allergic asthma patients in comparison with healthy controls [23], which indicated that IL-35 had markedly reduced the degree of airway hyperresponsiveness and inflammatory cells infiltration [24].

Although *H. pylori* inhabits the overlying mucus and gastric epithelial cell surfaces, little amount of *H. pylori* enters host immune cells and epithelial cells and it is considered an intracellular bacteria. In addition, due to the expression of virulence genes, such as vacA and cagA, antimicrobial therapy often fails to eradicate *H. pylori* infection, therefore, reinforces the importance of using antibiotics that achieve high intracellular concentrations [25].

In addition, by using transmission electron microscopy (TEM) and Time-lapsed scanning electron microscopy (SEM), it was possible to demonstrate that *H. pylori* survives within immunocytes and epithelial cells [26].

In *H. pylori* patients, the IL-35 levels were lower than healthy controls, but not statistically significant (P>0 .05) and this agreed with [27], but there were different studies which revealed that the concentration of IL-12 differs and depends on the component of two cytotoxins of *H. pylori* [28,29].

**Conclusion**

This study supported previous studies in that serum IL-35 level is reduced in allergic asthma patients.

**Ethical Clearance:** The study was approved by the Research Ethics Committee at College of science, Mustansiriyah University, Iraq.
Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

REFERENCE


Association of Arginase I Gene Polymorphism with the Risk of Atherosclerosis in a Sample of Iraqi Patients

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¹College of Sciences, University of Baghdad, Iraq; ²College of Biotechnology, Al-Nahrain University, Iraq

ABSTRACT

Background: Arginase is one of the enzymes that play an important role in atherosclerosis because of its complicated function in vascular cells. This study was aimed at determining the relationship between genetic polymorphism in three loci in arginase I gene and the incidence of atherosclerosis in a sample of Iraqi patients with an emphasis on the most common SNPs associated with atherosclerosis; rs 2781666, rs 2781668 and rs 60389358.

Method: Reliaprep™ Blood gDNA Miniprep System/Promega (USA) was used to extract total genomic DNA from blood samples. The amplification products for ARG I gene were sequenced and data were analyzed by the National Center for Biotechnology Information/single-nucleotide polymorphism (SNP; http://www.ncbi.nlm.nih.gov/SNP).

Results: Data showed that the genotype distribution of rs2781666 G>T was significant (P<0.01) in atherosclerosis patients who underwent percutaneous coronary intervention (PCI) compared to healthy controls as the occurrence of GT heterozygous in those patients was higher than in healthy controls. On the hand, these heterozygous alleles in patients who underwent diagnostic catheterization were not significantly different compared to healthy controls. Meanwhile, homozygous polymorphic alleles TT in PCI patients were significantly different (P<0.01) compared to healthy controls. Results also showed that rs 2781668 C>T SNP was not associated with the incidence of atherosclerosis in patients groups, PCI and DIG, compared to healthy controls. Also, heterozygous CT SNP for rs 60389358 in DIG patients was significantly different (P<0.01) compared to healthy controls.

Conclusion: Our finding suggested that genetic variations in ARG I may predispose subjects to T2DM, but not to atherosclerosis. This finding reinforces our interest in studies focusing on the role ARG I in different diseases.

Keywords: Atherosclerosis, arginase1 gene, SNP (rs2781666, rs2781668 and rs60389358), T2DM, alleles.

Introduction

Genetic factors are involved in the occurrence of atherosclerosis which is one of the most common health problems and causes mortality worldwide. Atherosclerosis occurrence increases with age in the vast majority of the population [1]. In the past, many risk factors have been identified, including hyperlipidemia, hypercholesterolemia, physical inactivity, smoking, hypertension and genetic pre-disposition [2]. Because of the functional contribution of genomics to research, it has been estimated that the incidence of coronary heart disease ranges from 20%-60% [3]. Considering the impact of atherosclerosis, it is fundamental to establish the genetic basis and to understand the pathophysiology of this disease. The available data support the role of arginase I (ARG I) located on 6q23 in the initiation, growth, and complications of coronary heart disease [4]. Notwithstanding hepatocytes, the gene encoding ARG I appeared to be expressed in different types of vascular cells, such as vascular smooth muscle cells, endothelial cells, and macrophages. It has been suggested that the overexpression of ARG I can be harmful through its contribution to the endothelial dysfunction observed in cases of vascular disorders including atherosclerosis [5].
This effect has been connected, to some degree, to the competition between endothelial nitric oxide synthase and \( \text{ARG I} \) for their shared substrate, L-arginine \(^6\). In many populations, the rare allele of the \( \text{ARG I} \), rs-2781666 G/T single nucleotide polymorphism located within the promoter of the gene, has been linked to an increased incidence of myocardial infarction (MI) \(^7\). In this study, we investigated the relationship between \( \text{ARG I} \), rs 2781666, rs 2781668 and rs 60389358 SNPs in Iraqi patients who had atherosclerosis and underwent diagnostic (DIG) and percutaneous coronary intervention (PCI) catheterization.

**Materials and Method**

**Blood Samples:** Blood samples were collected from atherosclerosis patients who visited the Department of Clinical Chemistry/Coronary Care and Catheterization Unit at Ibn Al-Nafees and AL- Sheikh Zayed Hospitals in Baghdad Governorate, Iraq. Patients were 64 men and 64 women who underwent percutaneous coronary intervention and diagnostic catheterization, as well as 64 healthy controls, during the period from June 2017 until January 2018. The study protocol was approved by the Research Ethics Committee at the College of Sciences/University of Baghdad.

**Genomic DNA Extraction:** Reliaprep™ Blood gDNA Miniprep System/Promega (USA) was used to extract total genomic DNA from blood samples.

**Amplification of \( \text{ARG I} \) gene:** A working solution of two primers indicated in Table (1) was prepared by mixing 90\(\mu\)l of deionized distilled water with 10\(\mu\)l of stock primers solution (100\(\mu\m)) in order to obtain a final concentration of 10pmol/\(\mu\)l. These primers SNPs supplied by Alpha DNA/Promega (USA) were selected for amplification rs 2781666 and 60389358 in 5′ promoter region and rs 2781668 in Intron I.

**Table 1: Oligonucleotide primers used for the amplification of \( \text{ARG I} \)**

<table>
<thead>
<tr>
<th>rs</th>
<th>Primer</th>
<th>Sequence (5′-3′)</th>
<th>Tm (°C)</th>
<th>Product Size (bp)</th>
<th>Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>60389358</td>
<td>Reverse</td>
<td>CTTGATGGTAACCGAGAGGG</td>
<td>58.12</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2781668</td>
<td>Forward</td>
<td>CAGCTCCCAGATGATGACTTT</td>
<td>57.72</td>
<td>536</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Reverse</td>
<td>CAGACTGGCACCACAGCTAATA</td>
<td>57.75</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The amplification program was done by initial denaturation for one cycle at 94°C for 1min, denaturation and annealing for forty cycles at 94°C for 30sec., then extension for forty cycles for 1min at 72°C and a final extension for one cycle for 1min at 72°C.

**Single-nucleotide polymorphism selection and genotyping:** The amplification products for \( \text{ARG I} \) gene were sequenced and data were analyzed by the National Center for Biotechnology Information/single-nucleotide polymorphism (SNP; http://www.ncbi.nlm.nih.gov/SNP).

**Statistical Analysis:** Genotype and allele distributions were compared among the three groups using one-way analysis of variance (ANOVA) from SPSS version 23.0 (SPSS Inc. Chicago, IL, USA). The Hardy–Weinberg equilibrium (HWE) test was used to assess the consistency of genotypic distribution in controls. A two-tailed \( P < 0.05 \) was considered significant. This study used the Student \( t \)-test to determine significance when comparing between percentages through the SAS program (SAS, 2012).

**Results and Discussion**

Genomic DNA was first extracted from blood samples of subjects. The concentrations of DNA solutions ranged between 70-85ng/\(\mu\)l, while the purity ranged between 1.6-2.0ng/\(\mu\)l. The purity and concentrations of DNA solutions were appropriate and highly recommended for more genetic analysis using Polymerase chain reaction (PCR) \(^8\). PCR was used to amplify the promoter regions (rs 2781666) (rs 60389358) and Intron 1 (rs 2781668) of \( \text{ARGI} \) under optimum amplification conditions. Results were illustrated in Figure 1 which showed the amplified products with a molecular size of 331bp and 538bp for the promoter and Intron 1 regions in \( \text{ARG I} \), respectively, for healthy controls and atherosclerosis patients who underwent diagnostic catheterization (DIG) and percutaneous coronary intervention catheterization (PCI).
Nucleotide sequence alignment of two amplified regions in \emph{ARG I}: Arginase is known to contribute directly to atherosclerosis progression and to counteract the beneficial effects of nitric oxide. In the present study, single nucleotide polymorphisms in \emph{ARG I} were detected. The rs 2781666 G/T located within the promoter sequence of several ethnic populations has been reported to be associated with myocardial infarction (MI) which is caused by atherosclerosis \cite{10}. Ethnic background is known to influence polymorphism frequencies and their effects on the disease. This study’s results showed a significant and consistent association of \emph{ARG I} that was restricted to the rs 2781666 SNP in Iraqi patients (Table 2). The results indicated that this site of polymorphism was highly significant (P<0.001) in patients who underwent percutaneous coronary intervention catheterization (PCI) compared with healthy controls as the occurrence of GT heterozygous in those patients was higher than in healthy controls. However, heterozygous alleles in patients underwent diagnostic catheterization were not significantly different from healthy controls. On the other hand, homozygous polymorphic alleles TT in PCI patients, but not in DIG patients, were significantly different (P<0.01) compared to healthy controls. The nucleotide sequence of \emph{ARG I} illustrated in Figure (2) showed the complete nucleotide sequence of promoter region in PCI and DIG patients and the position of the expected rs2781666 SNP associated with the incidence of atherosclerosis. This sequence was identical to the reference sequence of \emph{ARG I} promoter region of the same gene recorded in NCBI, except for the position of polymorphism (G/T).

Meanwhile, the results of the nucleotide sequence for promoter sequence of \emph{ARG I} in Iraqi patients, as indicated in Table (2), showed that (29.03\%) of patients are genotyped as homozygous GG non-polymorphic in patients underwent PCI as compared to healthy controls (25.00\%). These results may be related to the deleterious effect of \emph{ARG I} overexpression, at least in endothelial cells, as the rs2781666 polymorphism is located in the promoter region of the gene and it might modify \emph{ARG I} expression\cite{11-12}.

### Table 2: Distribution of GG rs2781666 polymorphism and allele frequency for all patients and healthy controls

<table>
<thead>
<tr>
<th>Genotype</th>
<th>Group (%)</th>
<th>Chi-squared value ($\chi^2$)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>PCI</td>
<td>DIG</td>
<td>Control</td>
</tr>
<tr>
<td>GG</td>
<td>(29.03%)</td>
<td>(23.07%)</td>
<td>(25.00%)</td>
</tr>
<tr>
<td>GT</td>
<td>(61.29%)</td>
<td>(38.46%)</td>
<td>(43.75%)</td>
</tr>
<tr>
<td>TT</td>
<td>(9.67%)</td>
<td>(38.46%)</td>
<td>(31.25%)</td>
</tr>
<tr>
<td>Allele frequency</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>G</td>
<td>0.59</td>
<td>0.42</td>
<td>0.46</td>
</tr>
<tr>
<td>T</td>
<td>0.41</td>
<td>0.58</td>
<td>0.54</td>
</tr>
</tbody>
</table>

PCI: Percutaneous coronary intervention Catheterization. DIG: Diagnostic catheterization. *: P<0.05. **: P<0.01.

On the other hand, the results mentioned in Table 2 showed that (61.29\%) and (9.67\%) of Iraqi patients who underwent PCI catheterization were genotyped as polymorphic heterozygous (GT) and homozygous (TT), respectively, were positive for rs 2781666 SNP, as guanine nucleotide was substituted by thymine.
Figure 2: Nucleotide sequence for 5' promoter sequence of ARG I in healthy controls group. Red square indicates the position of expected SNP (rs2781666) in PCI and DIG patients. Query represents patients’ samples. Subject represents database of National Center for Biotechnology Information (NCBI).

Furthermore, the results (Table 2) showed that (38.46%) and (38.46%) of Iraqi patients who underwent DIG catheterization were genotyped as polymorphic heterozygous (GT) and homozygous (TT), respectively, and were positive for rs 2781666 SNP compared with healthy controls. The use of SNP-based disease-susceptibility tests tend to be clinically justified because the disease categories covered include more common disorders that represent greater socio-economic burdens to the health care system [13].

The relationship between the rs2781668 polymorphism in Intron I and atherosclerosis in Iraqi patients was also investigated. Results (Table 3) showed that the rs2781668 C/T polymorphism had decreased significantly in PCI patients and diagnostic (DIG) when compared with healthy controls.

On the other hand, results of polymorphism and allele frequency for rs 2781668 Intron 1 sequence of ARG I in Iraqi patients (Table 3) showed that (80.76%) of PCI patients were genotyped as homozygous (CC) compared with healthy controls, while (19.23%) of Iraqi patients underwent PCI catheterization were genotyped as polymorphic heterozygous (CT) and were positive for rs 2781668 SNP, as cytosine nucleotide was substituted by thymine. Results also showed that (72.72%) of DIG patients were genotyped as homozygous (CC) compared with healthy controls. In addition, (27.27%) of Iraqi patients underwent DIG catheterization were genotyped as polymorphic heterozygous (CT) and were positive for rs 2781668 SNP. These results were observed in other ethnic populations such as some French populations; whereas the genetic polymorphism rs2781668 in ARG I may be a predisposition for MI [14]. The genotype distributions in both patient groups, who underwent PCI and DIG catheterization as well as controls, were conducted in Hardy-Weinberg equilibrium for ARGI gene polymorphisms.

Table 3: Distribution of CC rs2781668 polymorphism and allele frequency for patients who underwent PCI and DIG catheterization and healthy controls

<table>
<thead>
<tr>
<th>Genotype</th>
<th>Group (%)</th>
<th>Chi-squared value ($\chi^2$)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>PCI</td>
<td>DIG</td>
<td>Control</td>
</tr>
<tr>
<td>CC</td>
<td>(80.76%)</td>
<td>(72.72%)</td>
<td>(65.21%)</td>
</tr>
<tr>
<td>CT</td>
<td>(19.23%)</td>
<td>(27.27%)</td>
<td>(34.78%)</td>
</tr>
<tr>
<td>TT</td>
<td>(00.00%)</td>
<td>(00.00%)</td>
<td>(00.00%)</td>
</tr>
</tbody>
</table>

Allele frequency

<table>
<thead>
<tr>
<th>Allele</th>
<th>PCI (0.90)</th>
<th>DIG (0.86)</th>
<th>Control (0.82)</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>0.90</td>
<td>0.86</td>
<td>0.82</td>
</tr>
<tr>
<td>T</td>
<td>0.10</td>
<td>0.14</td>
<td>0.18</td>
</tr>
</tbody>
</table>

*: P<0.05. **: P<0.01. NS: Non-Significant.

During the present study, other SNPs were investigated in promoter region rs 60389358 with highly significant difference (P<0.001) in atherosclerosis patients who underwent PCI and patients underwent DIG catheterization,
when compared with healthy controls. The nucleotide sequence of \textit{ARG I} promoter region was determined for genotyping the genetic polymorphism in this region. Results illustrated in Figure (3) showed the nucleotide sequence alignment of this region in healthy controls and the position of the expected rs60389358 SNP which is considered to be associated with the incidence of type 2 diabetes mellitus (T2DM) in patients who underwent DIG catheterization, but this SNP is considered not to be associated and not related with incidence of atherosclerosis in T2DM patients who underwent PCI catheterization.

![Figure 4: Nucleotide sequence for 5’ promoter sequence of \textit{ARG I} in healthy controls group. Red square indicates the position of expected SNP (rs 60389358) in PCI and DIG patients. Query represents patients’ samples. Subject represents database of National Center for Biotechnology Information (NCBI).](image)

Results indicated in Table (4) showed that (74.19%) and (53.84%) of patients underwent PCI and DIG, respectively, were genotyped as homozygous (CC) polymorphic compared with healthy controls. Results indicated in Table (4) also showed that (25.80%) and (46.15%) of Iraqi patients who underwent PCI and DIG catheterization, respectively, were genotyped as polymorphic heterozygous (CT) and were positive for rs 60389358 SNP, as cytosine nucleotide was substituted by thymine with a highly significant difference (P<0.01) in comparison with healthy controls. These results may be related to the deleterious effect of \textit{ARG I} over expression as mentioned in other studies \cite{11, 12}. Because the disease categories covered include more common disorders which represent greater socio-economic burdens to the health care system, the use of SNP-based disease-susceptibility tests tend to be clinically justified \cite{13}.

\textbf{Table 4: Distribution of CC rs60389358 polymorphism and allele Frequency in difference groups}

<table>
<thead>
<tr>
<th>Genotype</th>
<th>PCI (%)</th>
<th>DIG (%)</th>
<th>Control (%)</th>
<th>Chi-squared value ($\chi^2$)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>CC</td>
<td>(74.19%)</td>
<td>(53.84%)</td>
<td>(68.75%)</td>
<td>8.35 **</td>
<td>0.0072</td>
</tr>
<tr>
<td>CT</td>
<td>(25.80%)</td>
<td>(46.15%)</td>
<td>(31.25%)</td>
<td>8.35 **</td>
<td>0.0072</td>
</tr>
<tr>
<td>TT</td>
<td>(00.00)</td>
<td>(00.00)</td>
<td>(00.00)</td>
<td>0.00 NS</td>
<td>1.00</td>
</tr>
</tbody>
</table>

\textbf{Allele frequency}

<table>
<thead>
<tr>
<th></th>
<th>C</th>
<th>T</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0.87</td>
<td>0.13</td>
<td>0.76</td>
<td>0.14</td>
</tr>
<tr>
<td>P-value</td>
<td>0.84</td>
<td>0.16</td>
<td>---</td>
<td>---</td>
</tr>
</tbody>
</table>

**: P<0.01. NS: Non-Significant.

It is important to mention that this study was the first to investigate the role of rs 2781666 G/T, rs2781668 C/T and rs 60389358C/T polymorphism of ARG \textit{I} gene in susceptibility to atherosclerosis and T2DM in Iraqi patients underwent PCI and DIG catheterization. This study found an excess of GT genotype for rs 2781666 variant among PCI catheterization compared with control group, and an excess of TT genotype for those SNPs variant among DIG catheterization patients compared with control group. Multivariate analysis showed that this association was independent of other factors related to vascular disease risk. Some previous studies on other populations and/or sub-populations showed similar results to ours such as the study of \cite{14}, who suggested concordant results of significant association between variant genotype/allele at rs 2781666 and MI.
Conclusion

Our findings suggested that there is significant association between \textit{ARG I} rs2781666 (G/T) heterozygous SNP and atherosclerosis patients with T2DM, who underwent PCI catheterization. Also, there is significant association between (T/T) as well as rs 60389358 (C/T) and patients with T2DM who underwent DIG catheterization, yet they did not have atherosclerosis. Meanwhile, this study found that rs2781668 (C/T) SNP was a functional mutation, yet not associated with the disease of polymorphism and atherosclerosis in Iraqi population.

Acknowledgement

We acknowledge all participated patients and healthy individuals who were very helpful in giving information and blood samples.

Ethical Clearance: It was obtained from the Scientific Research Committee at College of Sciences/University of Baghdad, Iraq.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

REFERENCE


Study of the Association between Prolidase Enzyme Kinetics and Severity of Asthma in Children

Seham A. Muhsen¹, Hassan H. AL-Saeed¹, Areej Abdul Abass ALOmrani²

¹Chemistry and Biochemistry Department, ²Department of Pediatrics, College of Medicine, Al- Nahrain University, Baghdda, Iraq

ABSTRACT

Background: Asthma is a perpetual provocative sickness comprising a mix of natural and hereditary factors. The catalyst prolidase assumes an imperative part in the breakdown of collagen, the breakdown of intracellular protein particularly in the last stage when peptides and dipeptides contain an abnormal state of proline. The aim of current study was to estimate prolidase enzyme levels in serum, plasma and hemolysate of asthmatic children and their healthy control.

Material and Method: A case–control study included two groups; the first group consisted of (80) asthmatic children aged 1-13 years. The second group contained 30 children as control. Enzyme activity was measured using spectrophotometry.

Result: The serum levels of prolidase enzyme showed significant decrease in asthmatic children group in comparison with control group (P<0.001). Also, serum levels of prolidase enzyme were significantly decreased with increasing severity of asthma in patients subgroups (P<0.001).

Conclusions: Spectrophotometer method is a simple and good method for determination of prolidase enzyme activity in patients with asthma.

Keywords: Prolidase, enzyme activity, spectrophotometry, asthmatic children, AUC, sensitivity, specificity.

Introduction

Asthma is a perpetual provocative sickness of the aviation routes [1]. It is a mix of natural and hereditary factors [2]. The catalyst prolidase assumes an imperative part in the breakdown of collagen [3]. Prolidase (EC3.4.13.9) is a cytosolic manganese-subordinate homodimeric iminodipeptidase [4]. Prolidase is the main human compound in charge of the absorption of iminodipeptides containing proline or hydroxyproline at their C-terminal end [5]. Prolidase deficiency (PD) is an uncommon hereditary issue [6]. Lack of prolidase prompts an uncommon [7]. The created three recombinant prolidase frames, hRecProl-231delY, hRecProl-E412K and hRecProl-G448R [8]. Anomalous prolidase action has been portrayed in numerous disarranges [9]. The indications are caused by the diminishment or loss of prolidase movement because of changes in the peptidase quality situated in chromosome 19q13.11 [10].

The aim of current study was to

Material and Method

A case–control study was executed during the term from March–July 2018. This study included two groups; the first group consisted of (80) asthmatic children aged 1-13 years, 41 of them aged 1-4 years and 39 aged 5-13 years. This group was divided according to severity of asthma into four subgroups. The second group contained 30 children as controls. The study was conducted at AL-Emamain AL-Kademain Teaching Medical City and AL-Kadhimiya Hospital for Children, Baghdad, Iraq.

Preparation of plasma and erythrocyte hemolysate:
Peripheral blood samples (3ml) from case and control
subjects were collected in heparinized tubes. The supernatant was collected which represents plasma and washed the precipitate twice with two volumes of PBS, hemolyzed with four volumes of ice-cold water and two cycles of freezing and thawing.

The amount of hemoglobin was determined by spectrophotometric measurement [11]. Samples were diluted 1:2 with 50mmol/l Tris–HCl; pH7.8. Plasma and erythrocyte hemolysate were stored at -20°C until used.

**Measurement of Prolidase:** Prolidase concentration was measured by (ELISA) in serum, plasma and erythrocyte hemolysate. Prolidase activity was determined optimizing and unifying all the various modifications by spectrophotometric measurements activity from blood [12]. Measurements were performed at 515nm. Kinetic analysis of prolidase was performed with different concentrations of the Gly-Pro substrate from 0 to 0.1mol/l (1×10^{-2}, 2 × 10^{-2}, 4 × 10^{-2}, 6 × 10^{-2}, 8 × 10^{-2}, 1×10^{-3}mol/l) [11].

Michaelis-Menten equation and Line weaver-Burke plot were used to obtain the Km. The kinetic parameters Vmax (μmol Pro min⁻¹ mg⁻¹), Km (mM) was determined with the Enzyme Kinetic.

**Result**

**Determination of the levels of serum prolidase in asthmatic children and controls and the levels of prolidase among the four subgroups:** The distribution of serum prolidase levels in asthmatic and control children was shown in Figures (3).

![Figure 3: Serum prolidase distribution in asthmatic and control children](image)

Serum levels of prolidase were significantly decreased with increasing severity of asthma in patients’ subgroups (P 0.001; Figure 4).

**Determination of serum levels of prolidase in asthmatic children aged <5 years and their healthy controls:** Serum levels of prolidase were measured for each child aged <5 years participated in this study and the results showed significant decrease of serum prolidase levels in asthmatic children group in comparison with control group (P<0.001; Table 1).
Moreover, serum levels of prolidase had significantly decreased with an increasing severity of asthma in children aged <5 years (P 0.001; Table 2).

**Table 2: Comparison of serum prolidase levels among the four subgroups of asthmatic patients aged <5 years**

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Severity of asthma</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Intermittent (n = 10)</td>
<td>Mild (n = 10)</td>
</tr>
<tr>
<td>Serum prolidase (U/ml) Mean ± SD</td>
<td>1.25 ± 0.38</td>
<td>0.53 ± 0.16</td>
</tr>
</tbody>
</table>

**Table 3: Comparison of serum prolidase levels in asthmatic children and their controls aged 5-13 years**

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Patients (n = 80)</th>
<th>Controls (n = 30)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Serum prolidase (U/ml) Mean ± SD</td>
<td>0.46±0.34</td>
<td>1.33±0.14</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

Furthermore, serum levels of prolidase showed significant decrease with increasing severity of asthma (P<0.001; Table 4).

**Table 4: Comparison of serum prolidase levels among the four subgroups of asthmatic children aged 5-13 years**

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Severity of asthma</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Intermittent (n = 10)</td>
<td>Mild (n = 10)</td>
</tr>
<tr>
<td>Serum prolidase(U/ml) Mean ± SD</td>
<td>085 ± 0.41</td>
<td>0.51 ± 0.26</td>
</tr>
</tbody>
</table>

**Table 5: Comparison of plasma and erythrocyte prolidase levels between asthmatic children and their controls**

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Patients (n = 40)</th>
<th>Controls (n = 30)</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Serum prolidase (U/ml) Mean ± SD</td>
<td>Plasma</td>
<td>0.47 ± 0.23</td>
<td>1.27 ± 0.02</td>
</tr>
<tr>
<td></td>
<td>Erythrocyte</td>
<td>0.83±0.2</td>
<td>1.46±0.21</td>
</tr>
</tbody>
</table>

Defining the normal ranges (cut-off values)

**Defining normal range (cutoff value) of prolidase in sera of children with asthma:** The (ROC) curve showed significant discriminating ability of decreased serum prolidase as shown in Figure (5).
Defining the normal range (cut-off value) of prolidase in erythrohemolysate of asthmatic children: The (ROC) curve showed significant discriminating ability of decreased prolidase in erythrohemolysate as shown in Figure (6).

Kinetic studies for determination of prolidase activity in plasma and erythrohemolysate of asthmatic children: Kinetic studies were used for determination of prolidase activity and to obtain the Michaelis constant ($k_m$) and maximum velocity ($V_{max}$) in plasma and erythrohemolysate of asthmatic children compared with their controls using spectrophotometric method.

The results showed a decrease in $k_m$ and $V_{max}$ values in asthmatic children compared with control in both plasma and erythrohemolysate as shown in table (6).
Table 6: Kinetic studies of prolidase activity in plasma and erythrohemolysate in asthmatic children and controls

<table>
<thead>
<tr>
<th></th>
<th>Michaelis-Menten equation</th>
<th>Line weaver-Burke plot</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$K_m$ in (mM)</td>
<td>$V_{max}$ μmol Pro min$^{-1}$ mg$^{-1}$</td>
</tr>
<tr>
<td>P.C.</td>
<td>5.23x10$^{-3}$</td>
<td>8.55x10$^2$</td>
</tr>
<tr>
<td>P.T.</td>
<td>5.53x10$^{-3}$</td>
<td>5.53x10$^2$</td>
</tr>
<tr>
<td>H.C.</td>
<td>4.71x10$^{-3}$</td>
<td>5.53x10$^2$</td>
</tr>
<tr>
<td>H.T</td>
<td>4.81x10$^{-3}$</td>
<td>1.81x10$^2$</td>
</tr>
</tbody>
</table>

Discussion

More grounded genetic part [14], environmental and others might be all exposures [15,16]. To achieve a good control of asthma, we have to minimize symptoms burden and risk of exacerbations. Pharmacological treatment is based on a cycle of assessments [17].

There was significantly decreased serum prolidase levels in asthmatic children group in comparison with control group (P<0.001). Also, serum levels of prolidase were significantly decreased with the increasing severity of asthma (P<0.001). These results agreed with the study done by [18].

The levels of prolidase were studied according to age in asthmatics compared with controls and according to the four asthmatic children subgroups. The results of current study for the serum levels of prolidase were measured for each children aged <5 years participated in this study. Unpaired test showed significantly decreased serum prolidase levels of asthmatic children group in comparison with control group (P<0.001). These findings agreed with study done by [12]. These results indicated that serum prolidase levels were significantly decreased with increased severity in asthmatic children, and this agreed with the study done by [19].

Serum levels in this study had significantly decreased with an increasing severity of asthma at this age groups (P<0.001) using ANOVA test, these result indicated that serum prolidase was significantly decreased with increased severity in asthmatic children. This agreed with the study of [20].

Serum levels of prolidase showed no significant differences according to gender in control group, however, significantly higher levels in sera of boys than girls reported by [21]. Some studies showed that asthma is a chronic inflammatory airway disease that has a higher prevalence in boys than in girls before puberty and a higher prevalence in women than in men in adulthood [22].

The levels of prolidase in plasma and erythrocytes were measured for asthmatic patients and controls. Unpaired $t$-test showed a significantly decrease of plasma and erythrocytes prolidase levels of asthmatic children group in comparison with control group (P<0.001). These results agreed with studies done by [1,23].

Current study concluded that the cut-off value of serum prolidase in asthmatic children when the serum prolidase concentration of 1.18 was used as cut-off value for this marker in asthmatic patients, the sensitivity was 90.0% and specificity was 92.5%. The (ROC) curve showed a significant discriminating ability of decreased serum prolidase. The element we have measured and assessed was the area under the ROC curve (AUC) [27] as the result showed that it may be possible to consider the test of prolidase enzyme sensitivity and specificity as a good biomarker. These findings agreed with study done by [20]. When the serum prolidase concentration of 1.25 was used as cut-off value for this marker in asthmatic patients, the sensitivity was 90.0% and specificity was 90%. Increased prolidase activity was associated with severity of bronchial asthma [12]. Prolidase in humans is essential for maintenance, rebuilding and degradation of collagen-containing connective tissue [13].

Currently, there is no standard protocol to evaluate the human prolidase activity. Kinetic studies were used for determination of prolidase activity and to obtain the Michaelis constant ($K_m$) and maximum velocity ($V_{max}$) using spectrophotometric method [26].

Kinetic studies were applied to obtain, and to accurately determine, the maximum activity for the recombinant enzyme. Results revealed that $V_{max}$ in plasma (8.55x10$^2$, 5.53x10$^2$) μmol Pro min$^{-1}$ mg$^{-1}$ as control, test and $V_{max}$ in erythrohemolysate...
The present data showed that the maximum amount of substrate hydrolyzed was achieved by activating the enzyme with 1 mmol/l MnCl₂ and 0.75 mmol/l GSH at 50°C for 20 min before incubation with the substrate (Gly-Pro) that was also performed at 50°C for 20 min [12,28].

Conclusions

Spectrophotometer method is a simple and good method for determination of the activity of prolidase enzyme in patients with asthma.

Ethical Clearance: It was obtained from the Scientific Research Committee at AL-Emamain AL-Kademain Teaching Medical City and AL-Kadhimiya Hospital for Children, Bghdad, Iraq.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

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The Effect of Environmental Temperature on Semen Characteristics of Three Breeds of Rams at Different Seasons and Locations in Iraq

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1Biology Department, College of Science, Mustansiriyah University, Baghdad, Iraq;
2Animal Production Department, College of Agriculture, University of Wassit, Iraq

ABSTRACT

This study was carried out on semen of adult twenty four (eight Awasi, eight karadi and eight Arabi) rams, semen was collected by means of artificial vagina. Once weekly for one year period, the study included season variations in semen quality. The volume, percentage of sperm motility, concentration rate, live percentage was high in Awasi in spring, and low abnormalities from Arabi and karadi breeds. The spring was the best season in high quality of semen in three breeds.

Testosterone was high in blood plasma of Awasi rams. Moreover, Awasi had the highest AST enzyme concentration (6.7 IU/L). From these results we show that semen characteristics was highest in Awasi in spring in different regions of Iraq (north, medium and south).

Keywords: Physiological of ram semen, Awassi, Seasons, Testosterone, Enzyme.

Introduction

Environmental factors affect living organisms, as plant, humans and animals also it has an effect on the physiological reproduction of animals. In our research we discussed effect of temperature on sheep breeds at four seasons1.

Animal resources is one of the main economic sources in Iraq for agricultural sector since it increases the national income and improve economic development and affect breed sheep and nutrition on the quality of ram semen2, also semen is affected by environmental factors as light in day which vary by season because pineal gland is affected with secretion of melatonin that affects hypothalamus to secret hormones that cause the pituitary gland to secret FSH & LH Hormones3.

Sheep are considered one of the most animals resistant to heat as they have the ability to lose heat by tolerance and radiation to get rid of excess body temperature but increase of temperature in summer that may reach (46-52°C) sheep can’t get rid of high temperature so increase heat tolerance and those all vital physiological activities are affected including reproduction4.

This study aims to know the effect of heat as an environmental factor on three breeds of Iraqi sheep in three different areas with different climate as Sulaymaniyah, Wasit and AlBasrah by analysis semen physical characteristics, testosterone and sperm plasma enzyme concentration.

Materials and Method

This study was performed in three Iraqi governments (AlBasra, Al-Kut and Al-Sulaymaniyah) from (1/9/2017 to 1/9/2018) including 24 adult rams divided into three groups (8 Awasi rams, 8 Arabi Rams and 8 Karadi Rams) their ages was between 2.6 - 3.6 years old and similar weight with no anomalies and no diseases.

The experiment was done to study effect of heat on semen physical characteristics Sheeps were trained one month ago by collection of semen by using artificial vagina of sheeps. During the experiment semen was
collected once weekly (4 times monthly), each time we evaluate the physical characteristics of semen of each Ram then semen of 8 Rams is mixed together then semen plasma is separated by centrifugation (3000 rpm/10min) to analyze enzyme.

Testosterone in blood serum and semen plasma enzyme (AST) monthly in each season and in three governments (AlBasra, Al-Kut and Al-Sulaymaniyah) each group (8 Rams) in barn after all examinations for checkup from diseases. Nutrition of sheeps depend on concentrated bullet with 17% protein concentration 1 kg/sheep with green leaves, hay and clean water. The first group was in Al Basrah (Arabi bread), second group in Wasit (Awasi bread) and third group in Sulaymania (Karadi group).

We evaluate semen directly after collection in tube to measure ejaculation volume then volume is recorded, then we calculate the mass motility by7 method by taking a drop of semen and it on a warm slide whose temperature is 37°C then examined by microscope magnification power x 100, while the concentration of sperms we used improved neubauer haemocyromerer chamber which was applied by7 equation to calculate concentration of sperms in cubic centimeter.

Number of sperms/cm² = (Number of sperms in 5squeres/80)x400x200x10x1000

We also calculated percentage of live and dead sperms, we used afresh drop of semen then put it on a clean warm slide whose temperature is 37°C after that we put 5% eisoin stain and 10% negrosin stain to be mixed with the drop of semen for 10 seconds then take a smear to put on another slide to be examined by microscope with magnification power x400 then calculate 100 sperms and calculate live and dead ones live sperm ratio = ( number of live sperms/100)x 100, while ratio of abnormal sperms was calculated, we put a drop of semen on a slide then we added 2 drops of methyl alcohol (97%) for 2 minutes to kill sperms, then we put it on slide by adding fast green stain to be mixed and leave it to dry also we add oil drop on the slide to be examined by microscope with oil focus6.

Percentage of abnormal sperms= (number of abnormal sperms/100) x 100.

To evaluate concentration of testosterone we took 5ml blood by puncture jugular vein twice each month (six in every season) from each sheep to be inserted in a test tube containing anticoagulant (EDTA) then we used centrifugation to separate plasma at speed rate 3500 rpm/min for 15 minutes then plasma was conserved in frozen at (-20°C) for hormonal analyses by ELFA (Enzyme Linked Flourescent Assay) by using kits manufactured by BioMerieux. In order to get seminal plasma we put mixed semen from sheeps in 5ml test tube afterwards we centrihge for 15 minutes at speed rate 3500 rpm/min. Then plasma was obtained by pipette to be frozen at (-20°C) to measure the enzymes by7,a to measure enzyme (AST)9. The statistical analysis system program was used to identify effect of difference factors in study parameters. The outcome quantitative variables were normally distributed, and conveniently described by mean SE and tested for statistical significance by ANOVA test with least significant difference (LSD). P value less than the 0.05 level of significance were considered statistically significant9.

Results and Discussion

Table(1) shows significant difference (P<0.05) in ejaculation volume between three breads and the overall mean was the highest among Awassi sheep (1.05 ± 0.11 ml) then karadi (0.90 ± 0.18 ml) then Arabi (0.74 ± 0.31 mL) from these results we conclude that Awassi sheep has the highest ejaculation volume.

Difference in ejaculation volume among these breads is due to different hereditary factors. This approves10 in his study on national Iraqi goat and crossbreed results agree with1 while 11 didn’t find significant difference between karadi and Arabi breeds.

Table 1: Rams semen volume (ml) in different seasons

<table>
<thead>
<tr>
<th>Seasons</th>
<th>Awassi Mean ± SE</th>
<th>Arabi Mean ± SE</th>
<th>Karadi Mean ± SE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Autumn</td>
<td>1.06 ± 0.06A</td>
<td>0.76 ± 0.56C</td>
<td>0.88 ± 0.07B</td>
</tr>
<tr>
<td>Winter</td>
<td>1.03 ± 0.08A</td>
<td>0.76 ± 0.07B</td>
<td>0.98 ± 0.08A</td>
</tr>
<tr>
<td>Spring</td>
<td>1.27 ± 0.06A</td>
<td>0.79 ± 0.09C</td>
<td>1.02 ± 0.08B</td>
</tr>
<tr>
<td>Summer</td>
<td>0.87 ± 0.08A</td>
<td>0.63 ± 0.09C</td>
<td>0.73 ± 0.08B</td>
</tr>
<tr>
<td>Overall</td>
<td>1.05 ± 0.11a</td>
<td>0.144 0.13c</td>
<td>0.9010.18b</td>
</tr>
</tbody>
</table>

Values bearing different superscript differ significantly (P<0.05)

A,B,C letters difference between seasons in significant (p<0.05).

a,b,c. letters difference between breeds in significant (p<0.05)
We found spring was the best season among seasons due to cool and warm weather then winter and autumn while in summer ejaculation volume was the least among breads, and the ejaculation volume in spring was (0.79, 1.02, 1.27 ml) for Awassi, karadi and Arabi respectively. The cause of difference in ejaculation volume is due to different temperature and humidity in these seasons which affects spermatogenesis and testis function as was concluded by\textsuperscript{12} that it increases during hot months compared to warm and cold month but our results were similar to results done by\textsuperscript{13} in his study on Finland sheeps but he noticed that spring was the best and autumn was the worst in ejaculation volume\textsuperscript{14,15} noticed that seasons has a significant difference in ejaculation volume among breeds in spring second the highest results for semen volume in autumn and winter, the least volume was in summer, because of the difference in the environmental factors\textsuperscript{14}.

Results showed significant increase in concentration of semen of Awassi sheep (P<0.05) compared to karadi and Arabi and overall mean of semen concentration of Awassi, Karadi and Arabi (2.78, 2.4m, and 2.27x10\textsuperscript{9} mL) respectively. The cause of difference is due to variety of hereditary factors of the breed this means Awassi is the best then karadi comes in the second place and finally comes the Arabi sheep according to concentration of sperms and this agree with\textsuperscript{16,17}.

Table (2) shows the percentage of sperm motility among Awassi is significantly the highest (P<0.05) then comes karadi and the last is Arabi (80.03, 74.35 and 69.75 %) respectively, the cause of variety is due to genetic factors of the breed which agree with\textsuperscript{20} also in the study\textsuperscript{21} showed that the percentage of sperm motility of Arabi sheep was the least compared to Negdi and cross breed sheeps in AlBasrah in months.

Table 3: Semen Live Sperm(%) in different seasons

<table>
<thead>
<tr>
<th>Seasons</th>
<th>Awassi Mean ± SE</th>
<th>Arabi Mean ± SE</th>
<th>Karadi Mean ± SE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Autumn</td>
<td>82.5 ± 1.31A</td>
<td>75.6 ± 1.32B</td>
<td>76.8 ± 0.98B</td>
</tr>
<tr>
<td>Winter</td>
<td>77.5 ± 1.95A</td>
<td>69.7 ± 1.88C</td>
<td>73.3 ± 1.89B</td>
</tr>
<tr>
<td>Spring</td>
<td>83.0 ± 1.14A</td>
<td>73.8 ± 1.85C</td>
<td>78.2 ± 1.45B</td>
</tr>
<tr>
<td>Summer</td>
<td>70.2 ± 1.31A</td>
<td>62.3 ± 0.187C</td>
<td>66.11 ± 2.31B</td>
</tr>
<tr>
<td>Overall mean</td>
<td>78.30 ± 2.34a</td>
<td>70.35 ± 2.49C</td>
<td>73.61 ± 3.45b</td>
</tr>
</tbody>
</table>

Values bearing different superscript differ significantly (p<0.05)

A,B,c. letters difference between seasons in significant (p<0.05).

a,b,c. letters difference between breeds in significant (p<0.05)

Sprin then winter, autumn and summer showed significant difference (P<0.05) characteristics by destroying sperm membrane so increase percentage of dead sperms as it affects sperm DNA\textsuperscript{22}.

Table (3) shows effect of breeds on live sperm percentage. The percentage of live sperms was (78.3%) among Awassi which was significantly higher than karadi (73.6%) than Arabi (70.35%) due to excellence genetic factors of Awassi sheep than Arabi and karadi.

Table 2: Rams semen motility(%)in different seasons

<table>
<thead>
<tr>
<th>Seasons</th>
<th>Breeds</th>
<th>Awassi Mean ± SE</th>
<th>Arabi Mean ± SE</th>
<th>Karadi Mean ± SE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Autumn</td>
<td>79.6 ± 1.30A</td>
<td>66.0 ± 1.32C</td>
<td>73.4 ± 1.66B</td>
<td></td>
</tr>
<tr>
<td>Winter</td>
<td>85.5 ± 1.34A</td>
<td>74.4 ± 1.67C</td>
<td>80.2 ± 1.33B</td>
<td></td>
</tr>
<tr>
<td>Spring</td>
<td>87.5 ± 1.30A</td>
<td>76.8 ± 1.52C</td>
<td>80.6 ± 1.96B</td>
<td></td>
</tr>
<tr>
<td>Summer</td>
<td>67.5 ± 1.34A</td>
<td>61.8 ± 2.31C</td>
<td>63.2 ± 2.81B</td>
<td></td>
</tr>
<tr>
<td>Overall mean</td>
<td>80.03 ± 3.44a</td>
<td>69.75 ± 4.34c</td>
<td>74.35 ± 3.41b</td>
<td></td>
</tr>
</tbody>
</table>

A,B,C letters difference between seasons in significant (p<0.05).

a,b,c . letters difference between breeds in significant (p<0.05)

Also the difference in sperm motility is due to high testosterone level in seasons\textsuperscript{21} disagree with\textsuperscript{22} their results increase significantly in summer than other seasons due to different environmental temperature and humidity.

Table (4) shows significant increase of abnormal sperm percentage (P<0.05) among Arabi breed (22.38%) more than Awassi breed (17.53%) and karadi (20.18%) due to increase heat tolerance in different regions in Iraq as AlBasra where Arabi is dominant cold weather where karadi and cool weather as in Al-Kut the percentage is significantly less this means that the breed plays an
important role in percentage of abnormal sperms as shown in study\textsuperscript{23} as sperm membrane is destroyed so DNA is affected and percentage increases.

### Table 4: Rams semen Abnormalities (%) in different seasons

<table>
<thead>
<tr>
<th>Seasons</th>
<th>Breeds</th>
<th>Mean ± SE</th>
<th>Karadi Mean ± SE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Awassi</td>
<td>18.2 ± 0.67B</td>
<td>22.5 ± 0.58A</td>
</tr>
<tr>
<td>Autumn</td>
<td></td>
<td>15.2 ± 0.45A</td>
<td>17.53 ± 1.34A</td>
</tr>
<tr>
<td>Winter</td>
<td>Arabi</td>
<td>17.2 ± 0.56C</td>
<td>26.9 ± 0.41C</td>
</tr>
<tr>
<td>Spring</td>
<td>Awassi</td>
<td>18.2 ± 0.41A</td>
<td>19.2 ± 0.58C</td>
</tr>
<tr>
<td>Summer</td>
<td></td>
<td>20.18 ± 1.97b</td>
<td>23.2 ± 0.56C</td>
</tr>
<tr>
<td>Overall</td>
<td></td>
<td>19.2 ± 0.58C</td>
<td>16.3 ± 0.67B</td>
</tr>
</tbody>
</table>

A,B,C letters difference between seasons in significant (p<0.05).

Moreover spring is the best for least percentage of abnormal sperms among breeds then autumn comes in the second place then winter and summer.

The season has a significant effect (P<0.05) among breeds in concentration of testosterone, spring is the best season then comes autumn then winter and the worst concentration was recorded in summer due to the hot weather that affects the reproductive ability of the rams that depend on the activity of testes that secrete reproductive hormones\textsuperscript{25} our results agree with\textsuperscript{26} in their study about different breeds and differs with\textsuperscript{21} that found autumn and summer are better than spring and winter among Nagdi and cross breed sheep in Al Basra.

In Table (6) Alwassi Rams had the highest (AST) enzyme concentration was (6.7 IU/L) in plasma of semen of karadi sheep was (5.64 IU/L) and Arabi (4.98 IU/L) due to difference between breeds and their genetic properties of each breed [27\&28] in their study about sheep and male goats as spring was the best season.

### Table 5: Effect of the breeds and Seasons on the concentration of AST enzyme (IU/L) in plasma of ram Semen

<table>
<thead>
<tr>
<th>Seasons</th>
<th>Breeds</th>
<th>Mean ± SE</th>
<th>Karadi Mean ± SE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Autumn</td>
<td>Arabi</td>
<td>5.70 ± 0.13B</td>
<td>5.05 ± 0.22C</td>
</tr>
<tr>
<td>Winter</td>
<td></td>
<td>5.15 ± 0.11C</td>
<td>5.05 ± 0.22C</td>
</tr>
<tr>
<td>Spring</td>
<td>Arabi</td>
<td>6.25 ± 0.15B</td>
<td>5.50 ± 0.15C</td>
</tr>
<tr>
<td>Summer</td>
<td></td>
<td>7.05 ± 0.15A</td>
<td>6.70 ± 0.22A</td>
</tr>
<tr>
<td>Overall</td>
<td></td>
<td>6.70 ± 0.38a</td>
<td>4.98 ± 0.35c</td>
</tr>
</tbody>
</table>

Values bearing different superscript differ significantly (p<0.05)

A,B,c letters difference between seasons in significant (p<0.05).

Acknowledgments

The authors would like to thank Mustansiriyah University, Baghdad, Iraq for its support in the present work. And agriculture college in Wassit and every one helps us.

**Ethical Clearance:** The Research Ethical Committee at scientific research by ethical approval of both environmental and health and higher education and scientific research ministries in Iraq
Conflict of Interest: The authors declare that they have no conflict of interest.

Source of Funding: Self-funding

REFERENCES


Human Metapneumovirus in Patients with Respiratory Infection Negative for Influenza Virus (H1N1, H3N2, Influenza B)

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1College of Science, Al-Mustansiriya University, 2College of Veterinary Medicine, University of Fallujah, 3College of Science, Al-Mustansiriya University, 4Central Public Health Laboratory, Ministry of Health, Baghdad, Iraq

ABSTRACT

Background: Human Metapneumovirus is a member of the family Pneumoviridae. It is the second most common cause, after human respiratory syncytial virus (RSV), for lower respiratory tract infection in young children. The aim of current study was to explore the infection rate of influenza viruses (H1N1, H3N2, influenza B) in patients with upper respiratory tract infection. Also, to investigate the percentage of HMPV in patients who were negative for (H1N1, H3N2, influenza B).

Patients and Method: This is a cross-sectional study conducted in Central Public Health Laboratory/Ministry of Health (MOH-CPHL), Baghdad, Iraq from May to December/2016 including 372 who had upper respiratory tract infection and they were diagnosed as having influenza viral infection (H1N1, H3N2, influenza B). One hundred patients of them, who were negative for influenza viruses, were randomly selected and tested for the presence of HMPV. Their age range was 1 month to 82 years. They were 163 (43.8%) males and 209 (56.1%) females. Molecular detection and determination of plasma viral DNA was achieved by Real Time quantitative PCR for all viruses. All data were statistically analyzed and P value <0.05 was considered significant.

Results: The results found that the highest rate of influenza viral infection was due to strain H1N1 (14.24%) followed by strain B (13.1%), while infection by strain H3N2 was the lowest rate (7.5%). HMPV was detected in 9.9% of patients who were negative for the influenza virus infection. HMPV infection was significantly higher among age group 1-11 months (P= 0.001). The male: female ratio was (1.8:1).

Conclusion: A part from influenza viral infection, infection by HMPV can occur separately and predominantly among male infants less than one year old.

Keywords: Human Metapneumovirus, Influenza virus, H1N1, H3N2, Influenza B, Respiratory infection.

Introduction

Human Metapneumovirus (HMPV) is a negative-sense single-stranded RNA virus of the family Pneumoviridae. It is closely related to the avian Metapneumovirus (AMPV) subgroup C [1]. It was isolated for the first time in 2001 in the Netherlands by using the PCR technique. It is the second most common cause, after human respiratory syncytial virus (RSV), of lower respiratory tract infection in young children [2]. HMPV isolates revealed morphological characteristics consistent with paramyxoviruses after being examined by electron microscope which revealed spherical enveloped particles with a mean diameter of 209nm [3].

HMPV is transmitted mainly through contact with infected respiratory secretions and it is associated with 6%-40% of respiratory tract infections in hospitalized and outpatient children. It is also documented as a significant cause of illness in transplant recipients and acute exacerbations of asthma in both children and adults. The peak age of hospitalization for infants with HMPV is between 6–12 months of age, slightly older than the peak of respiratory syncytial virus (RSV).
which is around 2–3 months \cite{4}. The clinical features and severity of HMPV are similar to those of RSV, including fever, cough, nasal congestion, rhinorrhea, dyspnea, hoarseness and wheezing. Besides, HMPV is an important cause of disease in older adults \cite{5}.

The HMPV epidemiology is distributed worldwide. In temperate regions, the seasonal distribution generally follows that of RSV and influenza virus during late winter and spring \cite{6}. In the northern hemisphere, the peak tends to be from January to March, while in the southern hemisphere, the peak is from June to July \cite{7,8}. The virus is difficult to be isolated on culture. Polymerase Chain Reaction (PCR) may be the preferred detection technique. So far, there is no vaccine for HMPV.

Patients and Method

This is a cross-sectional study conducted in Central Public Health Laboratory/Ministry of Health (MOH-CPHL) in Baghdad, Iraq from May to December/2016. Following the CDC influenza-like illness case definition (CDC, 2016), a total of 372 upper respiratory tract specimens were collected from hospitalized patients by local authorized and trained medical personal in twelve central Iraqi provinces. The age of participants ranged from 1 month to 82 years. They were 163 (43.8%) males and 209 (56.1%) females. Patients complained from some or all of the following symptoms; fever, chills, cough, sore throat, runny or stuffy nose, bronchial breathing, muscle or body aches, headache, wheeze, fatigue, sometimes associated with vomiting and diarrhea. Specimens were taken from the deep nostrils (nasal swab) and throat swab, then sent to the Central Public Health Laboratory (CPHL) in a cool sealed bag and were refrigerated at -70°C till use \cite{9}. All patients were diagnosed as having influenza viral infection (H1N1, H3N2 and Influenza B) by using Real time quantitative PCR.

One hundred patients of these, with negative results for influenza viral infection (H1N1, H3N2 and Influenza B), were randomly selected and tested for the presence of HMPV by Real time quantitative PCR.

RNA Extraction: Viral RNA was extracted from 140μl of original sample using QIA amp viral RNA mini-kit (QIAGEN®, Hilden, Germany) according to the manufactures instructions and then eluted using 60μl of elution buffer.

Real-time quantitative reverse transcription PCR (RT-qPCR): Real time quantitative PCR was performed using Ag Path-IDTM One Step RT-PCR Kit (Applied Biosystems) and according to the manufacturer’s instructions, with primers set and prob shown in Table (1) used for detection of HMPV. RT-qPCR was done using ABI Prism 7500 (Applied Biosystem). The reaction volume was 25μl. Thermocycler set up as follows:

- Reverse transcriptase at 45°C for 10min.
- Tag inhibitor activation at 95°C for 10min.
- PCR (denaturation at 95°C for 15 seconds, annealing and extension at 55°C for 1 minute) for 45 cycles.

Table 1: Primer and probe set for HMPV (CDC Real-Time Rrt-PCR) detection

<table>
<thead>
<tr>
<th>Primers andProbe</th>
<th>Oligonucleotide sequences(5’ - 3’)</th>
</tr>
</thead>
<tbody>
<tr>
<td>hMPV Forward</td>
<td>CAA GTG TGA CAT TGC TGA YCT RAA</td>
</tr>
<tr>
<td>hMPV Reverse</td>
<td>ACT GCC GCA CAA CAT TTA GRA A</td>
</tr>
<tr>
<td>hMPV Probe#</td>
<td>TGG CYG TYA GCT TCA GTC AAT TCA ACA GA</td>
</tr>
</tbody>
</table>

Statistical Analysis: Data were organized and processed by the Statistical Package for the Social Science (SPSS Version 17.0) (SPSS. Chicago, IL, USA). Chi-squared test at a 95% level of confidence was employed to compare between groups and P-value of <0.05 was considered statistically significant.

Results

Results in Table (2) revealed that the infection rate by influenza viruses H1N1, H3N2 and Flu B were 14.2%, 7.5% and 13.1%, respectively.

<table>
<thead>
<tr>
<th>Test result</th>
<th>H1N1 No. (%)</th>
<th>H3N2 No. (%)</th>
<th>Flu B No. (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive</td>
<td>53 (14.2)</td>
<td>28 (7.5)</td>
<td>49 (13.1)</td>
</tr>
<tr>
<td>Negative</td>
<td>319 (85.7)</td>
<td>344 (92.4)</td>
<td>323 (86.9)</td>
</tr>
<tr>
<td>Total</td>
<td>372 (100)</td>
<td>372 (100)</td>
<td>327 (100)</td>
</tr>
</tbody>
</table>
On the other hand, the infection rate by HMPV was 37% among patients who were negative for influenza virus (Table 3).

<table>
<thead>
<tr>
<th>Test Result</th>
<th>HMPV</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No.</td>
</tr>
<tr>
<td>Positive</td>
<td>37</td>
</tr>
<tr>
<td>Negative</td>
<td>63</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
</tr>
</tbody>
</table>

Results in Table (4) showed that the highest rate of respiratory infection was among age group 1-11 month with significant differences compared to other age groups.

<table>
<thead>
<tr>
<th>Age group</th>
<th>Females</th>
<th>Males</th>
<th>Total</th>
<th>*P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1mon. -11mon.</td>
<td>45</td>
<td>27</td>
<td>72</td>
<td>0.001</td>
</tr>
<tr>
<td>1yr-10yr</td>
<td>28</td>
<td>35</td>
<td>63</td>
<td>NS</td>
</tr>
<tr>
<td>11yr-20yr</td>
<td>22</td>
<td>13</td>
<td>35</td>
<td>0.05</td>
</tr>
<tr>
<td>21yr-30yr</td>
<td>11</td>
<td>17</td>
<td>28</td>
<td>NS</td>
</tr>
<tr>
<td>31yr -40yr</td>
<td>19</td>
<td>10</td>
<td>29</td>
<td>0.05</td>
</tr>
<tr>
<td>41yr -50yr</td>
<td>23</td>
<td>14</td>
<td>37</td>
<td>0.05</td>
</tr>
<tr>
<td>51yr -60yr</td>
<td>27</td>
<td>16</td>
<td>43</td>
<td>0.01</td>
</tr>
<tr>
<td>61yr -70yr</td>
<td>10</td>
<td>18</td>
<td>28</td>
<td>0.06</td>
</tr>
<tr>
<td>71yr -80yr</td>
<td>23</td>
<td>11</td>
<td>34</td>
<td>0.05</td>
</tr>
<tr>
<td>81yr -90yr</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>NS</td>
</tr>
<tr>
<td>Total</td>
<td>209</td>
<td>163</td>
<td>372</td>
<td>0.001</td>
</tr>
</tbody>
</table>

*: P<0.05 is considered significant. NS: Not significant.

The results in Table (5) showed that the highest rate of HMPV infection was among female participants with F:M ratio of 1.8:1.

Table 5: Distribution of HMPV infection according to participants’ gender

<table>
<thead>
<tr>
<th>Gender</th>
<th>No.(%)</th>
<th>Age range</th>
<th>Positive HMPV No.(%</th>
<th>Negative HMPV No.(%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female</td>
<td>47(47)</td>
<td>1mon-16yr</td>
<td>23(48.9)</td>
<td>24(51)</td>
</tr>
<tr>
<td>Male</td>
<td>53(53)</td>
<td>1mon-20yr</td>
<td>14(26.4)</td>
<td>39(73.6)</td>
</tr>
</tbody>
</table>

We can see from Figure 1 that the distribution of HMPV infection among age groups in both genders was higher among infants aged less than 1 year.

Figure 2 revealed that the number of HMPV positive cases recorded in Baghdad was higher than in other cities.

Discussion

This study was designed for detection of HMPV in 100 patients with respiratory tract infection who were negative for influenza virus (H1N1, H3N2 and influenza B) to give new insights into circulating HMPV. Results in Table (2) revealed that the infection rate by influenza viruses; H1N1, H3N2 and Flu B were 14.2%, 7.5% and 13.1%, respectively. From those patients who were negative for these viruses submitted for another RT-PCR detection for the presence of HMPV and the results showed high percentage of infection (37%; Table 3).

A recent study conducted in Baghdad indicated that 29.74% of patients with influenza-like illness under 15 years were positive for HMPV [10]. Another study
conducted by [11] reported that 13% of children with lower respiratory tract infection were positive for HMPV.

The study of Manuel, 2009 documented that combined yearly infection rates varied from 5.9%, in healthy elderly population, to 13.1% in young population. The overall infection rate was 4% in patients with community-acquired lower respiratory infection in Upper Egypt [12].

Rate of HMPV infection varied not only between study groups, but also from year to year [13]. Geographical distribution, seasonal variation, age and type of sample and laboratory technique used, all may play a role in the variability of the infection rates.

The result of influenza virus infection also showed that the highest rate of viral infection was caused by H1N1 followed by flu B virus while H3N2 infection rate was the lowest. These results were comparable to those obtained by [14] in AL-Najaf Governorate, Iraq who found that infection rates by H1N1, H3N2 and flu B among healthy adults were 27.7%, 25.79% and 9.23%, respectively. Infection rate obtained in current study was closely similar to that of H3N2, but it is somewhat differ from that of H1N1. This variation may be due to social, health and age differences. Generally, current results are consistent with recent report published by WHO in February 2018 which revealed that there is increasing rate of infection by influenza A (H1N1) pdm09 and influenza B viruses in countries of Western Asia [15].

Results presented in Table (4) showed that the highest rate of respiratory tract infection was among age group 1-11 month with significant differences when compared to other age groups. These results were in agreement with a large cohort study conducted on 1203 hospitalized patients with influenza virus and reported that 76.2% of patients were children [16]. Furthermore, another study showed that there was a decrease in the rate of respiratory viral infections with increasing age and viral respiratory infections were more common among patients less than 14 years [17].

On the other hand, results presented in Table (5) indicated higher rate of HMPV infection in females than males with a ratio of 1.8:1. These results were concordant with those from another study which found that 53.2% of children infected with HMPV were females considering female gender as a predisposing factor for high mortality rates [18]. Conversely, current findings were inconsistent with studies reported no female predominance [19].

Figure (1) showed the distribution of HMPV infection among age groups in both genders and it was higher among infants less than 1 year. This finding was compatible with that reported by [20] and [21]. Another study in Iraq found that infection rate in infant less than 1 year was 28%; whereas it was higher, 57%, among children 4-7 years old [22]. However, in the latter study the virus existed in small sample size (only 7 patients) which may be responsible for the differences found when compared to our study.

It is obvious from Figure (2) that the number of HMPV positive cases recorded in Baghdad was higher than other cities. This is probably due to difficulties for delivering samples from other cities to the CPHL, or may be the genetic material was denatured during the transport process.

It can be concluded that HMPV and influenza viruses have an important role in viral respiratory infections and HMPV is more common in females and in children less than 1 year old.

Ethical Clearance: It was obtained from the Research Development Unit at Central Public Health Laboratory/Ministry of Health (MOH- CPHL), Baghdad, Iraq.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

REFERENCES


Do Dental Arches Lengths, Widths and Perimeters Affect Bolton’s Ratios?

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ABSTRACT

Background: The main objectives in treating any orthodontic case are establishing stable occlusion with normal overjet and overbite class I canines relationship and good teeth interdigitation with appropriate proportion of maxillary and mandibular teeth widths. Bolton in 1958 introduced his analysis depending on the study models of fifty five cases with excellent occlusion, of which 44 cases where treated orthodontically (non-extraction) and 11 cases were untreated. He developed two ratios one related the whole teeth anterior to the second molars and the other from canine to canine. The aim of this study was to test whether Bolton’s tooth size ratios were affected by the maxillary and mandibular dental arch widths, lengths and perimeter.

Materials and Method: This investigation was performed on a sample of dental casts belong to sixty Iraqi individuals. Anterior and overall tooth size ratios, dental arches widths, lengths and perimeters of maxillary and mandibular arches were measured using digital caliper. Pearson’s correlation coefficient test was used to test the relation between the anterior and overall Bolton’s ratios with the dental arches parameters.

Results: The mean values of anterior and overall Bolton’s ratios were near to that reported by original study of Bolton. Statistically, there was no relationship between dental arch parameters and Bolton’s ratios.

Conclusions: Dental arch widths, lengths, perimeter had no effect on Bolton’s ratios.

Keywords: Bolton’s ratio, arch widths, arch lengths, arch perimeters, tooth size.

Introduction

The main objectives in treating any orthodontic case are establishing stable occlusion with normal overjet and overbite class I canines relationship and good teeth interdigitation with appropriate proportion of maxillary and mandibular teeth widths (¹²).

Bolton (³) in 1958 introduced his analysis depending on the study models of fifty five cases with excellent occlusion, of which 44 cases where treated orthodontically (non-extraction) and 11 cases were untreated. He developed two ratios one related the whole teeth anterior to the second molars and the other from canine to canine. These ratios are universal and have consideration in developing treatment planning for any case, aiding in determining the extraction or inter-dental reduction in crowding cases or composite build-up in spacing cases.

The literature is rich in research and review articles regarding Bolton’s ratios. Many researches developed the normal values of these ratios in different racial groups (⁴⁻⁵), as the mesio-distal widths of the teeth varies in different ethnic groups, while others discussed the effects of various parameters on these ratios like the effect of gender (⁴⁻⁸), method of measuring (⁹⁻¹²), types of malocclusion (¹³⁻¹⁸), degree of overbite and overjet, labio-lingual thickness of upper incisors, mesio-distal tipping of upper incisors (¹⁹), dental arches dimensions and forms (²⁰) and finally the effect of dental extraction (²¹,²²).

The aim of this study was to find whether the dental arch width, length and perimeter have an effect on Bolton’s ratios.

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Materials and Method

Samples: This study was conducted on sixty pairs of dental casts belonged to sixty Iraqi individuals selected randomly, according to specific inclusion criteria, from patients attending the Orthodontic Department at Al-Rafidain University College, Baghdad, Iraq.

Inclusion Criteria

- Subjects were of Iraqi Arab origin aged 15–28 years with full permanent dentition regardless of third molars.
- Normal occlusion with bilateral Class I molars and canines relationships.
- Maxillary and mandibular well-aligned arches with less than 3mm crowding or spacing.
- No history of trauma nor previous orthodontic, prosthodontic treatment, maxillofacial or plastic surgery.
- No craniofacial anomalies such as cleft lip, cleft palate or both.
- Absence of gingival or periodontal problems or therapy that would demoralize a healthy tissue to tooth relationship.
- Good quality stone casts with no substantiation of air bubbles.

Exclusion Criteria

- Subjects with severe crowding, excessive spacing, periodontal disease, retained deciduous teeth.
- Interproximal caries or restorations, or tooth wear that affected the tooth size measurements.
- Congenital missing or supernumerary teeth
- Abnormal teeth morphology.

Method

History and Clinical Examination: Consent form was signed by each subject to participate in this study then extra- and intra-oral examinations on the dental chair were done to check the participant’s fulfillment for the required sample selection criteria.

Dental Impressions and Casts Preparation: Dental impressions for the maxillary and mandibular arches were taken for each individual using Alginate hydrocolloid impression material (Tropicalgin, Chromatic alginate, Zhermack, Italy). The impressions were then inspected for any defect, disinfected with sodium hypochlorite (1:10) solution (23) then rinsed again and poured with dental stone (Elite Rock, Sandy brown, Zhermack, Italy). A base from plaster (Plaster of Paris, Al-Ahleea Co., Iraq) was prepared using plastic molds, then participant’s name was labeled on the base and finally the casts were ready for the measuring procedure.

Measurements

The teeth widths, dental arch lengths, widths and perimeters were measured for both arches using digital vernier (Mitutoyo, Japan) with 0.01mm accuracy.

Teeth Width Measurements: The greatest mesial-distal distance, measured from the buccal view, was obtained by measuring the distance from anatomical contact of one tooth to another on a line parallel to occlusal surfaces and perpendicular to the long axis of the teeth (24).

Teeth widths were utilized to calculate Bolton’s anterior ratio (BAR) and Bolton’s overall ratio (BOR) with the application of the subsequent equations (3)

\[
\text{BOR} = \frac{\text{Sum of the mandibular 6 to 6}}{\text{Sum of the maxillary 6 to 6}} \times 100
\]

\[
\text{BAR} = \frac{\text{Sum of the mandibular 3 to 3}}{\text{Sum of the maxillary 3 to 3}} \times 100
\]

Arch length (AL): Arch length was obtained using triangular shaped lines between the mesio-buccal cusp tips of first permanent molars and the central point between the incisors of each respective arch (25).

Arch width measurements (26,27): Maxillary and mandibular inter-canine widths (ICW) were obtained by measuring the linear distance between the right and left canines’ cusp tips.

- Maxillary and mandibular inter-premolar widths (IPW) were obtained by measuring the linear distance between the buccal cusp tips of the first premolars.
- Maxillary and mandibular inter-molar widths (IMW) were obtained by measuring the linear distance between the mesio-buccal cusp tips of the first molars.

Arch Perimeter (AP): Arch perimeter was measured as a segmental sum of five measurements, from the mesial of the right first molar to the distal of the right canine, from the distal of the right canine to the distal of the right central
incisor, from the distal of the right central incisor to the distal of left central incisor, from the distal of the left central incisor to the distal of the left canine, from the distal of the left canine to the mesial of the left first molar \(^{25}\).

**Statistical Analyses:** The data were analyzed using SPSS (Statistical Package of Social Science; version 24, IBM Co., New York, USA). The statistical analyses included:

1. **Descriptive statistics:** Means, standard deviations, minimum and maximum values.
2. **Inferential statistics:** Pearson’s correlation coefficient test to study the relation between the anterior and overall Bolton’s ratios and the dental arches widths, lengths and perimeters.

**Results**

Table (1) showed the descriptive statistics of the measured variables. Table (2) demonstrated the relation between the anterior and overall Bolton’s ratios with dental arches lengths, widths and perimeters. Generally, there were no significant relations between the measured variables except for a weak significant correlation between the inter-molar width and overall ratio in the maxillary arch, and between arch length and overall ratio in the lower arch.

<table>
<thead>
<tr>
<th>Table 1: Descriptive statistics of the studied variables</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Variables</strong></td>
</tr>
<tr>
<td>--------------</td>
</tr>
<tr>
<td>Bolton’s ratios</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Maxillary arch</td>
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<tr>
<td></td>
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<tr>
<td></td>
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<td></td>
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<tr>
<td>Mandibular arch</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Table 2: Relations between Bolton’s ratios and studied variables</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Arch</strong></td>
</tr>
<tr>
<td>-----------</td>
</tr>
<tr>
<td>Maxillary arch</td>
</tr>
<tr>
<td></td>
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<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Mandibular arch</td>
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</tbody>
</table>

**Discussion**

Andrews \(^{28}\) determined the famous six keys to normal occlusion, but to seat a good occlusion with proper inter-digitations in all planes of space, there must be a specific balance between the mesio-distal tooth size of the maxillary and mandibular arches \(^{29}\). However, \(^{30}\) concluded that this proper anterior and posterior fit could not be gained without the seventh key (Bolton’s tooth size ratio) is fulfilled.
Determination of teeth size ratio is an inter-maxillary analysis of enormous importance that needs to be routinely measured in the orthodontic practice prior to starting any orthodontic treatment in order to localize any difference in tooth size for anterior and overall discrepancy.

Since its publication in 1958, Bolton’s method of diagnosing tooth-size discrepancy has been commonly used in scientific researches and has become one of the key factors in orthodontic diagnosis and treatment planning.

Despite the availability of different types of measurement tools, in this study all the measurements were made directly on study cast with electronic calipers, as the conventional plaster study models are considered as a standard component of orthodontic records, and their analysis proved to be the most accurate, reliable and reproducible one (31-33). Moreover, (12) compared the measurements using digital calipers with OrthoCAD and found that digital calipers gave the most precise and reproducible measurements, hence electronic caliper was used in the present study. Also, (28) used CBCT in measuring dental arch and teeth dimensions. CBCT cannot be used routinely for each patient attending the orthodontic clinic unlike the study models.

The gender dimorphism in Bolton’s ratios was not considered in the present study as the findings of many previous studies proved statistically non-significant gender differences (8,13,15).

The researches depended on Bolton’s analysis for people of dissimilar races and from various countries could be very expedient for the determination of their own normative value. The Iraqi’s overall tooth size ratio was comparable to the original Bolton’s overall ratio and near to many previous Iraqi studies (34-39).

The current study investigated the effect of dental arches widths, lengths and perimeters on the Bolton’s ratios (both anterior and overall ratios) in Iraqi sample with Angle Class I normal occlusion. Generally, no significant relations were found (P≥0.05); this was in agreement with the findings of (28) regarding the arch width groups (inter-canine, inter-premolar, and inter-molar). However, (28) reported a statistically significant relation between arch length and arch perimeter with Bolton’s ratio and this could be explained by cultural and environmental differences in addition to the measuring methods differences.

Like any study, there are several inherent limitations that may exist. The sample included class I only, so class II and III with crowding and spacing of varying amount, cross bite or scissors bite, congenital missing or impacted teeth, cases indicated for orthognathic surgery should also be considered.

Conclusion

Dental arch widths, lengths and perimeters had no significant effect on Bolton’s ratios.

Ethical Clearance: The research Ethical Committee at scientific research by ethical approval of both environmental and health and higher education and scientific research ministries in Iraq.

Conflict of Interest: The authors declare that they have no conflict of interest.

Source of Funding: Self-funding.

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Persistently Elevated Levels of Serum Autoimmune Inflammatory Markers after Total Thyroidectomy for Hashimoto’s Thyroiditis. An Indicator of Prevailing Autoimmunity

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ABSTRACT

Hashimoto’s thyroiditis characterized by glandular lymphocytic infiltration with progressive parenchyma destruction and fibrosis. The autoimmunity was suggested by the reduced immune tolerance and the production of antibodies. The description of Th17 subpopulation has undesirable role in the pathogenesis of Hashimoto’s disease. Among the cytokine secretion of Th17 is cell-type specific which carry its major effectors functions, IL17 and IL22 are the most important.

Fifty two drug native patients with Hashimoto’s thyroiditis were enrolled in the study. Preoperative, 6 weeks and 6 months postoperative serum assay of ATPO Ab, IL6, tumor necrosis factor TNF-α, IL17 A, IL22,IL23 was adopted. Surgery in form of total thyriodectomy was carried out for patients with suspicious nodule based on cytological examination or large symptomatic multinodular goiter.

The preoperative elevated Anti TPO Ab significantly higher levels than the 6 weeks and 6 months post operative measurement. Serum levels of IL 6 and TNF-α were significantly higher in the preoperative measurement than the 6 weeks post operative measurement, and higher than 6 months serum level for IL6 but not TNF –α. The IL 17A levels were significantly higher in the preoperative patients sera than the 6 wk post operative measurement, but not the 6 months measurement. No statistical difference was observed in the preoperative and post operative levels of IL 22. The preoperative serum Level of IL-23 was apparently high, and significantly different from 6 weeks and 6 months post operative measurement.

The measured selected immune parameters exhibit partial decrease in serum level which would not reach the normal circulatory levels 6 months after thyroidectomy.

Keywords: Autoimmunity, Thyroidectomy, Inflammatory Markers.

Introduction

Hashimoto’s thyroiditis (HT) is common autoimmune thyroid disorders with glandular lymphocytic infiltration with progressive parenchyma destruction and fibrosis¹. HT affects 3–4% HT of the general population². The disease is 10 times more frequent in females than males³. The exact etiology of the disease is still elusive however genetic and environmental factors influence the development of autoimmunity against thyroid tissue⁴. The autoimmunity was suggested by the reduced immune tolerance and the production of antibodies⁵,⁶. The majority of patients have raised anti-thyroid peroxidase (anti-TPO)⁷. As destruction of thyrocytes progress followed by loss of thyroid hormone synthesis and eventual hypothyroidism⁸. Cell mediated autoimmune response is the main although not the sole pathogenic finding in HT, this response arise from a disruption of self-tolerance to thyroid antigenic structure⁹,¹⁰. In HT Th1 (T helper) lymphocytes generate an intense
inflammatory infiltrate (predominantly lymphocytic) of thyroid gland, which initiate further thyroiditis and loss of thyrocytes. The activated cytotoxic lymphocytes and macrophages, directly attack and destroy the thyroid follicular cells. The suggested accelerated apoptosis seen in HT is thought to be induced, when thyrocytes express molecules involved in cell cycle and apoptosis (Fas receptor and also Fas ligand), a process mediated by cytokine released from Th1 and macrophage. Th2 also induce B lymphocytes and plasma cells to produce thyroid targeted antibodies. In fact, although the cell-driven destruction of thyrocytes is the main pathological finding, antibodies to TPO and Tg are also important components. Th1 cytokines stimulate the release of immunoglobulin (Ig) G1, whereas Th2 cytokines participate in production of IgG4. TPO and Tg auto antibodies are of both IgG4 and IgG1 subclasses, indicating participation of Th2 and Th1 cytokines, including IL6 and TNF alpha. The Th1 mediated disease is the most widely accepted, however the concept is further modulated by the description of Th17 subpopulation. The Th17 cells mediate both normal and pathological immune response by its major role in immune response to the confounding extracellular pathogens and the disadvantageous role in the pathogenesis of several autoimmune diseases. The cytokine secretion of Th17 is cell-type specific which carry its major effectors functions, among which IL17 and IL 22 are the most important. Moreover, the Th17 cell expansion and survival is mainly mediated by IL-23. The clinicopathological course of the disease is very variable ranging from subclinical state to overt thyroid failure. Clinically HT present early with transient subclinical or overt hyperthyroidism for a variable periods followed by a stationary phase of euthyroid state eventually culminating on hypothyroidism, all stages of the disease may or not associated with goiter.

Aim: To evaluate some immune parameters in the sera of selected patients with Hashimoto’s thyroiditis before and after total thyroidectomy.

Materials and Method

Fifty two patients with presumptive diagnosis of Hashimoto’s thyroiditis were included in the study. The preoperative diagnosis was based upon clinical features, raised serum thyroid peroxidase Ab, cytology, TSH, thyroid hormone estimation and thyroid ultrasound. All patients were drug native euthyroid or mildly hypothyroid. Blood samples were collected in three different occasions, preoperatively as part of the assessment, 6wk and 6 months post operatively as part of the follow up, serum obtained for assay of ATPO Ab, IL6, tumor necrosis factor TNF-α, IL17 A, IL22, IL23. The indications for surgery was Hashimoto’s thyroiditis with suspicious nodule based on cytological examination or large symptomatic multinodular goiter. Surgery in form of total thyroidectomy was successful in all patients and was followed by full Levo-thyroxin replacement. All resected specimens were subjected to histopathological examination which proved the diagnosis of Hashimoto’s disease.

Inclusion Criteria: Adults patients (18-60 years) with recent diagnosis of Hashimotos thyroiditis with euthyroid or subclinical hypothyroid state who were not subjected to any form of thyroid hormone replacement therapy.

Exclusion Criteria

1. Patients with malignant disease including patients in whom thyroid malignancy was discovered after thyroidectomy.
2. Patients on thyroxin replacement.
3. Patients with advanced hypothyroidism.
5. Patients with chronic or autoimmune disease other than HT.
6. Patients on chronic steroid or immunosupressive drugs.

All candidates informed about the details of the research including the hazards of surgery and the planned follow up, for which they signed a written consent. Levels of antithyroid peroxidase (anti-TPO) antibodies in the sera of all candidates was determined, using the diagnostic enzyme-linked immunosorbent assay (ELISA) kit (Monobind Inc., Lake Forest, USA). Values more than 40 IU/ml were considered positive.

IL-6, TNF-α, IL-17A, IL-22, and IL-23 serum measurements were detected using human ELISA kit in accordance to the manufacturer’s instructions (KOMABIOTECH- INC. Korea).

Statistical Analysis: t-test for Independent sample was used for comparing the means of the two groups.
Results

Table 1: Age and Gender characteristics

<table>
<thead>
<tr>
<th>Gender</th>
<th>Age in years</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>S.D</td>
<td>Minimum</td>
</tr>
<tr>
<td>Female</td>
<td>(n=44)</td>
<td>43.3</td>
<td>8.8</td>
</tr>
<tr>
<td>Male</td>
<td>(n=8)</td>
<td>36.25</td>
<td>5.28</td>
</tr>
<tr>
<td>Total</td>
<td>(n=52)</td>
<td>42.2</td>
<td>8.7</td>
</tr>
</tbody>
</table>

The preoperative elevated Anti TPO Ab showed higher levels than the 6 weeks and 6 months post operative measurement p value 0.001 and 0.0001 respectively. The 6 weeks serum level of anti TPO Ab was significantly higher than the 6 months measurement p value 0.0001. Serum levels of IL 6 were significantly higher in the preoperative measurement than the 6 wk and 6 months post-operative measurement p value 0.01 and 0.003 respectively. Furthermore, no statistical difference was found between the 6 wks and the 6 months post operative measurement. The serum level of TNF-α in the preoperative measurement was significantly higher than the 6 wk post operative measurement p value 0.02 but no significant difference was found between the preoperative and 6 months measurement. The IL 17A levels were significantly higher in the preoperative patients sera than the 6 wk post operative measurement P value 0.04, but not the 6 months measurement. Furthermore no significant difference found between the 6 weeks and 6 months measurements. No statistical difference was observed in the preoperative and post operative levels of IL 22. The preoperative serum Level of IL-23 was apparently high, and significantly different from 6 weeks and 6 months post operative measurement p value =0.0001. No difference was found in serum level between the 6 weeks and 6 months measurements (Table 2).

Table 2: The pre and postoperative measured parameters, expressed by mean ± SD

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Preoperative</th>
<th>6 wk</th>
<th>6 month</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anti-TPO (Iu/ml)</td>
<td>708.3 ± 194.4</td>
<td>317.9 ± 154.1</td>
<td>180.4 ± 90</td>
</tr>
<tr>
<td>IL 6(pg/ml)</td>
<td>93 ± 12.18</td>
<td>30.3 ± 9.05</td>
<td>21.2 ± 9.9</td>
</tr>
<tr>
<td>TNF-α(pg/ml)</td>
<td>29.7 ± 14.2</td>
<td>19.03 ± 10.8</td>
<td>23.6 ± 13.45</td>
</tr>
<tr>
<td>IL 17 A(pg/ml)</td>
<td>7.8 ± 5.7</td>
<td>5.7 ± 3.64</td>
<td>6.7 ± 4.4</td>
</tr>
<tr>
<td>IL 22(pg/ml)</td>
<td>30.9 ± 16.2</td>
<td>28.8 ± 20.1</td>
<td>27.5 ± 17.3</td>
</tr>
<tr>
<td>IL 23(pg/ml)</td>
<td>87.76 ± 11.7</td>
<td>45.9 ± 9.8</td>
<td>42.3 ± 7.9</td>
</tr>
</tbody>
</table>

Discussion

In 2003 the discovery of Th17 cells, a unique CD4+ T-cells sub population have been found to have both beneficial and harmful immunological function, especially as a result of extravagant Th1 responses22,23. These lymphocytes are the major source for production of cytokines from IL-17 family namely the IL17A and IL17 F, together with IL21 and IL22, which particularly accentuate the immune state by further release of other pro inflammatory cytokines like IL-Beta, TNF-α, and chemokines which are involved in cellular induced tissue damage24. The IL-17A is the well known form in this family and has established proinflammatory effect in HT25. Many cytokines have been suggested to have a potential role in the Th17 cells differentiation in humans among which the IL23, IL21, IL6 and TNF-α are the most important players26. It has been found that patients suffering from HT found to have abnormally raised levels of Th17 cells and Th-17- related pro inflammatory cytokines27. Our findings was supportive of the persistently high serum level of ATPO antibody following total surgical thyroid ablation.

The pro inflammatory IL6 and TNF alpha has been found to have crucial role in the pathogenesis of HT, most of the published data agreed with the finding of increases serum level in patients with HT irrespective to the clinical state28,29. To date no available data regarding the serum level of these proinflammatory cytokines in thyroidectomised patients with HT. Yet no available research has depict the changes in the IL17 serum level in patients with HT after thyroidectomy. IL22 has a potential role in autoimmune disorders including HT, through its ability to induce other pro inflammatory cytokines30. Our results are associated with only modest increased serum level of IL-22 in HT patients preoperatively, results which has been demonstrated by31. Moreover our
results declared no difference in serum level of IL-22 between pre and post operative measurement in our sample. IL-23 is known to have potent stimulatory effect on Th-1 to differentiate, producing the Th-17 subpopulation. Ruggeri et al has recorded a significant increase in serum level as compared with healthy control. While results displayed by Fatemeh et al declare a non significant difference in serum level of IL-23 between patients with HT and healthy control. Our data revealed an abnormally high serum levels of IL-23 in the pre operative measurement which was statistically different from the post operative one, in which the levels approximately halved and remained static in an abnormally higher level for the following 6 months period. These parameters are indicative that the immune process is still working in spite of removal of the thyroid gland. The mechanisms, by which the auto reactive T cells escape deletion earlier and subsequent anergy, and activated thereafter remain elusive. Furthermore it has been found that patients with HT have elevated levels of Th-17 and its associated pro inflammatory cytokines both in the thyroid and peripheral blood. The natural T regulatory cells regarded by many as the natural suppressor of T reactive cells and responsible for maintaining the peripheral tolerance, In HT they found to be dysfunctional and loss their immunosuppressive function and in the affected patients, and possibly converted to a pro inflammatory cells (Th-1 and Th-17). On the other hand the coexistence of HT and other autoimmune diseases like diabetes and Addison disease and the existence of autoimmune polyendocrine syndrome type II, supplement the involvement of generalized autoimmune process rather than isolated thyroid targeted autoimmunity. Moreover the development of Hashimotos related encephalopathy which has immunologically based pathogenesis, may uncover the prevailing autoimmunity.

**Conclusion**

The level of selected circulating immune parameters which was essentially elevated before thyroidectomy in patients with Hashimoto’s thyroiditis, exhibit only partial reduction after total surgical removal of the gland. Therefore, in autoimmune disease extirpation of the target organ will not ablate the autoimmunity in particular patient.

**Conflict of Intrist:** Nil

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Assessment of Non-technical Skills Using High Fidelity Simulation among Emergency Medical Services (EMS) Students in Pune, India

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ABSTRACT

Introduction: In the curriculum for Emergency Medical Services (EMS), much emphasis is given on teaching technical skills and little focus on non-technical skills (NTS). The non-technical skills specifically applicable in emergency medical services are communicating, managing workload, anticipating, situation awareness, supervising, maintaining standards, using assertiveness and decision making which are broadly integrated into three key areas of Leadership, Teamwork and Task management. Simulated scenarios are an opportunity for presentation of similar crisis situations.

Objective: To assess non-technical skills using high fidelity simulation among Emergency Medical Services (EMS) students.

Methodology: Non-technical skills were assessed among 48 students using six clinical case scenarios on high fidelity simulation in a single day session. To assess the NTS, a standardized 11 item observational tool called Team Emergency Assessment Measure (TEAM) was used. The students were subjected to a simulation session followed by focused debriefing. The item on the TEAM tool was scored by two Simulation Educators to avoid rater bias.

Result and Discussion: Leadership and Task management were found to be relatively better compared to Teamwork across all groups. Overall team performance by all groups was found to be 5.38 out of 10. The participants scored well in parameters pertaining to leadership. The groups performed better in areas of effective communication, timely completion of tasks, acting with composure and control and maintaining a positive morale. High fidelity simulation offers an environment to hone both technical and non-technical skills.

Conclusion: This study underlines the significance of conducting more frequent non-technical skills training with adequate debriefing time dedicated to it.

Keywords: Leadership, Communication, Decision making, High fidelity simulation, Non-technical skills, Emergency medical services.

Introduction

Teaching technical skills and interventions using models and simulators specially intended for basic technical skills, prepare trainees for a positive and enriching educational experience in the technical or interventional platform¹. In the curriculum for Emergency Medical Services (EMS), emphasis is given on teaching technical skills and there is little focus on non-technical skills (NTS). Analysis of adverse events in the Emergency Department (ED) reveals that contributory factors commonly relate to non-technical skills such as decision-making. Crisis Resource Management (CRM) courses, designed to improve non-technical skills, invariably center on the critically ill patient. While resuscitation is undeniably important, little attention has been paid to the skills necessary for routine management of the ED and the vital leadership role². Traditionally, non – technical skills training is given to students through task trainers which are low fidelity in nature. Good non-technical skills are pivotal to delivering high quality care, particularly in acute situations. Five categories of non-technical skills have been identified -- situational awareness, teamwork,
leadership, task management and decision making. The non-technical skills specifically applicable in emergency medical services are communicating, managing workload, anticipating, situation awareness, supervising, maintaining standards, using assertiveness and decision making which are broadly integrated into three key areas of Leadership, Teamwork and Task management. High fidelity Simulation training helps improve non-technical skills along with the technical skills. The use of a Simulation based training program has the potential to amplify learning from real-life clinical scenarios. Medical teams depend on technical skills as well as non-technical skills for successful management of critical events. Simulated scenarios are an opportunity for recreation of similar crisis situations.

**Objective**

To assess non-technical skills using high fidelity simulation among Emergency Medical Services (EMS) students.

**Methodology**

Non-technical skills were assessed among 48 students using high fidelity simulation in a single day session. Six clinical case scenarios based on EMS curriculum were designed and tested before the session. The participants had experienced similar cases on low fidelity manikins along with the background theory of the cases. The session did not focus on technical skills of the participants. To assess the NTS, a standardized tool called Team Emergency Assessment Measure (TEAM) was used. The TEAM tool is an 11 item questionnaire with 5 point Likert scale having rating from 0 (lowest) to 5 (highest). The 12th item is the overall score for global rating of the team’s NTS performance on a scale of 1 (lowest) to 10 (highest). The 11 item observational TEAM tool is used to assess three key NTS including Leadership (2 items), Teamwork (7 items), and Task management (2 items).

On the day of the session, the participants were divided into eight groups of six students each. Each group was oriented to the manikin and prebriefed about the case history. This was followed by a simulation session lasting for about 10-12 minutes. The students underwent a focused debriefing session after the simulation. The entire event was video–recorded with prior consent of the students. The items on the TEAM tool were scored by two Simulation Educators to avoid rater bias. The data was collated and tabulated. The means and standard deviation of the scores was calculated.

**Result**

**Table 1: Mean scores and standard deviation**

<table>
<thead>
<tr>
<th>Non-Technical Skills</th>
<th>Tool</th>
<th>Mean Score for each sub parameter (out of 5)</th>
<th>Mean Score for each parameter (out of 5)</th>
<th>Standard deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Leadership</td>
<td>1. Directions and command</td>
<td>3.25</td>
<td>3.19</td>
<td>0.71</td>
</tr>
<tr>
<td></td>
<td>2. Maintained Global Perspective</td>
<td>3.13</td>
<td></td>
<td>0.83</td>
</tr>
<tr>
<td>Teamwork</td>
<td>3. Communicated effectively</td>
<td>2.88</td>
<td></td>
<td>0.64</td>
</tr>
<tr>
<td></td>
<td>4. Complete tasks in timely manner</td>
<td>2.75</td>
<td></td>
<td>0.46</td>
</tr>
<tr>
<td></td>
<td>5. Act with composure and control</td>
<td>2.88</td>
<td></td>
<td>0.35</td>
</tr>
<tr>
<td></td>
<td>6. Morale was positive</td>
<td>2.75</td>
<td></td>
<td>0.46</td>
</tr>
<tr>
<td></td>
<td>7. Adapted to changing situations</td>
<td>2.25</td>
<td></td>
<td>0.46</td>
</tr>
<tr>
<td></td>
<td>8. Monitored and reassessed the situation</td>
<td>1.63</td>
<td></td>
<td>0.74</td>
</tr>
<tr>
<td></td>
<td>9. Anticipated potential actions</td>
<td>2.25</td>
<td></td>
<td>0.89</td>
</tr>
<tr>
<td>Task Management</td>
<td>10. Prioritized tasks</td>
<td>2.38</td>
<td></td>
<td>1.06</td>
</tr>
<tr>
<td></td>
<td>11. Followed approved standards and guidelines</td>
<td>3.50</td>
<td></td>
<td>0.53</td>
</tr>
<tr>
<td>Overall</td>
<td>12. Global rating of team (out of 10)</td>
<td>5.38</td>
<td></td>
<td>0.74</td>
</tr>
</tbody>
</table>
Table 1 shows the mean scores and standard deviation for each non-technical skill parameter.

**Fig. 1: Score of assessed non-technical skills (Out of 5)**

Leadership and Task management were found to be relatively better compared to Teamwork across all groups. Overall team performance by all groups was found to be 5.38 out of 10.

**Discussion**

The 3 key non-technical skills assessed in the study included Leadership, Teamwork and Task management. The participants scored well in parameters pertaining to leadership.

**Figure 2: Mean Score for Leadership-sub parameters**

The team leader across groups gave frequent directions to the team and maintained a global perspective during the case simulation. Leadership remains the cornerstone of successful team dynamics and also impacts patient outcomes.

**Figure 3: Mean Score of Task management - sub parameters**
The participants also scored fairly well in the parameters measuring task management. All groups diligently followed approved standards and guidelines. But there was wide variation in prioritization of tasks. Some groups could not correctly prioritize the management steps. Correct task prioritization requires extensive experience and hence exposure to more simulation sessions can lead to improvement in this trait.

Figure 4: Mean Score of Teamwork - sub parameters

Teamwork was judged in seven parameters. The groups performed better in areas of effective communication, timely completion of tasks, acting with composure and control and maintaining a positive morale. However, the participants scored poorly in complex parameters like adapting to changing situations, monitoring and reassessment of situations and anticipation of potential actions. These parameters require repetitive practice to improve the overall situational awareness among the participants.

The participants scored on average of 5.38 out of 10 on overall rating of team. This value indicates large room for improvement in non-technical skills and draws attention to the significance of teaching non-technical skills to students involved in patient care.

High fidelity simulation offers an environment to hone both technical and non-technical skills. Unfortunately the focus of most simulation based trainings currently is hinged on technical skills.

Conclusion

This study underlines the significance of conducting more frequent non-technical skills training with adequate debriefing time dedicated to it. NTS training has a potential to vastly improve co-ordination amongst professionals in different specialties including medicine and nursing.

Source of Funding: Self

Conflict of Interest: Nil

Ethical Clearance: Taken from IEC, SIU

REFERENCES


Impact of First Exposure to High Fidelity Simulation on Self-Reported Psychological Stress Levels amongst EMS Students in Pune, India

Parag Rishipathak¹, Shrimathy Vijayraghavan², Anand Hinduja³

¹Director, ²Medical Officer, Academics, ³Adjunct Faculty, Symbiosis Centre for Health Skills, Symbiosis International (Deemed University), Pune, India

ABSTRACT

Introduction: Stress is an emotion-related response that results from exposure to various emotionally charged clinical events. Anxiety generated by these stressful clinical experiences may inevitably affect learning. A certain level of anxiety shall improve decision-making and clinical performance. High fidelity simulation is an innovative and effective teaching strategy for medical students. Emergency Medical Services (EMS) students are at present exposed more to low fidelity simulation, which fails to replicate real clinical stress. The study aims to assess self-reported psychological stress levels in EMS students before and after exposure to high fidelity simulation.

Objective: To assess the self-reported psychological stress levels in EMS students on their first exposure to high fidelity simulation.

Methodology: A facilitator guided simulation session was conducted in order to study the impact of psychological stress on first exposure to simulation amongst 65 students of Post Graduate Diploma in Emergency Medical Services (PGDEMS). The standardized Stressor Appraisal Scale (SAS) questionnaire comprising of 10 items was administered to the students before and after the simulation session to document the baseline self-reported psychological stress level. The scores of the Post Simulation versus Pre Simulation were tabulated and compared using t test.

Discussion: On comparison of the scores of post simulation questionnaire versus pre simulation questionnaire, the parameters pertaining to demanding and stressful nature of task, level of exertion, degree of effort, seriousness and perception of performance in the task showed remarkable significance as opposed to perception of threat, ability to cope, level of uncertainty and confidence which was not significant.

Conclusion: The participants felt that the simulation session was more stressful than expected. However, this stress was positive in nature as the score obtained on the parameter of importance to do well significantly increased after the simulation session.

Regular exposure to high fidelity simulation may help in channelizing the psychological stress constructively thereby improving the participant performance.

Further elaborate studies are required on this subject.

Keywords: High fidelity simulation, Psychological stress, Emergency medical Services.

Introduction

Medical training is identified as ‘full of stress’ and it is observed that students undergo tremendous stress during various years of medical training¹. Stress is an emotion-related response that results from exposure to various emotionally charged clinical events². It has been noted that the anxiety generated by these stressful clinical experiences may inevitably affect learning and clinical performance³.

Simulation is used as a safe format for instruction of students and trainees in the field of medicine and high fidelity simulation is an innovative and effective
teaching strategy for medical students. However, it is observed in many studies that simulation session can cause a certain degree of stress and anxiety in the participants, which can thereby affect their performance both positively and negatively. High-fidelity simulation using physiological. Model-driven, life-sized manikins with measurable vital signs and other ‘real’ attributes can create ‘true to-life’ experiences for learners thereby creating an environment similar to real clinical setting.

Emergency Medical Services (EMS) students are at present exposed to low fidelity simulation. It is important to expose them to high fidelity simulation, and evaluate their self-reported psychological stress levels.

Emergency medicine providers are tasked with performing highly complex skills and assessments under dynamic conditions in which every second matters and the cost of failure is significant. Furthermore, researchers in the fields of peak human performance and neuroscience have observed strong correlations between one’s performance state and the likeliness of performing optimally under duress. Learning how to prepare and respond more effectively in advance of potentially stressful situations, and how to refocus one’s attention within those moments, would be of tremendous value.

A study performed by Geeraerts T et al. in 2017 states that even if simulation-induced stress, as measured by self-assessment and biological parameter, does not seem to impact performance negatively, it should be still taken into account. Beverley Nielsen et al. in their study conducted in 2013 on anxiety of nursing students claim that anxiety is evident during the simulation experience as students experience heightened anxiety when “onstage” in a scenario.

The study aims to assess the impact of first exposure to high fidelity simulation on the self-reported psychological stress amongst EMS students. This shall help arrive at conclusion regarding utility of high fidelity simulation in creating psychological stress thereby helping learners perform better in real clinical situations.

### Objective

To assess the self-reported psychological stress levels in EMS students on their first exposure to high fidelity simulation.

### Methodology

A facilitator guided simulation session was conducted in order to study the impact of psychological stress on first exposure to simulation was conducted amongst 65 students of Post Graduate Diploma in Emergency Medical Services (PGDEMS).

Stressor Appraisal Scale (SAS) a standardized questionnaire was administered to evaluate self reported psychological stress amongst students before and after the exposure to high fidelity simulation.

On the day of session, One-hour orientation was conducted on the subject of Simulation and high fidelity manikin prior to the simulation in order to orient them to simulated environment.

The standardized SAS questionnaire comprising of 10 items was administered to the students before the simulation session to document the baseline self-reported psychological stress level. The items were scored on a 7-point Likert scale with one depicting lowest and seven depicting highest score.

The students were divided into six groups of 10 each and a facilitator guided simulation scenario was conducted. The session lasted for 10 minutes followed by a focused debriefing session. The session was video recorded with the consent of the participants. The same facilitator debriefed all the groups to avoid bias.

The SAS questionnaire was administered again immediately after the simulation session to document the post session stress levels. The scores of the post simulation questionnaire versus pre simulation questionnaire were tabulated and compared using ‘t’ test for equality of means of independent samples.

The models used for analysis were present in the Statistical Package for Social Sciences (SPSS) v23.

### Results

<table>
<thead>
<tr>
<th>Items</th>
<th>Pre-session Mean</th>
<th>Post Session Mean</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Threat Perception of the task</td>
<td>3.61</td>
<td>3.74</td>
<td>0.69</td>
</tr>
<tr>
<td>Demanding Nature of the Task</td>
<td>4.76</td>
<td>5.28</td>
<td>0.02*</td>
</tr>
</tbody>
</table>
Table No.1 depicts, T test results and the * marked show significant p values.

### Discussion

As seen in fig.1, the participants underestimated the demanding nature of simulation before the session. This is reflected by the sharp increase in the score obtained after the session.

![Demanding Nature of the Task](image)

**Figure 1**

![Stressful nature of task](image)

**Figure 2**
As shown in fig.2, the participants found the simulation task to be more stressful than their expectation. This could be attributed to the stress, caused due to a new experience, as this was their first exposure to simulation.

![Figure 3](image)

**Figure 3**

As shown in figure. 3, the participants realized that they need to exert a greater deal after the exposure to simulation.

![Figure 4](image)

**Figure 4**

Figure. 4, depicts that the participants opinion on the degree of effort required to be spent both at mental and physical level increased drastically after the session.

![Figure 5](image)

**Figure 5**
As shown in figure 5, the participants took the simulation exercise very seriously. This is reflected in the high scores obtained both before and after the simulation session. Simulation acted as a positive stressor as the score obtained on the importance to do well significantly increased after the simulation session.

**Figure 6**

Figure 6 shows that the participants found the simulation task to be difficult which is reflected in their self-appraisal on performance, which deteriorated post simulation session.

**Figure 7**

Figure 7. Highlights the following:

1. The threat perception increased after the simulation experience. Yet, the increase was not statistically significant.

2. The level of uncertainty regarding simulation increased marginally after the session.

3. The participants were confident that they would be able to manage the demands imposed on them by the task before the simulation session. This confidence wavered slightly after the task.

4. The participants' perception of the ability to cope with the task decreased marginally after the session.

**Conclusion**

The participants felt that the simulation session was more stressful than expected. However, this stress was positive in nature as the score obtained on the parameter of importance to do well significantly increased after the simulation session.
Regular exposure to high fidelity simulation may help in channelizing the psychological stress constructively thereby improving the participant performance.

Further elaborate studies are required on this subject.

**Source of Funding:** Self

**Conflict of Interest:** Nil

**Ethical Clearance:** Taken from IEC, SIU

**REFERENCES**


The Impact of Teaching the Creative writing by FOCUS Strategy to Develop

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¹University of Babylon–College of Basic Education, Department of Post-Graduate Studies, Iraq

ABSTRACT

This study aims to identify the effect of creative writing instruction on FOCUS strategy in developing the habits of the mind for the Fifth grade students. In order to achieve the goal, the researcher put the zero hypothesis, which states: There is no statistically significant difference at the level of significance (0.05) among the average of the students of the experimental group, the average score of the students of the control group who will study according to the usual method in the test habits of the mind, and to verify the application of her experience in the first half of the academic year (2018-2019). The sample consisted of (65) students of the Fifth grade in Al-A'MIL secondary school, they distributed randomly, (33) students in the experimental group and (32) students of the control group. The two groups were rewarded in the following variables: age, IQ, and linguistic ability test. The researcher prepared a measure of the habits of the mind based on Costa & Kellick, 2005, the researcher constructed the paragraphs of the habits of the mind in the form of positions and each position containing four alternatives to answer and the number of positions sixteen positions.

Keywords: FOCUS Strategy, fifth grade students, habits of mind, development.

Introduction

Innovation has become an important problem from the problems of scientific research in a large number of countries ¹. The growing interest in the subject of creativity and creative people is not confined to developed countries only, not to the community without the other, is a university education in Iraq and one of the communities the job that needs to be great interest, especially in the mental and creative, through the use of methods and programs of modern scientific in its development. So select the researcher in identifying the problem of her research on the effectiveness of an educational program in the development of creative writing using the habits of mind among the students of the um- al-kitab secondary at the Wasit city ². The researcher to conduct pre-testing of Creative writing Using a scale Torrance on members of the research sample’s (65) students from the fifth grade representing the research groups of the four, then the application strategy, which consists of five modules actual (usually mental), the duration of the module (60 minutes), given the educational unit and one each week and this took ³ the implementation of the strategy (10) weeks, after you complete the application tutorial on the two sets of research experimental groups female students, the researcher conducting the tests dimensionality of testing the Torrance Creative Thinking on the two groups mentioned in on Sunday (20/1/2019). The neglect of the use of mind habits causes many shortcomings in the results of the scientific process, habits are not the possession of information, but is to know how to work on it and use it, It is a pattern of intelligent thinking ⁵ behaviors that leads the learner to the product of knowledge as a result of responding to certain patterns of skills, values and attitudes, not just remembering them, that failure to take into account patterns of brain sovereignty in education is reflected negatively on students’ tendencies habits, attitudes, and attitudes. Most learners seem to recognize that most schools and universities do not take into account patterns of brain sovereignty⁵.
Methodology

It includes a presentation of the procedures that have been carried out to achieve the research objectives, starting with the research methodology and experimental design, defining the research community and its design, the equivalence of the research groups (experimental and control), preparation of the research requirements and tools, Experimental design of the research includes the independent variable (FOCUS strategy), the normal method, and the dependent variable (the development of the habits of the mind). Therefore, the researcher used experimental design with partial control of two equal groups, one experimental and the other controlling.

The study community and its model: The current study community represents fourth grade students, all of them in the governmental day-school preparatory school of the Directorate General of Education in Wasit Governorate for the academic year 2018-2019. In the same case, the researcher chose the middle school of swirah in the city of Wasit province in order to conduct this study. It was found that it includes two divisions for the fourth grade (A, B). The researcher chose (a) the random drawing method (the drawing method) to represent the experimental group and the number of its students 33) students who will study their students according to the (FOCUS strategy), the same way the researcher chose randomly Division (b) to represent the control group and the number of students (32 students), which will examine its students according to (the usual way). The researcher conducted a statistical equivalence between the experimental and control groups in some variables that affect the results of the experiment. Although the researcher chose the two groups in the random drawing method, although the students of the research sample from the social and economic center are very similar and study in one school, But he was keen to make the equivalence of the following variables: the age of time calculated months, the test of intelligence, the test of language ability), as the researcher parity between the two research groups in the variables mentioned above and showed the results according to the following table:

<table>
<thead>
<tr>
<th>The variable</th>
<th>Group</th>
<th>Size of sample</th>
<th>Average Arithmetic</th>
<th>The difference</th>
<th>Freedom degree</th>
<th>T value</th>
<th>Level of indication</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age counted by months</td>
<td>Exper.</td>
<td>32</td>
<td>188.73</td>
<td>28.637</td>
<td>0.5</td>
<td>0.883</td>
<td>Not statistically significant</td>
</tr>
<tr>
<td></td>
<td>Control</td>
<td>32</td>
<td>188.66</td>
<td>16.875</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intelligence</td>
<td>Exper.</td>
<td>32</td>
<td>26.79</td>
<td>56.729</td>
<td>0.374</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Control</td>
<td>32</td>
<td>26.13</td>
<td>38.564</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The language ability</td>
<td>Exper.</td>
<td>32</td>
<td>8.58</td>
<td>7.065</td>
<td>0.020</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Control</td>
<td>32</td>
<td>8.56</td>
<td>7.155</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Adjusting Exotic Variables: Although the researcher verified the equivalence of the two sets of research in some variables that are believed to affect the course of the experiment, he tried to avoid the effect of some of the extraneous variables in the course of the experiment and some of these variables and how to control them: Accidents associated with the experiment: The sample was selected: The two sets of research were chosen in the logical way and the two groups were confirmed. The maturity factor: Since the duration of the experiment is uniform between the two research groups As well as the approximate age of students B in the two groups, so what happens growth will return to the members of the two groups at the same level, so it was not for this factor is the impact of the research, the impact of the experimental procedures: the work of the researcher to reduce the impact of the experimental procedures that could affect the dependent variable during the course of the experiment. Preparation of research requirements: The research requirements of the basic things on which the research is based on which the search procedures are implemented and these requirements are: Scientific material (content): The scientific material that the researcher has been taught. For the students of the two groups of research during the duration of the experiment (the second semester) of the academic year (2018 - 2019). The researcher prepared 7 plans for the experimental group, which is taught according to (FOCUS strategy) and the same to the control group, which is taught according to (the normal method). The tools and methods used to develop the habits of mind according to FOCUS strategy.
Research Tool: A measure was prepared to measure the habits of the mind: The researcher constructed the paragraphs of the habits of the mind in the form of positions and each position includes four alternatives to answer (A, B, C and D) and the number of positions sixteen position, as each position is usually a mentality.

A. The validity of the paragraphs of the habits of the mind (the analysis of the paragraph): The logical analysis is the general appearance of the scale as a means of mental measurement, since the presentation of the paragraphs of the scale to a group of arbitrators to judge their validity in measuring the property to be measured is a kind of honesty to which the apparent honesty applies. The researcher verifies the validity of the paragraphs by presenting the scale to a group of specialized arbitrators in educational and psychological sciences to benefit from their observations and opinions in the amendment and delete what they see as inappropriate, so I got the proportion of agreement (96%)

B. Reliability of the building: And this type of Reliability, which illustrates the relationship between the theoretical basis of the test and the paragraphs of the scale in its fields, has achieved this truth by applying it to (40) students of the fourth grade literary and the calculation of correlation coefficients between the degree of each position and the total score, (0.62_0.84), and the significance of correlation coefficients. The T value of the correlation coefficient of each item was computed and compared with the tabular T value of (2.021) at the significance level (0.05) and the degree of freedom (38).

Spatial Application of the Habits of Reason Scale: The researcher applied the scale to a sample of 30 students randomly selected from the wasit prep school for girls in order to know the clarity of the instructions of the 16 habits of the mind, as well as calculating the time taken to answer this scale. His answers were clear and the average time to answer all the paragraphs was (55) minutes.

Item Analysis (Statistical Analysis): The process of analyzing paragraphs is statistically defined as the study of evaluating their effectiveness through the students’ response to the scales. The aim of this procedure is to keep the good paragraphs in the scale.

Discriminatory power of item: The distinction of a paragraph is strongly meant to distinguish between higher-level, lower-level, or test-measured subjects whose usefulness is to clarify the differences between the most capable individuals and the weaker individuals,, after calculating the power of discrimination of each Item, using the equation of discrimination of paragraphs, the researcher found that the forces of discrimination were limited between (0.31 - 0.53), as Ebel believes that the paragraphs of the test is good if the strength of the distinction (0.30) and more, The test is all good, and acceptable.

Validity of the scale:

Test-Retest method: The persistence of the Vaccronbach method depends on the consistency in the stability of the results of the individuals for all the paragraphs of the scale. To calculate the stability of this method, 20 random forms were withdrawn from the analysis sample of the vertebrates and the Vecronbach equation was applied to the internal consistency.

The final view of the measure of the habits of the mind and how to correct it: The scale consists of sixteen cards each representing one area for each of the habit of the sixteenth mind. 16 The items of the scale were formulated in the form of positions, from each position, four alternatives (A, B, C and D) (4) degrees, (b) give (3) degrees, (c) give (2) degrees, while (d) the lowest degree of common sense and give it a score, Every habit of mind habits is individualized.

Application of the study instrument: The experimental and control groups were informed of the date of application of the habits of the mind standard a week before it was carried out. It was applied after the completion of teaching the specific material for the two research groups at one time.

Statistical methods: The researcher used the t - test equation for two independent samples to make the parity between the experimental and control groups, Pearson ‘s correlation equation, the alpha - cronbach equation, and the spss.
Results and Discussion

The results showed statistically significant differences between the experimental and control groups in the development of the habits of the mind and can be explained as follows: The educational strategy of the same effect in the development of creative thinking (originality, fluency, flexibility) using the habits of mind to students. The researcher recommended the need to adopt FOCUS strategy a method independent in the education and development of creative writing in school because of its great importance in the development of creative writing. The students of the experimental group that studied according to FOCUS strategy surpassed the students of the control group which were studied in the normal way in the development of the habits of the mind in the post-test. This shows that teaching according to FOCUS strategy had a positive effect on the development of the habits of the mind. In light of the researcher’s experience, the results obtained and the reasons for the research, the researcher reached the following conclusions: FOCUS strategy has a positive impact on the development of the habits of the mind to the fifth grade students and increase their ability to understand information, facts and knowledge and raise their academic level. The FOCUS strategy has a role in making students the focus of the educational process through their active participation in the educational situation, which will increase their self-confidence and encourage them to persevere to raise their level of science. In light of the results, the researcher recommends: The researcher recommends the need to adopt the FOCUS strategy in teaching creative writing material for the preparatory stage. Provide English language teachers with the procedural steps of the FOCUS strategy, in light of which the subjects are taught, as well as giving a graphic video of how to teach according to FOCUS strategy. The researcher provided the English language teacher at the UM-alkitab Preparatory School for the procedural steps through which she is taught.

Conclusion

The sample consisted of (65) students of the Fifth grade in Al-A’MIL secondary school, they distributed randomly, (33) students in the experimental group and (32) students of the control group. The two groups were rewarded in the following variables: age, IQ, and linguistic ability test. The researcher prepared a measure of the habits of the mind based on Costa & Kellick, 2005, the researcher constructed the paragraphs of the habits of the mind in the form of positions and each position containing four alternatives to answer and the number of positions sixteen positions.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the University of Babylon – College of Basic Education, Department of Post-Graduate Studies, Iraq and all experiments were carried out in accordance with approved guidelines.

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Certain Hematological Denotations in Chronic Renal Failure Patients

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ABSTRACT

The study was concerned with investigating certain hematological indicators (including anemia parameters, hsCRP and WBCs) in chronic renal failure. Sixty patients among those who attended Baghdad teaching hospital during the period from 25 October-15 December 2018, in addition to 22 matched apparently healthy controls and whose ages are ranging from 32-56 years were investigated. Anemia parameters represented by Iron, unsaturated iron binding capacity and total iron binding capacity decreased in patients compared to healthy controls. High sensitive CRP increased significantly in patients compared to controls. White blood cells recorded gradual decrease depending on the disease progression. High iron requirements as a result of an enhanced erythropoiesis, an insufficient release of iron from the body iron stores insufficient iron absorption necessitate a compensatory measures.

Keywords: Patients, Hematological Denotations, Renal Failure

Introduction

Chronic renal failure (CRF) is a progressive and permanent kidney failure in which many numbers of nephrons are damaged, leading to impaired metabolic and electrolytic balance 1. Chronic kidney disease is defined as the existence of structural and functional signs of kidney damage for at least three months with or without glomerular filtration rate decline 2. Chronic kidney failure is associated with overt inflammatory events leading to progressive renal damaging, in addition to reduced renal function 3. Renal diseases are associated with a variety of inflammatory changes. Leukocyte disorders, as a result of uremic toxins, are commonly seen in CKF patients reflected by functional abnormalities 4.

Materials and Method

In the present study Sixty CRF patients in addition to 22 matched apparently healthy controls were investigated for their hematological and inflammatory parameters. They were selected among those who attended kidney unit in Baghdad teaching hospital, renal dialysis center, during the period extended from 25 October to 15 December 2018. Anemia parameters, namely iron, unsaturated iron binding capacity and total iron binding capacity were measured by using an automated hematology analyzer XT200 I (Sysmex, Japan). High sensitive CRP was measured turbidimetrically at 552nm 5. Differential white blood cells was performed for all participants in which normal ranges of hematological parameters were depended 6.

Results and Discussion

Results of anemia parameters indicated obvious changes in chronic renal failure patients compared to that in their matched control groups. Decreased iron level has been noticed, even though it is still within normal range, in patients group (15.9 ± 1.05µmol/L) compared to the normal values recorded in healthy group (21 ± 1.8µmol/L). In the same context TIBC and
UIbC recorded to be lower in the group of patients (47 ± 1.45µmol/L) (34 ± 1.02µmol/L) than that recorded in control group (58 ± 3.8 µmol/L)(40 ± 1.35 µmol/L) sequentially Table (1). The recorded levels indicated that CRF patients were iron deficient which can, in part, be attributed to malnutrition or a lack of proper nutrition. Such finding conflicts with the report of 7, who recorded that patients with end stage renal disease were not iron deficient, regardless of the type of dialysis 8. On the contrary, in an earlier study 9 found decreased iron levels in CRF patients. However, the presence of anemia, which may occur when iron stores are depleted as a result of loss or decreased intake, as a preservative measures, beside the occurrence of functional deficiency when there is a need for a greater amount of iron to support hemoglobin synthesis than can be released from iron stores 10. Poor iron utilization occurred in CRF patients due to the defective erythropoiesis was also reported by 11. The decreased UIbC in the group of patients indicates that UIbC may also be used as a marker for altered iron metabolism. UIbC represents the portion of iron binding sites on transferrin that are not occupied by iron therefore, a low UIbC indicates that transferrin is highly saturated with iron. These results are in consistence with other studies, which showed significant lowering of UIbC and TIBC in CRF patients before hemodialysis, and significant increase of the levels of these parameters after hemodialysis 12,13. High sensitive C reactive protein levels recorded to be higher than the upper limit of its normal value, and than that recorded in healthy group. The mean value of hsCRP in CRF patients was (13.29 ± 3.65mg/L) which differ significantly (p<0.05) than the mean value of healthy subjects (7mg/L) (table2). Such result may reflects what is going on of inflammatory events, related to tissue damage 14 or for vulnerability for infections, or even caused by dialysis itself 15.

White Blood Cells and Differential Count: Lymphocytes, monocytes, eosinophil and basophils decrease significantly (p<0.05) in CRF group when compared with control group. The results of total white blood cells count, Lymphocytes, monocytes, neutrophils, eosinophil and basophils were (5.20 ± 0.21, 1.50 ± 0.12, 0.4 ± 0.06, 0.42 ± 0.02, 0.15 ± 0.02, 0.03 ± 0.00) respectively in the group of CRF group in comparison to healthy subjects which were at follow (6.80 x10^9/L, 2x10^9/L, 0.7 x10^9/L, 4.5 x10^9/L, 0.03x10^9/L, 0.1x10^9/L). Table (3). Our study showed that white blood cells and differential count decreased significantly in CRF patients, but still they were within normal ranges. Most of the studies focus on the functional abnormalities of WBC. However, some immune system functional abnormalities are reported due to accumulation of uremic toxins. Minnaqanti and Cunha have declared that patients with kidney disorders may suffer impair host defenses 17. The precise mechanism by which chronic renal disease leads to a slight decrease in total leukocyte count is not fully understood. The postulated hypothesis is that in chronic renal failure patients, upon hemodialysis, exposed to artificial membranes which may result in complement activation8. Complement activation induces neutrophils aggregation and adherence to endothelial surface leading to fall in total leukocyte count 19. While Agarwal and Light had reported that Over time, granulocytes increased and lymphocytes decreased in those patients 20.

Table 1: Iron Biomarker in healthy and patients groups

<table>
<thead>
<tr>
<th>Biomarker</th>
<th>Healthy group Mean ± SE</th>
<th>CRR Patients group Mean ± SE</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Iron</td>
<td>21 ± 1.8 µmol/L</td>
<td>15.9 ± 1.05 µmol/L</td>
<td>P0.05</td>
</tr>
<tr>
<td>UIbC</td>
<td>40 ± 1.35 mol/L</td>
<td>34 ± 1.02 µmol/L</td>
<td>P0.05</td>
</tr>
<tr>
<td>TIBC</td>
<td>58 ± 3.8 µmol/L</td>
<td>47 ± 1.45 µmol/L</td>
<td>P0.05</td>
</tr>
</tbody>
</table>

UIbC Unsaturated Iron Binding capacity
TIBC Total Iron Binding Capacity

Table 2: High sensitivity C-Reactive Biomarker Protein in patients and healthy groups

<table>
<thead>
<tr>
<th>Biomarker</th>
<th>Healthy groups Mean ± SE</th>
<th>CRR Patients groups Mean ± SE</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>hsCRP</td>
<td>7 mg/L</td>
<td>13.29 ± 3.65 mg/L</td>
<td>P0.05</td>
</tr>
</tbody>
</table>

hsCRP high sensitivity C Reactive Protein

Table 3: White Blood Cell and Deferential Count in CRF and healthy Groups

<table>
<thead>
<tr>
<th>Biomarker</th>
<th>Healthy groups Mean ± SE</th>
<th>CRR Patients groups Mean ± SE</th>
<th>P value</th>
</tr>
</thead>
<tbody>
<tr>
<td>WBC</td>
<td>6.80 x10^9/L</td>
<td>5.20 ± 0.21</td>
<td>P0.05</td>
</tr>
<tr>
<td>LYM</td>
<td>2x10^9/L</td>
<td>1.50 ± 0.12</td>
<td>P0.05</td>
</tr>
<tr>
<td>MON</td>
<td>0.7 x10^9/L</td>
<td>0.4 ± 0.06</td>
<td>P0.05</td>
</tr>
<tr>
<td>NEU</td>
<td>4.5 x10^9/L</td>
<td>0.42 ± 0.02</td>
<td>P0.05</td>
</tr>
<tr>
<td>EOS</td>
<td>0.03x10^9/L</td>
<td>0.15 ± 0.02</td>
<td>P0.05</td>
</tr>
<tr>
<td>BAS</td>
<td>0.1x10^9/L</td>
<td>0.03 ± 0.00</td>
<td>P0.05</td>
</tr>
</tbody>
</table>

WBC white Blood Cells, NEU Neutrophil, LYM Lymphocytes, MON Monocytes, EOS Eosinophil, and BAS Basophil.
Conclusion

Anemia parameters represented by Iron, unsaturated iron binding capacity and total iron binding capacity decreased in patients compared to healthy controls. High sensitive CRP increased significantly in patients compared to controls. White blood cells recorded gradual decrease depending on the disease progression. High iron requirements as a result of an enhanced erythropoiesis, an insufficient release of iron from the body iron stores insufficient iron absorption necessitate a compensatory measures.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Department of Medical Lab Techniques/Bilad Al-Rafidain University College/Iraq/ Baqoubah, Iraq and all experiments were carried out in accordance with approved guidelines.

REFERENCES


Effectiveness of the Problem Tree Strategy in the Development of Multiple Intelligences among Preparatory School Students

Laith Al-Janabi¹, Mohammed H.¹
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ABSTRACT

The research aims to identify the effectiveness of the problem tree strategy in the development of multiple intelligences among preparatory school students. The sample consisted of two groups: one was the experimental group (30) students, the other was the control group (30) students, (Imam Ali Preparatory School) has been chosen from the research community represented by secondary and preparatory schools belonging to the Directorate of Education of Babil Governorate/the center. The empirical research method was adopted as a methodology for conducting the research which includes an independent variable (problem tree strategy) and one dependent variable (multiple intelligences). The partial experimental design was chosen to control the research variables. Before starting the experiment, the research groups were equalized for accurate results with the following variables: (time age calculated by months, the first semester grads of students, Raven’s test for intelligence). After the parity between the two sets of research, the application requirements of plans, objectives, and tests were prepared for the two research groups. The data results were statistically analyzed by t-test for two independent variables. The results showed that the experimental group was superior to the control group according to the problem tree strategy in multiple intelligences.

Keywords: Problem tree strategy, multiple intelligences, preparatory school students.

Introduction

The theory of multiple intelligences was not the product of its day, but rather the culmination of a heritage that extended from ancient historical times, the proofs and monuments are a clear evidence of the origins of multiple intelligences in primitive human, including written records dating back 3,000 years refers to linguistic intelligence, the existence of systems, tools and annual calendar refers to logical intelligence, cave drawings to spatial intelligence, early use of the machine refers to bodily intelligence, the existence of old musical instruments refers to musical intelligence, meditation and worship refers to intrapersonal intelligence. Specifically, in 1979, the Van Leer Foundation at Harvard University asked the American psychologist Howard Gardner and a group of specialists in the field of human and philosophical history, natural sciences and humanities to carry out a scientific research aimed at opening up the status of scientific knowledge interested in the mental potential of the human, the results of their research showed that man possesses multiple abilities of intelligence without limiting to a specific aspect. Gardner presented a new theory of intelligence through his observations of many individuals who have exceptional mental abilities in some aspects but do not get high marks in intelligence tests, it was also based on the idea that damage to some areas of the brain may affect a particular function without other functions. For example, Gardner observed that a child have an intelligent ratio, but he can mention the date from any day of weeks, he was able to play the piano and sing songs in a foreign language from just hearing it for the first time, and spelling any words told to him with normal or reverse spelling, as well as the ability to memorize long speeches. Many knew by their ability to perform the four mathematical calculations in orally long numbers so that they equal in accuracy and speed with calculator. The strategy of teaching directly and indirectly affect the increasing of multiple intelligences development or decreasing it so must be familiar with the strategies, methods of teaching, and modern methods through which to increase development of intelligence among students and one of these strategies is the problem tree strategy, which is based on enabling students analytical accuracy skills for one problem,
Methodology

The methodology and procedures of the research include the selection of the experimental design, the research community, and its population, as well as the parity procedures between the two groups of research (experimental and control), and the consideration and control of the external variables, also includes the preparation of research tools and requirements, application of the experiment, and identifying the needed statistical methods, as follows:

Experimental Design: It includes an independent variable (problems tree strategy), (normal method), and a dependent variable (multiple intelligences). Therefore, an experimental design was used with partial control of two equal groups, one experimental and the other control.

Research Community and Population: The current research community represents all high school students in the (secondary and preparatory) governmental day schools of the General Directorate of Education in Babil Governorate for the academic year (2018-2019), in which they have at least two classes (A, b). The researcher chose (A) class by the method of random selection to represent the experimental group with a number of students (30), who will study according to (Problems tree strategy), and in the same way the researcher randomly selected class (b) to represent the control group with a number of students (30), who will study according to (the normal method).

Equivalence of the two research groups: A statistical equivalence was conducted between the experimental and control groups in some variables that affect the results of the experiment. Although the two groups were chosen in the random selection method, and although the students of the research sample were from similar social and economic level and study in the same school, the equivalence of variables was performed and the following results Table (1).

<table>
<thead>
<tr>
<th>Variable</th>
<th>Group</th>
<th>Sample Vol.</th>
<th>Arithmetic Mean</th>
<th>STD.</th>
<th>D.F</th>
<th>T-Value</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age calculated by months</td>
<td>Experimental</td>
<td>30</td>
<td>164.70</td>
<td>3.43</td>
<td>58</td>
<td>0.684</td>
<td>Not. Significant</td>
</tr>
<tr>
<td></td>
<td>Control</td>
<td>30</td>
<td>165.23</td>
<td>2.97</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>First semester grades</td>
<td>Experimental</td>
<td>30</td>
<td>28.60</td>
<td>6.51</td>
<td></td>
<td>0.365</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Control</td>
<td>30</td>
<td>27.96</td>
<td>6.75</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IQ test</td>
<td>Experimental</td>
<td>30</td>
<td>37</td>
<td>7.96</td>
<td></td>
<td>0.42</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Control</td>
<td>30</td>
<td>37.86</td>
<td>9.05</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Control of External Variables: Although the researcher verified the equivalence of the two sets of research groups in some variables that are believed to affect the progress of the experiment, he tried to avoid the effect of some external variables. Some of these variables and how to control them are as follows:

1. Accidents associated with the experiment: The experiment in the research did not experience any emergency or accident that hinders its progress.

2. Experimental Evanescence: There was no discontinuity or transfer of any student throughout the experiment.

3. Selection of the sample: The two research groups were chosen by the intentional method, and the equivalence between them was ascertained.

4. Maturity factor: Since the duration of the experiment is united between the two research groups as well as the age of the students in the two groups is approximate, so the growth will return to the members of the two groups at the same level, so this factor has not affected the research.

5. Effect of experimental procedures: The researcher worked to limit the effect of experimental procedures that may affect the dependent variable during the progress of the experiment.

Preparation of Research Requirements: The requirements of the research are some of the basic factors on which the research is based, where the search procedures are implemented. These requirements are:

1. The scientific material (content): The scientific material that the researcher is teaching has been determined for the students of the two research groups during the period of the experiment (the second semester) of the academic year (2018 - 2019). It included the last three chapters of the scientific material for the preparatory school stage.

2. Formulation of Behavioral Goals: The researcher formulated 95 behavioral goals based on general objectives and the content of the material covered by the experiment, according to the Bloom classification in the field of knowledge distributed among the six levels of Bloom’s classification (cognition, understanding, application, analysis, composition, evaluation).

3. Teaching plans: The researcher prepared a set of teaching plans for the experimental and control groups in light of the content of the three chapters (fifth, sixth, and seventh) of the scientific material to be taught for the academic year (2018 - 2019). The number of teaching plans was (16), which was taught according to the problem tree strategy and the same for the control group, which was taught according to the normal method.

Research Tool

Steps have been developed for the research tool (multiple intelligences) were as follows:

1. Determining the purpose of the test: The purpose of the test is to measure the multiple intelligences of the preparatory stage students (information, skills, and experiences) in the scientific material of the last four chapters of the book, according to the behavioral goals that were formulated from the scientific material.

2. Determine the objectives of the test: After determining the purpose of the multiple intelligences test, the objectives of the test are determined to find the extent of achievement, and a number of behavioral goals have been formulated.

3. Determination of the test paragraphs: The researcher determined the number of paragraphs that constitute the test to develop multiple intelligences, which were (40 paragraphs).

4. The output of test paragraphs: The multiple intelligences test paragraphs were formulated in its preliminary form. The researcher chose the type of the test (multiple choice) which is one of the best objective tests. The test consisted of (40) test paragraphs distributed on Bloom’s cognition levels (cognition, understanding, application, analysis, evaluation) and on the four subjects of the scientific material.

5. Test instructions: The instructions and guidance on how to answer questions were formulated as (choosing one correct alternative to the paragraph, answering all paragraphs, the time period for the answer, writing the triple name).

6. Test Answers Correcting: After the test paragraphs were drafted and the test type was
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selected, a standard answers correction was established. As developed (one degree for each correct test paragraph) and (zero for the wrong answer, the abandoned paragraph which the student did not answer, and the paragraph to which he placed more than one choice). Thus, the maximum degree of the multiple intelligences test was (40°) and the minimum was (zero).

7. The validity of the test: The apparent validity of the test and the validity of the content was confirmed. The results showed that the apparent validity have obtained a percentage of agreement of which (80%) by the arbitrators and specialists. While the validity of the content, the results showed that all paragraphs of the multiple intelligence test are statistically significant, therefore; The test is valid in measuring the understanding and comprehension of preparatory school students.

The Survey application of the multiple intelligences test: It includes the following:

1. The first survey application: The multiple intelligence test was applied in its first survey phase to a group of students in the preparatory stage with a non-research sample, where the number of students was 30 students. The purpose of this test was to know the clarity of the test instructions and guidance, and the clarity of paragraphs for students understanding, and to calculate the time required for the test, the researcher recorded the exit time for each student.

2. The second survey application: The test was applied to a sample of (100) non-research sample. The purpose of the test is to analyze the test paragraphs statistically, namely paragraph difficulty, paragraph discrimination, the effectiveness of the wrong alternatives.

Statistical analysis of multiple intelligence test paragraphs: The multiple intelligence test paragraphs were analyzed as follows:

1. The difficulty of the paragraph: The statistical analysis of multiple intelligence test paragraphs found that the coefficient of the difficulty of paragraphs ranged from (0.43 - 0.70) and thus the paragraphs of the multiple intelligences test were all good and have appropriate difficulty.

2. Discrimination of the paragraph: One of the important characteristics that must be provided in the paragraphs of the test is the distinguishing feature which means the possibility of items or paragraphs to identify the individual differences of students, and the test items are valid when the coefficient of discrimination of items is (20.0) and above. The coefficient of discrimination of the multiple intelligences test paragraphs ranges from (0.33 - 0.63). Thus, the multiple intelligences test paragraphs were well-defined and appropriate.

3. The effectiveness of the wrong alternatives: The researcher conducted a statistical analysis (highest 27% and lowest 27%) to find the effectiveness of the wrong alternatives ranging from (-0.11 _ -0.33). As a result, the alternative of the multiple intelligences test paragraphs were all effective and therefore considered appropriate.

Reliability of the Test: Reliability is one of the indicators to verify the accuracy of the scale and the consistency of its paragraphs in measuring what should be measured and indicates its ability to produce the same results if it is applied to the same individuals in the same circumstances. The researcher investigated the reliability of the test by the method of Kuder-Richardson. This method is used in the case of calculating the reliability of a single application without the need for fragmentation. It is also used with two-answer (yes/no) (right/wrong) tests. This equation is designed to extract the internal consistency of tests, and by applying the equation, the reliability coefficient was (0.89) which is a good reliability coefficient.

Research Tool Application: The experimental and control groups were informed of the date of application of the multiple intelligences test a week before it was carried out. It was applied after the completion of teaching the specific material for the two research groups at one time. The researcher supervised the application of the test.

Statistical Methods: The researcher used the t - test equation for two independent samples to perform the parity between the experimental and control groups in the following variables: (age calculated by months, first semester student’s grades in the scientific material, IQ test (Raven).
Results and Discussion
The students of the experimental group who studied according to the problem tree strategy exceeded the students of the control group who studied according to the usual method in the multiple intelligences test. This is in line with the studies that confirmed the superiority of the experimental group that studied according to the problem tree strategy to the control group who studied according to the normal method, as shown in the following table 2.

Table 2: Arithmetic mean, standard deviation, variance, and T-value calculated for two independent samples according to the t-test

<table>
<thead>
<tr>
<th>Group</th>
<th>Sample</th>
<th>Arithmetic Mean</th>
<th>STD.</th>
<th>Variance</th>
<th>T-Value</th>
<th>D.F.</th>
<th>Sig. at 0.05</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Calculated</td>
<td></td>
<td>Tabulated</td>
</tr>
<tr>
<td>Experimental</td>
<td>30</td>
<td>34.50</td>
<td>2.84</td>
<td>8.12</td>
<td>5.093</td>
<td>58</td>
<td>Statistically Significant</td>
</tr>
<tr>
<td>Control</td>
<td>30</td>
<td>29.56</td>
<td>4.26</td>
<td>18.18</td>
<td>2</td>
<td>58</td>
<td></td>
</tr>
</tbody>
</table>

Conclusion
The use of the problem tree strategy in the teaching of scientific material has contributed to raising the level of multiple intelligences of students and activate their memory in the retrieval of information and give the correct answer. The problem tree strategy has helped to increase the multiple intelligences of students because they are modern theories that give students the opportunity to learn correctly and participate positively during the lesson.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the College of Basic Education, University of Babylon, Iraq and all experiments were carried out in accordance with approved guidelines.

REFERENCES
Gender-Specific Impact of Maternal Obesity on Birth Weight

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ABSTRACT

The purpose of this study was to evaluate the impact of maternal obesity on birth weight and determine which gender is affected more. The study included 100 consecutive healthy eligible pregnant women enrolled at Al-Eluia Teaching Hospital in Baghdad, Iraq between February and May 2017 for childbirth. Newborns were classified based on the definition of mothers’ BMI into three groups: 32 normal weight (18.5–24.9 kg/m²), 31 overweight (25–29.9 kg/m²), and 37 obese (>30 kg/m²). Detailed information on maternal age, gestational age, baby’s gender, birth weight, and birth order were obtained. No significant difference was observed regarding birth weight and gestational age among the studied groups. However, when we considered gender differences, we found that male newborns of obese mothers are significantly heavier than newborns of normal weight mothers. As for females, there were no statistically significant differences in birth weight between three groups. Nevertheless, males of obese mothers are significantly ($p <0.001$) heavier (3700.0 ± 416.95) than females (3173.91 ± 405.88) of obese mothers. Moreover, gestational age was positively associated with birth weight for both genders ($r=0.658$, $p:0.000$ for males; $r=0.680$, $p:0.000$ for females), whereas maternal BMI was significantly associated with birth weight for male gender only($r=0.334$, $P:0.029$).

Keywords: Body Mass Index, Gestational Age, Pregnancy, Maternal Obesity, Birth Weight

Materials and Method

The study included 100 consecutive healthy eligible pregnant women enrolled at Al-Eluia Teaching Hospital in Baghdad, Iraq between February and May 2017 to deliver...

a single, viable, non-anomalous baby which were classified
based on the definition of mothers’ BMI. Medical history
reviewed to determine eligibility pertaining to obstetric
complications during pregnancy. Women were excluded if
the pregnancy was complicated by medical conditions that
could affect fetal growth, such as hypertension, diabetes,
infection diseases, or smoking. Gestational age was
estimated based on ultrasound scans, expressed in weeks.
Data recorded just after birth included baby’s gender and
birth weight, which obtained using a digital scale. Each
mother was interviewed in a post-delivery ward to provide
detailed information on maternal age, birth order, which
was grouped into three categories: first, second, third or
more, if they were taking contraception. For maternal BMI
calculation, anthropometric measurements such as weight
and height were recorded after delivery. BMI defined as
weight in kilograms to square of height in meters and
categorized into three groups: 32 normal weight (18.5–
24.9 kg/m2), 31 overweight (25–29.9 kg/m2), and 37 obese
(>30 kg/m2)14.

Statistical Analysis
The quantitative variables were expressed as means
± standard deviation (SD), whereas qualitative variables
were expressed as absolute numbers and frequencies.
Maternal and newborn characteristics were compared,
according to maternal BMI, using analyses of variance
(ANOVA) followed by least significant difference-LSD
post hoc analysis for continuous data and chi-squares tests
for categorical data. The Pearson correlation coefficient
test was used to assess relationships of quantitative
variables. A p-value of <0.05 was considered significant.

Findings
The study group consisted of 100 mother-newborn
pairs which were classified based on the definition
of mothers’ BMI into three groups; controls of BMI
mean 23.33 ± 1.59 kg/m2, aged 24.53 ± 4.75 years and
overweight of BMI mean 27.98 ± 1.49 kg/m2, aged
26.87 ± 7.31 year and obese of BMI mean 33.81 ±
3.43 kg/m2 aged 29.05 ± 7.04 year. Characteristics of
Newborns among study groups are presented in Table 1.
No significant difference was observed regarding birth
weight and gestational age among the three groups. As
for birth order, we found a significant difference between
newborns of obese mothers compared with newborns
of normal weight mothers. However, when we take in

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to account gender differences in mean of birth weight
and gestational age as shown in Table 2, we found that
male newborns of obese mothers (3700.0 ± 416.95)
have significantly higher birth weight than newborns of
normal weight mothers (3025.0 ± 738.17), while male
newborns of overweight mothers (2953.33 ± 748.44) did
not differ from control group. As for females, there were
no statistically significant differences for all variables
between three groups. Nevertheless, when we compared
birth weight between males and females, we observed
that only males of obese mothers are significantly (p
<0.001) heavier (3700.0 ± 416.95) than females (3173.91
± 405.88) of obese mothers. Correlation between birth
weight and maternal BMI, gestational age, maternal
age and birth order is presented in Table 3. Gestational
age was positively associated with birth weight for
both genders (r=0.658, p: 0.000 for males; r=0.680, p:
0.000 for females). Maternal BMI was significantly
associated with birth weight for male gender (r=0.334,
P=0.029) but no such association was seen for females.
Birth weight is an important determinant of infant’s
wellbeing15. Our results indicated that male newborns
of obese mothers are heavier than of normal weight
mothers. Fetal growth is a complex biologic process that
is regulated by both maternal and fetal factors including
genes and environment. The amount and quality of food
that the mother consumes during gestation influences
birth weight, and therefore susceptibility of progeny
to disease in later life16. Birth weight is influenced by
common biological determinants across cultures, and
is also influenced by social, ethnic, and environmental
factors. Sex and birth order, maternal age and education
and to a lesser extent region were determinants of birth
weight17. Our study found that birth weight was positively
associated with gestational age for both genders, whereas
maternal BMI was significantly associated with birth
weight for male gender only. Other study reported that
gestational age and parity were found to be the important
maternal parameters influencing the birth weight whereas
maternal age and anthropometry showed no significant
relationship with baby weight18. Voldner et al., found
that parity, maternal BMI, gestational age and maternal
birth weight were associated with birth weight for both
sexes12. Although, several studies have indicated that
maternal obesity is associated with high birth weight both
gender11-13, our findings is the first to indicate a specific
influence of maternal obesity on birth weight. Further
research is required to determine the causes behind these
differences. Furthermore, a systematic review and meta-


analysis confirmed that maternal obesity is associated with fetal overgrowth\textsuperscript{11}. Additionally, neonates of obese women have increased body fat at birth, which increases the risk of childhood obesity. Maternal obesity likely contributes increased birth weight via mechanisms including increased insulin resistance (even in women who do not have diabetes) resulting in higher fetal glucose and insulin levels\textsuperscript{19}. Placental lipases metabolize triglycerides in maternal blood, allowing free fatty acids to be transferred in excess to the growing fetus\textsuperscript{11}. We found that males of obese mothers are significantly heavier than females of obese mothers. These findings are in accordance with a previous study reported that birth weight has consistently been shown to be higher in boys than in girls due to androgen action\textsuperscript{20}. Birth weight is a good indicator of mothers’ and neonates’ nutritional status, and it contributes to the newborn survival, health, growth and development\textsuperscript{11}. A birth weight of >3000g was found in 60\% of males and 40\% of females in this study. According to Qiao et al., a positive association between birth weight and childhood obesity was found, indicating higher levels of birth weight, defined as birth weight >3000 g, were associated with an increased risk of childhood obesity\textsuperscript{22}.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Controls</th>
<th>Overweight</th>
<th>Obese</th>
<th>P* value</th>
<th>P* value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gestational Age (Weeks)</td>
<td>37.36 ± 2.15</td>
<td>37.06 ± 2.57</td>
<td>38.17 ± 1.45</td>
<td>0.566</td>
<td>0.107</td>
</tr>
<tr>
<td>Birth Weight (Grams)</td>
<td>3095.31 ± 580.09</td>
<td>2880.64 ± 757.04</td>
<td>3372.97 ± 479.96</td>
<td>0.165</td>
<td>0.062</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Birth Order:</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>First</td>
<td>7(21.9%)</td>
<td>6(19.4%)</td>
<td>7(20.0%)</td>
<td>0.203</td>
<td>0.042</td>
</tr>
<tr>
<td>Second</td>
<td>12(37.5%)</td>
<td>6(19.4%)</td>
<td>5(23.0%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>≥ Third</td>
<td>13(40.6%)</td>
<td>19(61.3%)</td>
<td>25(57.0%)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Gender</th>
<th>Parameter</th>
<th>Controls</th>
<th>Overweight</th>
<th>Obese</th>
<th>Pa value</th>
<th>Pb value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>Birth Weight (Grams)</td>
<td>3025.0 ± 738.17</td>
<td>2953.33 ± 748.44</td>
<td>3700.0 ± 416.95</td>
<td>0.770</td>
<td>0.010</td>
</tr>
<tr>
<td></td>
<td>Gestational Age (Weeks)</td>
<td>37.10 ± 2.03</td>
<td>37.59 ± 2.40</td>
<td>38.63 ± 1.54</td>
<td>0.522</td>
<td>0.053</td>
</tr>
<tr>
<td>Female</td>
<td>Birth Weight (Grams)</td>
<td>3150.0 ± 435.55</td>
<td>2812.50 ± 783.05</td>
<td>3173.91 ± 405.88</td>
<td>0.077</td>
<td>0.890</td>
</tr>
<tr>
<td></td>
<td>Gestational Age (Weeks)</td>
<td>37.55 ± 2.28</td>
<td>36.55 ± 2.69</td>
<td>37.89 ± 1.34</td>
<td>0.170</td>
<td>0.612</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Total N = 100</th>
<th>Male N = 43</th>
<th>Female N = 57</th>
</tr>
</thead>
<tbody>
<tr>
<td>r</td>
<td>P Value</td>
<td>r</td>
<td>P Value</td>
</tr>
<tr>
<td>Maternal BMI</td>
<td>0.149</td>
<td>0.139</td>
<td>0.334</td>
</tr>
<tr>
<td>Maternal Age</td>
<td>-0.097</td>
<td>0.336</td>
<td>-0.064</td>
</tr>
<tr>
<td>Gestational Age</td>
<td>0.666</td>
<td>0.000**</td>
<td>0.658</td>
</tr>
<tr>
<td>Birth order</td>
<td>-0.023</td>
<td>0.822</td>
<td>0.051</td>
</tr>
</tbody>
</table>

**Conclusion**

There is a sex-specific impact of maternal obesity on birth weight. Furthermore, male newborns are more prone for childhood obesity than females. Birth weight of both genders is affected by gestational age, while only male gender is affected by maternal BMI. As far as we know, this is the first study to report gender difference regarding the effect of maternal obesity on birth weight.

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

**Source of Funding:** This study was self-funded.
**Ethical Clearance:** The current study was approved by the Ethics Committee of Al-Eluia Teaching Hospital in Baghdad, Iraq and the Scientific Committee of Chemistry Department, Collage of Science at Al-Mustansiriyah University. All participants were informed about the study and verbal consent had been taken.

**REFERENCES**


Interplay between EBERS and P27 Tumor Suppressor Proteins in Molecular Transformation of Nasopharyngeal and Sinonasal Carcinomas

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ABSTRACT

Epstein Barr viruses are well known to induce tumorigenesis in proliferative epithelial tissues. Many studies have implicated EBV in the progression of benign and malignant head and neck tumors by affecting cell cycle proteins expression. This study designed to determine the rates of existential concomitance of EBV in relation to P27 gene expression in tissues from nasopharyngeal and sinonasal lesions. The study included a total number of (183) formalin fixed, paraffin-embedded tissue blocks including 35 inflammatory nasal polyps (INP), 35 sinonasal papillomas (SNP), 65 nasopharyngeal carcinomas (NPC), 18 sinonasal carcinomas (SNC) as well as 30 nasal healthy tissues as control group. After histopathological confirmatory re-examination, a Chromogenic In Situ Hybridization technique (CISH) for EbV-EbERs localization and immunohistochemistry technique (IHC) for p27 expression were performed. The positivity percentages of EBV-EbERs detection in NPC and SNC carcinoma tissues were (86.2% and 88.9%, respectively) while it was (57.1%) in SNP and INP. These results were with highly significant differences (P<0.01). The positively percentages of p27-IHC were (58.5% in NPC, 66.7% in SNC, 51.4% in SNP and 60% in INP) tissues in comparison to control healthy tissues in which only (3.3%) noticed as positive. The statistical analysis shows highly significant differences (P<0.01).

Keywords: NPC, SNC, EBV-EBERS, P27, CISH, IHC.

Introduction

SINonasal Carcinom (SNC) could arise from various tissues within the nasal cavity, including lymphoreticular, epithelial and nonepithelial tumors ¹. However, it is a rare tumor, representing about 1% of all human cancers and 3% of the head and neck cancers². Although certain environmental exposures, including high consumption of salt-preserved fish, tobacco smoking and lack of fresh fruit and vegetable intake, are risk factors of NPC, a lot of evidences were accumulated for the a probable causal role of EBV in the pathogenesis of the most common histological subtype of NPC, that is true undifferentiated NPC ²³. Epstein Barr virus (EBV) also has been shown to be associated to other human cancers, such as burkitt’s lymphoma and Non-Hodgkin lymphoma etc. ⁴⁵. The Epstein Barr virus Early Repeats (EBER1 and EBER2), have 167 and 172 nucleotides long in consequence with 54% sequence homology between them. EBERs were used for the recognition of EBV infected cells in tissues by CISH and are a reliable markers indicating the presence of EB, EBER-1 interacts with interferon-inducible protein kinase R (PKR), inhibiting its activation and protecting infected cells from IFN induced apoptosis and induce the expression of growth factors that promote cell survival ⁶⁷. The p27 is cyclin dependent kinase CDK-inhibitor belongs to the Cip/Kip proteins that are playing an important role funkung extracellular regulatory growth signals to progress or exit from cellular cycle ⁸. The P27 Kip is phosphorylated in S–phase by cyclin...
E-CDK2. Alteration of $P27^{kip1}$ protein expression was excessively associated with cell proliferation and have been linked to many types of human tumors, such as NPC, oral cavity squamous carcinoma (OSC), gastric cancer, and small cell lung cancer. Moreover, $p27$ dysregulation was found to play a role both in cell cycle dysregulation and chromosomal instability, leading then to higher-grade NPC malignancy and an increased cell proliferation in sinonasal tumors. The aim of this study is to analyze the rate of accompaniment of $P27$-gene translational expression and Epstein Barr Virus-Encoded Small Untranslated RNAs (EBERs) in nasopharyngeal and sinonasal malignant and benign tumors.

**Materials and Method**

A total of 183 formalin-fixed paraffin-embedded tissue samples (120 male, 63 female) with an age ranging from 15 to 82 years were collected from archives of histopathological laboratories of several hospitals in Baghdad. These collected samples are including 18 rare cancers, namely Sinonasal carcinomas group (SNC), 65 nasopharyngeal carcinomas (NPC), 35 sinonasal papillomas (SNP), 35 inflammatory nasal polyps (INP) and 30 normal apparently sinonasal tissues as healthy control. All clinical data were taken from the accompanied histopathological reports in hospitals. A confirmatory re-examination of each block was done by the consultant histopathologist. The practical work of this study was carried out in the Molecular Virology Research Laboratories at Communicable Diseases Research Unit/Baghdad Medical College/Baghdad University. The paraffin blocks are sectioned serially at 4 μm thickness and stuck on the specified charged slides. The CISH kits (ZytoVision/Germany) were used for detection EBERs in tissue sections and done according to the manufacturer company protocols (Cat. Numbers: T-1061-40) using digoxigenin-labeled long DNA probe for EBERS detection (Cat. Number: T-1114-400:0.4 ml) (Zyto Visions/Germany). Immunohistochemical (IHC) assays were used to evaluate $p27$ expression in sinonasal and nasopharyngeal lesions by using Monoclonal Rabbit Anti-$P27$ antibody (Cat. Number: ab32034) and rabbit specific (HRP/DAB detection IHC Kit, Abcam/England) which binds to nuclear targeted protein. Quantification of CISH and IHC signals were assessed under light microscopy at X1000 also, scoring and intensity of signals were done according to.

**Statistical Analysis:** In this study Chi-Square test ($\chi^2$), Odd ratio and Spearman’s rho were used to assess the significance between variables where the statistical analysis was done by SPSS program (version-21).

**Results and Discussion**

The results of EBERs-CISH among nasopharyngeal and sinonasal study groups: Table (1) shows the positive EBERs-CISH signal detection NPC and SNC cancers tissues as well as benign sinonasal tumors; the signals of EBERs/CISH reactions were recognized as blue discoloration that was detected by their specific probes and counter stained by nuclear red, CISH-positive reactions constituted 86.2% of total NPC tissues, 88.9% of total SNC tissues. On the other hand, in benign SNP and NP tumors each of them were 57.1% in comparison to control group in which (6.7%) total positive signals were detected. The results revealed that SNC and NPC have odds ratio value of 112 (11100) and 87.111(8611.1) whereas, SNP and INP each have odds ratio of 18.667(1766.7). Highly-significant differences recorded among the studied groups ($P<0.01$). Of the positive of NPC tissues the highest percentage (35.4%) was in score 1, while the highest percentage of SNC (66.7%) in score 3. On the other hand, the highest percentages of SNP (37.1%) was noticed in score 1,while (20%) of INP was recorded in score 2 and 3 for each. The signal intensities of EBERs-CISH detection were detailed in (Figure 1). In NPC tissues group the strong signal intensity was noticed in (58.5%); while (18.5%) and (9.2%) have moderate and weak intensity. In sinonasal carcinoma, (83.3%) have strong intensities; while (5.6%) and (zero%) have moderate and weak intensities. The results of $P27$-IHC among study groups: The signals of $p27$-IHC were detected as brown discoloration at the specific antigenic sites of these reactions. (Table 2) shows the positive results of $P27$-IHC detection, where 58.5% of NPC, 66.7% of SNC, 51.4% of SNP and 60% of INP tumor tissues were with total positive signals in comparison to control healthy group in which 3.3% only noticed as positive signals. Statistically, highly significant differences were noticed between studied groups ($P<0.01$). The highest percentage of NPC tissues positivity was (26.2%) was with score 3, on the other hand highest percentage of SNC (61.1%) was with score 3. In SNP, the highest percentage (25.7%) was in score...
results in relation to the examined histopathological grading of NPC and SNC. Regarding EBERS in SNC (81.2%) are mainly noticed to have moderate and poorly differentiation grades. While in NPC highest percentage (73.2%) was undifferentiated grade. On the other hand, p27 in SNC was (66.7%) are mainly noticed to have poorly and undifferentiation grades whereas in NPC highest percentage (76.3%) have undifferentiated grade.

Table 1: Distribution of Signal scoring of EBER–CISH Reactions

<table>
<thead>
<tr>
<th>EBV CISH reaction score</th>
<th>A.H. Control</th>
<th>Inflammatory nasal polyp (INP)</th>
<th>Sinonasal papillomas (SNP)</th>
<th>Sinonasal carcinoma (SNC)</th>
<th>Nasopharyngeal carcinoma (NPC)</th>
<th>Pearson Chi-Square (P-value)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Negative</td>
<td>N</td>
<td>28</td>
<td>15</td>
<td>15</td>
<td>2</td>
<td>9</td>
</tr>
<tr>
<td>%</td>
<td>93.3%</td>
<td>42.9%</td>
<td>42.9%</td>
<td>11.1%</td>
<td>13.8%</td>
<td></td>
</tr>
<tr>
<td>Positive</td>
<td>N</td>
<td>2</td>
<td>20</td>
<td>20</td>
<td>16</td>
<td>56</td>
</tr>
<tr>
<td>%</td>
<td>6.7%</td>
<td>57.1%</td>
<td>57.1%</td>
<td>88.9%</td>
<td>86.2%</td>
<td></td>
</tr>
<tr>
<td>+</td>
<td>N</td>
<td>1</td>
<td>6</td>
<td>13</td>
<td>2</td>
<td>23</td>
</tr>
<tr>
<td>%</td>
<td>3.3%</td>
<td>17.1%</td>
<td>37.1%</td>
<td>11.1%</td>
<td>35.4%</td>
<td></td>
</tr>
<tr>
<td>++</td>
<td>N</td>
<td>0</td>
<td>7</td>
<td>6</td>
<td>2</td>
<td>21</td>
</tr>
<tr>
<td>%</td>
<td>0%</td>
<td>20%</td>
<td>17.1%</td>
<td>11.1%</td>
<td>32.3%</td>
<td></td>
</tr>
<tr>
<td>+++</td>
<td>N</td>
<td>1</td>
<td>7</td>
<td>1</td>
<td>12</td>
<td>12</td>
</tr>
<tr>
<td>%</td>
<td>3.3%</td>
<td>20%</td>
<td>2.9%</td>
<td>66.7%</td>
<td>18.5%</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>N</td>
<td>30</td>
<td>35</td>
<td>35</td>
<td>18</td>
<td>65</td>
</tr>
<tr>
<td>%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td></td>
</tr>
</tbody>
</table>

Table 2: Distribution of P27-IHC Signal Scoring

<table>
<thead>
<tr>
<th>P27-IHC signal scores</th>
<th>A.H. Control</th>
<th>Inflammatory nasal polyps (INP)</th>
<th>Sinonasal papillomas (SNP)</th>
<th>Sinonasal carcinomas (SNC)</th>
<th>Nasopharyngeal carcinomas (NPC)</th>
<th>Pearson Chi-Square (P-value)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Negative</td>
<td>N</td>
<td>29</td>
<td>14</td>
<td>17</td>
<td>6</td>
<td>27</td>
</tr>
<tr>
<td>%</td>
<td>96.7%</td>
<td>40%</td>
<td>48.6%</td>
<td>33.3%</td>
<td>41.5%</td>
<td></td>
</tr>
<tr>
<td>Positive</td>
<td>N</td>
<td>1</td>
<td>21</td>
<td>18</td>
<td>12</td>
<td>38</td>
</tr>
<tr>
<td>%</td>
<td>3.3%</td>
<td>60%</td>
<td>51.4%</td>
<td>66.7%</td>
<td>58.5%</td>
<td></td>
</tr>
<tr>
<td>+</td>
<td>N</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>7</td>
</tr>
<tr>
<td>%</td>
<td>3.3%</td>
<td>0%</td>
<td>2.9%</td>
<td>0%</td>
<td>10.8%</td>
<td></td>
</tr>
<tr>
<td>++</td>
<td>N</td>
<td>0</td>
<td>8</td>
<td>9</td>
<td>1</td>
<td>14</td>
</tr>
<tr>
<td>%</td>
<td>0%</td>
<td>22.9%</td>
<td>25.7%</td>
<td>5.6%</td>
<td>21.5%</td>
<td></td>
</tr>
<tr>
<td>+++</td>
<td>N</td>
<td>0</td>
<td>13</td>
<td>8</td>
<td>11</td>
<td>17</td>
</tr>
<tr>
<td>%</td>
<td>0%</td>
<td>37.1%</td>
<td>22.9%</td>
<td>61.1%</td>
<td>26.2%</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>N</td>
<td>30</td>
<td>35</td>
<td>35</td>
<td>18</td>
<td>65</td>
</tr>
<tr>
<td>%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td>100%</td>
<td></td>
</tr>
</tbody>
</table>
Table 3: Co-association of EBV and p27 with grading in sinonasal and nasopharyngeal carcinomas

<table>
<thead>
<tr>
<th>Studied groups</th>
<th>Diagnosis</th>
<th>EBV</th>
<th>P27</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Positive</td>
<td>Negative</td>
</tr>
<tr>
<td>Sinonasal carcinoma (SNC)</td>
<td>Moderately differentiated</td>
<td>N 8</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>% 50%</td>
<td>0%</td>
</tr>
<tr>
<td></td>
<td>Poorly differentiated</td>
<td>N 5</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>% 31.2%</td>
<td>100%</td>
</tr>
<tr>
<td></td>
<td>Undifferentiated</td>
<td>N 3</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>% 18.8%</td>
<td>0%</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>N 16</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>% 100%</td>
<td>100%</td>
</tr>
<tr>
<td>Nasopharyngeal carcinoma (NPC)</td>
<td>Well differentiated</td>
<td>N 10</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>% 17.9%</td>
<td>0%</td>
</tr>
<tr>
<td></td>
<td>Moderately differentiated</td>
<td>N 1</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>% 1.8%</td>
<td>11.1%</td>
</tr>
<tr>
<td></td>
<td>Poorly differentiated</td>
<td>N 4</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>% 7.1%</td>
<td>0%</td>
</tr>
<tr>
<td></td>
<td>Undifferentiated</td>
<td>N 41</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td></td>
<td>% 73.2%</td>
<td>88.9%</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>N 56</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td></td>
<td>% 100%</td>
<td>100%</td>
</tr>
</tbody>
</table>

Pearson Chi-Square (P-value)  
P=0.171 Non Sign. (P>0.05)  
P=0.276 Non Sign. (P>0.05)

Figure 1: Intensity of EBERs-CISH reactions
Correlation of EBER-CISH with p27 in Patients with Sinonasal and Nasopharyngeal Lesions:

There are weak negative relationships don’t reach a significant level (P > 0.05) between EBERs and p27 scores (r = -0.027, P = 0.830) in NPC group while this relationship was a non-significant weak positive (r = 0.329, p = 0.183) in SNC. In INP, there are also weak negative relationships which again did not reach a significant levels (r = -0.281, p = 0.102), on the other hand, the correlation between EBERs and p27 scoring was a non-significant weak positive in SNP (r = 0.03, p = 0.835) (Table 4). The EBV latent proteins expression
contribute to most, if not all, of the transforming and immortalizing properties of prototype DNA oncogenic viral agent. In addition to the EBERs, human cancer cells, that are latently infected with this virus express the most powerful oncogenic proteins, latent membrane protein LMP-1 and LMP-2 (13,14). Again it is possible that HPV exerts its oncogenic influences in concert with cofactors including a possible collaboration with EBV (15,16). The higher results of EBER in present study of tumor groups are supporting other studies which found the percent of EBER in NPC were (81%, 63%, 91%, 59% and 62.2%), respectively (17,18,19). Several studies have declared an association between EBV and undifferentiated SNC; Gallo et al., (1995) (20) found that 39% of SNC was positive for EBV beside Zahedi et al., (2017) who found 100% EBV-positive SNC by CISH (21). Regarding SNP study done by Costa et al., (2014) found that EBV positively detected in (65%) while in INP, higher EBV frequency in polyps (60%) compared with 10% in nasal healthy group were found (22).

Table 4: Spearman’s rho statistical testing to evaluate studied molecular marker scoring in relation to EBV infections in sinonasal and nasopharyngeal lesions

<table>
<thead>
<tr>
<th>Spearman’s rho (Scoring)</th>
<th>EBV-EBERs</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Nasopharyngeal carcinoma</td>
</tr>
<tr>
<td>P27</td>
<td>r.</td>
</tr>
<tr>
<td></td>
<td>P-value</td>
</tr>
</tbody>
</table>

**Conclusion**

The highly significant translational expression of p27 gene as well as the high percentage of EBV-associated SNC and NPC malignant and benign tumors in our results might indicate the oncogenic potential of such bilateral relation in these cases, as well as pointing for its crucial role in development, transformation and/or progression of a subset of SNC and NPC cancers and benign SNC and NPC hyperplasia.

**Financial Disclosure:** There is no financial disclosure.

**Conflict of Interest:** None to declare.

**Ethical Clearance:** All experimental protocols were approved under the Department of Biology, College of Science, Mustansiriyah University, Baghdad, Iraq and all experiments were carried out in accordance with approved guidelines.

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Nosocomial Bacterial Strains Isolated from Patients Who Reside in Different Health Facilities in Duhok City with Their Antibiotics Resistance Patterns

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¹Karbala University, Nursery College, Iraq, ²Hawler Medical University, College of Health Sciences, Iraq, ³Hawler Medical University, College of Health Sciences, Iraq

ABSTRACT

Nosocomial infections are health associated problem since the emergence of multidrug resistance bacteria, MDR bacteria have been linked with mortality and morbidity globally. Most frequent bacterial strains that have been recovered from Iraqi patients reside in hospital are identified, antibiotics patterns for all isolates have been included in this study. S. aureus and mannitol negative S.aureus have high frequency rate among recovered nosocomial bacteria with 25% and 29% consequently. 90% of all bacterial strains were multi-drug resistant bacteria, MDR incidence was higher in female in compare to male p<0.05. following international infection control guidelines and CDC recommendations are required to burden the spread of nosocomial infections and MDR bacteria among Iraqi patients.

Keywords: Nosocomial infections, Multi drug resistance bacteria, Antibiotic resistance.

Introduction

Nosocomial infections are bacterial infection that patients acquired over staying in hospital for at least 48-72 hrs¹. Most frequent nosocomial infections are urinary tract infections, respiratory tract infections, burn- wound infections and blood stream infections². About 7% to 10% of patients are at risk of acquiring infections over residing at a hospital³. Gram positive bacteria especially S. aureus is predominant bacteria in nosocomial infections⁴. People who accompanying patients in intensive care units are under high risk of getting disease by nosocomial bacteria. Bacteria are rapidly spread in hospital environment by different sources, transmission from patient to patient, through contaminated medical instruments or through health care providers⁵. Hospital acquired infections constitute a major health problem in developing countries due to increasing resistance of bacteria to wide range of antibiotics⁶,⁷. Bacteria can develop resistance through different mechanisms such as modifying enzymes, efflux pump, target mutations⁸, widespread of antibiotics misuse like interrupting treatment, overuse of antibiotics or use it incorrectly aid in bacteria gaining resistance against it⁹. Study showed that the percentage of multidrug resistant bacteria isolated from intensive care units in Uganda were 58% of E.coli, 33.3% of K.pneumonia and 9.1% of Acinetobacter spp¹⁰. Whereas in Iraq, nosocomial bacteria that have been isolated from burn patients exhibited multidrug resistance were 51%, most of bacterial isolates were S. aureus¹¹. Bacteria resistance profiles has been complicated since the emergence of multidrug resistance bacteria (MDR), these bacteria show resistance to one or more of mechanisms which antibiotics work on¹⁰. An example of MDR is methicillin resistance S. aureus that are resist to more than 5 antibiotics such as aminoglycosides, macrolides, tetracycline, chloramphenicol, and lincosamides, MRSA accounts for most hospitals infections and high mortality rate in developing countries¹¹,¹². Other recently emerged bacteria are multi drug resistance gram negative bacteria which consider other health threats¹³. Studying patterns of antibiotics resistance for isolated bacteria help in prescribing the right antibiotic to combat infection, also identifying similar antibiotic resistance patterns for two or more bacterial strains can be used to determine the

DOI Number: 10.5958/0976-5506.2019.01395.0
source of contamination. This study will display most frequent bacterial strains that have been isolated from patients residing in hospital for more than 48 hrs. & identifying antibiotics sensitivity profile for each strain.

Materials and Method

**Specimen Collection:** 109 patients were involved in this study, collected samples included urine, semen, swabs, sputum and blood. For blood collecting, area was swabbed with 70% of alcohol, 5-10 mmol of blood was collected in blood culturing bottles. Midstream urine was taken for diagnosis of UTI infections. Swabs were used to collect wounds, burns and vagina discharges. Each sample was collected in a suitable transfer media until the time of culturing. Culture media: blood, chocolate and MacConkey media were used as an enrichment and selective media for primary diagnosis of bacteria. All petri dishes were incubated aerobically and in the presence of 5% of CO2. Gram staining and different biochemical tests were applied for further identification of grown bacteria at genera and species levels.

**Antibiotic Sensitivity Test:** Antibiotic susceptibility testing was performed by Kirby-Bauer’s disk diffusion method on Muller-Hinton agar (Hi Media, Mumbai, India) in accordance with the standards of the Clinical Laboratory Standards Institute (CLSI, formerly National Committee for Clinical Laboratory Standards [NCCLS]) guidelines. Antibiotics that used are Amikacin (AK), Ampicillin (AM), Amoxicillin+ Clavulanic acid (AMC), Azithromycin (AZM), Chloramphenicol (C), Cefixime (CFM), Ciprofloxacin (CIP), Colistin (CL), Ceftriaxone (CRO), Cefotaxime (CTX), Doxycycline (DOX), Nitrofurantoin (F), Gemifloxacin (GEM), Gentamicin (GEN), Imipenem (IPE), Levofloxacin (LEV), Meropenem (MEM), Nalidixic acid (NA), Netilmicin (NET), Norfloxacin (NOR), Piperacillin (PI), Rifampin (RA), Tetracycline (TE), Ticarcillin (TI).

**Statistical Analysis:** Data were analyzed using excel program 2017, Comparisons between patients’ gender in the rate of occurrence of MDR nosocomial infections were made using fisher test, Probability <0.05 considered significant.

Results and Discussion

113 different bacterial strains have been isolated from different specimens, frequency of each isolated bacteria is illustrated in table 1. Nosocomial bacteria that have been isolated from female was 77% while in male was 19% with P<0.05.

<table>
<thead>
<tr>
<th>Nosocomial bacteria type</th>
<th>No. in female</th>
<th>No. in male</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>S. aureus</em></td>
<td>25 (22%)</td>
<td>9 (8%)</td>
</tr>
<tr>
<td>Mannitol negative <em>S. aureus</em></td>
<td>29 (26%)</td>
<td>4 (4%)</td>
</tr>
<tr>
<td><em>E. coli</em></td>
<td>21 (19%)</td>
<td>5 (4%)</td>
</tr>
<tr>
<td><em>Klebsiella spp.</em></td>
<td>5 (4%)</td>
<td>2 (2%)</td>
</tr>
<tr>
<td><em>Streptococcus spp.</em></td>
<td>3 (3%)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td><em>Pseudomonas spp.</em></td>
<td>0 (0%)</td>
<td>1 (1%)</td>
</tr>
<tr>
<td><em>Enterobacteriaceae</em></td>
<td>2 (2%)</td>
<td>0 (0%)</td>
</tr>
</tbody>
</table>

Antibiotics sensitivity patterns for gram positive and gram negative bacteria are stated in table 2&3, MDR nosocomial bacteria percentage was 90%. The rate of MDR bacteria occurrence among male and female are explained in Figure 1. The problem of antibiotics resistant bacteria has been widely distributed in Iraq, the misuse of antibiotics by patients is the mainly cause of such problem. We conducted this study for the above reason, to determine the percentage of MDR bacteria and to recognize which antibiotics should be excluded from patients’ treatments. Emergence of MDR mannitol negative *S.aureus* have been reported, 33% of nosocomial bacterial isolates are Mannitol negative *S.aureus*. Molecular identification for this isolates are required for validation since STAPH API misidentified mannitol negative strains of *S.aureus* with *S. lundunensis* 17. *S. aureus* and *E.coli* were the most common nosocomial bacteria that have been isolated in the current study. Other studies have been recorded that *S.aureus* followed by *E.coli* and *Klebsiella* are the most common bacteria that have been isolated from different infections. 90% of our isolates were MDR bacteria, Most MDR *E.coli* strains have been isolated from female with UTI. *E.coli* UTI infections are common in female rather than male because of physiological reasons. Following infection control tips are required to burden the spread of nosocomial MDR infections such as hand washing with alcohol gels that are bactericidal, fungicidal and virucidal, wearing garments, gloves and a good quality air filters masks specifically for nurses and other health care providers are important to avoid infections through patients’ body fluids and droplets during coughing 21.

![Table 1: Nosocomial bacteria frequencies distributed by gender](image-url)
help in minimizing the risk of MDR infections, Local surveillance of MDR bacteria percentage and their pattern of resistance should be done annually in order to determine the right antibiotic and the accurate duration of treatment\(^2\). There are guidelines that are followed by US hospitals to minimize the spread of MDR nosocomial bacteria, these guidelines are 1- following SHEA guideline on control of MRSA and VRE\(^2\), 2- CDC recommendation to fight resistance by: Implement infection prevention and control practices. Improve antibiotic use. Implement data and tracking systems to track resistance, guide prevention strategies, and report results at the local and global level. Improve lab capacity to identify resistant bacteria\(^2\).

**Table 2: Antibiotics sensitivity patterns for gram positive nosocomial bacteria**

<table>
<thead>
<tr>
<th>Gram positive bacteria</th>
<th>Ceftriaxone Sensitivity %</th>
<th>Azithromycin Sensitivity %</th>
<th>Rifampin Sensitivity %</th>
<th>Cefotaxime Sensitivity %</th>
<th>Amikacin Sensitivity %</th>
<th>Norfloxacin Sensitivity %</th>
</tr>
</thead>
<tbody>
<tr>
<td>S. aureus</td>
<td>50%</td>
<td>0%</td>
<td>100%</td>
<td>0%</td>
<td>100%</td>
<td>50%</td>
</tr>
<tr>
<td>Negative mannitol S. aureus</td>
<td>0%</td>
<td>0%</td>
<td>100%</td>
<td>0%</td>
<td>100%</td>
<td>0%</td>
</tr>
<tr>
<td>Streptococcus</td>
<td>37.5%</td>
<td>14%</td>
<td>83%</td>
<td>0%</td>
<td>67%</td>
<td>33%</td>
</tr>
</tbody>
</table>

**Table 3: Antibiotics sensitivity patterns for gram negative nosocomial bacteria**

<table>
<thead>
<tr>
<th>Gram negative bacteria</th>
<th>Amikacin Sensitivity %</th>
<th>Ampicillin Sensitivity %</th>
<th>Ciprofloxacin Sensitivity %</th>
<th>Ceftriaxone Sensitivity %</th>
<th>Gentamicin</th>
<th>Nitrofurantoin Sensitivity %</th>
</tr>
</thead>
<tbody>
<tr>
<td>E. coli</td>
<td>43%</td>
<td>0%</td>
<td>62%</td>
<td>31%</td>
<td>79%</td>
<td>84%</td>
</tr>
<tr>
<td>Klebsiella spp.</td>
<td>44%</td>
<td>0%</td>
<td>67%</td>
<td>50%</td>
<td>Unknown</td>
<td>50%</td>
</tr>
<tr>
<td>Pseudomonas spp.</td>
<td>100%</td>
<td>unknown</td>
<td>unknown</td>
<td>100%</td>
<td>50%</td>
<td>50%</td>
</tr>
<tr>
<td>Enterobacter</td>
<td>29%</td>
<td>0%</td>
<td>unknown</td>
<td>43%</td>
<td>75%</td>
<td>100%</td>
</tr>
</tbody>
</table>

![Multi drug resistant bacteria](image)

**Figure 1: The rate of MDR bacteria occurrence between male and female patients. * means P<0.05.**
Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Karbala University, Nursery College, Iraq and all experiments were carried out in accordance with approved guidelines.

REFERENCES
Prevalence and Risk Factors of Low Back Pain among Nurses in Kirkuk General Hospitals

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¹Community Health Nursing, Iraq; ²Psychiatric Nursing, Iraq; ³Maternal and Child Health Nursing, Iraq

ABSTRACT

Work-related low back pain (LBP) is a significant problem among nurses. Great prevalence rates of LBP among nurses are recorded in many countries. Many factors affect back problem included individual and occupational factors. This study aimed to assess the prevalence and associated risk factors with low back pain (LBP) among nurses in general hospitals. A cross-sectional descriptive design study. Convenience sampling technique was used comprising 204 nurses who have fulfilled the inclusion criteria. Data were collected through a self-constructed questionnaire over a period of three weeks, and from two general hospitals (Azadi teaching hospital and Kirkuk general hospital) in Kirkuk city/Iraq. Most of the respondent nurses (52 %) were reported having LBP during the last 12-month of their life. Factors that significantly associated with LBP were personal factors included age, marital status, and weight level in addition to occupational factors such as hospital and the unit/department they work. The current study cautions of high LBP prevalence rates among nurses in Kirkuk city/Iraq. The LBP has a significant association with multiple factors such as; age, marital status, weight level, hospital and the unit or department they work in.

Keywords: Kirkuk, low back pain, nurses, prevalence

Introduction

Musculoskeletal disorders are one of the major troubles that occur in the discipline of health. It is viewed globally as the 2nd leading reason of physical disability ¹. Low back pain (LBP) as one of the most musculoskeletal disorders considered a predominant public health problem, reaching epidemic levels among general people, affecting economically active humans and considered the most critical reason for medical leave ². Previous studies indicated that more than 80% of the overall population will experience a back disorder at some period in their lives ³. The LBP can be defined as pain for at least one day that might radiate to one or both lower limbs in the area between the lower margins of the twelfth ribs to the lower gluteal folds, acute LBP also defined as any LBP that lasts for less than three months, and chronic LBP is defined as pain that lasts for three months or more ⁴. Back pain can be described as all disorders of pain; ache, stiffness or fatigue localized to the back, associated to nursing practice ⁵. Generally, it is the leading reason of disability, reduced bodily overall performance at work and absenteeism in the working people ⁶. The nurses who work for protection, increase and promotion of health in cases of health problems for individuals and families, devote more time with the patients when compared with other health specialists and deliver direct care for the patients ⁷. Therefore, Nurses are amongst the professionals with the most elevated occurrence rates of work-related LBP ⁸. For example, prevalence rate among Iranian nurses was 50%, and one-year prevalence among nurses in Qatar was 54.3 % ⁹,¹⁰. Previous studies discovered that there is different risk factors affecting the incidence and prevalence of low back pain among nurses. These risk factors are divided into: personal, occupational, and psychosocial risk factors. Personal risk factors includes; participants age, gender, marital status, educational level, body mass index, family history, smoking, alcohol usage and physical activity performance ¹¹,¹². Whereas, occupational risk factors that associated with LBP among nursing staff includes; prolong standing, frequent bending, lifting and moving patients or heavy objects, continued postures, awkward positions, job organization,
inadequate ergonomic structures, inappropriate work
design, low social support, poor job satisfaction, staff
deficiencies and unsuitable working condition\textsuperscript{13,14}.

Methodology

Design and Sampling: This study adopted a cross-
sectional descriptive design. Convenience sampling
technique was used to involve 204 nurses who fulfilled
the inclusion criteria. The participant nurses were from
different workplace (units/departments) and at different
work shifts. The researchers had excluded the nurses
with less than a year experience, pregnant nurses, and
nurses with a metastatic disease.

Data Collection Tool: A data collection sheet was
constructed after reviewing many relevant literatures. It
composed of 30 items comprising: personal characteristics
(age, gender, marital status, education level, weight,
height, smoking and exercise performance), work-related
characteristics (hospitals, units/departments, experience,
weekly working hours’ rate, working shifts, dual jobs,
work stress, frequent standing, sitting, walking, bending
or twisting, lifting heavy weight and participation in
training course regarding preventing LBP). The final
part of the tool concerned prevalence of LBP (last 12
month), pain description (pain acuity, duration, causes,
and professional consequences (absence from work, and
change of workplace). The English questionnaire was
translated to Arabic language.

Data Collection Procedure: The data were collected
over a period of three weeks from two general hospitals
(Azadi teaching hospital and Kirkuk general hospital)
in Kirkuk city/Iraq. The data were collected through
self-administrated questionnaire and filling out the
questionnaire took about 5-10 minutes. Ethical approval
was granted by the Directorate of Kirkuk health and the
hospitals. Informed consent was obtained from all the
participants before the data collection procedure. They
were informed that their participation was fully voluntary
and they had the right to withdraw or discontinue from
this study at any time without any hesitation or risk.

Data Analysis: All data were summarized and analyzed
by using Statistical Package for Social Sciences version
23. Descriptive statistics described the nurses’ personal
characteristics data, work-related characteristics data and
the prevalence of LBP. Group differences and association
were analyzed by the ($t$-test and Chi-square test and Fisher
test) with the level of significance determined at P- value
less than 0.05. Data were further analyzed using Binary
logistic regression techniques to discover for independent
predictors of point prevalence of LBP.

Result and Discussion

Sample Characteristics: Two hundred and eighteen
questionnaires were distributed and only 206 nurses
(response rate = 94.5\%) decided to participate and
completed the survey from the selected hospital.
Respondents were mostly young ($M = 28$, $SD = 7.86$) and
71.6\% were between the age 20-29 years, approximately
60\% of were female and 53.4\% were single. Most of the
nurses (84.6\%) had work experience ranged from 1 to 10
year. Other details are shown in Table 1.

Table 1: Personal characteristics of the respondents

<table>
<thead>
<tr>
<th>Variable</th>
<th>F</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age Group</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20-29</td>
<td>146</td>
<td>71.6</td>
</tr>
<tr>
<td>30-39</td>
<td>33</td>
<td>16.2</td>
</tr>
<tr>
<td>40-49</td>
<td>21</td>
<td>10.3</td>
</tr>
<tr>
<td>50-59</td>
<td>4</td>
<td>2.0</td>
</tr>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>80</td>
<td>39.2</td>
</tr>
<tr>
<td>Female</td>
<td>124</td>
<td>60.8</td>
</tr>
<tr>
<td><strong>Marital Status</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single</td>
<td>109</td>
<td>53.4</td>
</tr>
<tr>
<td>Married</td>
<td>93</td>
<td>45.6</td>
</tr>
<tr>
<td>Divorced/ Separated</td>
<td>2</td>
<td>1.0</td>
</tr>
<tr>
<td><strong>Educational Level</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Preparatory of Nursing</td>
<td>63</td>
<td>30.9</td>
</tr>
<tr>
<td>Institute of Nursing</td>
<td>73</td>
<td>35.7</td>
</tr>
<tr>
<td>College of Nursing</td>
<td>68</td>
<td>33.4</td>
</tr>
<tr>
<td><strong>Hospital</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Azadi</td>
<td>108</td>
<td>52.9</td>
</tr>
<tr>
<td>Kirkuk</td>
<td>96</td>
<td>47.1</td>
</tr>
<tr>
<td><strong>Experience</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-10</td>
<td>173</td>
<td>84.8</td>
</tr>
<tr>
<td>11-20</td>
<td>20</td>
<td>9.8</td>
</tr>
<tr>
<td>21-30</td>
<td>7</td>
<td>3.4</td>
</tr>
<tr>
<td>31-40</td>
<td>4</td>
<td>2.0</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>204</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Prevalence Rates: Figure 1 shows the last 12-month
prevalence of low back pain (LBP). Total 106 (52\%) of
the respondent reported having LBP and 98 (48\%) not
reported LBP during the last 12-month of their life.
Factors associated with LBP: Regarding the personal factors, the results revealed that age, marital status and weight level were personal factors significantly associated with LBP within the P-value less than 0.5. Also, the results of the t-test show that the prevalence of LBP was higher in older nurses ($M = 29.09$, $SD = 8.33$) than in younger nurses ($M = 26.97$, $SD = 7.1$) ($t$-test $= -1.953$, $P = 0.05$). Furthermore, the results of the Fisher test show that single nurses significantly reported higher prevalence of LBP (59.6 %) compared to the married nurses 43 % (Fisher = 5.777, $P= 0.03$). The prevalence of LBP was also higher in overweight nurses (63.6%) compared with underweight (25 %) and normal body weight nurses (44.9 %) (Fisher = 8.01, $P = 0.04$). Other personal factors, such as gender, educational level, smoking and regular exercise performance were not significantly associated with LBP within the P-value equal or less than 0.5 (Table 2). The hospital and the workplace (department/unit) were only the occupational factors significantly associated with LBP. The results of the Chi-square show that the prevalence of LBP was more common in nurses who working in Azadi teaching hospital (63.9 %) in compare with nurses who working in Kirkuk teaching hospital (38.5 %) ($X^2 = 9.505$, $P = 0.002$). Regarding the unit/department, the result of Chi-square reveals that the prevalence of LBP was higher in nurses who are working in Operations department (68.9 %), Pediatric departments (66.7 %) and Maternity departments (66.7) sequentially ($X^2= 23.219$, $P = 0.003$). Other occupational factors, such as experience, work stress, standing, sitting, walking, bending or twisting and lifting heavy weight were not significantly associated with LBP within the P-value less than 0.5 (Table 3). Binary logistic regression demonstrated the association between LBP and risk factors; such as age, gender, marital status, educational level, smoking, exercise, BMI, work experience, hospital, department/unit, work stress, prolong standing, prolong sitting, prolong walking, prolong bending and lifting heavy weight. Four of these risk factors, reached statistical significance ($P < 0.05$) including department or unit, hospital, age and marital status. Some departments or units show statistically significant association includes pediatrics, operation department, consultation and surgical departments, with working in pediatric departments ($P= 0.00$) and operation departments ($P= 0.006$) sequentially being the strongest risk factors with an odds ratio of 0.1 (range 0.031 to 0.318) and 0.162 (range 0.044 to 0.591). Hospital is also considering statistically significant factor with an odds ratio of 0.288 (range 0.135 to 0.612) and $P= 0.001$. Furthermore, age is statistically significant with an odds ratio of 1.05 (range 0.998 to 1.104) and $P= 0.041$, indicating that, for every additional year of age, nurses are 0.8 more likely to report LBP, controlling all other factors in the model. The last statistically significant factor is marital status, with an odds ratio of 0.555 (range 0.301 to 1.021) and $P= 0.045$. Other risk factors were not demonstrated significant association with LBP within the P-value less than 0.5 (Table 4). Current study results show that more than half of nurses (52 %) experienced LBP during the last 12-month period. This indicates that LBP is an existing and prevalent problem among the nurses. Comparing with the results from various studies using the same measure, the result is in line with a result of a study conducted among nurses in Fattouma Bourguiba teaching hospital in Tunis when last year prevalence rate was 50.1% 16. Higher records of LBP prevalence were observed in a study done among nurses working in intensive care units in China and they reported an annual prevalence of 87% 17, and among Jordan nurses with the one year prevalence of 78.9% 18. Lower records of LBP prevalence were also observed in studies conducted in England 45% 19, Italy 44% 20, and Hong Kong 41.6%.
Table 2: Individual factors associated with LBP

<table>
<thead>
<tr>
<th>Variables</th>
<th>With LBP (n=106)</th>
<th>Without LBP (n= 68)</th>
<th>Test</th>
<th>Test Value</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (Mean ± SD)</td>
<td>29.09 ± 8.332</td>
<td>26.97 ± 7.196</td>
<td>t-test</td>
<td>-1.953</td>
<td>0.05</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>male</td>
<td>40 (50%)</td>
<td>40 (50%)</td>
<td>Chi-square</td>
<td>0.203</td>
<td>0.66</td>
</tr>
<tr>
<td>female</td>
<td>66 (53.2%)</td>
<td>58 (46.8%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Marital status</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single</td>
<td>65 (59.6%)</td>
<td>44 (40.4%)</td>
<td>Fisher</td>
<td>5.777</td>
<td>0.03</td>
</tr>
<tr>
<td>Married</td>
<td>40 (43%)</td>
<td>53 (57%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Divorced/Separated</td>
<td>1 (50%)</td>
<td>1 (50%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Educational level</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Preparatory</td>
<td>32 (50.8)</td>
<td>31 (49.2)</td>
<td>Chi-square</td>
<td>3.261</td>
<td>0.19</td>
</tr>
<tr>
<td>Institute</td>
<td>33 (45.2)</td>
<td>40 (54.8)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>College</td>
<td>41 (60.3)</td>
<td>27 (39.7)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Smoking</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Smoker</td>
<td>10 (41.7)</td>
<td>14 (58.3)</td>
<td>Chi-square</td>
<td>1.155</td>
<td>0.38</td>
</tr>
<tr>
<td>Non smoker</td>
<td>96 (53.3)</td>
<td>84 (46.7)</td>
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</tr>
<tr>
<td>Exercise</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>28 (54.9)</td>
<td>23 (45.1)</td>
<td>Chi-square</td>
<td>0.238</td>
<td>0.74</td>
</tr>
<tr>
<td>No</td>
<td>78 (51)</td>
<td>75 (49)</td>
<td></td>
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</tr>
<tr>
<td>Weight Level</td>
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<td></td>
</tr>
<tr>
<td>Underweight</td>
<td>2 (25)</td>
<td>6 (75)</td>
<td>Fisher</td>
<td>8.012</td>
<td>0.04</td>
</tr>
<tr>
<td>Normal weight</td>
<td>48 (44.9)</td>
<td>59 (55.1)</td>
<td></td>
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</tr>
<tr>
<td>Overweight</td>
<td>42 (63.6)</td>
<td>24 (36.4)</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Obese</td>
<td>10 (43.5)</td>
<td>13 (56.5)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 3: Occupational factors associated with LBP

<table>
<thead>
<tr>
<th>Variables</th>
<th>With LBP (n= 106)</th>
<th>Without LBP (n= 98 )</th>
<th>Test</th>
<th>Test Value</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experience (M ± SD)</td>
<td>5.82 ± 8.05</td>
<td>4.63 ± 6.26</td>
<td>t-test</td>
<td>-1.170</td>
<td>.243</td>
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<tr>
<td>Hospital</td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Azadi</td>
<td>69 (63.9)</td>
<td>39 (36.1)</td>
<td>Chi-square</td>
<td>9.505</td>
<td>0.0002</td>
</tr>
<tr>
<td>Kirkuk</td>
<td>37 (38.5)</td>
<td>59 (61.5)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unit/Department</td>
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<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Consultation</td>
<td>5 (50)</td>
<td>5 (50)</td>
<td>Chi-square</td>
<td>23.219</td>
<td>0.003</td>
</tr>
<tr>
<td>Dialysis</td>
<td>6 (50)</td>
<td>6 (50)</td>
<td></td>
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</tr>
<tr>
<td>Emergency</td>
<td>5 (25)</td>
<td>15 (75)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ICU</td>
<td>8 (47.1)</td>
<td>9 (52.9)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maternity</td>
<td>12 (66.7)</td>
<td>6 (33.3)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medical</td>
<td>8 (25.8)</td>
<td>23 (74.2)</td>
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<tr>
<td>pediatric</td>
<td>12 (66.7)</td>
<td>6 (33.3)</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Surgical</td>
<td>19 (57.6)</td>
<td>14 (42.4)</td>
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</tr>
<tr>
<td>Theatre</td>
<td>31 (68.9)</td>
<td>14 (31.1)</td>
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<tr>
<td>Work Stress</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>52 (57.8)</td>
<td>38 (42.2)</td>
<td>Chi-square</td>
<td>2.183</td>
<td>0.159</td>
</tr>
<tr>
<td>No</td>
<td>54 (47.4)</td>
<td>60 (52.6)</td>
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</tbody>
</table>
Conted…

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<thead>
<tr>
<th>Frequent Standing</th>
<th>Yes</th>
<th>81 (53.3)</th>
<th>71 (46.7)</th>
<th>Chi-square</th>
<th>0.442</th>
<th>0.525</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No</td>
<td>25 (48.1)</td>
<td>27 (51.9)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Frequent Sitting</th>
<th>Yes</th>
<th>9 (69.2)</th>
<th>4 (30.8)</th>
<th>Chi-square</th>
<th>1.659</th>
<th>0.25</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No</td>
<td>97 (50.8)</td>
<td>94 (49.2)</td>
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</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Frequent Walking</th>
<th>Yes</th>
<th>53 (49.5)</th>
<th>54 (50.5)</th>
<th>Chi-square</th>
<th>0.531</th>
<th>0.486</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No</td>
<td>53 (54.6)</td>
<td>44 (45.4)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Frequent Bending</th>
<th>Yes</th>
<th>60 (57.7)</th>
<th>44 (42.3)</th>
<th>Chi-square</th>
<th>2.792</th>
<th>0.122</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No</td>
<td>46 (46)</td>
<td>54 (54)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Frequent Lifting heavy weight</th>
<th>Yes</th>
<th>47 (51.1)</th>
<th>45 (48.9)</th>
<th>Chi-square</th>
<th>0.051</th>
<th>0.888</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No</td>
<td>59 (52.7)</td>
<td>53 (47.3)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 4: Logistic regression of risk factors

<table>
<thead>
<tr>
<th>Factors</th>
<th>OR</th>
<th>95% C.I. for OR Lower</th>
<th>95% C.I. for OR Upper</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>1.050</td>
<td>.998</td>
<td>1.104</td>
<td>.041</td>
</tr>
<tr>
<td>Gender</td>
<td>1.903</td>
<td>.883</td>
<td>4.103</td>
<td>.101</td>
</tr>
<tr>
<td>Marital status</td>
<td>.555</td>
<td>.301</td>
<td>1.021</td>
<td>.045</td>
</tr>
<tr>
<td>Educational level</td>
<td>1.047</td>
<td>.870</td>
<td>1.260</td>
<td>.629</td>
</tr>
<tr>
<td>Smoking</td>
<td>1.065</td>
<td>.409</td>
<td>2.772</td>
<td>.898</td>
</tr>
<tr>
<td>Exercise</td>
<td>.724</td>
<td>.367</td>
<td>1.427</td>
<td>.351</td>
</tr>
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<td>BMI</td>
<td>.985</td>
<td>.905</td>
<td>1.071</td>
<td>.716</td>
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<tr>
<td>Experience</td>
<td>1.009</td>
<td>.958</td>
<td>1.062</td>
<td>.737</td>
</tr>
<tr>
<td>Hospital</td>
<td>.288</td>
<td>.135</td>
<td>.612</td>
<td>.001</td>
</tr>
<tr>
<td>Unit/Department</td>
<td></td>
<td></td>
<td></td>
<td>.006</td>
</tr>
<tr>
<td>Consultation</td>
<td>.158</td>
<td>.029</td>
<td>.848</td>
<td>.031</td>
</tr>
<tr>
<td>Emergency</td>
<td>.543</td>
<td>.128</td>
<td>2.306</td>
<td>.408</td>
</tr>
<tr>
<td>Theatre</td>
<td>.162</td>
<td>.044</td>
<td>.591</td>
<td>.006</td>
</tr>
<tr>
<td>Surgical</td>
<td>.285</td>
<td>.081</td>
<td>1.007</td>
<td>.046</td>
</tr>
<tr>
<td>Medical</td>
<td>.498</td>
<td>.119</td>
<td>2.082</td>
<td>.340</td>
</tr>
<tr>
<td>Pediatrics</td>
<td>.100</td>
<td>.031</td>
<td>.318</td>
<td>.000</td>
</tr>
<tr>
<td>Maternity</td>
<td>.817</td>
<td>.219</td>
<td>3.046</td>
<td>.764</td>
</tr>
<tr>
<td>ICU</td>
<td>.458</td>
<td>.146</td>
<td>1.433</td>
<td>.180</td>
</tr>
<tr>
<td>Stress</td>
<td>.753</td>
<td>.378</td>
<td>1.500</td>
<td>.420</td>
</tr>
<tr>
<td>Standing</td>
<td>.889</td>
<td>.390</td>
<td>2.028</td>
<td>.780</td>
</tr>
<tr>
<td>Sitting</td>
<td>.368</td>
<td>.093</td>
<td>1.462</td>
<td>.155</td>
</tr>
<tr>
<td>Walking</td>
<td>1.093</td>
<td>.526</td>
<td>2.269</td>
<td>.812</td>
</tr>
<tr>
<td>Bending</td>
<td>.617</td>
<td>.301</td>
<td>1.267</td>
<td>.188</td>
</tr>
<tr>
<td>Lifting</td>
<td>1.255</td>
<td>.601</td>
<td>2.622</td>
<td>.546</td>
</tr>
</tbody>
</table>

Conclusion

The current study cautions of high LBP prevalence rates. Though, taking precautions for prevention of LBPs in nurses is necessary in order for nurses to exercising their fundamental right to work below healthful and safe conditions, to keep their professions and to grant better support for their patients. The LBP has associated with factors, such as age, marital status, weight level, and hospital and the unit or department they work in. We recommend conducting further studies with a larger sample of nursing staff in different cities and regions and include other types of risk factors such as psychosocial factors. In addition, there is need to conduct more studies to investigate the level of nurse’s cognitive knowledge for this problem, and its ergonomic solutions.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Community Health Nursing. Iraq and all experiments were carried out in accordance with approved guidelines.

REFERENCES

1. Vos T, Flaxman AD, Naghavi M, Lozano R, Michaud C. Years lived with disability (YLDs) for 1160 sequelae of 289 diseases and injuries


Quality of Life among Caregiver of Children with Thalassemia in Al-Najaf Governorate

Wameedh Hamid Shaker
University of Kufa, Faculty of Nursing, Iraq

ABSTRACT

Objective(s): To assess quality of life among child’s caregiver with thalassemia, and to find out relationship between socio-demographic data and caregiver of child with quality of life among caregiver. Descriptive study designed was carried out through the present study in order to achieve the early stated objectives for period from February 2017 to March 2017. The study is conducted at AL-Najaf health directorate Al Zahra’a teaching Hospital the governorate of Najaf. Simple purposeful sample of (80) children with thalassemia in the present study all from teaching Hospital. The main findings of the study indicated that through the course of data analysis more than one half of the study sample the most hospitals are distributed in the city center rather than in the city side or in rural areas, the males patients are more attend than the female patients, the study sample responses to overall evaluation for the majority of the family interaction items was unsatisfied, study subject’s responses to the correlation ship through all domain the family interaction was which reported a significant cases correlation ship at p-value 0.01 level correlation is significant also parenting and physical material well–being.

Keyword: Caregiver, Children, Quality of life, Thalassemia.

Introduction

Thalassemia at current is reflected as one of the most challenging hematological disorder with no permanent cure. It refers to a group of genetic disorders, characterized by insufficient making of hemoglobin\(^1\). The genetics of thalassemia are alike to those of sickle cell disease in that it is hereditary through an autosomal recessive process. It a genetic disorder that most often affects those of African descent, but it also affects individuals of Middle Eastern, Caribbean, Mediterranean descent and South Asian,\(^2\). There are two basic types of thalassemia, \(\alpha\) and \(\beta\). In \(\alpha\)-thalassemia, synthesis of the \(\alpha\) chain of the hemoglobin protein is affected. Complications with the \(\beta\) chain occur more often.\(^2\) Thalassemia affects patients’ health-related quality of life (HRQOL). Children with thalassemia major has to undergo blood transfusion at least once a month, depending on the severity of the disease. Iron chelation therapy such as desferrioxamine is required to remove excessive iron in the blood, which resulted from regular blood transfusion\(^3\). Although efforts to measure quality of life (QOL) of children are complex, more and more generic measures of disease-specific tools have been reported HRQOL of the physical, psychological and social domains of health are influenced by experiences, beliefs, expectations and perceptions\(^4\).

Methodology

A descriptive “Evolutional” design was carried out to determine the Quality of life among caregiver of children with thalassemia. Simple purposeful sample of (80) Quality of life among caregiver of children with thalassemia in al-najaf governmental.

Instruments: Through extensive review of relevant literature, a questionnaire was fashioned for the purpose of the study. It is composed of three major parts included personal information sheet. Demographical data, social-demographic data of child and family interaction.

Data Collection: The data collection process was initiated for the period of February 1th, 2017 through March 23th, 2017. Data were collected through the use of the constructed questionnaire.

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Email: wamithh.alzubeidi@uokufa.edu.iq
Data Analysis: In order to determine whether the objectives of the study were met or not, two statistical approaches were used for analyzing the data of the study. Results were considered highly significant.

Results and Discussion

Table 1 shows that the different levels of Age Groups variable whatever a large frequency was reported at seven and above (55.0%). This table shows that the majority of the study subjects haven’t male (56.2%). This table show is father occupation was student 57.5%. This table also father that frequency is a highly significant mainly at the father alive 98.8% and mother alive 93.3%. (Institution and college graduate) for father education level (37.5%), whereas the mother education level was Secondary school graduate (17.5%). This table show is father occupation was Employment (51.2%). While mother occupation was House wife (61.3%). This table shows that majority have urban (52.5%). Whereas the family socio-economic status was (52.5%) barely sufficient. Table 2 showed the correlation ship through all domain the family interaction was which reported a significant cases correlation ship at 0.01 level correlation is significant also parenting and physical/material well-being

Throughout the course of the present study, the study results show of the sample age of the child that the percentage was for (7-11) average (50.%) this result agree with the Caregiver Burden and Social Support in Mothers with β-Thalassemia children concerning the gender, most of the study sample (56.2 %) this may be due to that the mean gender of the patients, this result is similar to results (51.8%) obtained from study Quality of life in children with β-thalassemia major at center for special diseases  the study results show of the sample child is student (75.5%) and father alive is (98.8%) and mother alive is (93.8%). This result similar to result (95.1%), caregiver age (26-40) year is (50%) the study found that high percentage of caregiver is mother (48.8%) and educational level for mother is primary school (31.2%) while education level for father is institution and college graduated (37.5%) this result agree with Quality of Life among thalassemia children, adolescent and their caregivers and study of occupation of mother is house wife (61.3%) and father occupation is employed (41.2%)  the study results show of the satisfied with hepatic iron stores and plasma ferritin concentration in patients with sickle cell anemia and thalassemia major satisfied for emotional well-being in the study  the study results show of satisfied with bone marrow transplantation for children with thalassemia major in the UK is the quality of life satisfied was reach agreement in study  This table show is explain the quality of life variables that include Caregiver, Educational level for father, Educational level for mother, Occupation for father, Occupation for mother, Residential area, and Family socio-economic status was disagree with for the Growth and puberty and its management in thalassemia

Table 1: Distribution of the Study Sample by Their Socio-Demographic Characteristics

<table>
<thead>
<tr>
<th>Demographic data</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age of the child</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;= 6</td>
<td>4</td>
<td>5.0%</td>
</tr>
<tr>
<td>7 – 11</td>
<td>44</td>
<td>55.0%</td>
</tr>
<tr>
<td>12 Up</td>
<td>32</td>
<td>40.0%</td>
</tr>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>45</td>
<td>56.2%</td>
</tr>
<tr>
<td>Female</td>
<td>35</td>
<td>43.8%</td>
</tr>
<tr>
<td><strong>Occupation</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Student</td>
<td>46</td>
<td>57.5%</td>
</tr>
<tr>
<td>Employed both</td>
<td>0</td>
<td>0.0%</td>
</tr>
<tr>
<td>Nothing</td>
<td>34</td>
<td>42.5%</td>
</tr>
<tr>
<td><strong>Father</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alive</td>
<td>79</td>
<td>98.8%</td>
</tr>
<tr>
<td>Dead</td>
<td>1</td>
<td>1.2%</td>
</tr>
<tr>
<td><strong>Mother</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alive</td>
<td>75</td>
<td>93.8%</td>
</tr>
<tr>
<td>Dead</td>
<td>5</td>
<td>6.2%</td>
</tr>
<tr>
<td><strong>Caregiver age</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;= 25</td>
<td>11</td>
<td>13.8%</td>
</tr>
<tr>
<td>26 – 40</td>
<td>40</td>
<td>50.0%</td>
</tr>
<tr>
<td>41 Up</td>
<td>29</td>
<td>36.2%</td>
</tr>
<tr>
<td><strong>Caregiver</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Father</td>
<td>30</td>
<td>37.5%</td>
</tr>
<tr>
<td>Mother</td>
<td>39</td>
<td>48.8%</td>
</tr>
<tr>
<td>Brother</td>
<td>7</td>
<td>8.8%</td>
</tr>
<tr>
<td>Sister</td>
<td>2</td>
<td>2.5%</td>
</tr>
<tr>
<td>Friend</td>
<td>0</td>
<td>0.0%</td>
</tr>
<tr>
<td>Relative</td>
<td>2</td>
<td>2.5%</td>
</tr>
</tbody>
</table>
... educational level for mother

<table>
<thead>
<tr>
<th>Educational level</th>
<th>Unable to read and write</th>
<th>Able to read and write</th>
<th>Primary school graduate</th>
<th>Intermediate school graduate</th>
<th>Secondary school graduate</th>
<th>Institution and college graduate</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>6</td>
<td>13</td>
<td>25</td>
<td>8</td>
<td>14</td>
<td>14</td>
</tr>
<tr>
<td>Percentage</td>
<td>7.5%</td>
<td>16.2%</td>
<td>31.2%</td>
<td>10.0%</td>
<td>17.5%</td>
<td>17.5%</td>
</tr>
</tbody>
</table>

... educational level for father

<table>
<thead>
<tr>
<th>Educational level</th>
<th>Unable to read and write</th>
<th>Able to read and write</th>
<th>Primary school graduate</th>
<th>Intermediate school graduate</th>
<th>Secondary school graduate</th>
</tr>
</thead>
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<tr>
<td></td>
<td>2</td>
<td>5</td>
<td>13</td>
<td>14</td>
<td>16</td>
</tr>
<tr>
<td>Percentage</td>
<td>2.5%</td>
<td>6.2%</td>
<td>16.2%</td>
<td>17.5%</td>
<td>20.0%</td>
</tr>
</tbody>
</table>

... occupation for mother

<table>
<thead>
<tr>
<th>Occupation</th>
<th>Employment</th>
<th>Unemployed</th>
<th>House wife</th>
<th>Retired</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percentage</td>
<td>13</td>
<td>18</td>
<td>49</td>
<td>0</td>
</tr>
</tbody>
</table>

... occupation for father

<table>
<thead>
<tr>
<th>Occupation</th>
<th>Employment</th>
<th>Unemployed</th>
<th>House wife</th>
<th>Retired</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percentage</td>
<td>41</td>
<td>33</td>
<td>3</td>
<td>3</td>
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</table>

... residential area

<table>
<thead>
<tr>
<th>Area</th>
<th>Urban</th>
<th>Rural</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percentage</td>
<td>42</td>
<td>38</td>
</tr>
</tbody>
</table>

... family socio-economic status

<table>
<thead>
<tr>
<th>Status</th>
<th>Sufficient</th>
<th>Barely sufficient</th>
<th>Don’t know</th>
<th>&lt;= 1</th>
<th>1 – 3</th>
<th>3 Up</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percentage</td>
<td>30</td>
<td>42</td>
<td>8</td>
<td>30</td>
<td>49</td>
<td>1</td>
</tr>
</tbody>
</table>

... Crowding index

<table>
<thead>
<tr>
<th>Index</th>
<th>&lt;= 1</th>
<th>1 – 3</th>
<th>3 Up</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percentage</td>
<td>37.5%</td>
<td>61.3%</td>
<td>1.2%</td>
</tr>
</tbody>
</table>

... Total

<table>
<thead>
<tr>
<th></th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percentage</td>
<td>80</td>
</tr>
</tbody>
</table>

Table 2: Correlation among all domain Items

<table>
<thead>
<tr>
<th>No. 80</th>
<th>Family interaction</th>
<th>Parenting</th>
<th>Emotional well being</th>
<th>Physical/material well being</th>
<th>Disability related suppose</th>
</tr>
</thead>
<tbody>
<tr>
<td>Family interaction</td>
<td>Pearson Correlation</td>
<td>.561**</td>
<td>.192</td>
<td>.299**</td>
<td>.544**</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td>.000</td>
<td>.087</td>
<td>.007</td>
<td>.000</td>
<td></td>
</tr>
<tr>
<td>Parenting</td>
<td>Pearson Correlation</td>
<td>.561**</td>
<td>.320**</td>
<td>.401**</td>
<td>.378**</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td>.000</td>
<td>.004</td>
<td>.000</td>
<td>.001</td>
<td></td>
</tr>
<tr>
<td>Emotional well being</td>
<td>Pearson Correlation</td>
<td>.192</td>
<td>.320**</td>
<td>.294**</td>
<td>.217</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td>.087</td>
<td>.004</td>
<td>.008</td>
<td>.053</td>
<td></td>
</tr>
<tr>
<td>Physical/material well being</td>
<td>Pearson Correlation</td>
<td>.299**</td>
<td>.401**</td>
<td>.294**</td>
<td>.291**</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td>.007</td>
<td>.000</td>
<td>.008</td>
<td>.009</td>
<td></td>
</tr>
<tr>
<td>Disability related support</td>
<td>Pearson Correlation</td>
<td>.544**</td>
<td>.378**</td>
<td>.217</td>
<td>.291**</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td>.000</td>
<td>.001</td>
<td>.053</td>
<td>.009</td>
<td></td>
</tr>
</tbody>
</table>

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

The majority of the study subjects father occupation and mother occupation was majority. Most of the sample from above 7-11 years old. The educational level of majority of the sample is Secondary school graduate the majority of gender was of the sample male, overall disability assessment of the physical and emotional study subjects responded with overall disability. The quality of life was affected the most domain. The overall assessment of quality of life and demographic data significant.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the University of Kufa/faculty of Nursing, Iraq and all experiments were carried out in accordance with approved guidelines.

REFERENCES


The Impact of Teaching on the Skills of Visual Thinking and the Development of the Tendency of Pupils in the Fifth Grade Primary

Olfat Kazem Omran1, Mahdi Jader Habib1, Qais Hatem Hani1
1University of Babylon, College of Basic Education, Babylon, Iraq

ABSTRACT

The aim of the research was to identify the effect of teaching on the skills of visual thinking in the collection of social subjects and the development of the inclination of the students in the fifth grade. The researcher adopted the method of experimental research as a methodology for the research, which includes independent variable (visual thinking skills) and two variables (achievement and tendency development) A partial-experimental experiment to adjust search variables, Before applying the experiment, the researcher was rewarded between the two research groups for the purpose of obtaining accurate and objective results with the following variables (The chronological age is a month, Grades of social subjects in the half year, Educational achievement of parents, Raven test for intelligence, Tribal test for tilt scale) After the equivalence between the two groups of research, the researcher prepared the application requirements of plans, objectives and tests for the two research groups, after the completion of the application of the experiment. The researcher applied her research tools to the two research groups and after correcting the students’ answers, the researcher obtained data for the experimental group and control. The data were processed statistically by (spss) and (T-test) for both groups.

Keywords: education, Course of Study, Teacher, Modalities and skills, Social Studies, Visual thinking, Visual Thinking Skills, Collection, development of inclination.

Introduction

Since education is a planned and deliberate process, it aims at making desired positive changes (educational and social) in the student’s behavior, thinking and understanding. The main objective is to make the student a strong and influential figure in society and to establish relations with his peers. The first goal of education is to graduate men who are capable of producing new things, innovative men and explorers 1, Hence, education has become one of the most important means adopted by nations and peoples to raise their children in accordance with the social philosophy they are following. This is the most powerful way for nations to prepare their generations 2. The curriculum is a means of education that includes all the experiences that are given to the student from inside and outside the school. It also constitutes a basis in shaping the life of the individual and the society and preparing generations capable of keeping pace with the progress of civilization and keeping pace with the scientific development. The curriculum is important for giving the individual the ability to deal with others Ability to think properly, which includes analysis, criticism, reasoning and evaluation in the stages of the educational process, all of which passes through the student 3. The school can achieve its objectives represented by the objectives of education through various means, including the school curriculum, which means the range of experiences and the practical activities of the school for students with the purpose of contact and interaction with them and the results of this interaction to learn and modify their behavior and lead these experiences and those activities to achieve the ultimate goal of education 4. And that the school curriculum is closely related to the methods of teaching; because teaching methods are one of the important means in translating the curriculum to what the school aims to create habits, tendencies, trends and values when asked and the good way of teaching is not limited to providing methodological information.
only but helps to develop student tendencies and push them to Positive action and productive participation in education\(^5\). There is no better method of teaching, so the teacher must choose a method appropriate to the nature of the learner and the subject matter for each method of social and descriptive environment that achieves its objectives Titi, (2007). The social materials curriculum has a prominent place because of its importance and effective impact in the preparation of young people for their academic and professional future to make them useful and active members of society so that they can bear the consequences of life and their burdens, understand the problems surrounding them and their society and contribute to the development of successful solutions to them and have the will to change for what is best for them and their community. An important factor that leads to the success of the teacher in his work is his proficiency in teaching skills, because this leads to increasing the participation of students and attract their attention and raise their level of education. The successful teacher is the teacher who adapts the different methods and volunteering to suit the different grades that differ according to the students themselves\(^8\).

**Methodology**

**Experimental Design:** Research Methodology The researcher adopted the experimental approach to achieve the two research objectives and used the experimental design of the experimental groups and the partial control.

**Research Community:** The research community is one of the fifth grade primary school pupils in the primary day schools for girls in Babil governorate for the academic year 2017-2018. A sample of schools from the Directorate General of Babylon was randomly selected. Fifth Primary Of the 69 students distributed between the two divisions (A - B) In a random way was chosen Division (A) to represent the experimental group and Division (B) to represent the control group and after the exclusion of student deposits in the two divisions (A - B) The total number of 63 students in each The experimental and control groups.

**Equal Search Groups:** The two groups were investigated in the following variables (IQ test, the age of the students, the grades of the social subjects in the semesters exam, the parents’ educational achievement and the pre-test of the slope scale).

**IQ Test:** The researcher applied the Raven test for successive colored matrices on the students of the two research groups because of their suitability for the students of the research sample. After correcting the responses, the average score of the experimental group was (21.06), while the average score of the students in the control group was( 20.66), When the T-test was used for two independent samples, it was found that the difference was not statistically significant at (0.05).

<table>
<thead>
<tr>
<th>Level of significance</th>
<th>T value</th>
<th>The degree of freedom</th>
<th>variance</th>
<th>standard deviation</th>
<th>Arithmetic mean</th>
<th>Number of sample members</th>
<th>the group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-D at the level of 0.05</td>
<td>2,000</td>
<td>0.223</td>
<td>61</td>
<td>44,36</td>
<td>6,66</td>
<td>21,06</td>
<td>31</td>
</tr>
<tr>
<td></td>
<td>61,00</td>
<td>7,81</td>
<td></td>
<td></td>
<td>20,66</td>
<td>32</td>
<td>Control</td>
</tr>
</tbody>
</table>

The chronological age is computed per month: The mean age of the experimental group was 130.94 months. And the arithmetic average of the control group (129.78) months. The variance of the control group was (19,27) and the experimental group (29,70). When the t-test was used for two independent groups to determine the difference between the age of the students of the two groups of research, it was found that the difference was not statistically significant at (0.05) and the freedom degree (61). The calculated T value (0.928) Which is smaller than the scale value of (2,000) as in Table (2). The T tabular value is (2) at the degree of freedom (61) and the significance level (0.05), meaning that there are no statistically significant differences between the average age of months for the two research groups.
Table 2: Arithmetical mean, standard deviation, variance, and T calculated and tabular value of the experimental and control groups in the chronological age variable

<table>
<thead>
<tr>
<th>Level of significance</th>
<th>T value</th>
<th>The degree of freedom</th>
<th>Variance</th>
<th>standard deviation</th>
<th>Arithmetic mean</th>
<th>Number of sample members</th>
<th>the group</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Table</td>
<td>Calculated</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-D at the level of 0.05</td>
<td>2,000</td>
<td>0,928</td>
<td>61</td>
<td>29,70</td>
<td>5,45</td>
<td>130,49</td>
<td>31 Experimental</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>19,27</td>
<td>4,39</td>
<td></td>
<td></td>
<td></td>
<td>129,78</td>
<td>32 Control</td>
</tr>
</tbody>
</table>

Grades of social subjects in the half year: The score of the students in the experimental group was (64.29) and the standard deviation was 14.7. The average score of the students in the control group was (63.88) and the standard deviation was (14.74). When the t-test was used for two independent samples to determine the significance of statistical differences, it was found that the difference was not statistically significant at (0.05). The calculated T value (0.112) was smaller than the scale (2,000) and the degree of freedom (61) However, the experimental and control groups are statistically equivalent in the grades of social subjects in the semester, and Table (3) shows this.

Table 3: The arithmetic mean, the standard deviation, and the calculated and tabular T value for the two social research groups for the half year (2011-2012)

<table>
<thead>
<tr>
<th>Level of significance</th>
<th>T value</th>
<th>The degree of freedom</th>
<th>Variance</th>
<th>standard deviation</th>
<th>Arithmetic mean</th>
<th>Number of sample members</th>
<th>the group</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Table</td>
<td>Calculated</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-D at the level of 0.05</td>
<td>2,000</td>
<td>0,112</td>
<td>61</td>
<td>216,09</td>
<td>14,7</td>
<td>64,29</td>
<td>31 Experimental</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>217,27</td>
<td>14,74</td>
<td></td>
<td></td>
<td></td>
<td>63,88</td>
<td>32 Control</td>
</tr>
</tbody>
</table>

Parental Achievement:

A. Educational achievement of parents: The researcher conducted an equivalence between the two research groups in the educational achievement of the parents through an information form distributed to the students. After collecting the data on the parents’ achievement of the two groups, the achievement levels were (reading, writing, primary, intermediate, preparatory). Of these levels, In order to determine the parity of the students of the research groups (experimental and control) in the educational achievement of the parents, the researcher used the square equation of Ka (2) t was found that the difference was not statistically significant at the significance level (05, 0). The value of Ka (Ka2) calculated (1,032) was less than the value of Kai (Ka2) of the scale (7,815) and the degree of freedom (3) In parents’ academic achievement and Table (4)

Table 4: Frequency of academic achievement of the parents of the students of the two research groups and the calculated and tabular values of Ka2 and the statistical significance

<table>
<thead>
<tr>
<th>Level of significance</th>
<th>The value of the square is Kai</th>
<th>The degree of freedom</th>
<th>Father’s collection</th>
<th>is reading Writes and initials</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Table</td>
<td>Calculated</td>
<td>College and above</td>
<td>Preparatory and Institute</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>9</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>15</td>
<td></td>
</tr>
</tbody>
</table>
B. Educational achievement of mothers: The researcher obtained information on this variable in the same way as the previous variable (parents’ achievement). After collecting the data on the maternal achievement of the two groups, the achievement levels were: (Reading and writing, primary, intermediate, preparatory, institute, college and above) The results of the data showed that the calculated Kai value (1,968) was lower than the kai (k 2) tabular value of 7,815 and the freedom degree (3) at the level of significance (05, 0) and Table (5) shows that.

Table 5: Frequency of educational attainment of mothers of the students of the two research groups and the calculated and tabular values (k2) and statistical significance

<table>
<thead>
<tr>
<th>Level of significance</th>
<th>The value of the square is Kai</th>
<th>Calculated</th>
<th>The degree of freedom</th>
<th>Collecting the mother</th>
<th>Number of sample</th>
<th>the group</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not statistically significant</td>
<td>7,815</td>
<td>1,968</td>
<td>3</td>
<td>College and above</td>
<td></td>
<td>9</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Preparatory and Institute</td>
<td></td>
<td>7</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Medium</td>
<td></td>
<td>8</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>is reading writes and initials</td>
<td></td>
<td>10</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Number of sample</td>
<td></td>
<td>21</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Total</td>
<td></td>
<td>63</td>
</tr>
</tbody>
</table>

Search Accessories

Determination of scientific material: The scientific material included the second and third units of the social books to be taught for the fifth grade for the academic year (2017-2018) during the period of the experiment.

Teaching Plans: The researcher prepared for the two groups research the teaching plans based on the content and behavioral objectives of the scientific material has been prepared (20) study plan for each group and formulated (141) behavioral goals.

Test application for testing: The researcher applied the experimental test to a sample of 100 students from the fifth grade The response time for students was approximately (46) minutes.

Statistical analysis of test paragraphs: The researcher applied the test to a sample of 100 students with the characteristics of the research sample to extract the statistical analysis of the test paragraphs in the school of rejoicing The coefficient of difficulty of the paragraph calculated by the researcher where Oujda it ranges between (0.39-0.70) The difficulty coefficients were acceptable because the coefficient of difficulty of the paragraph was acceptable, ranging from (0.20 to 0.80). (Bloom, 1971: 40)

Parameter discrimination coefficient: The coefficient of discrimination of paragraphs ranged from (0.33, 0.56) It is preferable to have a coefficient of distinguishing paragraphs (0.30) (Eble, 1972: 40).

The effectiveness of wrong alternatives: The researcher used the equation of excellence with the wrong alternatives for each paragraph, which turned out to be attractive to the respondent of the low level, as he chose more than the high level.

Test stability: The test was verified In the equation of alpha chromosome Which is the usability that indicates the homogeneity of the interior which is closest to the concept of stability, but divided the test into parts with a number of paragraphs The
stability coefficient (0.88) It is a good stability factor because tests with a coefficient of stability of (0.60) and more, it is reliable.

The researcher used the statistical means T-test for two independent samples The coefficient of ease The difficulty And the effectiveness of wrong alternatives And the Kai box (Ca 2 - x2 - quire - his).

The results indicated that there was no statistically significant difference at the level of (0.05) between the experimental and the control groups between the average achievement scores and the experimental group that studied the social subjects through visual thinking skills and the average control group scores studied by the normal method The average score of the experimental group was (28.94) and the standard deviation was (5.9), while the average score of the control group was (24.19) and the standard deviation was (5.69).

Conclusion

The adoption of visual thinking skills in teaching activate knowledge and generate excitement and motivation and suspense for the lesson, which increases the educational achievement of students. The adoption of visual thinking skills in learning social subjects for the fifth grade has had a positive impact on the expansion of visual thinking of girls, And encourages learning based on the skills of visual thinking on freedom and express opinion and active participation in the lesson and this in turn increases self-confidence when expressing ideas and opinions without hesitation or fear. The teaching of social sciences according to the skills of visual thinking has had a positive impact on the level of students’ attitudes toward social subjects.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the University of Babylon, College of Basic Education, Babylon, Iraq and all experiments were carried out in accordance with approved guidelines.

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Uric Acid Correlates Negatively with Anti-Mullerian Hormone in Chronic Kidney Disease and/or Polycystic Ovary Syndrome Patients

Samal Hakeem Kareem AL-Jaff
Mustansiriyah University, College of Science, Biology Department, Baghdad, Iraq

ABSTRACT

Female reproductive is deteriorating during CKD by a disruption in (hypothalamic-pituitary-gonadal axis). Our interest was to study the Anti-Mullerian Hormone (AMH) in CKD patients, with the possibility that CKD (not kidney failure) may effect on women AMH levels in CKD and/or PCOS, and the affection possibility of PCOS on kidney function. Eighty female involvement in this research (26-40) years old divided in to: twenty female as a healthy control. Twenty female PCOS group. 3) Twenty CKD group. Twenty female patients suffering from both CKD and PCOS (CKD+PCOS). This study conducted between (April 2015 to August 2017), in Baghdad. AMH was sub normal in CKD patients with a significantly higher level of LH (P ≤ 0.01). Uric acid, urea, Creatinine, monocytes and AMH was elevated in PCOS patients, uric acid correlate positively with and monocytes and negatively with AMH, also uric acid, LH, AMH and monocytes were significantly high (P≤0.01) in CKD+PCOS group. Uric acid negatively affect AMH levels in women, AMH is not a good diagnostic indicator of PCOS status, if blood uric acid was high. PCOS may cause hyperuricemia leading to kidney failure. Kidney function showed be tested rottenly in any suspected case of PCOS.

Keywords: Anti-mullerian hormone; Luteinizing hormone; Polycystic Ovary Syndrome; Chronic Kidney Disease; uric acid; monocytes.

Introduction

Menstrual defects, premature menopause, and infertility are mutual incident among chronic kidney disease (CKD) in women 1. Their etiology is complex, such disorders may deteriorate fertility (secretion or metabolism) of several hormones 2,3. The kidney is a sex hormone key regulator in CKD patients 4, kidney disease onset results in the dysfunction of ovaries in women, predominantly though normal hypothalamus-pituitary-gonadal axis disruption 1. Fertility disturbance by uremia in women with CKD may cause ovaries damage 5. Luteinization of the follicles of the ovaries in patients with uremic CKD is very unusual leading to arrest of the ovary follicles 6, the un Luteinization of ovary follicles in CKD seems to be similar to the Poly Cystic Ovary Syndrome (PCOS) in women. In premenopausal women, PCOS is a very common endocrine disturbance, it’s distinguished by, oligo-anovulation leading to changing in the morphology of the ovaries 7,8. Anti_mullerian Hormone (AMH) a delicate indicator for the activity of the ovaries and for diagnosis of PCOS 9,10. AMH is a 140 kDa glycoprotein 11, granulosa cells of essential pre antral follicles and small antral follicles in the ovaries synthesized AMH until these follicles reach to a diameter of 6-8 mm 12. AMH function as folliculogenesis is to suppression the excessive of more primordial follicles recruitment and growth modification of the pre antral follicles and antral follicles by decreasing follicle sensitivity to Follicle Stimulation Hormone (FSH) 11,13. The number of follicles correlates positively with serum level of AMH, Therefore, it is related to the reduction of growing follicles quantity 14,15. Thus, the concentration of serum AMH reflects to follicles pool and it considers the best marker for ovarian reserve 14,16. Serum Creatinine derived

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DOI Number: 10.5958/0976-5506.2019.01399.8
from the breakdown of Creatinine and phosphocreatine in muscle, it is filtered freely by glomerular. In Nerwan study, Creatinine and urea were significantly higher in CKD case, in addition, there is a growing proof that hyperuricemia (elevation in uric acid) is correlated with CKD development. There are limited literatures on the sexual problem of CKD in women. The aim of this study was to 1 comparing the level of AMH in PCOS patients and in CKD patients and in patients who have both diseases (PCOS and CKD). 2 Investigate the accuracy of using AMH for PCOS diagnosis when there is a kidney problem. 3 The causal relationship between PCOS leading to Kidney Disease. There are no other studies of this precise topic have been proceeding so far.

**Material and Method**

This study accepted by all parties with the ethical standards of the responsible committee of the medical college in Mustansiriyah University.

**Subjects:** The informed written agreement has been signed by the participant. Before any involvement in this study. Eighty female involved in this study their age ranged between (26 - 40) years old, divided in to; (1) twenty healthy fertile female as control, (2) twenty female as PCOS patients (PCOS group), (3) twenty female previously diagnosed chronic kidney disease patients (CKD group), not a stage of kidney failure that need hemodialysis, and (4) twenty female patients with both CKD+PCOS. Blood sample and testing were collected in (Baghdad Medical City) in Baghdad during the period from (February 2015 to June 2017). Poly cystic ovary syndrome has diagnosed according to Rotterdam 2003 criteria: After exemption of any other disorders, PCOS defined as the existence of two of three of the following signs. (a) Menstrual and/or ovulatory disorder, Oligo or anovulation {Oligo menorrhea, less than six menstrual periods in the prior year} or Amenorrhea {no menstrual bleeding over prior three months}. (b) Hirsutism (clinical evidence of Hyperandrogenism) and/or biochemical signs of androgen excess. (c) Polycystic ovaries. This study discarded by a (questionnaire way) any patients with obvious system diseases such as diabetes, genetical diseases, obesity (Body Mass Index (BMI) ≥ 25 kg/m2 was excluded), liver and thyroid diseases, and any endocrine disorder, also we excluded any patients on long-term treatment.

**Method:** Blood samples collected from the antecubital vein using a disposable syringe then centrifuged after that, serum was separated and kept in (-20 C) to be tested later by using.

- a. AFIAS- 6 {Automatic Florescence Immuno-Assay} were used to measure FSH, LH, by a Kite produced by (boditech)® from Boditech Med Inc. (KOREA).
- b. {ELIZA} for AMH using (BECKMAN COULTER) ® kite from Beckman Coulter, Inc. (U.S.A.).
- c. Serum urea, uric acid, and Creatinine are most widely accepted parameters to assess kidney function status as well as renal status blood urea, Creatinine, and uric acid tested by using (BioSystems) ® Kite, (Spain).

- Monocytes count was done with whole blood, using DxH 500®, a five-part differential hematology auto-analyzer, (BECKMAN COULTER) ®, (USA).

**Statistical Analysis:** The research data expressed as mean ± standard error (M ± SE). Considered data were analyzed by one-way analysis of variance (ANOVA) then followed by fisher’s test for multiple comparisons using (Stat View software version 5.0). The differences were considered significant only when P-value is ≤ 0.01. Analyses Regression were conducted through covariance analysis (ANCOVA) for correlation also carried out by using (Stat View software version 5.0).

**Results and Discussion**

Anti-mullerian hormone data differentiated significantly, in the table (1) AMH significantly differs (P ≤ 0.01) between all study groups and control group, it was higher (P ≤ 0.01) in PCOS group and lowest (P ≤ 0.01) in CKD group. In FSH, results showed significant differences (P ≤ 0.01) between all study groups and control group, the CKD group had the higher level (P ≤ 0.01) and the CKD+PCOS group showed the most lowest level (P ≤ 0.01), there were no differences (P ≤ 0.01) between CKD+PCOS group with PCOS group. This study showed a clear significant elevation (P ≤ 0.01) in LH concentration between all study groups compared with control group. It was very high (P ≤ 0.01) in the CKD+PCOS group and lowest (P ≤ 0.01) in the control group. Table (1) showed differences (P ≤ 0.01) in Creatinine. All groups under study showed a differences
(P≤ 0.01) compared with control group, Creatinine was higher (P≤ 0.01) in CKD group and lowest (P≤ 0.01) in the control group, urea concentration was significantly different (P≤ 0.01) between all study groups compared with control group. Urea was higher (P≤ 0.01) in CKD group and lower (P≤ 0.01) in the control group. There were no differences (P≥ 0.01) in Creatinine and urea levels between CKD+PCOS group and CKD group. Also in the table (1), a significant difference (P≤ 0.01) in uric acid between all groups of the study compare to control group, it was higher (P≤ 0.01) in the CKD+PCOS group and lowest (P≤ 0.01) in the control group. No significant difference (P≥ 0.01) was in uric acid between CKD group and PCOS group. Monocytes was increased significantly (P≤ 0.01) in all study groups comparing with control group, it was higher in CKD+PCOS group and lower in control group. This study showed a negative association between AMH and uric acid in all study groups (fig 1, B.C.D) except in healthy control group (fig 1, A). Also Uric acid correlate positively with monocytes in all study groups (fig 2, B.C.D) except in control group (fig 2 A).

In CKD group, AMH decreased under normal level; in women the onset of kidney disease results in dysfunction of the ovaries, largely by (hypothalamus-pituitary-gonadal axis) normal disarrangement, the degree of dysfunction seems to be linked directly to CKD, Thus, any disorder in menstrual cycle and in fertility become increasingly prevalent as CKD progressing in women (28). Logically impairment of ovulation in CKD may lead to increasing AMH, similar to PCOS cases (25), but our data showed decreases in AMH in CKD patients. We believe that this decrease due to the size of the follicles in the ovary, it might be bigger than (8mm) in CKD patient, normally AMH secretes from follicles less than (8mm) in size (27). More studies should be done to compare the size of ovarian follicles between PCOS and CKD.

Grabkaa (5) and Stoumpos (29) found that women with CKD, levels of AMH decreased but not in hemodialysis CKD patients, they found that with hemodialysis AMH increased, because AMH molecular weight of 140 kDa, and it cannot be cleared by dialysis (30). Uric acid in PCOS group was elevated, this result agreed by Gozukara (50) who also tested a high uric acid in PCOS patients, PCOS patients suffered from high C-Reactive Protein (CRP), and high CRP correlated positively with hyper filtration (49). This correlation is very important because increasing filtration is linked to renal function decline eventually (48). This declining in renal function leads to rising blood uric acid in PCOS patients.

Luteinizing hormone in CKD+PCOS group was very high, higher than all study groups, this might be due to a synergism between CKD and PCOS, with the fact that both diseases cause LH elevations, LH elevated in CKD (34-36) and LH elevated in PCOS (24,32,39). AMH in CKD+PCOS group was lower than PCOS group this due to kidney disease which affect negatively on the ovaries by disruption of (hypothalamus-pituitary-gonadal) axis (28), also AMH was higher in CKD+PCOS group than the CKD group; this is a confusing result, logically it should be non-significant. This elevation of AMH in CKD+PCOS group may be hypothetical because: There are some small ovary follicles less than (8 mm) which still secrete AMH even with the disruption of (normal hypothalamus-pituitary-gonadal axis), this appeared to be due to kidney dysfunction (28), also, this is why AMH in CKD+PCOS group was higher significantly than control group. We believe that with time AMH will decrease in CKD+PCOS group.

<table>
<thead>
<tr>
<th>Parameters</th>
<th>AMH ng/ml</th>
<th>FSH uIU/ml</th>
<th>LH mIU/ml</th>
<th>Creatinine mg/dl</th>
<th>Urea mg/dl</th>
<th>Uric acid mg/dl</th>
<th>Monocytes cell/mm³</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>3.182 ± 0.269 S</td>
<td>6.281 ± 0.463 S</td>
<td>6.365 ± 0.430 S</td>
<td>0.558 ± 0.090 S</td>
<td>28.502 ± 2.051 S</td>
<td>8.781 ± 0.775 S</td>
<td>1412 ± 151.849 S</td>
</tr>
<tr>
<td>CKD + PCOS</td>
<td>6.318 ± 0.301 S</td>
<td>3.267 ± 0.387 S</td>
<td>21.073 ± 0.531 S</td>
<td>2.808 ± 0.277 S</td>
<td>77.220 ± 3.910 S</td>
<td>1412 ± 151.849 S</td>
<td>6.318 ± 0.301 S</td>
</tr>
<tr>
<td>Control</td>
<td>3.182 ± 0.269 S</td>
<td>6.281 ± 0.463 S</td>
<td>6.365 ± 0.430 S</td>
<td>0.558 ± 0.090 S</td>
<td>28.502 ± 2.051 S</td>
<td>8.781 ± 0.775 S</td>
<td>1412 ± 151.849 S</td>
</tr>
<tr>
<td>CKD</td>
<td>1.123 ± 0.126 S</td>
<td>7.720 ± 0.312 S</td>
<td>15.965 ± 0.719 S</td>
<td>3.365 ± 0.272 S</td>
<td>80.496 ± 2.700 S</td>
<td>1743 ± 73.990 S</td>
<td>1.123 ± 0.126 S</td>
</tr>
<tr>
<td>Control</td>
<td>3.182 ± 0.269 S</td>
<td>6.281 ± 0.463 S</td>
<td>6.365 ± 0.430 S</td>
<td>0.558 ± 0.090 S</td>
<td>28.502 ± 2.051 S</td>
<td>8.781 ± 0.775 S</td>
<td>1412 ± 151.849 S</td>
</tr>
<tr>
<td>PCOS</td>
<td>9.881 ± 0.962 S</td>
<td>3.422 ± 0.286 S</td>
<td>14.054 ± 0.691 S</td>
<td>1.803 ± 0.173 S</td>
<td>67.452 ± 2.823 S</td>
<td>1743 ± 73.990 S</td>
<td>9.881 ± 0.962 S</td>
</tr>
<tr>
<td>CKD + PCOS</td>
<td>6.318 ± 0.301 S</td>
<td>3.267 ± 0.387 S</td>
<td>21.073 ± 0.531 S</td>
<td>2.808 ± 0.277 S</td>
<td>77.220 ± 3.910 S</td>
<td>1412 ± 151.849 S</td>
<td>6.318 ± 0.301 S</td>
</tr>
<tr>
<td>CKD</td>
<td>1.123 ± 0.126 S</td>
<td>7.720 ± 0.312 S</td>
<td>15.965 ± 0.719 S</td>
<td>3.365 ± 0.272 S</td>
<td>80.496 ± 2.700 S</td>
<td>1743 ± 73.990 S</td>
<td>1.123 ± 0.126 S</td>
</tr>
<tr>
<td>CKD + PCOS</td>
<td>6.318 ± 0.301 S</td>
<td>3.267 ± 0.387 S</td>
<td>21.073 ± 0.531 S</td>
<td>2.808 ± 0.277 S</td>
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<td>1.803 ± 0.173 S</td>
<td>67.452 ± 2.823 S</td>
<td>1743 ± 73.990 S</td>
<td>9.881 ± 0.962 S</td>
</tr>
</tbody>
</table>

Table 1: Comparison of data between study groups
Figure 1: Show the correlation between AMH: Anti-mullerian hormone (ng/ml) and Uric acid(mg/dl).
A) Control group: no correlation (P-value =0.490) (R²-value =0.136). B) CKD+PCOS group: negative correlation (P-value = 0.001)(R²-value = - 0.663). C) CKD group: negative correlation (P-value = 0.001) (R²-value = - 0.775). D) PCOS group: negative correlation (P-value = 0.001)(R²-value = - 0.932)

Figure 2: Show the correlation between Monocytes (cell/mm³) and Uric acid (mg/dl). A) Control group: no correlation (P-value =0.476) (R²-value =0.430). B) CKD+PCOS group: positive correlation (P-value = 0.001) (R²-value = + 0.268). C) CKD group: positive correlation (P-value = 0.001)(R²-value = + 0.680). D) PCOS group: positive correlation (P-value = 0.001)(R²-value = + 0.678)

Conclusion

Blood uric acid negatively affect AMH levels in women, AMH is not a good diagnostic indicator of PCOS status, if blood uric acid was high. PCOS may cause hyperuricemia leading to kidney failure. Kidney function showed be tested rottenly in any suspected PCOS cases. Blood uric acid positively correlate with monocytes numbers.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Mustansiriyah University, College of Science, Biology Department, Baghdad, Iraq and all experiments were carried out in accordance with approved guidelines.

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The Cytotoxic Effects of Lipopolysaccharide Extracted from a Local Isolate of *Salmonella enteritidis* on Breast and Ovarian Cancer Cell Lines

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¹Maternity and Children Teaching Hospital, Ministry of Health, Al-Diwaniyah, Iraq; ²University of Al-Qadisiyah, College of Veterinary Medicine, Unit of Zoonotic Disease Research

**ABSTRACT**

The current *in vitro* study was performed to evaluate the anti-tumor cytotoxic effects of lipopolysaccharide (LPS) extracted from a local isolate of *Salmonella enteritidis* on breast and ovarian cancer cell lines, MCF-7, SKOV-3 respectively. Here, a local isolate of *S. Enteritidis* was obtained from Al-Diwaniyah Teaching Hospital, Al-Diwaniyah City, Iraq. The isolate was exposed to a series of morphological examinations and API 20E kit-based test to confirm the identity of the bacterium. Then, the bacterium was used in a polymerase chain reaction (PCR), and partial sequencing is targeting the RNA polymerase subunit beta (*rpoB*) gene at pieces of 1090bp and 897bp respectively to confirm the bacterium identity. After that, the bacterium LPS extracted to study its cytotoxic effects against MCF-7 and SKOV-3 cancer cell lines, in comparison with a commercial LPS using different concentrations (100µg/ml, 200µg/ml, 300µg/ml, 400µg/ml, and 500µg/ml). The results of the cytotoxicity effects showed that both LPSs had significant (*p*<0.05) cytotoxicity against both cell lines. This study reveals that LPS isolated from *Salmonella enteritidis* might provide a promising substance for controlling breast and ovarian cancers.

**Keywords:** Cancer, lipopolysaccharide, MCF-7, *Salmonella enteritidis*, SKOV-3.

**Introduction**

The Gram-negative bacterium of the *Enterobacteriaceae* family, *Salmonella enteritidis*, is a well-known facultative anaerobic bacterium with a motile-based characteristic. In mammals especially humans, the bacterium introduces a series of infections such as typhoid fever, gastroenteritis, bacteremia or septicemia, abscess, osteomyelitis; however, bloodstream dissemination of the microorganism may be initiated to all organs and tissue ¹. These systemic-based localized infections are predisposed by some health conditions such as diabetes, pneumonia or empyema with malignant tumors, sickle-cell disease infections with urolithiasis, immunosuppression-based osteomyelitis with sickle-cell disease, structural abnormalities, sickle thalassemia, and Sickle-C disease ²-⁸. These bacteria have lipopolysaccharide (LPS) in the outer core of their outer membrane which considered as a major constituent of these microorganisms. LPS is known as an essential material for bacterial adherence and invasion of epithelial-based cells ⁹. LPS is formed out of lipid A, oligosaccharide core, and most of the times O-antigen polysaccharide ¹⁰. This importance of LPS-mediated bacterial colonization was shown to be defected in a mouse-intestine model infected with an LPS-mutants of serovar *Typhimurium* ¹¹. Cancer is a global problem an especially in Iraq increased in recent years due to environmental pollution related to several years of conflicts in Iraq since 1980 until recently ¹². Cancer cell lines used as a successful in vitro models for drug development ¹³,¹⁴. At the Michigan Cancer Foundation of the year 1973, the MCF-7 cells were established by Dr. Soule and colleagues. From a 69-year-old pleural effusion woman with a metastatic condition, the MCF-7 cells were isolated ¹⁵. Since after that time, the MCF-7 cell line has been used as a well-proved suitable cancer-based cell line to study breast cancer-
related conditions. This cell line is an endoreticulum (ER)-positive and progesterone receptor (PR)-positive, and this cell line is considered as a low-metastatic luminal A-based molecular subtype of breast cancer cells. The SK-OV-3 cell line is an ovarian-based cancer cell line isolated from a 64-year-old Caucasian female ascites affected by cystadenocarcinoma. The SK-OV-3 cell line is positive for antigens such as high molecular weight cytokeratin, vimentin, low molecular weight cytokeratin, leucocyte common antigen, and epithelial membrane antigen. The current in vitro study was performed to evaluate the cytotoxic effects of lipopolysaccharide (LPS) extracted from a local isolate of Salmonella enteritidis on breast and ovarian cancer cell lines, MCF-7, SKOV-3 respectively.

Materials and Method

Cell Culture: The SKOV3 ovarian cancer and MCF7 breast cancer cell lines, were cultured in MEM medium with 10% fetal bovine serum (FBS), 100 units/mL penicillin, and 100 µg/mL streptomycin and then incubated at 37 °C.

Bacterial Isolate Identification: A local clinical isolate of S. Enteritidis was obtained from Al-Diwaniyah Teaching Hospital, Al-Diwaniyah City, Iraq, that was exposed to a series of morphological examinations on Salmonella-Shigella (SS) agar and XLD (Oxoid) and biochemical API 20E kit-based test (Biomerieux, France) to confirm the identity of the bacterium. The results were interpreted using Bergey’s Manual of Determinative Bacteriology (Bergey and Holt, 1994). Finally, the genomic DNA of the isolate was extracted using a genomic DNA isolation kit (Primer Design, UK, Co.) following the manufacturer’s instructions.

PCR- and Sequencing-based Identification: Then, the bacterium was used in a polymerase chain reaction (PCR) and partial sequencing targeting the rpoB gene to confirm the bacterium identity by running the extracted DNA on 1%-agarose-gel electrophoresis. The primer set was (F: 5-AAC CAG TTC CGC GTT GGC CTG G-3 and R: 5- CCT GAA CAA CAC GCT CGG A-3). The PCR reaction volume was 25µL including a DNA template at 30ng, both primers at 15 pmol/each forward and reverse primer, 2X of Master Mix at 12.5µL (Kappa Biosystem), and H₂O for molecular-biology use at 6.5µL. The thermocycler (Primus 25 pQLab) reaction conditions were initial denaturation for 5min at 94°C, 35 cycles of each of (denaturation for 2min at 94°C, annealing for 1min at 60°C, and extension for 1min at 72°C), and 10min for the final extension at 72°C. The bands of the PCR products were visualized under a UV-based imager.

The amplified piece of the rpoB gene was purified employing the PCR Clean UP-kit (Promega, Co.) following the manufacturer instructions. Then, sequencing was made (ABA applied Biosystem). BLASTN (Basic Local Alignment Search Tool, http://www.ncbi.nlm.nih.gov/BLAST/Blast.cgi) was used to analyze the sequencing data.

LPS-based lipopolysaccharide by phenol extraction: Here, the water bath at 70°C was used to prepare the bacterial suspension. Then, an equal amount of phenol solution at 90% was added and heated up at 70°C. After that, the mixture was placed on a magnetic-stirrer at 70°C for 15min. The mixture was then placed in an ice bath cooling it down to 20°C and then was centrifuged at 18000g and 3000rpm for 15min. Then, from top to bottom, phases observed were an aqueous phase, interphase, phenolic phase, and sediment. Using a Pasteur pipette, the aqueous and phenolic phases were separated (both on one side). Then, re-extraction of the remainders was done by adding three volumes of distilled water (DH2O) and placing the mixture on the magnetic stirrer for 5min. Then, centrifugation of the mixture was performed at 18000g and 3000rpm for 15min. After that, the floating liquid was separated and added to the aqueous phase. Finally, a dialyzing-based step was induced on the phases against DH₂O for several times/day/several days to remove phenol’s odor.

LPS-Cytotoxicity on the MCF-7 and the SKOV-3 cancer cell lines: MTT (3-(4,5-dimethylthiazol-2-yl)-2, 5-diphenyltetrazoliumbromide) was used to study the cytotoxicity of the LPS on the MCF-7 and the SKOV-3 cancer cell lines. A 96-well plate was utilized to initiate the test by plating these cells in the wells at 37°C for 24hrs at 10000 cell/well of density. Then, different concentrations (100µg/ml, 200µg/ml, 300µg/ml, 400µg/ml, and 500µg/ml) of LPS for both phenolic and aqueous phases were added to the cells in the wells plus using a control LPS, commercial. After incubation for 72hrs at 37°C, the viability of the cells in these wells was determined. The addition of 28µg/ml of MTT was used to remove the medium, and incubation of the cells was performed for 1.5hr at 37°C. Then, removing of the
MTT solution was done. A dissolving-based step was performed to remove the remaining crystals in the wells by adding of Dimethyl Sulphoxide (DMSO) at 100mg/ml. Then, a shake-incubating step was performed for 15min at 37°C. Using ELISA, the absorption was detected at 492nm wavelength repeating this step three times for each concentration. The following equation was used to measure the inhibition rates of the LPSs.

\[ \text{Inhibition rate} = \frac{A - B}{A} \times 100 \]

Results and Discussion

Morphological and Biochemical Identification: For the SS agar colonies, their morphological features were pale-yellow or having no color, 1-3mm in diameter, and lactose fermentation negative. Moreover, the colonies were circular, gas-bubble producing, and H2S-based black spots. The XLD agar colonies were small, convex, smooth, circular, and red with as black center. These features confirmed the family identity. The results of the API 20 kit, numerical profile (6704752), showed the confirmation of Salmonella sp identity.

PCR Results: The results of the PCR showed the amplification of the 1090-bp piece of the rpoB gene as shown in figure 1.

LPS Cytotoxicity Results: The LPS cytotoxicity effects showed that both LPSs had significant (p<0.05) destructive activities to both cell lines, figure 2 and 3. The Gram-negative bacterium, Salmonella Enteritidis, is a well-known facultative and motile anaerobic LPS-containing microorganism that infects humans causing typhoid fever, gastroenteritis, bacteremia or septicemia, abscess, osteomyelitis; however, bloodstream dissemination of the microorganism may be initiated to all organs and tissues (1). The current in vitro study was performed to evaluate the cytotoxic effects of lipopolysaccharide (LPS) extracted from a local isolate of S. Enteritidis on breast and ovary cancer cell lines, MCF-7, SKOV-3 respectively. Using the phenotypic methods, the results in the identity detection of the microorganism revealed the accurate isolate that belongs to Salmonella sp; however, these methods have limitations of detection beyond the genus level. The current results agree with 30 who isolated and identified Salmonella from diarrheagenic infants using phenotypic methods such as urease broth, triple sugar iron, ortho-nitrophenyl galactosidase, indole, Voges-Proskauer, methyl red, and Citrate test. Moreover, 31 had been successful in characterizing isolates of Salmonella Typhimurium using phenotypic approaches such as SS and deoxycholate citrate agars plus antibiotic susceptibility tests. Although these tests were able to identifying Salmonella genus, they still have obstacles in going beyond the genus level. Molecular techniques provide tools to overcome some of these obstacles. After doing PCR and sequencing using the rpoB gene as a target, the results showed that the current study isolate was S. Enteritidis. PCR approaches, most of the times, are accurate in identifying species and beyond the species levels using suitable primers for a specific region of a target gene. The current study results regarding the PCR method agree with 32 who used a PCR approach in detecting Salmonella enterica Serovars from febrile patients, and their PCR was 100% sensitive and specific in identifying Salmonella Enteritidis, Salmonella Typhimurium, Salmonella Stanleyville, and Salmonella Dublin. The sequencing results showed the current...
study isolate identity that belongs to \textit{S. Enteritidis}, and these findings agree with \cite{33} who successfully genotyped \textit{Salmonella enterica} using \textit{ropB} gene partial sequencing. The current study also is focused on LPS-based cytotoxic effects on breast and ovarian cancer cell lines, MCF-7, SKOV-3. The LPS cytotoxicity effects showed that both LPSs had significant ($p<0.05$) cytotoxicity activities against both cell lines. The LPS was found to be effective in increasing apoptosis in breast cancer epithelial cells, and this activity was found to be in the presence of the Toll-like receptor 4 (TLR4) ligand LPS which increased apoptosis in cancer cells due to differential-based kinetics of the TLR4-related signal transductions \cite{34}.

**Conclusion**

The results of the cytotoxicity effects showed that both LPSs had significant ($p<0.05$) cytotoxicity against both cell lines. This study reveals that LPS isolated from \textit{Salmonella enteritidis} might provide a promising substance for controlling breast and ovarian cancers.

**Financial Disclosure:** There is no financial disclosure.

**Conflict of Interest:** None to declare.

**Ethical Clearance:** All experimental protocols were approved under the Maternity and Children Teaching Hospital, Ministry of Health, Al- Diwaniyah, Iraq and all experiments were carried out in accordance with approved guidelines.

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Assessment of Knowledge for Pregnant Women toward Risk of Pregnancy in Al-Amara Primary Health Care Centers at Southern of Iraq

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¹MSc. Assistant Lecturer, Community Health Nursing Department, ²MSc. Assistant Lecturer, Adult Nursing Department, College of Nursing, University of Misan, Iraq

ABSTRACT

Objectives: This study aims to assess the knowledge for pregnant women toward risk of pregnancy and to identify the association between level of awareness and demographic data. Quantitative design (Descriptive study) was conducted during the period 15th November 2018 at 25th March 2019 in the city of Al-Amara at Southern of Iraq. A simple random sample is used by the researcher to select (4) primary health care centers. Purposive sample of (150) pregnant women visiting health centers were selected according to special criteria. The data was collected through interview method by using constructed instrument, which consisted of (2) parts. The first part for socio-demographic characteristics and second part to risk of pregnancy which contain: nutritional; exercise; smoking; caffeine; polycystic ovary syndrome; radiation; consanguineous marriages, and non-prescription drugs. The mean score and standard deviation for overall domains to risk of pregnancy were moderate level of knowledge were (1.93 ± 0.433) with the majority sample 63 (42%). Moreover, the findings of the study demonstrated that there was no significant between women’s age and knowledge at (P > 0.05), but there were high significant between level of education, occupation, monthly income and level of knowledge at (P < 0.01).

Keywords: Risks of Pregnancy, Knowledge, Pregnant Women.

Introduction

Pregnancy is usually a tranquil time of unequaled joy and expectation in the life of women’s. Particularly, all pregnant women need to health education during pregnancy period to promote healthy behaviors and prevented risk factors, which can be initiated from the woman herself, family support, community, or health care providers ¹. However, prenatal care is an effective care for health intervention to reduce risk of the pregnancy mortality and morbidity, especially in places where the general health status of women is poor. Most studies indicate that these risks are much higher among women who do not receive this care ². In general, the pregnant woman is at greater risk when exposed to the following conditions such as smoking, obesity, alcohol, poor exercise, polycystic ovary syndrome, exposure to radiation, non-prescription drugs and consanguineous marriage, or include the history of chronic diseases such as (diabetes mellitus, hypertension, and cardiovascular disorders). In addition, previous pregnancies, multiple pregnancy, reproductive aged women less than 18 or increase than 35 years, and intervals less than 3 years between pregnancies, and therefore mother, fetus or neonate is more susceptible to death, disability or disorders (³). The prevalence of high-risk pregnancies was reported up to 20% worldwide. Also, 50% of perinatal deaths are being observed during high-risk pregnancies. Prevalence of high-risk pregnancy varied in different countries, for example it is reported as of 31.4% in the north India, 59.3% in Tunisia, 40.1% in Nigeria, 39.8% in Iran, 53.2% in Iraq (³). In many developing countries, complications due to pregnancy and labor are main causes of maternal mortality. According to WHO reports
almost every day (800) women die due to preventable risk factors associated with pregnancy (99%) of these deaths occur in developing countries 4. Finally, improving women’s health and establishing good health behavior before or during pregnancy is especially important because nearly half of pregnancies (49%) may be unintended and associated with inadequate knowledge about the risk factors that place them at constant risk 5, 6.

Methodology

A descriptive study was done during the period 15th November 2018 at 25th March 2019. Simple random sample is used by the researcher to select (4) primary health care centers PHCs at Al-Amara city. Purposive sample (150) pregnant women visiting PHCs for therapeutic or preventive reasons, these women were collected from the four centers which include (37) women from Dijla Health Center Model, (38) women from AL-Askan, (37) pregnant women from Al-Quds, and (38) women from Shaheed Al-Watan PHCs. The selection of them were according to special criteria which include (1) Pregnant women. (2) Pregnant women have from (1 to more) gravida. While the excluded criteria which including (1) Female non pregnant. (2) Female non married. Data was collect through use of contracted questionnaires by the researchers for aims of this study, which contains two parts. First part comprised of (4) items in regarded to socio-demographic characteristics, and the second part to assess of knowledge for pregnant women toward risk of pregnancy it was consisted of (40) items. It comprises of (9) section which including (the nutritional status during pregnancy; exercise for women; risk of smoking; effect of caffeine on pregnant women; polycystic ovary syndrome effect on the pregnancy; radiation exposure during pregnancy; the sections seven it concerned with consanguineous marriages; also, awareness of pregnancy about intake of non prescription drugs. Finally, the section nine it concerned with other risks during pregnancy such as hypertension, diabetes mellitus and anemia. These items were rated according to the three likert scale: I know (3); uncertain (2) and I do not known scored as (1). The measurement was scored by using grand mean of score through intervals (1-1.67) low, (1.68-2.33) moderate, and (2.34-3) high, as well as (L), (M), and (H) respectively. The data collection process was conducted by interviews technique with each woman who visits the PHCs and by using Arabic version to assess of knowledge for pregnant women toward risk of pregnancy. The data of our study was analysis by used of Statistical Package of social sciences (SPSS) version 20, by application of two statistical approaches. (1) Descriptive approach that includes Percentage, Frequency, and Mean of Score. (2) Inferential statistic that include Chi-Square test. The results were affirmed as significant at $P \leq 0.05$ and not significant at $P < 0.05$.

Results and Discussion

The results of the data analysis were corresponding with the objectives of the study. Such a presentation was systematically organization to demonstrate the significant findings. Table 1 shows majority of sample were (16-20) years old (32.7 %), most of the sample within level of education of read and write and primary (20%), so the almost of participant is housewife (86.7%), and finally in regarding for monthly income is not enough within (38%). Table (2) demonstrates assessment of overall domains the pregnant women’s knowledge concerning risk of pregnancy are moderate level of knowledge with average of mean and standard deviation were (n=150; 1.93 ± 0.433). While, this table shows there were low level of knowledge in polycystic ovary syndrome with average mean and standard deviation was (1.54 ± 0.579), but demonstrated high level of knowledge in non prescription drugs with average mean and standard deviation was (2.80 ± 0.405). Table (3) Shows majority of participants in moderate knowledge toward risk of pregnancy (n=150 with 42. %).

**Table 1: Socio-demographic characteristics for study sample**

<table>
<thead>
<tr>
<th>No.</th>
<th>Variables</th>
<th>(N = 150)</th>
<th>F</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Age</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>16-20</td>
<td>49</td>
<td>16.4%</td>
<td>32.7</td>
</tr>
<tr>
<td></td>
<td>21-25</td>
<td>39</td>
<td>12.6%</td>
<td>26.0</td>
</tr>
<tr>
<td></td>
<td>26-30</td>
<td>33</td>
<td>11.3%</td>
<td>22.0</td>
</tr>
<tr>
<td></td>
<td>31-35</td>
<td>20</td>
<td>6.7%</td>
<td>13.3</td>
</tr>
<tr>
<td></td>
<td>≥36</td>
<td>9</td>
<td>3.1%</td>
<td>6.0</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>150</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Level of educational</td>
<td></td>
<td></td>
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</tr>
<tr>
<td></td>
<td>Illiterate</td>
<td>27</td>
<td>18.0%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Read and Write</td>
<td>30</td>
<td>20.0%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Primary</td>
<td>30</td>
<td>20.0%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Intermediate</td>
<td>22</td>
<td>14.7%</td>
<td></td>
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<tr>
<td></td>
<td>High School</td>
<td>14</td>
<td>9.3%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Diploma</td>
<td>11</td>
<td>7.3%</td>
<td></td>
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<tr>
<td></td>
<td>Bachelor</td>
<td>16</td>
<td>10.7%</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>150</td>
<td>100</td>
<td></td>
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Conted…

3. Occupational Status

<table>
<thead>
<tr>
<th>Status</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Housewife</td>
<td>130</td>
<td>86.7</td>
</tr>
<tr>
<td>Employment</td>
<td>15</td>
<td>10.0</td>
</tr>
<tr>
<td>Unemployment</td>
<td>5</td>
<td>3.3</td>
</tr>
<tr>
<td>Total</td>
<td>150</td>
<td>100</td>
</tr>
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</table>

4. Monthly income

<table>
<thead>
<tr>
<th>Income</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enough</td>
<td>51</td>
<td>34.0</td>
</tr>
<tr>
<td>Rather enough</td>
<td>42</td>
<td>28.0</td>
</tr>
<tr>
<td>Not enough</td>
<td>57</td>
<td>38.0</td>
</tr>
<tr>
<td>Total</td>
<td>150</td>
<td>100</td>
</tr>
</tbody>
</table>

Table 2: Assessment of Overall Domains of knowledge for pregnant women toward risk of pregnancy

<table>
<thead>
<tr>
<th>Domains of knowledge</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nutritional status</td>
<td>2.14</td>
<td>0.569</td>
</tr>
<tr>
<td>Exercise</td>
<td>2.08</td>
<td>0.596</td>
</tr>
<tr>
<td>Risk of smoking</td>
<td>1.73</td>
<td>0.569</td>
</tr>
<tr>
<td>Effect of caffeine</td>
<td>1.65</td>
<td>0.742</td>
</tr>
<tr>
<td>Polycystic Ovary Syndrome</td>
<td>1.54</td>
<td>0.579</td>
</tr>
<tr>
<td>Radiation</td>
<td>2.16</td>
<td>0.723</td>
</tr>
<tr>
<td>Consanguineous Marriages</td>
<td>1.67</td>
<td>0.587</td>
</tr>
<tr>
<td>Non prescription drugs</td>
<td>2.80</td>
<td>0.405</td>
</tr>
<tr>
<td>Other Risks</td>
<td>1.79</td>
<td>0.752</td>
</tr>
<tr>
<td>Total Domains</td>
<td>1.93</td>
<td>0.433</td>
</tr>
</tbody>
</table>

Table 3: Overall Assessment of Knowledge for Pregnant Women toward Risk of Pregnancy

<table>
<thead>
<tr>
<th>No.</th>
<th>Level of Knowledge</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Low</td>
<td>53</td>
<td>35.3</td>
</tr>
<tr>
<td>2.</td>
<td>Moderate</td>
<td>63</td>
<td>42.0</td>
</tr>
<tr>
<td>3.</td>
<td>High</td>
<td>34</td>
<td>22.7</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>150</td>
<td>100%</td>
</tr>
</tbody>
</table>

Above table shows there are association between the knowledge for pregnant women toward risk of pregnancy and their demographic characteristics (level of educational; occupational status, and monthly income) at $P \leq 0.05$. While there were no association between the knowledge of pregnant women toward risk of pregnancy and their ages at $P > 0.05$. Considered our study is one of the few investigations intended to collect particular data regard knowledge of pregnant women toward a number of risk factors. In table (1): data showed in regarding for ages of sample was (32.7%) which means nearly quarter of the participants were married in young age, and therefore are more at risk than others as a result of inexperience that lead to low birth weight, prenatal or infant mortality, and maternal complications. This result was agree with study was conducted by Guimaraes, et al., (2013) 7 shows approximately (30%) of participants with aged 18 and 19 years. In relative to their educational status, most of the sample in our study was able to read and write or have a primary school (20 and 20%) respectively. This result was agree with 8 who found majority of pregnancy have read and write was (22.3%) or with primary school (22.5%). In regarding to occupational status the housewife accounted for almost (86.7 %), this result concur with Esposito, et al., (2015) 9 who found that more than half of the sample was unemployed/housewife (60.9%). In concerning to monthly income nearly quarter of participants in the study (38%) does not have enough financial support which is due to the poor economic situation in the country or the majority of women are housewives with a low level of education. In regarding to assess of knowledge for pregnancy concerning risk of pregnancy in all domains as in table (2) that is shows moderate level of knowledge in all domain with low awareness about polycystic ovary syndrome which considered more risked on life of mother and their baby. This result consistent with study done Kamalanathan et al., 2013 10 who mentioned that the polycystic ovary syndrome affects (6 to 15%) of reproductive age and associated with increased risk of hypertensive disorders, gestational diabetes mellitus, miscarriage, and preterm delivery for women globally. While domain of non prescription drugs were all pregnant women have adequate level of knowledge, this result supported by Okandceji-Barry, (2016) 11 who found the majority (80.6%) of the participants had good knowledge about non-prescription drugs and considered most harmful in the first trimester. Generally, according to the researchers’ perspective the result of (table 3) was moderate level of knowledge may have been due to a low level of education as the majority have primary schools or because of the lack of experience resulting from the fact that the majority of ages located between 16-20 years who have inadequate knowledge about risk factors during pregnancy. This result was agree with Esposito et, al., (2015) 91 who found that the pregnant women has moderate knowledge (42%) in regarding to maternal risk factors such as smoking, alcohol conception, and obesity. The results of our study in table (4) showed there were no significant association ($P< 0.05$) in the
variable under study of the age, this result may be related to the small sample size and majority of the sample was young women do not have experience during pregnancy. This result agrees with a study conducted by Jerdén, who found no significant between age and level of knowledge about risk of pregnancy (Jerdén, 2010) 12. While in regarding to level of education, the result showed there is a significant association between educational level and their knowledge, in our opinion the majority of pregnant women are read and write and they have good knowledge about risk factors through the recent development in technology, such as watching health programs through television, You Tube or Facebook. This result agrees with a study conducted in Ethiopia by Daba et, al., (2013) 13 who shows significant between educational level and level of knowledge. In concerning to occupation and level of knowledge, the result shows there were a significant association, these result may be related to the vast majority of pregnant women were housewives, and they have moderate knowledge about the risk factors caused by communicating with relatives or neighbors or reading health magazines. This result agrees with a study conducted by Zaki, and Albarraq (2013) 14 Finally, in concerning of monthly income in table (4) that show there are a significant association between monthly income and level of knowledge. In our point view as researchers this result may be due to from application the health visitor program in Al-Amara city that was plays an important role in education pregnant women, as well as proximity of PHCs from residential areas, which in turn offer free service with lower cost. This result supported by a study conducted by Daba et, al., (2013) 13 in Ethiopia to assess awareness for pregnancy concerning maternal nutrition and associated factors, who found that a significant association between monthly income and level of knowledge.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Characteristics</th>
<th>No.</th>
<th>mean</th>
<th>S.D</th>
<th>d.f</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (year)</td>
<td>16-20</td>
<td>49</td>
<td>1.85</td>
<td>0.418</td>
<td>145</td>
<td>1.100</td>
<td>0.359</td>
</tr>
<tr>
<td></td>
<td>21-25</td>
<td>39</td>
<td>2.01</td>
<td>0.438</td>
<td></td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>26-30</td>
<td>33</td>
<td>1.90</td>
<td>0.431</td>
<td></td>
<td>1</td>
<td>1</td>
</tr>
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<td></td>
<td>31-35</td>
<td>20</td>
<td>2.03</td>
<td>0.419</td>
<td></td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>≥ 36</td>
<td>9</td>
<td>1.94</td>
<td>0.516</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>150</td>
<td>1.93</td>
<td>0.433</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Level of educational</td>
<td>Illiterate</td>
<td>27</td>
<td>1.74</td>
<td>0.398</td>
<td>143</td>
<td>18.628</td>
<td>0.000</td>
</tr>
<tr>
<td></td>
<td>Read and Write</td>
<td>30</td>
<td>1.66</td>
<td>0.211</td>
<td></td>
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<td></td>
</tr>
<tr>
<td></td>
<td>Primary</td>
<td>30</td>
<td>1.86</td>
<td>0.437</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Intermediate</td>
<td>22</td>
<td>1.90</td>
<td>0.343</td>
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</tr>
<tr>
<td></td>
<td>High School</td>
<td>14</td>
<td>2.14</td>
<td>0.266</td>
<td></td>
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<tr>
<td></td>
<td>Diploma</td>
<td>11</td>
<td>2.10</td>
<td>0.349</td>
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<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Bachelor</td>
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<td>2.64</td>
<td>0.076</td>
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<td></td>
<td>Total</td>
<td>150</td>
<td>1.93</td>
<td>0.433</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Table 4: Association between Knowledge for Pregnant Women toward Risk of Pregnancy and their Demographic Characteristics**

**Conclusion**

The study show that quarter the sample have low knowledge, while less than half of the sample had a moderate knowledge about risks of pregnancy. In regarding to associations between level of knowledge and the socio-demographic characteristics the result shows there were no significant association between age and level of knowledge, but there were high significant between level of education, occupation, monthly income and level of knowledge toward risk of pregnancy.

**Financial Disclosure:** There is no financial disclosure.

**Conflict of Interest:** None to declare.

**Ethical Clearance:** All experimental protocols were approved under the Community Health Nursing Department, College of Nursing/University of Misan, Iraq and all experiments were carried out in accordance with approved guidelines.
REFERENCES


Assessment of Level of Depression in Patient with Osteoarthritis at Handicap Center in Al-Nasiriyah City

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1Adult Nursing Department, College of Nursing, University of Thiqar, Iraq; 2Community Health Department, Nasiriyah Technical Institute, Southern Technical University, Iraq; 3Adult Nursing Department, College of Nursing, University of Thiqar, Iraq

ABSTRACT

Objectives: Osteoarthritis is a leading cause of disability. This study aimed to assess level of depression in patients with osteoarthritis. A descriptive study design was conducted at handicap center in Al-Nasiriyah city for period from 29th November 2016 to 1st March 2017. A purposive (non-probability) sample of 50 patients were included. Data were collected through the use of the constructed questionnaire and the process of the self-administrative report. The questionnaire consists of 2 parts: part 1 includes Patients socio demographic characteristics includes (age, gender, educational level, monthly income, and duration of diagnosis). Part 2: consist of: Beck Scale for depression. Content validity of the instrument was determined through the use of panel of experts and the internal consistency of the instrument was determined through the pilot study and the computation of Alpha Correlation Coefficient (r = 0.870). Data were analyzed through the application of descriptive and inferential statistical approaches by using Statistical Package for Social Science (IBM SPSS) version 20.0. The findings of the study revealed that most of study sample (46%) have sever and very severe depression. The assessment of level of depression among patients with osteoarthritis require more and more attention.

Keywords: Patient, Osteoarthritis, Depression Level, Beck Scale of Depression (BSD).

Introduction

Osteoarthritis (OA) is a degenerative and chronic disease of musculoskeletal system that have an international prevalence of 20% of females and 10% of males above 60 years of age 1. Despite increment in expectancy of life internationally 2,3, patients are as well struggling through additional years to live with disability caused by this musculoskeletal disease 4. Osteoarthritis usually apply an intense effect on a patient’s well-being and health due to it is association with progressive pain, impairment in function and disability elevation 5,6, and affiliated troubles experienced in preserving daily life activities 7 and resulting decrement in life quality [8]. So, it is expected that patients that have osteoarthritis have a higher possibility of developing disturbances in mental health 9-11. A considerable literature has proved that chronic pain, which is a regular symptom in osteoarthritis, is linked with depression and anxiety manifestations 10-11. Nowadays, the significance of major depression, depression manifestations and anxiety amongst patients with osteoarthritis has achieve growing recognition 7. Symptoms of depression were considered as a possible obstacle to physical activity in patients with osteoarthritis in a current systematic review 12. This is very significant regarding that physical activity has been established to decrease disability and pain in those population 13. A study of more than 2,000 individual with possible osteoarthritis 14 showed that 29% of individuals had depression probably and about half of them did not get any mental healthcare support. This is even though a recent proof showing that integrated depression management, cognitive behavioral therapy, and exercise, and can enhance results for people with osteoarthritis and co-morbid depression 15. A recent study proved that symptoms of depression were very common among

DOI Number: 10.5958/0976-5506.2019.01402.5
patients with rheumatoid arthritis and related to lower outcomes. The study aims to assess level of depression in patients with osteoarthritis.

**Material and Method**

Descriptive study design was conducted at Al-Nasiriyah Handicap Center in Al- Nasiriyah city during the period from 29th of November 2016 to 1st March 2017. A purposive (non-probability) sample of 50 patients were included which all have the following criteria:

1. Age from 20 years to 59 years old.
2. Patients accepted to cooperate in the study.
3. Male and female patients.
4. Patients diagnosed with osteoarthritis of any joint weather diagnosed through a combination of clinical signs and symptoms and/or radiological evidence of degenerative osteoarthritis changes in line with recognized international criteria (American College of Rheumatologists). Official permission was obtained from the administration of Thi-qar health office and from patient before their inclusion in the study. Nature and aim of the study was explained to each member of participants. In order to assess level of depression in patients with osteoarthritis, the researchers use questionnaire consists of 2 parts. Part 1 involves patients socio demographic characteristics includes (age, gender, marital status, monthly income, and duration of diagnosis). While Part 2 of the questionnaire includes. Beck Scale for depression (named after Bmchterah world specialist in known Byron Beck psychiatry). Dr. Abdul Sattar Ibrahim translated Beck psychotherapy for depression to the Arabic language. The scale consist of twenty-one question about known disease and depression symptoms, after choosing answers and calculate the obtained points, the examiner can know the degree and rate of depression suffered by the person. Phrases in testing Beck express the class, for example, it takes zero and one degree and no one counted one point and so on. The items was rated and scored according to the following designs gauge standards: 0-9 (does not have a depression); 10-15 (simple depression); 16-23 (average depression); 24-36 (severe depression). The content validity of questionnaire were determined by panel of (5) experts, whom review the instruments for content, clarity, relevancy, and competence. Reliability Coefficient for (Inter Examiners, Intra Examiners) revealed that 0.870 (52:400), 0.720 (3.567) respectively. Data was analyzed using IBM.SPSS (Statistical Package for Social Sciences) version to data was presented as number and percent data analyzed though an application of frequency and chi-square test to determine the association.

**Results and Discussion**

Table (1) indicated that (37.0 %) of the patients within age group of (49-58). Concerning to the gender, the greater number of study sample are male and account (78.4 %). Regarding to the level of education, the greater number of them do not read and write and they are accounted for (30.0%) of the sample. The majority of monthly income of the study sample individuals are barley insufficient and they are accounted (33.3 %). Table (2) indicated the majority of study sample duration of diagnosis are since one to five years with percent (33.3). Table (3) reveal non statistical significance between sociodemographic characteristics (age, gender, and educational level), while there is a (statistical significance) between level of depression and the duration of diagnosis. Table 4 show the highest percent of study sample have sever and very severe depression account for (46%). Result of the study indicated that 37.0 % of the patients within age group of (49-58). Greater number of study sample are male account for 78.4 %. Regarding to the level of education, the greater number of them do not read and write and they are accounted for (30.0%) of the sample. The majority of monthly income of the study sample individuals are barley insufficient and they are accounted (33.3 %) this results agree with study done by. Relative to the patients Distribution of the (50) Patients According to the duration of diagnosis this results agree with another studies. That reveal association between level of depression and duration of diagnosis.
Table 1: Distribution of the (50) Patients According to the Demographical Characteristics

<table>
<thead>
<tr>
<th>Basic Information</th>
<th>Groups</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age groups</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18-28</td>
<td>17</td>
<td>33.3</td>
<td></td>
</tr>
<tr>
<td>29-38</td>
<td>6</td>
<td>11.8</td>
<td></td>
</tr>
<tr>
<td>39-48</td>
<td>6</td>
<td>11.8</td>
<td></td>
</tr>
<tr>
<td>49-58</td>
<td>21</td>
<td>41.2</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>50</td>
<td>100%</td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>40</td>
<td>78.4</td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>10</td>
<td>40.0</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>50</td>
<td>100.0</td>
<td></td>
</tr>
<tr>
<td>Education Level</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Not read and write</td>
<td>6</td>
<td>11.8</td>
<td></td>
</tr>
<tr>
<td>Read and write</td>
<td>10</td>
<td>19.6</td>
<td></td>
</tr>
<tr>
<td>Primary</td>
<td>13</td>
<td>25.5</td>
<td></td>
</tr>
<tr>
<td>Intermediate</td>
<td>10</td>
<td>13.8</td>
<td></td>
</tr>
<tr>
<td>Secondary</td>
<td>16</td>
<td>31.4</td>
<td></td>
</tr>
<tr>
<td>Institute and colleague graduation or higher</td>
<td>5</td>
<td>9.8</td>
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</tr>
<tr>
<td>Total</td>
<td>50</td>
<td>100.0</td>
<td></td>
</tr>
<tr>
<td>Monthly income</td>
<td></td>
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</tr>
<tr>
<td>Sufficient</td>
<td>12</td>
<td>23.5</td>
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</tr>
<tr>
<td>Barely sufficient</td>
<td>21</td>
<td>41.2</td>
<td></td>
</tr>
<tr>
<td>Insufficient</td>
<td>17</td>
<td>33.3</td>
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</tr>
<tr>
<td>Total</td>
<td>50</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>

Table 2: Distribution of the (50) Patients According to the duration of diagnosis

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-5 years</td>
<td>17</td>
<td>33.3</td>
</tr>
<tr>
<td>6-10 years</td>
<td>11</td>
<td>21.6</td>
</tr>
<tr>
<td>11-15 years</td>
<td>3</td>
<td>5.9</td>
</tr>
<tr>
<td>16-20 years</td>
<td>6</td>
<td>11.8</td>
</tr>
<tr>
<td>21 years and more</td>
<td>13</td>
<td>25.5</td>
</tr>
<tr>
<td>Total</td>
<td>50</td>
<td>98.0</td>
</tr>
</tbody>
</table>

Table 3: Association between level of depression and sociodemographic characteristic (Age, Gender, Level of Education, and Duration of diagnosis)

<table>
<thead>
<tr>
<th>Variables</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Between Groups</td>
<td>9.106</td>
<td>4</td>
<td>2.277</td>
<td>1.302</td>
<td>.284</td>
</tr>
<tr>
<td>Within Groups</td>
<td>78.674</td>
<td>45</td>
<td>1.748</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>87.780</td>
<td>49</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Between Groups</td>
<td>.134</td>
<td>4</td>
<td>.033</td>
<td>.192</td>
<td>.942</td>
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<tr>
<td>Within Groups</td>
<td>7.866</td>
<td>45</td>
<td>.175</td>
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</tr>
<tr>
<td>Total</td>
<td>8.000</td>
<td>49</td>
<td></td>
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<td></td>
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<tr>
<td>Educational level</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Between Groups</td>
<td>4.900</td>
<td>4</td>
<td>1.225</td>
<td>.851</td>
<td>.501</td>
</tr>
<tr>
<td>Within Groups</td>
<td>64.780</td>
<td>45</td>
<td>1.440</td>
<td></td>
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</tr>
<tr>
<td>Total</td>
<td>69.680</td>
<td>49</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Duration of diagnosis</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Between Groups</td>
<td>12.441</td>
<td>4</td>
<td>3.110</td>
<td>1.155</td>
<td>0.034</td>
</tr>
<tr>
<td>Within Groups</td>
<td>121.179</td>
<td>45</td>
<td>2.693</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>133.620</td>
<td>49</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 4: Show distribution of Beck Scale of Depression among patients with osteoarthritis:

<table>
<thead>
<tr>
<th>Beck Scale of Depression</th>
<th>Frequency</th>
<th>Percent</th>
<th>Valid Percent</th>
<th>Cumulative Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-9 (does not have a depression)</td>
<td>1</td>
<td>2.0</td>
<td>2.0</td>
<td>2.0</td>
</tr>
<tr>
<td>10-15 (Simple depression)</td>
<td>13</td>
<td>25.5</td>
<td>26.0</td>
<td>28.0</td>
</tr>
<tr>
<td>16-23 (Average depression)</td>
<td>13</td>
<td>25.5</td>
<td>26.0</td>
<td>54.0</td>
</tr>
<tr>
<td>24-36 (severe depression)</td>
<td>16</td>
<td>31.4</td>
<td>32.0</td>
<td>86.0</td>
</tr>
<tr>
<td>37 and above (very severe depression)</td>
<td>7</td>
<td>13.7</td>
<td>14.0</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Conclusions

A highest percent of the study sample were male more than females, they were illiterate, read and write, and primary school and having insufficient monthly income. The assessment of level of depression among patients with osteoarthritis require more and more attention.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Adult Nursing Department, College of Nursing/University of Thiqar/Iraq and all experiments were carried out in accordance with approved guidelines.

REFERENCES


Assessment of Quality of Life in Patients with Brain Tumor after Surgery

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¹University of Babylon, College of Nursing, Iraq; ²Babylon Health Directorate, Iraq

ABSTRACT
A descriptive study which was utilized as an assessment approach, and was conducted from the 12 of September 2018 to 1St of November 2018 in order to assess the quality of life of the brain tumor patients. A purposive (non probability) sample of (82) brain tumor patients was selected from radiation and nuclear medicine hospital in Baghdad. The findings of the study proved that the demographic characteristics of the brain tumor patients, age, gender, level of education, marital status, type of work, had significant correlation with the quality of life of these patients. The socioeconomic characteristics of the brain tumor patients, income, and residency had no significant effect on the QOL of these patients. The findings also indicated that medical information for the brain tumor patients had a significant correlation with medical diagnosis and surgical treatment with their QOL. The findings also revealed that the assessment of brain tumor patients QOL had different significant effect through the relative sufficient from the social interaction domain (RS=85), level of independence (RS=82.5), psychological (RS=81.2), physical, (RS=67.2) and finally spiritual domains (RS=58.2). The sub domains of pain and discomfort, recreation & leisure had been highly affected by the brain tumors of these patients after surgery.

Keywords: assessment, quality of life, brain tumors, surgery.

Introduction
The brain controls our thoughts, intelligence, memory and emotions. Brain tumor is an abnormal growth of tissue in the brain; these tumors rarely spread (metastasisise) outside the brain. The tumor either originates in the brain itself, or come from another part of the body and travel to the brain (metastasize). It may be classified as either benign (non-cancerous) or malignant (cancerous) depending on their behavior. Cancer is still a major worldwide problem, it accounts for one-tenth of all deaths worldwide. Today more people are surviving cancer, especially brain cancer and even more have extended lives because of early diagnosis and improved treatment options. The increase intensity of brain tumor research, especially in the study of tumor genetics, invasion and impairment of normal functioning brain, as well as novel therapies that sometimes involve combining potent modalities have renewed interest in tumor and treatment effects on quality of life. Quality of life (QOL) assessment in neurosurgery is becoming more relevant with the proliferation of intensive research into brain tumors and their therapy therefore the authors examined several aspects and problems associated with the past, present and future application of quality of life assessment in neurosurgery. The phrase (quality of life) can mean different things at different periods during this century, it entered the vocabulary of the United States towards the end of World War II and implied the good life, or marital affluence evidence by possession of cars, houses and other consumer good. In addition to that, (QOL) assessment has become increasingly important in clinical research, especially for cancer such as brain cancer. As far as we are concerned, the QOL indicators in patient monitoring is important not only because it is a basic part of the concept of health but also the close relationship between QOL, morbidity and mortality. In USA more than 79,000 new cases of primary brain tumors are expected to be diagnosed this year (2017). Approximately one-third or 32% of brain and CNS tumors are malignant. It has recorded brain tumors incidence is about 2/100,000 of population per year as it’s registered
in cancer registry for the year 1994. From 1997 – 2001 Iraq Cancer Registries had recorded all primary brain & CNS tumors by histology in a different percentage. Aims of the Study: To describe the brain tumor patients socio-demographic characteristics and clinical characteristics. To assess the quality of life of brain tumor patients throughout its domains of physical, psychological, social, level of independence, and spirituality ones. To identify the relationship between the QOL domains for these patients and the sociodemographic characteristics (age, gender, occupation, level of education.).

**Materials and Discussion**

**Design of the Study:** A descriptive study used the assessment as an approach to assess the quality of life for brain tumor patients who have undergone craniotomy.

The study was carried out during the period of 12 Sep 2016 to 12 Nov 2016. The study was conducted in the out patients clinic of the Radiation and Nuclear Medicine Hospital in Baghdad. All its attended patients were cancer patients and brain tumor cancer was one of them.

Data collection: A purposive (non-probability) sample of (82) brain tumor patient who had craniotomy, was selected from the out patients clinic in this hospitals.

The criteria of the sample selection employed were:

Adult patients with brain tumor (malignant) (18 years and more) patients who had craniotomy and they were conscious.

**Tools:** A questionnaire was designed and constructed by the investigator to measure the variables underlying the present study. The questionnaire were determined through extensive literatures and studies review. It was adopted and developed from the (WHOQOL) scale by the researcher to measure these variables. The study instruments consist of total of (43) items which were distributed through 4 parts. The developed questionnaire consists of (4) parts: Demographic Data, Medical Information, Quality of life domains, Physical domain, Psychological domains, Level of independence domains, Social relationship domains, Spiritually, Religion, personal believes domains. A descriptive statistics used to characterize the sample with regard to socio-demographic characteristics, in addition to, three point type Likert scale was used to rating the items as always, sometimes, never, they scored as 3 for always, 2 for sometimes, 1 for never. The reliability was tested using Cronbach’s alpha reliability coefficient it was 0.85. P (0.05)

**Results and Discussion**

The finding of the study shows that the highest incidence of the sample (31.7%) was within the age group of (20-29) years. Our finding is consistent with international reports, that brain tumors occurs at any age, but the most common age in adults for primary brain tumors is between the ages (20-40) years. Regarding gender, the majority of the sample were males (74.4%). Our findings are in agreement with 10 who found that among 79 patients analyzed 54% were males and 46% were females in their study to predicate neurocognitive outcomes for these brain tumor patients. All incidence reports agree that brain tumors are more frequent in males than females 10. It is estimated that 16,050 adults (9,440 men and 6,610 women) will die from primary cancerous brain and CNS tumors this year. 5 Regarding educational status, the results revealed that the majority of the samples (25.6%) were secondary school graduates. Concerning occupational status after craniotomy, most of the female samples were housewives (22.0%). Furthermore (24.4%) of the sample were jobless or earner. Comparing unemployment brain tumor patients with employment (41.6%) one can suggest that in this study brain tumor patients have higher percentage of employment. However brain tumor patient’s job changed because of the disease and the prognosis of it, after surgery. A proximately (50%) of the sample had Medulloblastomas which is one of the brain tumors type, whereas (29.3%) of them had astrocytoma’s, and the lowest percent was (20.7%) it belongs to gliomas. Regarding headache before operation 78% of the sample had headache for variable periods. These were (32.9%), (23.2%), (22.0%) respectively regarding them. (22.0%) of the patients did not suffer from headache before surgery. This indicated that headache is one of the most important and most common symptoms in patients with brain tumors. These results inconsistent with the finding of 13. The data analysis indicated that the highest percentage of the sample who stay in hospital for two weeks were (35.4%) and those who stay for one month were (34.1%), finally (30.5%) of the patients, stay one week only in the hospital after operation. Our findings agree with 6 who stated that the median length of the hospital stay was one week. The follow-up for the patients after surgery are necessary to maintain healthy status
and to improve their QOL after that period. Regarding period after operation (51.2%) of the patients (which was the highest percent in the sample study) attended to hospital (3-4) months after operation, which is one of the aims of our study. Many studies evaluating the QOL of patients with primary brain tumors who have usually been based on small samples of patients suggest the goal of the physicians, nurses and staff at any institute is to provide the best possible QOL for all its patients. They also have a new clinical intervention study designed to help improve QOL by teaching patients skills for coping with the many changes that occur in their lives as a result of brain tumors 17. Analysis of such assessment shows that most of brain tumor patients experienced pain and discomfort (RS=91.36) they usually have headache and pain in lower extremities 16. reported that headache was more common at presentation in his group study which was enrolled in Brain Tumor Research Center, in University Of California.

Table 1: Distribution of brain tumor patients according to the demographic characteristics

<table>
<thead>
<tr>
<th>Demographic characteristics of brain tumor patients</th>
<th>F</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>61</td>
<td>74.4</td>
</tr>
<tr>
<td>Female</td>
<td>21</td>
<td>25.6</td>
</tr>
<tr>
<td>2-Age</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;20</td>
<td>10</td>
<td>12.2</td>
</tr>
<tr>
<td>20-29</td>
<td>26</td>
<td>31.7</td>
</tr>
<tr>
<td>30-39</td>
<td>18</td>
<td>22.0</td>
</tr>
<tr>
<td>40-49</td>
<td>7</td>
<td>8.5</td>
</tr>
<tr>
<td>50-59</td>
<td>13</td>
<td>15.9</td>
</tr>
<tr>
<td>60&gt;</td>
<td>8</td>
<td>9.8</td>
</tr>
<tr>
<td>3-Educational status</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unable to read &amp; writ</td>
<td>16</td>
<td>19.5</td>
</tr>
<tr>
<td>Primary</td>
<td>10</td>
<td>12.2</td>
</tr>
<tr>
<td>Intermediate Secondary</td>
<td>21</td>
<td>25.6</td>
</tr>
<tr>
<td>Graduated</td>
<td>15</td>
<td>18.3</td>
</tr>
<tr>
<td>Higher Education</td>
<td>20</td>
<td>24.4</td>
</tr>
<tr>
<td>4-Type of Work</td>
<td></td>
<td></td>
</tr>
<tr>
<td>House wife</td>
<td>18</td>
<td>22.0</td>
</tr>
<tr>
<td>Employee</td>
<td>12</td>
<td>14.6</td>
</tr>
<tr>
<td>Student</td>
<td>18</td>
<td>22.0</td>
</tr>
<tr>
<td>Retired</td>
<td>14</td>
<td>17.1</td>
</tr>
<tr>
<td>Earner</td>
<td>10</td>
<td>12.2</td>
</tr>
<tr>
<td>Jobless</td>
<td>10</td>
<td>12.2</td>
</tr>
</tbody>
</table>

**Table 2: Distribution of brain tumor patients according medical information about patients**

<table>
<thead>
<tr>
<th>Medical information of patients</th>
<th>F</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-Medical diagnosis</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Astroplastom</td>
<td>24</td>
<td>29.3</td>
</tr>
<tr>
<td>Gliomas(Glioblastoma)</td>
<td>17</td>
<td>20.7</td>
</tr>
<tr>
<td>Medulloblastomas</td>
<td>41</td>
<td>50.0</td>
</tr>
<tr>
<td>2-Headach before operation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non</td>
<td>18</td>
<td>22.0</td>
</tr>
<tr>
<td>One month</td>
<td>27</td>
<td>32.9</td>
</tr>
<tr>
<td>One year</td>
<td>18</td>
<td>22.0</td>
</tr>
<tr>
<td>Several years</td>
<td>19</td>
<td>23.2</td>
</tr>
<tr>
<td>3-Stay in the hospital</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Week</td>
<td>25</td>
<td>30.5</td>
</tr>
<tr>
<td>Two weeks</td>
<td>29</td>
<td>35.4</td>
</tr>
<tr>
<td>One month</td>
<td>28</td>
<td>34.1</td>
</tr>
<tr>
<td>4-Period after operation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3-4 months</td>
<td>42</td>
<td>51.2</td>
</tr>
<tr>
<td>5-6 months</td>
<td>10</td>
<td>12.2</td>
</tr>
<tr>
<td>6 months &amp; more</td>
<td>19</td>
<td>23.2</td>
</tr>
</tbody>
</table>

**Conclusion**

Assessment of the brain tumor patient’s quality of life domains indicated that the QOL domains of those patients are affected by different weight, accordingly with social interaction, level of independence, psychological, physical and spiritual domain. Generally, the entire brain tumor patient’s quality of life is in low level of affect according to this study and it could be changed in the future. Finally all variables which are included in this study (age, gender, level of education, marital states, type of work, treatment cost) have high significant correlation with the QOL of brain tumor patients, whereas income and residency do not have effect. An education oriented program can be designed, constructed and administered to brain tumor patients and their family through which health and life related issues can be presented. Well-structured and highly-specialized brain tumor patients center can be established in every governorate in Iraq to provide brain tumor patient’s treatment and psychological and social counseling to all patients and their families with reasonable cost. As a nursing implication, the researcher had obtained many information from this study, the first priority of it was the assessment tool which was the most important step in nursing care to identify the patients problems
after suffering from any disease or tumors, this step helps the nurses to recognize area that need support, be strengthened or developed.

**Financial Disclosure:** There is no financial disclosure.

**Conflict of Interest:** None to declare.

**Ethical Clearance:** All experimental protocols were approved under the University of Babylon/College of Nursing, Iraq and all experiments were carried out in accordance with approved guidelines.

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Assessment of Senior Students’ Knowledge Concerning Nursing Diagnosis at Southern of Iraq Nursing Faculties

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ABSTRACT

Objective: The aim of the study is to assess the senior students’ knowledge concerning nursing diagnosis at southern of Iraq nursing faculties, and to find out relationship between students’ knowledge with demographic characteristics (age, gender, acceptance certification in college; residency during study; monthly income and desire of admission to the faculty of nursing). A quasi experimental design was carried out at southern of Iraq nursing faculties (Misan; Thi-Qar and Basra) from 11th November, 2018 to 28th March, 2019. The instruments was constructed by the researcher for the purpose of the study. It was consisted of two parts: Part one demographic characteristics. Part two of the questionnaire was include knowledge level which include (25) question. A random sample comprised of (90) male and female students who were admission in college of nursing at fourth stage. The measurement of instrument used observes knowledge level as the following: Within low (0-0.33); moderate (0.34-0.67); and high (0.68-1.00). The study findings indicated that there were the majority of participants’ level in colleges of nursing (Basra, Misan, and Thi-Qar) have moderate level of knowledge; = (0.34- 0.67) for students were (66.7%), (40%), (69%) and (66.7%) respectively.

Keyword: assessment; senior students; knowledge; nursing diagnoses; nursing faculties

Introduction

Nursing process is a global concept, which forms the foundation and organizational framework that guides professional nursing practice. The process has defined as a systematic and dynamic way to deliver nursing care, operating through five interrelated steps: assessment, diagnosis, planning, implementation and evaluation. The introduction of nursing process as a systematic and scientific approach to patient’s care started in the early 60s in the developed countries, which be used in demonstrating nurses’ responsibility and responsibility while providing care to the patients. It is a widely accepted scientific method to guide procedures and quality nursing care. The term of nursing diagnosis was introduced in 1953 to describe a step necessary in developing a nursing care plan, after the next 20 years specifically 1973, the American Nurses Association published the standards of practice, and it was followed in 1980 with a statement of social policy, which defined nursing as “the diagnosis and treatment of human response to actual or potential health problems” (3). More than 40 years have passed, and the idea of “nursing diagnosis” has inspired and encouraged nurses around the world who seek independent practice based upon professional knowledge. Nursing diagnosis “provides the basis for selection of nursing interventions to achieve outcomes for which nursing has accountability” (NANDA-I 2013) (4). Nursing diagnosis is defined as “a clinical judgment about individual, family, or community experiences/ responses to actual or potential health problems/life processes. There are four types of nursing diagnoses: actual, risk, possible, wellness, and syndrome (5). The NANDA-I system of nursing diagnosis provides for four categories and each has 3 parts: diagnostic label or the problem, related factors or the cause of the problem, and defining characteristics found in the selected patient are
the symptoms present that are supporting the diagnosis. These categories include: Actual diagnosis; Risk diagnosis; Health promotion diagnosis, and Syndrome diagnosis. Importance of the Study: The important nursing diagnosis formula used to identify a complex problem involves investigating the problem etiology and describing signs and symptoms, it can provide the basis for the proper nursing intervention.

Methodology

Descriptive design is carried out in order to achieve the early stated aims of the study by using the assessment knowledge for fourth stage nursing colleges students concerning nursing diagnosis, the study was performed in southern of Iraq nursing faculties (University of Basra; University of Misan and University of Thi-Qar). The period of the study was from 11th November, 2018 to 28th March, 2019. The total population of the study was consist of (178) students who were study in colleges of nursing fourth stage. Random sample selected in the present study consisted of (90) students distributed equally (30) students in each college of nursing. The data collection process has been performed through the utilization of the developed questionnaire in Arabic version, Each test spends approximately (15-25) minutes to complete the interview. The study instrument was adopted and developed by the researcher to assess knowledge of the nursing students colleges. It was consisted of two parts: Self-administered questionnaire sheet related to demographic characteristics of the students consisted of (6) items, which included age, gender, acceptance certification in college; residency during study; monthly income and desire of admission to the faculty of nursing, and second part of questionnaire sheet is assessment students’ knowledge, it was composed of (25) questions, which use to assessment of students’ knowledge. Each question comprised of (4) alternatives for multiple choice. The questions were scored as correct (1) point and incorrect (0) point. The test covered relevant points from the major content area of the nursing diagnosis.

Results and Discussion

Analysis of nursing colleges students’ demographic characteristics in our study revealed that the most of age group to the study sample were within (21) years represented (44.4%), and the majority of participants in study sample were female (60%). In regarding to the subject acceptance certification in college, the results show that majority of them have secondary school graduate (78.9%). This study is supported by (Narmeen Badri., 2009) reported that evaluation the knowledge of the nursing students colleges related to nursing diagnosis, its revealed that the most ages of the sample was between (20-25) years and the most of them was male who are come from secondary school/scientific. Residency during study, majority of them live in internal department (56.7%). In addition the monthly income, the finding show that of them have some rather enough (44.4%). In the above table the results show that majority of desire of admission to the faculty of nursing were unconvinced of acceptance (40%) (table-1). This study agree with Demir, (2017) Nursing Diagnoses Determined by Second Year Students: Findings of study involve students mean age was 19.93 ± 1.18 and most of students were female (71.2%). The students were determined 13 out of the 15 nursing diagnoses. Conclusion: Students were successful in half identified the majority of nursing diagnoses. Assess what stage we are at identifying nursing diagnoses will contribute to the development of nursing education. The assessment of knowledge was developed purposely by the investigator for the students in colleges of nursing for the purpose of evaluating students’ knowledge. The knowledge score was divided into; low (0-0.33):1; moderate (0.34-0.67):2; high (0.68-1.00):3. The results of the study revealed that the analysis of the data (25 items) of the students’ knowledge concerning nursing diagnosis in the study sample had indicated that there table (2) demonstrates that overall assessment of the students’ knowledge concerning nursing diagnosis at southern of Iraq nursing faculties (university of Basra; university of Misan and university of Thi-Qar) are moderate level of knowledge, with average of mean and standard deviation were (n=90; (0.61 0.083). As well as table (3) reveals that the majority distribution of participants in all colleges of nursing (Basra, Misan, and Thi-Qar) have the moderate level of knowledge, with total percentage (n=90; (74.4% ) and each college represented (66.7%, 73.3%, 83.3% ) from participants in study sample respectively. The results agree with following study: Examination of nursing diagnoses used by nursing students and their opinions about nursing diagnoses. The findings of the students, 76.9% knew what nursing diagnosis was, but 31.5% had difficulty stating patient care needs as nursing diagnoses. Our study also shows that there are no significant differences in students’ knowledge among
nursing colleges (university of Basra; university of Misan and university of Thi-Qar) in overall items concerning nursing diagnosis, when analyzed by ANOVA (table-4). This study revealed that the colleges of nursing (university of Basra, university of Misan, and university of Thi-Qar) have similar participants’ level of knowledge, with average of mean and standard deviation were (n=30; (0.59 0.099), n=30;(0.63 );and n=30; (0.60 ), respectively. (table-3).

Table 1: Distribution of the Study Sample by their Demographic Characteristics for Nursing Colleges Students in Southern of Iraq (n = 90 student)

<table>
<thead>
<tr>
<th>Variables</th>
<th>Characteristic</th>
<th>Basra</th>
<th>Misan</th>
<th>Thi-Qar</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>F</td>
<td>%</td>
<td>F</td>
<td>%</td>
</tr>
<tr>
<td>Age (year)</td>
<td>21 years</td>
<td>24</td>
<td>80.0</td>
<td>9</td>
<td>30.0</td>
</tr>
<tr>
<td></td>
<td>22 years</td>
<td>6</td>
<td>20.0</td>
<td>8</td>
<td>26.7</td>
</tr>
<tr>
<td></td>
<td>23 years</td>
<td>0</td>
<td>0.0</td>
<td>7</td>
<td>23.3</td>
</tr>
<tr>
<td></td>
<td>24 years</td>
<td>0</td>
<td>0.0</td>
<td>5</td>
<td>16.7</td>
</tr>
<tr>
<td></td>
<td>≥25 years</td>
<td>0</td>
<td>0.0</td>
<td>1</td>
<td>3.3</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>30</td>
<td>100.0</td>
<td>30</td>
<td>100.0</td>
</tr>
<tr>
<td>Gender</td>
<td>Male</td>
<td>19</td>
<td>63.3</td>
<td>13</td>
<td>43.3</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>11</td>
<td>36.7</td>
<td>26</td>
<td>56.7</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>30</td>
<td>100.0</td>
<td>30</td>
<td>100.0</td>
</tr>
<tr>
<td>Acceptance Certification in College</td>
<td>Secondary School Graduate</td>
<td>30</td>
<td>100.0</td>
<td>25</td>
<td>83.3</td>
</tr>
<tr>
<td></td>
<td>High School Nursing Graduate</td>
<td>0</td>
<td>0.0</td>
<td>2</td>
<td>6.7</td>
</tr>
<tr>
<td></td>
<td>Nursing Institute Graduate</td>
<td>0</td>
<td>0.0</td>
<td>3</td>
<td>10.0</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>30</td>
<td>100.0</td>
<td>30</td>
<td>100.0</td>
</tr>
<tr>
<td>Residency during study</td>
<td>live with the Family</td>
<td>16</td>
<td>53.3</td>
<td>8</td>
<td>26.7</td>
</tr>
<tr>
<td></td>
<td>Live in internal Department</td>
<td>14</td>
<td>46.7</td>
<td>22</td>
<td>73.3</td>
</tr>
<tr>
<td></td>
<td>Other</td>
<td>0</td>
<td>0.0</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>30</td>
<td>100.0</td>
<td>30</td>
<td>100.0</td>
</tr>
<tr>
<td>Monthly Income</td>
<td>Enough</td>
<td>10</td>
<td>33.3</td>
<td>11</td>
<td>36.7</td>
</tr>
<tr>
<td></td>
<td>Some Rather Enough</td>
<td>12</td>
<td>40.0</td>
<td>10</td>
<td>33.3</td>
</tr>
<tr>
<td></td>
<td>Not Enough</td>
<td>8</td>
<td>26.7</td>
<td>9</td>
<td>30.0</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>30</td>
<td>100.0</td>
<td>30</td>
<td>100.0</td>
</tr>
<tr>
<td>Desire of Admission to the Faculty of Nursing</td>
<td>Convinced of acceptance</td>
<td>9</td>
<td>30.0</td>
<td>6</td>
<td>20.0</td>
</tr>
<tr>
<td></td>
<td>Compulsion of acceptance</td>
<td>5</td>
<td>16.7</td>
<td>6</td>
<td>20.0</td>
</tr>
<tr>
<td></td>
<td>Unconvinced of acceptance</td>
<td>16</td>
<td>53.3</td>
<td>18</td>
<td>60.0</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>30</td>
<td>100.0</td>
<td>30</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Table 2: Overall Assessment of the Students’ knowledge Concerning Nursing Diagnosis

<table>
<thead>
<tr>
<th>Items</th>
<th>Answers</th>
<th>True</th>
<th>False</th>
<th>Mean</th>
<th>S.D.</th>
</tr>
</thead>
<tbody>
<tr>
<td>The concept of use of diagnosis and nursing discovered by about</td>
<td></td>
<td>60</td>
<td>30</td>
<td>0.67</td>
<td>0.474</td>
</tr>
<tr>
<td>If the first method of data collection is to conduct an interview, what is the second method?</td>
<td></td>
<td>49</td>
<td>41</td>
<td>0.54</td>
<td>0.501</td>
</tr>
<tr>
<td>After establishing a database and before the identification of nursing diagnosis, what does a nurse do?</td>
<td></td>
<td>52</td>
<td>38</td>
<td>0.61</td>
<td>0.083</td>
</tr>
</tbody>
</table>
Clinical judgment 63 70.0 27 30.0 0.70 0.461

Which of the following is a Risk Nursing Diagnosis statement? 63 70.0 27 30.0 0.70 0.461

Difference between Medical and Nursing Diagnoses 38 42.2 52 57.8 0.42 0.497

Syndrome Nursing Diagnosis 44 48.9 46 51.1 0.49 0.503

Clear, precise description of a problem 51 56.7 39 43.3 0.57 0.498

A synonym for significant data that usually demonstrate an unhealthy response 37 41.1 37 58.9 0.41 0.495

Data Clustering are meaning 60 66.7 30 33.3 0.67 0.474

Secondary Source of Data except 47 52.2 43 47.8 0.52 0.502

A common framework that helps guide the prioritization of nursing tasks during the process of planning 51 56.7 39 43.3 0.57 0.498

Prioritization of tasks belongs to which phase of the Nursing Process? 46 51.1 44 48.9 0.51 0.503

Components of a Nursing Diagnosis except 56 62.2 34 37.8 0.62 0.488

Which of the following are true regarding nursing diagnosis? 53 58.9 37 41.1 0.59 0.495

How many parts does a risk nursing diagnosis have? 55 61.1 35 38.9 0.61 0.490

What is a risk nursing diagnosis as described by NANDA-I 58 64.4 32 35.6 0.64 0.481

Wellness Nursing Diagnosis 51 56.7 39 43.3 0.57 0.498

Clinical cues, signs, symptoms that furnish evidence that the problem exists 52 57.8 38 42.2 0.58 0.497

### Table 3: Distribution of the participants’ level of knowledge Concerning Nursing Diagnosis

<table>
<thead>
<tr>
<th>Level of Students’ Knowledge</th>
<th>Basra F</th>
<th>Basra %</th>
<th>Misan F</th>
<th>Misan %</th>
<th>Thi-Qar F</th>
<th>Thi-Qar %</th>
<th>Total Knowledge F</th>
<th>Total Knowledge %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low = (0 - 0.33)</td>
<td>0</td>
<td>0 %</td>
<td>0</td>
<td>0 %</td>
<td>0</td>
<td>0 %</td>
<td>0</td>
<td>0 %</td>
</tr>
<tr>
<td>Moderate = (0.34 - 0.67)</td>
<td>20</td>
<td>66.7</td>
<td>22</td>
<td>73.3</td>
<td>25</td>
<td>83.3</td>
<td>67</td>
<td>74.4</td>
</tr>
<tr>
<td>High = (0.68 - 1.00)</td>
<td>10</td>
<td>33.3</td>
<td>8</td>
<td>26.7</td>
<td>5</td>
<td>16.7</td>
<td>23</td>
<td>25.6</td>
</tr>
<tr>
<td>Total</td>
<td>30</td>
<td>100.0</td>
<td>30</td>
<td>100.0</td>
<td>30</td>
<td>100.0</td>
<td>90</td>
<td>100.0</td>
</tr>
</tbody>
</table>

| 0.59 | 0.63 | 0.60 | 0.61 |

### Table 4: Comparison of students’ knowledge among Colleges of Nursing

<table>
<thead>
<tr>
<th>Items</th>
<th>Colleges of Nursing</th>
<th>ANOVA</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Basra Mean</td>
<td>Misan Mean</td>
</tr>
<tr>
<td>The concept of use of diagnosis and nursing discovered by about</td>
<td>0.67</td>
<td>0.77</td>
</tr>
<tr>
<td>If the first method of data collection is to conduct an interview, what is the second method?</td>
<td>0.50</td>
<td>0.63</td>
</tr>
<tr>
<td>After establishing a database and before the identification of nursing diagnosis, what does a nurse do?</td>
<td>0.59</td>
<td>0.63</td>
</tr>
<tr>
<td>Clinical judgment</td>
<td>0.60</td>
<td>0.70</td>
</tr>
<tr>
<td>Which of the following is a Risk Nursing Diagnosis statement?</td>
<td>0.70</td>
<td>0.67</td>
</tr>
<tr>
<td>Difference between Medical and Nursing Diagnoses</td>
<td>0.40</td>
<td>0.57</td>
</tr>
</tbody>
</table>
Table 5: Association between the Students’ knowledge and their Demographic characteristics (Age, Gender, Acceptance Certification in College; Residency during study; Monthly Income and Desire of Admission to the Faculty of Nursing)

<table>
<thead>
<tr>
<th>Variables</th>
<th>Characteristics</th>
<th>No.</th>
<th>Mean</th>
<th>S.D.</th>
<th>d.f.</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Age (year)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>21 years</td>
<td>40</td>
<td>0.62</td>
<td>0.094</td>
<td>85</td>
<td>1.033</td>
<td>0.395</td>
</tr>
<tr>
<td></td>
<td>22 years</td>
<td>29</td>
<td>0.59</td>
<td>0.072</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>23 years</td>
<td>13</td>
<td>0.63</td>
<td>0.066</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>24 years</td>
<td>7</td>
<td>0.58</td>
<td>0.080</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>≥ 25 years</td>
<td>1</td>
<td>0.68</td>
<td>0.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>90</td>
<td>0.61</td>
<td>0.083</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Male</td>
<td>36</td>
<td>0.62</td>
<td>0.091</td>
<td>88</td>
<td>1.454</td>
<td>0.231</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>54</td>
<td>0.60</td>
<td>0.077</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>90</td>
<td>0.61</td>
<td>0.083</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Acceptance Certification in College</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Secondary School Graduate</td>
<td>71</td>
<td>0.61</td>
<td>0.084</td>
<td>87</td>
<td>1.798</td>
<td>0.172</td>
</tr>
<tr>
<td></td>
<td>High School Nursing Graduate</td>
<td>11</td>
<td>0.57</td>
<td>0.076</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Nursing Institute Graduate</td>
<td>8</td>
<td>0.64</td>
<td>0.078</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>90</td>
<td>0.61</td>
<td>0.083</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Residency during study</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>live with the Family</td>
<td>38</td>
<td>0.61</td>
<td>0.076</td>
<td>87</td>
<td>1.383</td>
<td>0.256</td>
</tr>
<tr>
<td></td>
<td>Live in internal Department</td>
<td>51</td>
<td>0.60</td>
<td>0.087</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Other</td>
<td>1</td>
<td>0.48</td>
<td>0.0</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>90</td>
<td>0.61</td>
<td>0.083</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Monthly Income</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Enough</td>
<td>32</td>
<td>0.62</td>
<td>0.090</td>
<td>87</td>
<td>0.483</td>
<td>0.618</td>
</tr>
<tr>
<td></td>
<td>Some Rather Enough</td>
<td>40</td>
<td>0.60</td>
<td>0.081</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Not Enough</td>
<td>18</td>
<td>0.60</td>
<td>0.076</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>90</td>
<td>0.61</td>
<td>0.083</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Desire of Admission to the Faculty of Nursing</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Convinced of acceptance</td>
<td>34</td>
<td>0.62</td>
<td>0.083</td>
<td>87</td>
<td>0.695</td>
<td>0.502</td>
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<tr>
<td></td>
<td>Compulsion of acceptance</td>
<td>20</td>
<td>0.59</td>
<td>0.077</td>
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<td></td>
</tr>
<tr>
<td></td>
<td>Unconvinced of acceptance</td>
<td>36</td>
<td>0.61</td>
<td>0.087</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>90</td>
<td>0.61</td>
<td>0.083</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Conclusion

The majority of participants’ level in colleges of nursing (Basra, Misan, and Thi-Qar) have moderate level of knowledge. The results of study sample represented that the nursing students have deficit knowledge in nursing diagnosis. Analysis findings of the study show that there are no significant differences among nursing colleges in southern of Iraq (Basra; Misan and Thi-Qar) in all students’ knowledge items.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Department of Adult Nursing, College of Nursing, University of Misan, Iraq and all experiments were carried out in accordance with approved guidelines.

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Bullying and Its Relation to Obesity and Overweight among School Age Children at Hilla City

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ABSTRACT

Objectives of the study were: assess the possessions of victimization on child life and correlate obesity and overweight with the bullying behaviors of others in the school. A correlation study was started from 31st of June 2017 to 10th December 2017 in Al Hilla city schools, a purposive sample of (100) students were selected randomly from (12) schools with Body Mass Index of more than normal. Most of the sample were females (78%), (42%) of the subjects are in (G5), (35%) were obese the highest percentage of them ordered the 1st child in the family. Majority of the mothers working that represents (75%), differences between the bullying behaviors, according to attacks of belongings and other avoidance behaviors reported the uppermost mean of scores, while the bullied behavior in general showed low mean. This study revealed that was a weak noteworthy correlation amongst the age, Sex, Body Mass Index and child order in the family with assessment of bullying behaviors they exposed to. This study showed that there was several victimization effects on students social, psychological health and even academic performance associated with the increased body weight as shown in a form of verbal, or even physical.

Keywords: Bullying, obesity, overweight, school age children

Introduction

Obesity and overweight during Childhood period are of the peak thoughtful public health challenges of the “21st century” increased worldwide, further in economically developed countries and less in rural populations. Worldwide, in 2016 the numeral of weighty children underneath the age of five is predictable to be above 41 million. Very nearly half of totally overweight children under 5 survived in Asia and one section lived in Africa. Overweight and obese children are likely to stopover obese into adulthood and more likely to develop non-communicable chronic diseases like diabetes and cardiovascular illnesses at a beginning age. Overweight and obesity, as well as their allied diseases, are essentially avoidable, as a result discouragement of childhood obesity needs high priority. Many children today are rising up in an obesogenic environment that inspires weight gain and obesity. Energy inequity has resulted from the variations in food type, availability, affordability and marketing, as well as deterioration in physical activity, with more time being spent on screen-based and deskbound leisure activities. Probable harm, emotional magnitude of childhood obesity together with being liked to a less significant extent by peers, being prohibited by peers, and actuality the victims of numerous structure of peer violence such as bullying have been well predictable. Different types of studies show a connection between being bullied and different health outcomes indicate that low self-esteem reduced life satisfaction. Bullying is defined as an intentional, recurrent hostility committed by a more influential person or group attacking a less dominant victim, it is an imperative issue in schools. Bullying is divided at least into five types verbal cruelty is the public type such as name calling or teasing. “Somatic bullying includes

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forcefulness such as being hit or thrusted or locking someone in a room and is more common among boys, although bodily attacks on girls by girls are becoming more public, depression, emotional, developmental, besides behavioral (EDb) problems, and exposure to child abuse and domestic violence are associated with increased bullying”. 6 Body size and obesity in school age and adolescence have a high level of distress and strongly associated with school bullying which escalated to the peak incidents within school age as middle childhood. 7 Scholars elaborate in bullying are at a noteworthy threat of come into contact with a wide field of psychosomatic symptoms, running away from home, alcohol and drug misapplication, malingering and above all self-inflicted, accidental or executed injuries. 8 “In the UK (6,700 school-age children) “27 percent” conveyed that they had been intimidated ‘occasionally or often’ throughout that term and ten per cent described existence bullied at least once a week”. 9

Methodology

Design of the study: Correlation design conducted to study the association between the bulling children and malnutrition.

Sample of the study: probability (purposive sampling) was selected which consists of (100). School age students selected form multi sector schools in Babylon Governance by divided the schools as cluster sample to choose random sample from (12) schools

Setting of the study: primary schools and 1st grade form secondary schools, data collected from the period of 31th of June 2017 to 10th December 2017

Instruments: The questionnaire was assembled for the purpose of the study. The Instruments consisted three parts: data was gathered by interviewing child through a questionnaire was completed by the researchers. All the participants were informed about the objectives of the study and informed consent were taken from all of them. Ethical considerations were approved by the scientific committee in the college.

Part 1: Demographic Date Sheet: This part concerned with personal information include, the patient (Age, sex, address, grade Body Mass Index).

Part 2: items related to child family history (6) variables regarding bullied child (16) items. These items are rated according to three levels Likert scale three level Likert scale (Always, Sometimes, and Never)

Statistical Analysis: Data were analyzed using the Statistical Package for Social Sciences (SPSS) version 19. Through the application of descriptive statistical data analysis include (Frequencies and Percentages, and arithmetic mean with standard deviation, Mean of score (M.S.) with their Standard Deviation (SD), and inferential statistics, Pearson Correlation.

Results and Discussion

Table (1) Displayed the maximum percentage of the sample conveyed at age oscillated (10-11 years old) and they are accounted (%79). Greatest are females (78%), (52%) are rural residence in recent times. In regard to grade or class of students (42%) of the subjects are in (G5). The body Mass Index indicated that (35%) are obese. Table (2) represented the participants’ family history (46%) of them their order was the 1st child, while in regard to age of the mother (32%) of them aged 18-23. Whereas (33%) of them were primary school graduates and the majority of them working which represents (75%). According to number of children, table shows that (56%) of mothers have only (1) child, (45%) of the subjects was economically satisfied. Table (3) confirmed the Bullying behaviors were (11) of them showed significant assessment, scored more than (2) mean of score and they stating (others have taken my belongings, others do avoid sit by me or talk to me, others try to hurt me on the way to and from school, I miss school because felt unsafe, uncomfortable or nervous at school, or on way to or from school ….) Table (4) showed sample overall effect scores, a moderate level of effect assessment were found among the participants as represented as (58%), At the same time the high level was almost same which represented (35%). Table (5) illustrated the correlation between the sample scores and some of the sociodemographic data, it is indicated that there is no to weak significance regarding the Age, Sex, Body Mass Index and Child order in the family at p (< .05). The current study involved a group of school age children with different Socio – demographic characteristics and variables investigated against the bullying matters. It has been found that the age domain was the pre-adolescent period, most are females, lived in rural areas. In a large UK study of bullying, was found the suitability to administer a modified questionnaire for children from
eight years and older and summaries the nature and extent of victimization above the aforementioned duration. Moreover from a 37 schools through four federations in the USA a five-year randomized controlled trial of both primary and secondary, selected a 11-year-olds to identify whether primary or secondary prevention approaches are effective in evolving social, emotional and cognitive skills to handle struggle. Some others originate that no gender differences in the school which can be recognized aside from those between the boys and girls who are self-identified as such but grade level moderated in differences by gender for all types of aggression. The present study came in consistent with results predicted that sixth grade students would report higher levels of victimization than older students, the study emphases the main variables in regard to the type of bullying which have been scored differently that children were affected and bullied when others tackle their things, exposed to hurt on the way to and back to school as well as avoid the communication with them and this is came along with some results which found that being affected by these difficulties in school will impair the social relationships and lower educational achievements. A study mentioned that difficulties in children’s lives may be both a consequence of and partial explanation for bullying victimization. Interaction styles and psychosocial factors may interact to create a vicious cycle in which children place themselves at risk, which might explain the reduced well-being. Other results agree that bullying among children takes the form of voiced abuse, racist name calling, spreading rumors besides somatic intimidation. In this definition, negative actions include physical contact, words, making faces or dirty gestures, and intentional exclusion from a group. It was found also that boys were more likely to be exposed to physical aggression and girls were more likely experience social aggression, which in turn might be cultural influences on their personalities. Adults who care for these children must be focused to the likelihood that bullying distresses their lives and learn how to together be aware of bullying and victimization comportments and respond effectively. Though the present study did not account high bullying scores in regard to verbal abuse, a study found that bullying among the susceptible children profits the form of verbal abuse, racist name calling, spreading rumors and physical bullying. in his study a low to reasonable association of direct bullying such as hitting with common health problems in younger children aged six to nine years was demonstrated. It is merely recognized that experiencing bullying victimization might be ranged from mild to severe according to many factors, among them we may find the family support, the school approach toward children and even the health care providers’ consultation role. Results of this study did not indicate a correlation between the gender and the level of hurt the sample may exposed to so that male and female may have the same effects, some studies pass on that the gender differences in aggression roles are examined for verbal aggression, not reached the p > .05 standard for statistical significance. The body mass index is examined against the bullying victimization which indicated no correlation between them, means as long as the child looks with a problem of increases weight, there will be such a behavior from others.

### Table 1: Distribution of sample according to their Socio-demographic characteristics

<table>
<thead>
<tr>
<th>Socio-demographic characteristics</th>
<th>Freq.</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10-11</td>
<td>79</td>
<td>79.0</td>
</tr>
<tr>
<td>12-13</td>
<td>21</td>
<td>21.0</td>
</tr>
<tr>
<td>Sex</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>78</td>
<td>78.0</td>
</tr>
<tr>
<td>Male</td>
<td>22</td>
<td>22.0</td>
</tr>
<tr>
<td>Address</td>
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<td></td>
</tr>
<tr>
<td>Rural</td>
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<td>52.0</td>
</tr>
<tr>
<td>Urban</td>
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<td>48.0</td>
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<tr>
<td>Grade</td>
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<td></td>
</tr>
<tr>
<td>G4</td>
<td>26</td>
<td>26.0</td>
</tr>
<tr>
<td>G5</td>
<td>42</td>
<td>42.0</td>
</tr>
<tr>
<td>G6</td>
<td>22</td>
<td>22.0</td>
</tr>
<tr>
<td>G7</td>
<td>10</td>
<td>10.0</td>
</tr>
<tr>
<td>Body Mass Index</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Underweight</td>
<td>6</td>
<td>6.0</td>
</tr>
<tr>
<td>Normal</td>
<td>26</td>
<td>26.0</td>
</tr>
<tr>
<td>Overweight</td>
<td>33</td>
<td>33.0</td>
</tr>
<tr>
<td>Obese</td>
<td>35</td>
<td>35.0</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100.0</td>
</tr>
</tbody>
</table>

### Table 2: Distribution of sample according to their family history

<table>
<thead>
<tr>
<th>Family history of the child</th>
<th>Freq.</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Child order in the family</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1st</td>
<td>46</td>
<td>46.0</td>
</tr>
<tr>
<td>2nd</td>
<td>15</td>
<td>15.0</td>
</tr>
<tr>
<td>3rd</td>
<td>34</td>
<td>34.0</td>
</tr>
<tr>
<td>4th</td>
<td>5</td>
<td>5.0</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100.0</td>
</tr>
</tbody>
</table>
Table 3: Indicates the assessment of the level of the bullied child

<table>
<thead>
<tr>
<th>Bullying behaviors</th>
<th>Mean of score</th>
<th>Std. D</th>
<th>Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. I have been bullied.</td>
<td>1.06</td>
<td>.312</td>
<td>NS</td>
</tr>
<tr>
<td>2. I have been annoyed and baptized names.</td>
<td>1.86</td>
<td>.865</td>
<td>NS</td>
</tr>
<tr>
<td>3. I have been hit, kicked or pushed.</td>
<td>1.88</td>
<td>.742</td>
<td>NS</td>
</tr>
<tr>
<td>4. Others leave me out of their group.</td>
<td>1.70</td>
<td>.759</td>
<td>NS</td>
</tr>
<tr>
<td>5. Others have taken my belongings.</td>
<td>2.59</td>
<td>.552</td>
<td>S</td>
</tr>
<tr>
<td>6. Others do avoid sit by me or talk to me.</td>
<td>2.11</td>
<td>.898</td>
<td>S</td>
</tr>
<tr>
<td>7. Others say they will hurt me.</td>
<td>1.66</td>
<td>.794</td>
<td>NS</td>
</tr>
<tr>
<td>8. Others try to hurt me on the way to and from school.</td>
<td>2.40</td>
<td>.791</td>
<td>S</td>
</tr>
<tr>
<td>9. I miss school because felt precarious, rough or panicky at school, or on way to or from school</td>
<td>2.01</td>
<td>.759</td>
<td>S</td>
</tr>
<tr>
<td>10. I have been afraid of being strapped, thrusted, cuffed, hit, or thrust by somebody on school property</td>
<td>2.25</td>
<td>.796</td>
<td>S</td>
</tr>
<tr>
<td>11. I often were in a physical fight</td>
<td>2.16</td>
<td>.775</td>
<td>S</td>
</tr>
<tr>
<td>12. I respond to bad words calibrated</td>
<td>2.08</td>
<td>.646</td>
<td>S</td>
</tr>
<tr>
<td>13. I have been exposed to my parents abuse</td>
<td>2.11</td>
<td>.827</td>
<td>S</td>
</tr>
<tr>
<td>14. My family punished me on time of food when I consume a lot particularly sweets</td>
<td>2.33</td>
<td>.473</td>
<td>S</td>
</tr>
<tr>
<td>15. Children look at some of the stories and false rumors about me</td>
<td>2.28</td>
<td>.587</td>
<td>S</td>
</tr>
<tr>
<td>16. Harassment have impact on my academic performance</td>
<td>2.35</td>
<td>.657</td>
<td>S</td>
</tr>
</tbody>
</table>

Table 4: Distribution of the study sample by their overall bullying effect scores

<table>
<thead>
<tr>
<th>Level of bullying effect</th>
<th>Freq.</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mild</td>
<td>7</td>
<td>7.0</td>
</tr>
<tr>
<td>Moderate</td>
<td>58</td>
<td>58.0</td>
</tr>
<tr>
<td>High</td>
<td>35</td>
<td>35.0</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Table 5: Correlation between sample scores and some sociodemographic data

<table>
<thead>
<tr>
<th>Variables</th>
<th>Groups</th>
<th>Mild</th>
<th>Moderate</th>
<th>high</th>
<th>Total</th>
<th>Pearson’s</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>10-11</td>
<td>6</td>
<td>49</td>
<td>24</td>
<td>79</td>
<td>.173</td>
</tr>
<tr>
<td></td>
<td>12-13</td>
<td>1</td>
<td>9</td>
<td>11</td>
<td>21</td>
<td>weak</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>7</td>
<td>58</td>
<td>35</td>
<td>100</td>
<td>correlation</td>
</tr>
</tbody>
</table>
Conted…

<table>
<thead>
<tr>
<th>Sex</th>
<th>Female</th>
<th>6</th>
<th>46</th>
<th>26</th>
<th>78</th>
<th>0.076</th>
<th>No correlation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Male</td>
<td>1</td>
<td>12</td>
<td>9</td>
<td>22</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>7</td>
<td>58</td>
<td>35</td>
<td>100</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Body Mass Index</th>
<th>Underweight</th>
<th>0</th>
<th>5</th>
<th>1</th>
<th>6</th>
<th>-0.022</th>
<th>No Correlation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Normal</td>
<td>2</td>
<td>12</td>
<td>12</td>
<td>26</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overweight</td>
<td>1</td>
<td>24</td>
<td>8</td>
<td>33</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Obese</td>
<td>4</td>
<td>17</td>
<td>14</td>
<td>35</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>7</td>
<td>58</td>
<td>35</td>
<td>100</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Child order in the family</th>
<th>1</th>
<th>0</th>
<th>22</th>
<th>24</th>
<th>46</th>
<th>0.0333 weak correlation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2</td>
<td>2</td>
<td>11</td>
<td>2</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>5</td>
<td>20</td>
<td>9</td>
<td>34</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>0</td>
<td>5</td>
<td>0</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>7</td>
<td>58</td>
<td>35</td>
<td>100</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Conclusion**

Conclusion: this study showed that there was several victimization effects on students social, psychological health and even academic performance associated with the increased body weight as shown in a form of verbal, or even physical.

**Financial Disclosure:** There is no financial disclosure.

**Conflict of Interest:** None to declare.

**Ethical Clearance:** All experimental protocols were approved under the College of Nursing, University of Babylon, Iraq and all experiments were carried out in accordance with approved guidelines.

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Effectiveness of an Instructional Program of Nurses Knowledge Concerning Management of Anaphylactic Shock at Emergency Units in Babylon Teaching Hospitals

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1Adults Nursing, Babylon Health Directorate, Iraq; 2PhD, Adults Nursing Department, College of Nursing, Bagdad University, Iraq

ABSTRACT

Anaphylactic shock is the hyper-response of the immune system following the allergic or allergic reaction, thus threatening the life of the person and is considered a serious problem that requires direct and rapid medical intervention. The study aims at: to assess nurses’ knowledge concerning management of anaphylactic shock. A quasi-experimental design with the application of a pre-test/post-test approach is conducted for the period of October 14th 2018 to June 1st 2019 on nurses working in emergency units. By non-probability sampling (purposive sample) are chosen, (30) nurses through the verbal consent has been taken and the answering of questions have been done by using the self-administrative method. The investigator informed the nurse about the study to insure their consent and discuss the plan of the program. The implementation of the program and conducted the post test. A descriptive statistical data analysis approach used to describe the study variables: Frequencies, Percentages, and standard deviation. The grand mean of all items shows that there is a low level of knowledge of the at pre test toward anaphylactic shock the mean was 1.26.

Keywords: Effectiveness, Knowledge, Anaphylactic Shock

Introduction

Anaphylactic shock is defined as a severe life-threatening generalized or systemic hypersensitivity reaction. All anaphylaxis guidelines, highlight the severity of the anaphylactic episode and the risk of death. Since anaphylaxis is characterized by rapidly developing life-threatening airway and/or circulation problems, it must be managed quickly. However, anaphylaxis is often difficult to recognize owing, in part, to the variability of diagnostic criteria, which in turn leads to a delay in administration of appropriate treatment, thus increasing the risk of death. In addition, it hampers reliable epidemiological data since medical records are the basis of national and international registries1, 2. Anaphylaxis develops rapidly, usually reaching peak severity within 5-30 min, and may, rarely, last for several days. All dental practitioners should be aware of the diagnosis and management of emergencies such as anaphylaxis that may arise from the use of local anesthetic agents in their clinical set up. Resuscitative drugs such as antihistamine, adrenaline and corticosteroids should be available at chair side for immediate use. All patients must be warned prior to local anesthetic administration of the possible danger that follows its use. They should be told to report back immediately to the clinic if a rash should develop3. Primary care physicians have a pivotal role in the prevention and treatment of anaphylaxis. However, few studies have covered the management of anaphylaxis in primary care. A systematic review on the management of anaphylaxis identified a number of gaps at this level, most notably a lack of knowledge regarding recognition of the reaction, treatment with epinephrine (adrenaline), and prescription of epinephrine auto-injectors (EAI)4. The most common approach to the evaluation of the management of anaphylaxis in primary care has been through questionnaires and case studies. The results of several recent surveys from different countries are based on data from general practitioners, paramedics, and, most frequently, pediatricians and do not differ much from one study to another. There is still much room for improvement with respect to
knowledge about epinephrine as the initial treatment of anaphylaxis, intramuscular administration, doses, and prescription of EAs. It is estimated that the world population has a lifetime prevalence of 1% to 3%, though the prevalence is increasing. While reactions can occur in any age group, they are most commonly noted in the younger population and developed countries. Unfortunately, anaphylaxis is often misdiagnosed or not diagnosed at all. The consequences of missed or delayed diagnosis result in increased morbidity and mortality. Anaphylaxis is an emergency condition that requires immediate, accurate diagnosis and appropriate management. However, little is known about the level of knowledge of doctors and nurses treating these patients in the emergency department. Adrenaline is the life-saving and first line of drug to be used for the treatment of anaphylaxis. Several studies conducted previously reveals that there is a lack of knowledge regarding dose and route of administration of adrenaline and confusion in selecting the first line drug for treating the emergency condition among health care professionals. Knowledge regarding the management of anaphylaxis was inadequate in almost all the health care providers among nurses. Improved education and training of health care providers are necessary for better management of anaphylaxis.

**Methodology**

**Study Design:** A quasi-experimental design with the application of a pre-test/post-test approach is conducted for the period of October 14th 2018 to June 1st 2019 on nurses working in emergency units.

**Study Sample:** Non-probability sampling (purposive sample) are chosen, (30) nurses is selected according to the criteria includes the nurses all educational levels working in emergency units, nurses have one year or more of experience in emergency units, and those who agreed to participate in the study.

**Study Instrument:** The study instrument was constructed depending on literature reviews and previous studies related to the anaphylactic shock. It is a questionnaire format for the research purpose and composed of two parts and these parts are:

**Part I:** Which composed of demographical characteristics.

**Part II:** This part is related to the evaluation of the knowledge of nurses for pre and post program.

**Data Collection the Methods:** A verbal consent has been taken and the answering of questions have been done by using the self-administrative method. The investigator informed the nurse about the study to insure their consent and discuss the plan of the program. The implementation of the program and conducted the post test.

**Statistical Analysis:** The statistical data analysis approach by using (SPSS-ver.20) is used in order to analyze and evaluate the data of the study. A descriptive statistical data analysis approach used to describe the study variables: Frequencies, Percentages, and standard deviation.

**Results and Discussion**

Table 1 indicate that male more than female study group 56.7%, the age is between (21-25) for most of the study sample 50%, most of the study sample are married 60%, the level of the education graduate diploma of nursing 40% and study group have from (1-5) years of service in nursing generally and 80% of the study group have from (1-5) years of service in emergency units in particular, 73.3% of the study sample have from (1-3) No. of specialized courses in emergency units and 100% of them the place of courses inside the country. Table 2 indicate that the study group at the pre test had a low level of knowledge by the mean for all items except the items (1, 2 and 7) had moderate level by the mean, the grand mean of all items shows that there is a low level of knowledge of the study group at pre test toward anaphylactic shock the mean was 1.26. Table 3 indicate that the study group at post test had a high level of knowledge by the mean for all items except the items (3, 6, 7, 9 and 15) had a moderate level, the grand mean of all items at post test shows that there is a high level of knowledge of the study group toward anaphylactic shock the mean was 1.73. The life-threatening allergic reaction can be dangerous. Shock or sudden drop in blood pressure and difficulty breathing. It can occur in people who already have allergies after minutes of exposure to an allergen. At times, there may be a delayed allergic reaction or delayed retinopathy without a clear emotional effect. It is occurs within seconds or minutes after exposure to certain foreign substances, such as medications (penicillin, iodinated contrast material), and other agents, such as latex, insect stings (bee, wasp, yellow jacket, hornet), or foods (eggs, peanuts). Repeated administration of parenteral or oral therapeutic agents (repeated exposures to penicillin) may also
precipitate an anaphylactic reaction when initially only a mild allergic response occurred. Results of the study indicate that male more than female study group 56.7%, the age is between (21-25) for most of the study sample 50%, most of the study sample are married 60%, the level of the education graduate diploma of nursing 40% and study group have from (1-5) years of service in nursing generally and 80% of the study group have from (1-5) years of service in emergency units in particular, 73.3% of the study sample have from (1-3) No. of specialized courses in emergency units and 100% of them the place of courses inside the country. The study in the same decade, has been assessed the knowledge of anaphylaxis among emergency department staff. These study results may come because that the equal sample size selected from study and control group is from the researcher opinion, while for the study sample age group, this result come because that the majority of the nurses they dealing directly with the patients are from those with this age group because the action with the patients require a high physical activity and the nurses who are advanced age fail to dealing with the patients. In addition, the participation in a training sessions outside of Iraq is diminished due to the political and economic limitation and this is controlled by the policy of the minister of health of Iraq. Findings depicts 76.9% of the nurses incorrectly diagnosed single organ involvement without hypotension as anaphylaxis. The knowledge of treatment of anaphylaxis among nurses was moderate and can be improved [19].

Table 1: Nurses their Demographic Characteristics

<table>
<thead>
<tr>
<th>Variable</th>
<th>Study Group</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>f</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>13</td>
</tr>
<tr>
<td>Male</td>
<td>17</td>
</tr>
<tr>
<td>Total</td>
<td>30</td>
</tr>
<tr>
<td>Age by years</td>
<td></td>
</tr>
<tr>
<td>21-25</td>
<td>15</td>
</tr>
<tr>
<td>26-30</td>
<td>9</td>
</tr>
<tr>
<td>31-35</td>
<td>2</td>
</tr>
<tr>
<td>36-40</td>
<td>1</td>
</tr>
<tr>
<td>41-45</td>
<td>3</td>
</tr>
<tr>
<td>Total</td>
<td>30</td>
</tr>
<tr>
<td>Marital status</td>
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</tr>
<tr>
<td>Married</td>
<td>18</td>
</tr>
<tr>
<td>Single</td>
<td>11</td>
</tr>
<tr>
<td>Divorced</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>30</td>
</tr>
<tr>
<td>Level of education</td>
<td></td>
</tr>
<tr>
<td>Graduate high school of nursing</td>
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</tr>
<tr>
<td>Graduate diploma of Nursing</td>
<td>12</td>
</tr>
<tr>
<td>Graduate of the College of Nursing</td>
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</tr>
<tr>
<td>Total</td>
<td>30</td>
</tr>
<tr>
<td>Years of service in nursing generally</td>
<td></td>
</tr>
<tr>
<td>1-5</td>
<td>23</td>
</tr>
<tr>
<td>6-10</td>
<td>2</td>
</tr>
<tr>
<td>11-15</td>
<td>1</td>
</tr>
<tr>
<td>16 and more</td>
<td>4</td>
</tr>
<tr>
<td>Total</td>
<td>30</td>
</tr>
<tr>
<td>Years of service in emergency units in particular</td>
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</tr>
<tr>
<td>1-5</td>
<td>24</td>
</tr>
<tr>
<td>6-10</td>
<td>4</td>
</tr>
<tr>
<td>11-15</td>
<td>1</td>
</tr>
<tr>
<td>16 and more</td>
<td>1</td>
</tr>
<tr>
<td>Total</td>
<td>30</td>
</tr>
</tbody>
</table>
Table 2: Distribution of Nurses Knowledge toward Anaphylactic Shock at the Pre Test Period

<table>
<thead>
<tr>
<th>Items</th>
<th>Correct answer</th>
<th>Un correct answer</th>
<th>Mean</th>
<th>Severity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anaphylactic shock is a serious and rapid allergic reaction that may cause death</td>
<td>f</td>
<td>f</td>
<td>1.66</td>
<td>M</td>
</tr>
<tr>
<td>Anaphylactic or allergic shock can happen by eating common foods such as milk, eggs and oysters</td>
<td>20</td>
<td>10</td>
<td>1.43</td>
<td>M</td>
</tr>
<tr>
<td>Allergic reaction can be as simple as skin rash after exposure to the allergen. R</td>
<td>4</td>
<td>26</td>
<td>1.13</td>
<td>L</td>
</tr>
<tr>
<td>If a patient enters into emergency unit with a mild sensitivity to allergens in the past, he is not at risk of future interaction. R</td>
<td>6</td>
<td>24</td>
<td>1.2</td>
<td>L</td>
</tr>
<tr>
<td>Epinephrine should be given early to the patient when anaphylactic shock occurs immediately upon arrival at the emergency unit</td>
<td>4</td>
<td>26</td>
<td>1.13</td>
<td>L</td>
</tr>
<tr>
<td>Anaphylactic shock can cause-absorbing it is conjunctive eye rash can occur due to skin irritation</td>
<td>7</td>
<td>23</td>
<td>1.23</td>
<td>L</td>
</tr>
<tr>
<td>The signs and symptoms of anaphylactic shock are high blood pressure. R</td>
<td>13</td>
<td>17</td>
<td>1.43</td>
<td>M</td>
</tr>
<tr>
<td>Anaphylactic shock may lead to disturbances in the body’s systems</td>
<td>8</td>
<td>22</td>
<td>1.26</td>
<td>L</td>
</tr>
<tr>
<td>An education plan or patient guidance about care is a doctor’s duty only. R</td>
<td>5</td>
<td>25</td>
<td>1.16</td>
<td>L</td>
</tr>
<tr>
<td>Beta stimulants or receptors are used to relieve bronchospasm caused by histamine. Beta drugs cannot increase the severity of anaphylaxis. R</td>
<td>8</td>
<td>22</td>
<td>1.26</td>
<td>L</td>
</tr>
<tr>
<td>Antihistamines and cortisone are given by the muscle to reduce respiratory tract infections and improve breathing. All antihistamines must be stopped at least 7 days prior to the test. They may interfere with the allergic reaction during the test and make it passive. R</td>
<td>8</td>
<td>22</td>
<td>1.26</td>
<td>L</td>
</tr>
<tr>
<td>Because anaphylactic shock occurs in patients who have already get an antigen and who have developed antibodies, they cannot be prevented. Environment and ambient atmosphere can cause anaphylactic.</td>
<td>9</td>
<td>21</td>
<td>1.3</td>
<td>L</td>
</tr>
<tr>
<td>Mean</td>
<td>Assessment</td>
<td>1.26</td>
<td>Low knowledge</td>
<td></td>
</tr>
</tbody>
</table>

Table 3: Distribution of Nurses Knowledge toward Anaphylactic Shock at the Post Test Period

<table>
<thead>
<tr>
<th>Items</th>
<th>Correct answer</th>
<th>Un correct answer</th>
<th>Mean</th>
<th>Severity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anaphylactic shock is a serious and rapid allergic reaction that may cause death</td>
<td>f</td>
<td>f</td>
<td>1.8</td>
<td>H</td>
</tr>
<tr>
<td>Anaphylactic or allergic shock can happen by eating common foods such as milk, eggs and oysters</td>
<td>24</td>
<td>6</td>
<td>1.8</td>
<td>H</td>
</tr>
<tr>
<td>Allergic reaction can be as simple as skin rash after exposure to the allergen. R</td>
<td>19</td>
<td>11</td>
<td>1.63</td>
<td>M</td>
</tr>
<tr>
<td>If a patient enters into emergency unit with a mild sensitivity to allergens in the past, he is not at risk of future interaction. R</td>
<td>26</td>
<td>4</td>
<td>1.86</td>
<td>H</td>
</tr>
</tbody>
</table>
Conted…

<table>
<thead>
<tr>
<th>Statement</th>
<th>Score</th>
<th>Correct</th>
<th>Knowledge</th>
</tr>
</thead>
<tbody>
<tr>
<td>Epinephrine should be given early to the patient when anaphylactic shock occurs immediately upon arrival at the emergency unit</td>
<td>23</td>
<td>7</td>
<td>1.76 H</td>
</tr>
<tr>
<td>Anaphylactic shock can cause-absorbing it is conjunctive eye</td>
<td>19</td>
<td>11</td>
<td>1.63 M</td>
</tr>
<tr>
<td>Rash can occur due to skin irritation</td>
<td>19</td>
<td>11</td>
<td>1.63 M</td>
</tr>
<tr>
<td>The signs and symptoms of anaphylactic shock are high blood pressure. R</td>
<td>22</td>
<td>8</td>
<td>1.73 H</td>
</tr>
<tr>
<td>Anaphylactic shock may lead to disturbances in the body’s systems</td>
<td>20</td>
<td>10</td>
<td>1.66 M</td>
</tr>
<tr>
<td>An education plan or patient guidance about care is a doctor’s duty only. R</td>
<td>23</td>
<td>7</td>
<td>1.76 H</td>
</tr>
<tr>
<td>Beta stimulants or receptors are used to relieve bronchospasm caused by histamine.</td>
<td>25</td>
<td>5</td>
<td>1.83 H</td>
</tr>
<tr>
<td>Beta drugs cannot increase the severity of anaphylaxis. R</td>
<td>21</td>
<td>9</td>
<td>1.7 H</td>
</tr>
<tr>
<td>Antihistamines and cortisone are given by the muscle to reduce respiratory tract infections and improve breathing.</td>
<td>23</td>
<td>7</td>
<td>1.76 H</td>
</tr>
<tr>
<td>All antihistamines must be stopped at least 7 days prior to the test. They may interfere with the allergic reaction during the test and make it passive. R</td>
<td>23</td>
<td>7</td>
<td>1.76 H</td>
</tr>
<tr>
<td>Because anaphylactic shock occurs in patients who have already get an antigen and who have developed antibodies, they cannot be prevented.</td>
<td>20</td>
<td>10</td>
<td>1.66 M</td>
</tr>
<tr>
<td>Environment and ambient atmosphere can cause anaphylactic.</td>
<td>21</td>
<td>9</td>
<td>1.7 H</td>
</tr>
<tr>
<td>Mean Assessment</td>
<td>1.73</td>
<td>High knowledge</td>
<td></td>
</tr>
</tbody>
</table>

Conclusions

A designed program in the emergency department related to emergency services as anaphylaxis management, the program has been influential on nurses’ knowledge. Health directorate need to be engaging emergency nurses in special training with guide course for improve knowledge and practice concerning emergency situations.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Adults Nursing/Babylon Health Directorate- Iraq and all experiments were carried out in accordance with approved guidelines.

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Environmental Impact Assessment of Medical Wastes Shredding Machine in Al-Hila Teaching Hospital-Babylon Province, IRAQ

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¹Sanitary and Environmental Engineering, Department of Building and Construction Engineering, ²Environmental Research Center, University of Technology, Iraq

ABSTRACT

This study was carried out to assess the environmental impact of medical wastes shredding machine in Al-Hila Teaching Hospital- Babylon Province, IRAQ and samples of medical wastes received from various local health premises were identified and the percentage of each component in wet and dried forms were assessed. Several heavy metal ions were determined while air variables such as CO, NO₂ and SO₂ were measured in shredding machine location and surrounding environment. Regarding waste heavy metal content, current work has found that the highest mean concentration (1.473 ± 0.786 µg/kg) was recorded for cadmium ion which was within standard limit (1 – 3 µg/kg) while both copper and ferrous ions gave mean value of 0.0163 ± 0.005 µg/kg and 0.679 ± 0.431 µg/kg respectively. In case of air gases, it was found that there were no significant differences between all measured gases in all measured sites within shredding room and surrounding environment where NO₂ mean values were 0.0194 ± 0.006 ppm and 0.019 ± 0.002 ppm respectively while SO₂ gave mean values of 0.033 ± 0.002 ppm and 0.049 ± 0.003 ppm respectively and CO mean concentrations have been found to be 0.026 ± 0.023 ppm and 0.05 ± 0.007 ppm respectively.

Keywords: Medical wastes, Shredding machine, Surrounding environment, Air gases, Noise level

Introduction

It is very obvious that medical solid wastes generated by various health institutes represent environmental and health problems 1-3. In general, these medical solid wastes can be classified into two main categories such as general and hazardous wastes 4,5. General wastes consist of municipal and other un-harm wastes while hazardous wastes include biological, chemical and radioactive wastes 6. These medical wastes need to be soundly handled and controlled otherwise they would cause severe environmental and public health impacts. However, much attention has been focused on health care wastes worldwide 1,7,9 and various techniques have been invented to properly discharge these wastes such as land disposal 10, wet thermal treatment 11, chemical disinfection 12, waste autoclaving 13, microwave irradiation 14, encapsulation 15, incineration 9,16 and recently applied technique of shredding 17,18. Currently, the most common techniques used in various world countries are incineration and shredding of medical solid wastes. So, significant attention was focused upon health and environmental impacts imposed by incinerating such wastes due to various gasses and suspended particulate released from the burning process 1,2,9,11,16 and reported different health and environmental effects while shredding technique has received few attention 9,18,19 which is associated with less harm impacts on both public health and surrounding environment. The current study was designed to assess environmental and health impacts caused by medical solid wastes shredding in Al-Hilla teaching hospital in Babylon Province, IRAQ via calculating daily generated solid waste, examining most wastes components and assessing certain heavy metals content. Also, the work has recorded the concentration of several air gases and noise level in shredding machine site and surrounding environment.
Materials and Method

Al-Hilla teaching hospital is situated in Babylon province- Iraq and consists of 447 beds. Estimated medical solid wastes per bed was 0.44 kg/day (Hospital records). So, this study has calculated the expected daily total generated wastes using hospital records by the following equation:

\[
\text{Total daily generated medical solid wastes} = \text{Rate of patient waste per day} \times \text{Bed No.} \\
= 0.44 \text{ kg/day} \times 447 \text{ bed} = 196.68 \text{ kg/day}
\]

The annual grand wastes total = 71,984.88 kg.

Random sample of such waste with weight of 0.832 kg and free from municipal wastes was obtained from the hospital and isolated in different categories such as biological tissues, glass, metals, fabrics, plastics, and papers. Each waste component was weighted as fresh and dried and their percentages were recorded. Also, heavy metal contamination of medical solid wastes was determined for cadmium, copper and ferrous following the method of USEPA at four weeks and finally, air contamination by CO, NO2 and SO2 was recorded using portable multi-gas detector in shredding, sterilizing, controlling, worker rooms and surrounding environment while noise level was measured only in shredding apparatus site and outside using portable sound meter.

Results and Discussion

Wastes Classification: Table 1 shows the fresh and dry weight and percentage of each medical solid wastes component. Apparently, all waste components were varied significantly in both fresh and dry weight values and it seems clearly that biological and fabric wastes had higher fresh weights than those of other components (Fig 1). In case of fresh wastes, biological wastes had the highest (34.8%) percentage followed by fabric waste ((21.07%) while the lowest percentage (1.56%) was recorded for metal waste followed by that paper (4.46%) waste. But in terms of dry wastes, the highest percentage (41.56%) was recorded for glass waste followed by that of plastic (21.96%) while the lowest percentages were 2.55 % and 6.85 % for metal and paper wastes respectively (Fig 2). It was found that the average medical solid waste generated was 0.44 kg per bed per day. Similar mean medical waste was reported in Khartoum State Hospitals which was 0.38kg/bed/day and in Istanbul- Turkey was 0.63 kg/bed/day while a study has reported a mean of 0.758 Kg/Bed/Day in the Sirsa city- India but other study in kargil hospital- India has reported a mean of 2.0 kg/bed/day 24 found to range from 2,250 to 2,500 kg/bed/
Fig. 3: Cd, Cu and Fe concentrations in medical solid waste from Al-Hilla teaching hospital

Waste Heavy Metal Contamination: Table 2 contains concentrations value of Cd, Cu and Fe in medical solid wastes in a sample collected from Al-Hilla teaching hospital measured in four weeks. It has been found that medical solid wastes contained certain heavy metal ions such as Cd, Cu, and Fe. Cadmium ions content was varied from 1.14 to 2.1786 µg/kg and copper ion concentrations were found to range from 0.0089 to 0.0252 µg/kg while ferrous ions had varied from 0.271 to 0.9719 µg/kg. Apparently, quantity and quality of heavy metal ions contained in medical solid wastes are affected by medicine species and healthcare equipments used. However, a recent study 29 has examined heavy metals content in medical solid wastes after being incinerated and reported that the ash of such wastes had high Fe, Zn, Cd and Pb ions.

Table 2: Cd, Cu and Fe concentrations in medical solid waste from Al-Hilla teaching hospital. measured in 4 weeks

<table>
<thead>
<tr>
<th>Time</th>
<th>Concentration value in µg/kg</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Cadmium</td>
<td>Copper</td>
<td>Ferrous</td>
</tr>
<tr>
<td>1st week</td>
<td>1.2962</td>
<td>0.0252</td>
<td>0.2721</td>
</tr>
<tr>
<td>2nd week</td>
<td>2.1786</td>
<td>0.0215</td>
<td>0.271</td>
</tr>
<tr>
<td>3rd week</td>
<td>1.2769</td>
<td>0.0097</td>
<td>0.9719</td>
</tr>
<tr>
<td>4th week</td>
<td>1.14</td>
<td>0.0089</td>
<td>0.4859</td>
</tr>
</tbody>
</table>

Air Contamination: Table 3 shows concentration of CO, NO2 and SO2 measured in shredding, sterilizing, controlling and worker rooms and surrounding environment. The highest CO concentration (0.4 ppm) was in sterilizing room while surrounding environment had the lowest (0.05 ppm) concentration and for NO2 concentrations, it was found that the highest (0.025 ppm) concentration was again recorded in sterilizing room but worker room had the lowest (0.014 ppm) concentration. In case of SO2, surrounding environment had the highest (0.06 ppm) concentration while the worker room contained the lowest (0.03 ppm) concentration (Fig. 4).

In general, all concentrations of these air gases were within standard limits. No data related to air pollutants in shredding medical solid wastes are available but many works have examined such air contaminants in case of incineration of such medical wastes 30. On the other hand, noise level was found in shredding room being higher than that recorded in surrounding environment (Fig 5) and such difference may be expected due to the sounds generated by shredding machine operation. The current work has concluded that shredding technique of medical solid wastes seems to be much better in terms of having almost insignificant impacts on both public health and surrounding environment and may present good opportunity to recycle certain solid wastes components such as plastic and metals but it needs controlling and treating biological pollutants in proper methods and to handle hazardous wastes scientifically and soundly.

Table 3: Concentration of CO, NO2 and SO2 measured in shredding, sterilizing, controlling and worker rooms and surrounding environment

<table>
<thead>
<tr>
<th>Measuring Sites</th>
<th>Concentrations ppm</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>CO</td>
</tr>
<tr>
<td>Shredding room</td>
<td>0.3</td>
</tr>
<tr>
<td>Sterilizing room</td>
<td>0.4</td>
</tr>
<tr>
<td>Controlling room</td>
<td>0.01</td>
</tr>
<tr>
<td>Worker room</td>
<td>0.02</td>
</tr>
<tr>
<td>Surrounding environment</td>
<td>0.05</td>
</tr>
</tbody>
</table>

Fig. 4: CO, NO2 and SO2 concentrations measured in shredding, sterilizing, controlling, worker rooms and surrounding site.

Fig. 5: Noise level measured in shredding room and adjacent site.
Conclusion

Regarding waste heavy metal content, current work has found that the highest mean concentration (1.473 ± 0.786 µg/kg) was recorded for cadmium ion which was within standard limit (1 – 3 µg/kg) while both copper and ferrous ions gave mean value of 0.0163 ± 0.005 µg/kg and 0.679 ± 0.431 µg/kg respectively. In case of air gases, it was found that there were no significant differences between all measured gases in all measured sites within shredding room and surrounding environment where NO\textsubscript{2} mean values were 0.0194 ± 0.006 ppm and 0.019 ± 0.002 ppm respectively while SO\textsubscript{2} gave mean values of 0.033 ± 0.002 ppm and 0.049 ± 0.003 ppm respectively and CO mean concentrations have been found to be 0.026 ± 0.023 ppm and 0.05 ± 0.007 ppm respectively.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Sanitary and Environmental Engineering, Department of Building and Construction Engineering- University of Technology, Iraq and all experiments were carried out in accordance with approved guidelines.

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Immunohistological Study of ER, PR, and Her2/neu Status in Breast Carcinoma

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ABSTRACT

Immunohistological (IH) procedure was used to detect the expression of ER, PR and HER2/neu in postoperative paraffin blocks of breast tumors and statistically analyzed their correlations with clinicopathological characteristics. The mean age was 47.3 years (range 31-76 years). Most of the patients (66.0%) were ≤50 years at diagnosis. The left breast was more commonly involved (57%). Tumor size ranged from 0.5 - 13.0 cm. The staining of Her2/neu was mainly localized in the membrane, whereas ER, PR, were localized in the nucleus. ER positivity was observed in 70% grade I, 48.2% grade II and 3.5% grade III carcinomas (P<0.05). Similarly PR positivity was observed in 70% grade I, 36.14% grade II and 1.75% grade III carcinomas (P<0.05). HER2/neu was positive in 1 (10%) case of grade I carcinoma, 31 (37.35%) cases of the grade II carcinoma and 24 (42.11%) cases of grade III carcinoma. In the HER-2/neu positive tumors, ER and PR expression in high grade tumors was significantly decreased compared with intermediate grade tumors (ER 5.6% vs 10.5; PR 0% vs 5.3%). Among the ER, PR and HER2/neu statuses, a significant correlation was observed between ER expression and PR status (P<0.05).

Keywords: Breast carcinoma, Estrogen, Progesterone, Her-2/neu receptor, Immunohistology.

Introduction

Breast cancer is the most common cancer among women, accounting for one in four types of cancer diagnosed in women worldwide, and is the main cause of death in women 45 to 55 years of age. Over 1.1 million women are diagnosed with this disease each year and incidence rates are still on the increase in several countries. The ultimate outcome of breast cancer relies on its initial stage at diagnosis with the main prognostic factors associated with breast cancer being lymph node involvement, tumor size and histological grade. However, tumor at the same stage can behave in a different manner, and the prognosis can vary. Therefore, it is important to find biomarkers that will predict the likelihood of recurrence and identify those patients who might benefit from additional therapy. Hence, low-risk patients can be spared unnecessary and costly treatment. Moreover, high-risk patients could be rapidly identified and offered appropriately aggressive treatment. Estrogen and progesterone receptors (ER, PR) and more recently, HER-2/neu have with increasing importance influenced the management of the malignancy. Estrogens are potent mitogens that mediate its proliferative action through the induction of cyclin D1, the major regulator of entry into the G1 stage of the cell cycle, and promote the secretion of positive or negative paracrine growth signals by breast stroma cells, stimulating epithelial cells to proliferate. With an established positive correlation of ER and PR with the degree of tumor differentiation, determination of ER and PR status on biopsy specimens prior to therapeutic intervention is advocated as standard practice. HER-2/neu also known as C-erb B2 (HER-2), is a proto-oncogene located on chromosome 17(9, 10). It is amplified and the protein (HER-2) overexpressed in 15-25% of invasive breast carcinoma with associated poor prognosis. HER-2/neu encodes a transmembrane glycoprotein with tyrosine kinase activity known as p185 belonging to the family of epidermal growth factor.

DOI Number: 10.5958/0976-5506.2019.01408.6
receptors. Immunohistological (IH) detection has become essential to many malignancies and plays a key role in tumor diagnosis, treatment and prognostic assessment. In this study, we study 75 cases of invasive BC and 15 of benign proliferative diseases, to detect the expression of estrogen receptor (ER), progesterone receptor (PR), and human epidermal growth factor receptor-2 (HER2), by IH and analyzed the associations between these indicators and the clinico-pathological characteristics.

Materials and Method

Breast samples used in this study were obtained by total or partial mastectomy in Hilla Teaching Hospitals, Babel, IRAQ during a ten years period extending from 1st January 2005 to 1st December 2017. They included a total of 75 cases of infiltrative carcinoma and 15 of benign proliferative diseases including ductal and lobular hyperplasia, apocrine metaplasia, fibroadenoma, and fibrocystic changes. Four micrometer thick formalin fixed, paraffin embedded tumor sections were stained with Haematoxylin and Eosin. Histological grade was assessed according to Nottingham modification of the Bloom-Richardson system. The presence of invasive carcinoma was confirmed in all cases. The histologic type of each tumor was recorded. All infiltrative tumor samples were classified by the TNM system. Each specimen was processed for immunohistochemistry using formalin fixed and paraffin embedded tissues sections and the hormonal status of each lesion was evaluated. Representative sections with breast tissue tumor were processed for ER, PR and HER-2/neu Immunohistological staining. Sections 4 μm thick were processed by using the avidin–biotin–peroxidase complex method (Figure 1). After the removal of paraffin, sections were hydrated and incubated for 30 min in 0.3% H₂O₂ to inhibit endogenous peroxidase activity; to retrieve the antigen the sections were incubated with retrieval solution (DakoCytomation, Carpinteria) and heat at 90°C in a vegetable steamer for 10 minutes. After being rinsed in Tris-buffered saline (TBS), the slides were incubated with 3% normal rabbit serum (NRS) in TBS for 30 min to prevent non-specific binding of the first antibody. The sections were then incubated with primary mouse monoclonal antibodies, ER (dilution 1:25) (DakoCytomation) and PR (DakoCytomation) (dilution 1:100), for 30 minutes at room temperature. For HER-2/neu staining, after antigen retrieval, slides were stained with a polyclonal antibody against HER-2/neu (DAKO) oncoprotein by envision system. HER2 score of 3+ was taken as positive. A score 3+ may be taken as “positive” as over 90% of these show gene amplification

Figure 1: Immunohistological (IH) procedure - Avidin-Biotin Complex (ABC) Method

Statistical Analysis: The results of principal components analysis were confirmed by determination of the correlation of ER, PR and HER-2/neu receptors expression status and several clinicopathological factors, by using Chi-square tests (χ² test two-tailed). Fisher’s exact test were also performed to examine whether or not the studied variables differed. A p value of <0.05 was taken as significant.

Results and Discussion

A total of 75 breast cancer cases were included in the study. The mean age was 47.3 years (range 31-76 years; median age 44.5 years). Most of the patients (66.0%) were ≤50 years at diagnosis. The left breast was more commonly involved (57%). Tumor size ranged from 0.5 - 13.0 cm. Immunohistological stained slides were evaluated for the presence of positive reaction, cellular localization (nuclear or cytoplasmic), pattern of staining (focal or diffuse), and intensity of reaction in individual tumor cells (strong or weak). The intensity of positive nuclear reactions was evaluated against the reaction in respective control samples. The staining of HER2 was mainly localized in the membrane (Fig. 2), whereas ER, PR, were localized in the nucleus (Fig. 3, respectively). Cells were classified according to the positive rate and colour intensity as follows: negative (-), weak positive (+), moderate positive (+++) and strong positive (++++). The morphological categories were infiltrating ductal carcinoma (IDC) 64 (85.3%) cases, metaplastic carcinoma 3 (4.0%) cases, IDC with mucinous differentiation 2 (2.7%) cases, infiltrating...
lobular carcinoma 1 (2.0%) case; mixed (ductal and lobular) carcinomas, IDC micropapillary and medullary carcinoma 1 (1.3%) cases each. Other types were apocrine, papillary and pleomorphic lobular carcinoma accounting for a single case each. Tables 2 and 3 give the ER, PR and HER-2/neu status by tumor grade, size and lymph node involvement. Seven (9.3%) cases were grade I, 40 (53.3%) were grade II and 28 (37.3%) were grade III. ER and PR were positive in 49 (32.7%) and 38 (25.3%) cases respectively. HER-2/neu was positive (3+) in 37 (24.7%), 2+ in 19 (12.7%) and negative (0 and 1) in 94 (62.7%) cases. Simultaneous ER and HER-2/neu positivity was observed in 6 (4%) cases. Special subtype of carcinomas like metaplastic carcinoma showed no HER-2 positivity, except for a case of grade II IDC with mucinous differentiation. ER and PR expression correlated inversely with HER-2 over-expression. ER and PR expression were decreased significantly in HER-2/neu positive compared with HER-2/neu negative tumors (Table1, 2). ER positivity was observed in 71.4% grade I, 50% grade II and 3.5% grade III carcinomas (p value <0.005). Similarly PR positivity was observed in 70% grade I, 36.14% grade II and 1.75% grade III carcinomas (p value<0.001). HER-2 was negative in all cases of grade I carcinoma, 9 (22.5) cases of the grade II carcinoma and 10 (35.7) cases of grade III carcinoma. In the HER-2/neu positive tumors, ER and PR expression was significantly decreased (Table1).

Table 1: Correlation of ER, PR and HER-2/neu Status with malignant Grade, tumor Size and Lymph Node metastasis

<table>
<thead>
<tr>
<th>Grade</th>
<th>ER+ (#26)</th>
<th>PR+ (#21)</th>
<th>HER/2neu+ (#19)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Grade 1 (#7)</td>
<td>5(71.4)</td>
<td>5(71.4)</td>
<td>None</td>
</tr>
<tr>
<td>Grade 2 (#40)</td>
<td>20 (50)</td>
<td>15(37.5)</td>
<td>9(22.5)</td>
</tr>
<tr>
<td>Grade 3 (#28)</td>
<td>1 (3.5)</td>
<td>1(1.75)</td>
<td>10(35.7)</td>
</tr>
<tr>
<td>ER expression PR expression HER-2/neu expression p-value</td>
<td>&lt;2.0 cm (#9)</td>
<td>5(55.5%)</td>
<td>4(44.4%)</td>
</tr>
<tr>
<td>2-5 cm (#40)</td>
<td>14(35%)</td>
<td>12(30)</td>
<td>9(22.5)</td>
</tr>
<tr>
<td>&gt;5.0 cm (#35)</td>
<td>7(20%)</td>
<td>5(14.2)</td>
<td>8(23)</td>
</tr>
<tr>
<td>PR expression HER-2/neu expression p-value</td>
<td>No LN (#22)</td>
<td>6 (27.2%)</td>
<td>5(22.6)</td>
</tr>
<tr>
<td>1-3 LN (#17)</td>
<td>7 (41.1%)</td>
<td>5(29.4)</td>
<td>5(29.4)</td>
</tr>
<tr>
<td>&gt; 3 LN (#36)</td>
<td>13(36.1%)</td>
<td>11(30.5)</td>
<td>11(30.5)</td>
</tr>
</tbody>
</table>

Table 2: Correlation of HER-2/neu Status with Estrogen and Progesterone Receptor Expression

<table>
<thead>
<tr>
<th>HER-2/neu status</th>
<th>ER expression</th>
<th>PR expression</th>
</tr>
</thead>
<tbody>
<tr>
<td>+ (5%)</td>
<td>++ (4%)</td>
<td>+++ (10%)</td>
</tr>
<tr>
<td>HER-2/neu positive (3+;19)</td>
<td>6</td>
<td>4</td>
</tr>
<tr>
<td>HER-2/neu positive (2+;9)</td>
<td>6</td>
<td>23</td>
</tr>
<tr>
<td>HER-2/neu negative (47)</td>
<td>5</td>
<td>5</td>
</tr>
</tbody>
</table>

ER positivity was observed in 71.4% grade I, 50% grade II and 3.5% grade III carcinomas (p value <0.001). Similarly PR positivity was observed in 71.4 grade I, 37.5% grade II and 3.5% grade III carcinomas (p value<0.001). HER-2 was positive in None case of grade I carcinoma, 31 (22.5%) cases of the grade II carcinoma and 35.7% cases of grade III carcinoma. In the HER-2/neu positive tumors, ER and PR expression in high grade tumors was significantly decreased compared with intermediate grade tumors. With regard to tumor size, three groups was performed, group 1 (tumor size < 2 cm), group 2 (2–5 cm) and group 3 > 5 cm in diameter. The total number of group 1 tumors was 9 [5 (55.5%) ER positive; 4 (44.4%) PR and 2(22.2%) HER-2 positive]. Of the group 2 tumors 14 (35%) were ER positive, 12 (30%) were PR positive and 9 (22.5%) were HER-2 positive. Of the group 3 tumors 7 (20%) were ER positive, 5 (14.2%) were PR positive and 8 (23%) were HER-2 positive. ER expression in the HER-2/neu positive, large sized tumors was significantly decreased compared with smaller tumors (ER 20% vs 55.5). Breast cancer survival is linked to early detection, timely appropriate treatment and genetic predisposition. Prognosis is related to a variety of clinical, pathologic and molecular features which include classical prognostic factors viz. histologic type, grade, tumor size and lymph node metastases [14-19]. In the present study data regarding tumor size, type, histological grade, lymph node status and hormone receptor status as well as HER2 marker status for breast carcinomas were analyzed. These demographic findings
complement other studies which have stressed on the younger age of breast cancer cases at presentation and the higher stage and tumor grade\textsuperscript{14-19}. With regard to hormone receptors, ER were positive in 71\% for grade 1 and 50\% for grade 2 breast cancer cases respectively and PR were positive in in 71\% for grade 1 and 37.5\% for grade 2 cases respectively. Regarding HER2 expression, HER-2/neu was nil in grade 1, positive in 22.5\% for grade 2 and positive in 35.7\% for grade 3 breast cancer cases respectively. The ER, PR expression in breast cancer, in the current study is comparable to published international studies, but the frequency of HER-2/neu expression is higher in the current study. This may reflect the younger age at diagnosis. Larger studies are required to study the biological behavior of breast cancer in this high risk population. The clinical importance of these prognostic markers in the management of breast cancer patients is strongly advocated in our population to improve the dismal prognosis and to provide better therapeutic options\textsuperscript{28}.

\textbf{Conclusion}

There is a definite correlation between IH indices and clinicopathological characteristics in breast carcinomas. Combined detection of these indices may be significant in the evaluation of biological behavior and prognosis of breast carcinomas and thus in the diagnosis and comprehensive treatment of this disease.

\textbf{Financial Disclosure}: There is no financial disclosure.

\textbf{Conflict of Interest}: None to declare.

\textbf{Ethical Clearance}: All experimental protocols were approved under the Department of biotechnology, College of biotechnology, Qasim Green University, Iraq and all experiments were carried out in accordance with approved guidelines.

\textbf{REFERENCES}


ABSTRACT

This study aims to (1) Assess the level of nurses’ burnout in oncology wards. (2) Identify the relationship between nurses’ age, years of experience in nursing, years of experience in the oncology ward, the nurse’s burnout and quality of oncology nursing care. (3) Find out the differences in nurses’ exposure to burnout and quality of oncology care between the groups of age, gender, and educational qualification. For the assessment of Burnout Syndrome and quality of oncology nursing care we used the questionnaire: (1) Maslach Burnout Inventory (MBI) and (2) quality of oncology nursing care scale (QONCS). Respondents consisted of Nurses n=46, who working in oncology ward in pediatric teaching hospital in Baghdad City. In our study, out of n=46 Nurses working at the wards of Oncology, most of study participants experience high level of emotional exhaustion (n = 32; 71.1%), Most of study participants experience low level of depersonalization (n = 29; 64.4%) and more than a half of study participants experience low level of personal accomplishment (n = 23; 51.1%). There are statistically significant associations between nurses’ age, nurse-to-bed ratio, socioeconomic status and the quality of oncology care.

Keywords: burnout, oncology, nursing care.

Introduction

Burnout occur when a person experiences chronic emotional and interpersonal stress for a prolonged time\(^1\). Burnout is determined by the dimensions’ exhaustion, cynicism, and decreased professional efficacy. As a predetermined job-related stress syndrome, the individual stress experience accompanied to burnout syndrome are laid within the organizational context of individual’s relation to their job. Burnout negatively affects individuals’ personal and social functioning. Burnout can result in a compromised quality of work and an increased cost both for the individual and his/her their significant others. This cost is owing to both physical and psychological health. The interventions that aim to minimize the severity of burnout and to better its adverse effects can involve workers’ engagement with their work at the individual and organizational levels\(^2\).

According to Maslach, burnout is a final reaction that manifests as a result of chronic stressors from the job characterized by three dimensions which are cynicism, inefficacy, and exhaustion\(^3\). This implies that burnout is characterized by a number of factors not just one single symptom therefore a rough day at work or a bad day does not imply that the individual is suffering from burnout. Burnout will be inevitable when discrepancy occurs between the type of job performed and the type of person performing the job. The widening gap between the individual and demands from the job becomes too great eventually leading to burnout\(^4\). The issue of burnout and stress among nurses is familiar, nursing is inevitably a stressful profession\(^5\). The prevalence of burnout in nursing is a real issue and a real threat to the health care system. Several studies around the world in different continents have been carried out showing the high rates of burnout among nurses, more especially staff nurses working in hospitals. High levels of burnout among nurses are reported in Europe, Asia and North America\(^6\). Burnout reduces productivity and saps your energy, leaving you feeling increasingly helpless, hopeless, cynical, and resentful. Eventually, you may feel like...
you have nothing more to give. The negative effects of burnout spill over into every area of life including your home, work, and social life. Burnout can also cause long-term changes to your body that make you vulnerable to illnesses like colds and flu. It has been reported that there are approximately 14 million new cancer cases every year in the world, and this number is expected to reach 22.2 million by 2030. Of these annual cases, 175,000 are children under 15 years of age. WHO has projected that new cancer cases in Southeast Asia will rise from 1.3 million to 2.1 million between 2002 and 2020 - a dramatic 60 percent jump (WHO, 2005). Standards of practice and competencies for oncology nurses appear to be similar across continents. Many childhood cancers are now curable. In recent years, understanding the importance of early diagnosis, new diagnostic methods, new chemotherapy regimens, and especial improvements in bone marrow transplantation have affected survival rates. Oncology nursing society approximately 48 percent of nurses in the U.S. hold a bachelor’s degree. In this context, the pediatric oncology nurse must go beyond the application of technical and scientific knowledge, offering the child and his family a humanized care. aiming at the promotion of health, quality of life, comfort and well-being of them. It is necessary that all those involved in care are more sensitive and responsible, open to forming partnerships with families and mobilizing possible social support networks, in order to create links. Among the professionals who deal with the oncological child, the Nurses stand out, once they assume a position of support, dealing daily and directly with the child. It has an important role in guiding the patient and his family in the experience of the disease process, treatment and rehabilitation, definitively affecting future quality of life. It acts to alleviate the suffering caused by hospitalization, through the humanization of the care and development of the ludic. The nurse has an indispensable role in the care of the oncological child, and must act consciously, reflexively and critically in the care of the child and the family that is under his care. carefully considering the particularities and singularities of each. They are sensitized by the whole situation that cancer imposes. It is necessary that the nurse professional understands the pain of the other, in order to relieve it, seeking recovery and a good standard of quality of life of the pediatric patient.

Methodology

Study Design: A descriptive design research is used to discover relationships among variables and to allow the prediction of future events from present knowledge. In the present study, several variables were examined to determine each subjects’ likelihood to experience burnout including age, gender and educational qualification. The period of the study started from October 15th, 2018 to April 30th, 2019.

Study Sample: The study applied the convenience sampling method. This type of sampling is inexpensive and feasible, and usually requires less time in comparison with other types of samples. Convenience sampling facilitates conducting studies on topics that could not be investigated via the application of probability sampling. Furthermore, it allows researchers to obtain information in unexplored fields. In the convenience sampling approach, participants were included in the study since they happened to be in the right place at the right time. Therefore, it is also convenient to the researcher for data collection purposes. Based on predictors (age, gender, marital status, educational qualification, income, number of working hours). The total number of nurses who work in pediatric oncology unit is 56 nurses. The researcher distributed (50) copies of the study instrument to those nurses. The returned questionnaires were 46; 4 of them were incomplete. So, they were excluded from the data analyses. The final sample size was 46. Thus, the response rate was 92%.

Study Instrument: In addition to collecting demographic data, the researcher used the Maslach’s Burnout Inventory (MBI) and quality of oncology nursing care scale (QONCS). The latter measures the burnout level in oncology nurse’s.

Part 1: The Maslach’s Burnout Inventory

Part 2: The quality of oncology nursing care scale

Data Collection the Methods: The researcher collected data throughout different times of the day in morning and night shift. The researcher used the same form of the study questionnaire to collect data for all hospitals. Using simply language clearly because different of nurses educational levels. The estimated time range for each participant to complete the study questionnaire ranged between 15-20 minutes, to be
The data were collected from the period from December 20\textsuperscript{th} 2018 to January 30\textsuperscript{th}, 2019.

**Statistical Analysis:** Data were analyzed using the Statistical Package for Social Science (SPSS), version 24 for Windows©. Descriptive statistical measures of frequency, percentage, mean, and standard deviation were used to demonstrate the participants’ sociodemographic characteristics. Inferential statistical measure of bivariate Pearson correlation was used to measure variables that can predict participants’ likelihood to experience burnout.

## Results and Discussion

The mean age for nurses is 32.53 ± 7.93; more than a half age 21-31-years (n = 25; 55.6%), followed by those who age 32-42-years (n = 13; 33.3%), and those who age 43-55-years (n = 5; 11.1%). Concerning gender, most are females (n = 28; 62.2%) compared to males (n = 17; 37.8%). Regarding marital status, most are married (n = 31; 68.9%), followed by those who are not married (n = 13; 28.9%), and one who is widowed (n = 1; 2.2%). With respect to educational qualification, less than a half hold an associate degree (n = 22; 48.9%), followed by those who are nursing high school graduate (n = 17; 37.7%), and those who hold each of a bachelor’s degree and a graduate degree (n = 3; 6.7%). Concerning socioeconomic status, most are of lower-middle class (n = 33; 73.4%), followed by those who are of upper lower class (n = 6; 13.3%), those who are of upper-middle class (n = 5; 11.1%), and one who is of upper class (n = 1; 2.2%). There are statistically significant associations between nurses’ age, nurse-to-bed ratio, socioeconomic status and the quality of oncology care (p-value = .034, .003, .030) respectively. There are statistically significant associations between years of experience in the current unit, socioeconomic status and the level of emotional exhaustion (p-value = .011, .034) respectively. There are statistically significant associations between years of experience in the current unit, number of shift hours and the level of depersonalization (p-value = .033, .026) respectively. There is a statistically significant association between nurse-to-bed ratio and the level of personal accomplishment (p-value = .006). Most of study participants experience high level of emotional exhaustion, followed by those who experience an average level of EE, and those who experience a low level of EE. According to the Multidimensional Theory of Burnout, BO is a person stress knowledge embedded in a context of complex social association, and it includes the individual’s perception of both self as well as other people (Maslach, 1998). In this sense, the stressors that the nurse feels more in the workplace that trigger emotional exhaustion include job dissatisfaction owning to societal negative view of nursing as a profession. Other stressors related to person’s perception of self—include workload and conflict at work. Maslach (1998) stated that workload happens when job demands exceed human limits. People have to do too much in too slight time with too insufficient resources. When overwork is a chronic work condition, not an occasional emergency, there is slight chance to rest, recover, and reinstate equilibrium. This fits with the findings of the current study which demonstrated that about a quarter of participants work for 18-hours per shift which could result in such a high level of emotional exhaustion. Maslach (1998) stated that workload can make employees feel exhausted and used up without any source of renewal and they deficiency enough energy to face another day or another person in need.

On the other hand, the person’s perception of others may be contextualized within the nature of the patients admitted to the oncology wards who experience compromised psychological status. The complex health status of those patients require greater physical efforts and more vigilance. Maslach (1998) stated the centrality of relations at work—whether it be associations with patients, colleagues or managers—has always been at the heart of descriptions of burnout.

Concerning DP, the finding of the current study displayed that most of study participants experience low level of depersonalization (n = 29; 64.4%), followed by those who experience high level of DP (n = 15; 33.3%). Maslach (1998) stated that workload Depersonalization improves in response to the excess of emotional exhaustion. The relationships are the basis of both emotional strains and rewards, they can be a source for coping with work stress, and they often tolerate the burnout of the negative effects of burnout. The finding of the current study displayed that most study subjects experience high level of emotional exhaustion which could result in Depersonalization. Regarding personal accomplishment, more than a half of study participants experience low level of PA (n = 23; 51.1%), followed by those who experience an average and high levels of PA.
(n = 11; 24.4%) for each of them. Maslach (1998) stated that reduced personal accomplishment this lowered fell of self-efficacy has been connected to depression and an incapability to cope with demands of the work and it can be worsened by a deficiency of social support and chances to develop professionally. The reality of health agencies in Iraq lacks to any social support system. Insufficient reward includes a deficiency of suitable rewards for the work people do. This deficiency of recognition devalues both the job and the workers. Prominent amongst these rewards are outside ones such as salary and benefits, but the loss of internal rewards (such as pride in doing something of importance and doing it well) can also be a critical part of the mismatch between the person and the work.

Table 1: Participants' sociodemographic characteristics

<table>
<thead>
<tr>
<th>Variables</th>
<th>Frequency</th>
<th>Percent</th>
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<tr>
<td>Age (Years): Mean (SD): 32.53 ± 7.93</td>
<td></td>
<td></td>
</tr>
<tr>
<td>21-31</td>
<td>25</td>
<td>55.6</td>
</tr>
<tr>
<td>32-42</td>
<td>15</td>
<td>33.3</td>
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<td>43-55</td>
<td>5</td>
<td>11.1</td>
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<tr>
<td>Total</td>
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</table>

Table 2: Association between study variables and quality of oncology care

<table>
<thead>
<tr>
<th>Model</th>
<th>Unstandardized Coefficients</th>
<th>Standardized Coefficients</th>
<th>t</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
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<td>Std. Error</td>
<td>Beta</td>
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<tr>
<td>Age</td>
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<td>.551</td>
<td>2.205</td>
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<tr>
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<tr>
<td>Number of shift hours</td>
<td>-.147</td>
<td>.765</td>
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<tr>
<td>Nurse-to-bed ratio</td>
<td>6.956</td>
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<td>.425</td>
<td>3.169</td>
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<tr>
<td>SES</td>
<td>2.032</td>
<td>.900</td>
<td>.264</td>
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Table 3: Association between study variables and Emotional Exhaustion

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<th>Sig.</th>
</tr>
</thead>
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<td>B</td>
<td>Std. Error</td>
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<td></td>
</tr>
<tr>
<td>Age</td>
<td>-.583</td>
<td>.439</td>
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<td>-.225</td>
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<td>-.092</td>
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<td>Nurse-to-bed ratio</td>
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<td>-.977</td>
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Table 4: Association between Study Variables and Depersonalization

<table>
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<th>Sig.</th>
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<td>.338</td>
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<td>-.734-</td>
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<td>-.336-</td>
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<tr>
<td>Nurse-to-bed ratio</td>
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<td>-.155-</td>
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<td>SES</td>
<td>-.663-</td>
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Table 5: Association between study variables and Personal Accomplishment

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<td>Std. Error</td>
<td>Beta</td>
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<td>.411</td>
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<td>Years of experience in nursing</td>
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<td>.364</td>
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<td>Years of experience in the unit</td>
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<td>.333</td>
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<tr>
<td>Number of shift hours</td>
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<td>.382</td>
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<tr>
<td>SES</td>
<td>-.177-</td>
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<td>-.425-</td>
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</table>

Conclusion

Most of nurse’s experience high levels of EE, DP, and low level of PA, Female nurses have better quality of pediatric oncology care than male nurses, the better the nurses’ SES, the better quality of pediatric oncology care and nurses who hold a graduate degree have better quality of pediatric oncology care.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Faculty of Dentistry, University of Babylon, Hillah city, Iraq and all experiments were carried out in accordance with approved guidelines.

REFERENCES


Physiological Aspects of Osmolality and Cations of Young University Adults Suffer from Blood Glucose, Blood Pressure and Smokers

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Department of Environmental Pollution, Faculty of Environmental Sciences, AL-Qasim green University, Iraq

ABSTRACT
The study deals with the physiological measurements of cations and osmolality for fasting blood glucose (FBG), clinic blood pressure (CBP) and smokers among university students. A total of 254 students (77 females and 177 males) were registered. Including 41 healthy and 42 students who were FBG; 31 were healthy and 68 were suffering from CBP; 39 nonsmokers and 33 students who were smokers; aged 19-26 years. A significant increase was observed in the concentrations of trace elements (Cd²⁺, Pb²⁺, and Cu²⁺ excluding the smokers group), electrolytes (Na⁺) and osmolality, as well as significantly reduced serum Zn²⁺, Fe²⁺ and K⁺ for the three cases at (p<0.05) in comparison with healthy students. The lack of Zn²⁺ and Fe²⁺ and the rise exposure to toxic elements from the three cases may be synergistic with the hazard factors linked with many diseases.

Keywords: blood glucose, blood pressure, smoking, cations, osmolality.

Introduction
Trace minerals are dietary minerals that are needed in very small quantities for the growth, development, and physiology functions appropriate to the body¹. Although the trace elements are essential components for biological activities, the immoderate levels of them can be toxic for body health. The imbalances in the optimum levels of trace minerals may have a negative impact on biological processes because of the tendency of the components to collect and accumulate organisms within and are associated with many fatal diseases². The proposed mechanism for trace minerals that promote insulin function include activation sites of insulin receptor, according to³, they act as co-factors or component of enzyme systems involving glucose metabolism. Cigarette smoking may be an important source of absorption of these dangerous minerals not only for smokers, but also through smoking passively⁴.

The human body contains water about 60% of body mass and a small proportion of solutes. In the path of development, knotted arrangement mechanisms developed to osmolarity keeping the (≈280 mosm/L) and thus water amount at needed level. Thus it came the function of major solutes and their mechanisms of regulatory in blood pressure regulation⁵. Therefore, serum osmolality is an essential laboratory parameter to understand several clinical disorders such as electrolyte disturbances exogenous intoxication and hydration status⁶. Literature survey showed that no sufficient work has been done to study the effect of the three cases on serum cations alterations and osmolality, so the current work was carried out to determine the influence of the cases on serum minerals and osmolality to decrease exposure for toxic minerals in the student’s college in order to reduce the hazard of adverse health influences.

Materials And Method
Criteria of Participants: A sample of 254 students aged between 19 and 26 years was selected randomly among students. About 83 of FBG were divided to: health (<100 mg/100cm³), pre-diabetes (100-125 mg/100cm³), diabetes (≥126 mg/100cm³), and hypoglycemia (≤70 mg/100cm³). In addition, 99 of a CBP level were divided as:
Results and Discussion

There is growing guide that the metabolism of many trace minerals changes in diabetes, and these micro-nutrients may have particular roles in causing disease and its development. The level of Pb2+, Cd2+, and Cu2+ was found to be significantly elevator in diabetic of students, while the concentration of Zn2+ and Fe2+ was found to be significantly lower than healthy (Table 1). This result agrees with7, who showed a significantly higher level in Cd2+ level of experimental rats when compared to control. Other toxic minerals, including Pb2+, have been reported in higher concentration in biological samples of diabetics when compare to non-ones8. The results of9, the level of copper in control cohort was 933.43 (mg/L) and 950.30 (mg/L) of type 2 diabetes cohort in Chinese adults. The low plasma level of Zn2+ negatively impacts the capability of islet cells to produce and secrete insulin10. While11 found that iron (Fe2+) serum level there were low in diabetic patients. The data obtained in study appeared significant increase of Cd2+, Pb2+, and Cu2+ concentration in FBG. And data gained in12, suggested that an high cadmium (Cd2+) concentration lead to high blood pressure(HBP)/ischemic heart illness or it is the result of outset of disease that is resulted in the rising of Cd2+. While the potential health effects of Pb2+ accumulation are HBP and peripheral arterial disease13.

In subgroups of coronary artery disease (CAD) patients according to hypertension (HT) and diabetic (DM) they had a lower level of Zn2+ and a high level of Cu2+ in HT and DM than normotensive and non-diabetic, respectively14. The concentrations of Zn2+ in15 study on blood samples low-HT male patients. And16 showed that there was a low serum Fe2+ level in HT patients. A high levels of toxic minerals (Pb2+ and Cd2+) and a low levels of Cu2+, Zn2+ and Fe2+ were associated with raise in a number of cigarettes (Table 3). In Iraq, according to17, the concentration levels of Cd2+ was 0.023 μg/dl in infertility men smokers higher than in fertility men non-smokers (0.006 μg/dl). A positive linked was found between Pb2+ serum and the duration of smoking and number of cigarettes smoked per day18. The results appeared that serum Cu2+ was significantly decrease in number of cigrattes compared with nonsmokers ones, which came in line with19. The study20 found that serum Zn2+ was lower in cigarette smokers. Zn2+ was detected in cigarette smokers in Sudan, and low concentrations of Fe2+ plasma in infants’ exposure to tobacco smoke21. The results illustrated a significance increased and decreased

Collection of Data and Measurement: The data were collected using a self-administered questionnaire and it is built on several axes: age, smoking case, the number of cigarettes smoked per day and the duration of smoking, the family history of diabetes and physical activities. Women smokers were not comprised because of the tradition of Iraq society, in which restricts the arrival of researchers to females at the time of study, and prevents their smoking. The criteria for selecting students were that no one should suffer any medical complication such as heart disease, stroke or any other disorder. A total of five ml of the venous blood sample was gathered from the healthy student and FBG in the morning after the fasting period for at least 8-10 hours. The serum was separated using a centrifuge device for 3000/10 rpm and stored at (-20°C) until analysis. BG were measured using the active glucose meter Accu-chek. BP was measured by the electronic pressure device, by taking the pressure rate while students were at rest for at least 10-15 min.

Methods of Measuring Minerals: Serum microminerals (mg/L) were determined from all samples. Ten ml of HNO3 was added to one ml of serum, heated under boiling for 3 hours on a hot plate device. Then 5 ml of 30% H2O2 was added to low amounts of samples, and also heated at the same temperature to dry. The remain was dissolved at 50 ml of 1% HNO3, after it was filtered by the whatman filter. The element was then analyzed using atomic absorption spectrophotometer. Depending on a flame photometer device, to assessment Ca2+, Na+ and K+ (mg/L), after serum dilution with a certain percentage of water free of ions. Osmolality (mosm/Kg) was determined for cases by using standardized procedures of single-sample Micro-Osmometer device.

Statistical Analysis: Data of study were analyzed using ANOVA, differences of the entire study students for osmolality and cations were statistically assessed using F-test. Least significant difference, LSD was applied to compare the results, descriptive analysis was also used to show the mean and standard deviation (SD) of the results. The various letters indicated significance in p<0.05.
in level of sodium and potassium in FBG, respectively (Table 4) and came in line with. In appeared that the average value of K+ was significantly decreased, while the Na+ blood level was higher in samples of non-HT diabetic subjects as compared to healthy of both sexes. Na+, the major extracellular cations, has long been seen a vital environmental factor in disruption. by contrast, K+, the essential intracellular cat-ion, has commonly been viewed as a secondary factor in the pathogenesis of HBP. K+ supplementation can lower the need for anti-hypertensive medication. The kidneys account for 90% or more of K+ loss, with the remnant exiting via the fecal way. This technique, is inadequate for the Na+-rich and K+-poor modern diet. The end outcome of the failure of the kidneys to acclimate to this diet is an excess of Na+ and a deficit of K+ in the patients of hypertensive. This end outcome came in line with my results (Table 5). Hypotension is associated with a reduction in Na+ food intake with a sensitivity of Na+.

Table 1: Level of trace minerals for fasting blood glucose classes

<table>
<thead>
<tr>
<th>Trace minerals</th>
<th>Health</th>
<th>Pre-diabetes</th>
<th>Diabetes</th>
<th>Hypoglycemia</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pb2+</td>
<td>74.63 ± 0.506a</td>
<td>184.7 ± 0.437b</td>
<td>256.0 ± 0.140c</td>
<td>250.9 ± 0.335d</td>
</tr>
<tr>
<td>Cd2+</td>
<td>401.9 ± 0.152a</td>
<td>468.5 ± 0.521b</td>
<td>494.5 ± 0.499c</td>
<td>497.8 ± 0.142d</td>
</tr>
<tr>
<td>Cu2+</td>
<td>0.110 ± 0.003a</td>
<td>0.131 ± 0.002b</td>
<td>0.146 ± 0.001c</td>
<td>0.150 ± 0.001d</td>
</tr>
<tr>
<td>Zn2+</td>
<td>0.994 ± 0.004a</td>
<td>0.901 ± 0.008b</td>
<td>0.613 ± 0.004c</td>
<td>0.719 ± 0.005d</td>
</tr>
<tr>
<td>Fe2+</td>
<td>67.49 ± 0.121a</td>
<td>58.28 ± 0.225b</td>
<td>56.40 ± 0.385c</td>
<td>62.38 ± 0.363d</td>
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Table 2: Level of trace minerals for clinic blood pressure classes

<table>
<thead>
<tr>
<th>Trace minerals</th>
<th>Normotensive</th>
<th>Elevated blood pressure</th>
<th>Hypertension</th>
<th>Hypotension</th>
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</thead>
<tbody>
<tr>
<td>Pb2+</td>
<td>34.71 ± 0.138a</td>
<td>40.94 ± 0.269b</td>
<td>43.11 ± 0.388c</td>
<td>42.51 ± 0.132d</td>
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<tr>
<td>Cd2+</td>
<td>90.68 ± 0.285a</td>
<td>91.58 ± 0.311b</td>
<td>94.91 ± 0.127c</td>
<td>93.91 ± 0.130d</td>
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<tr>
<td>Cu2+</td>
<td>0.014 ± 0.001a</td>
<td>0.035 ± 0.005b</td>
<td>0.050 ± 0.001c</td>
<td>0.015 ± 0.001ad</td>
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<tr>
<td>Zn2+</td>
<td>0.980 ± 0.002a</td>
<td>0.690 ± 0.002b</td>
<td>0.356 ± 0.007c</td>
<td>0.431 ± 0.007d</td>
</tr>
<tr>
<td>Fe2+</td>
<td>49.31 ± 0.292a</td>
<td>44.59 ± 0.449b</td>
<td>42.35 ± 0.060c</td>
<td>47.47 ± 0.078d</td>
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### Table 3: Level of trace minerals of smoking status

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<th>Trace minerals</th>
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<th>LSD</th>
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<tr>
<td></td>
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<td>Light smokers</td>
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<tr>
<td>Pb²⁺</td>
<td>42.28 ± 0.285a</td>
<td>46.63 ± 0.426b</td>
</tr>
<tr>
<td>Cd²⁺</td>
<td>98.01 ± 0.143a</td>
<td>98.97 ± 0.031b</td>
</tr>
<tr>
<td>Cu²⁺</td>
<td>0.123 ± 0.002a</td>
<td>0.112 ± 0.003b</td>
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<tr>
<td>Zn²⁺</td>
<td>0.955 ± 0.006a</td>
<td>0.441 ± 0.051b</td>
</tr>
<tr>
<td>Fe²⁺</td>
<td>64.07 ± 0.041a</td>
<td>55.64 ± 0.081b</td>
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### Table 4: Level of electrolytes and osmolality for fasting blood glucose classes

<table>
<thead>
<tr>
<th>Electrolytes</th>
<th>FBG</th>
<th>LSD</th>
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<tbody>
<tr>
<td></td>
<td>Health</td>
<td>Pre-diabetes</td>
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<tr>
<td>Na⁺</td>
<td>3105.60 ± 0.700a</td>
<td>3121.13 ± 0.404b</td>
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<tr>
<td>K⁺</td>
<td>167.166 ± 0.351a</td>
<td>164.150 ± 0.409b</td>
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<td>osmolality</td>
<td>288.660 ± 0.570a</td>
<td>293.660 ± 0.600b</td>
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### Table 5: Level of electrolytes and osmolality of clinic blood pressure levels

<table>
<thead>
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<th>Electrolytes</th>
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<tbody>
<tr>
<td></td>
<td>Normotensive</td>
<td>Elevated blood Pressure</td>
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<td>Na⁺</td>
<td>3320.1 ± 0.763a</td>
<td>3337.26 ± 0.472b</td>
</tr>
<tr>
<td>K⁺</td>
<td>158.63 ± 0.665a</td>
<td>148.960 ± 0.115b</td>
</tr>
<tr>
<td>osmolality</td>
<td>282.00 ± 1.732a</td>
<td>290.330 ± 1.527b</td>
</tr>
</tbody>
</table>

### Table 6: Level of electrolytes and osmolality for smoking status

<table>
<thead>
<tr>
<th>Electrolytes</th>
<th>Smoking status</th>
<th>LSD</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Non-smoker</td>
<td>Light smokers</td>
</tr>
<tr>
<td>Na⁺</td>
<td>9896.1 ± 0.264a</td>
<td>3432.9 ± 0.100b</td>
</tr>
<tr>
<td>K⁺</td>
<td>158.90 ± 0.529a</td>
<td>165.80 ± 0.300b</td>
</tr>
<tr>
<td>osmolality</td>
<td>234.66 ± 0.577a</td>
<td>240.33 ± 1.154b</td>
</tr>
</tbody>
</table>

### Conclusion

A significant increase of toxic minerals (Cd²⁺, Pb²⁺, Cu²⁺), electrolyte Na⁺, osmolality and reduce serum Zn²⁺, Fe²⁺ and K⁺ of the cases and cigarette smokers in young university was observed, whereas the level of toxic minerals was affected by number of cigarettes. Alteration in the level of one metal as a result of the three states listed in the search may influence normal levels of other metals. Which in turn may serve as a simple plate of vital indicators for the risk of many diseases.

### Ethical Clearance:

Ethical clearance taken from Research Review Board of Department of Environmental pollution, College of Environmental Sciences at Al-Qasim Green University, Iraq.

### Source of Funding:

This study was self-funded.

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Prevalence of Meningitis among Children under Fifteen Years for the Period of 2014 to 2018 in Hilla City

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ABSTRACT

Is an acute infection of the protecting membranes that cover the spinal cord and brain, known as meninges. Meningitis may be dangerous because of its proximity to the spinal cord and brain; hence, meningitis is categorized as an emergency health condition. The study aims at assessment the prevalence of meningitis in children less than 10 years for the Last 5 year. A descriptive (retrospective) study used assessment approach was carried to explore prevalence of meningitis for the period of September 1st 2018 to January 1st 2019. It conducted at Statistics Unit in Babylon Teaching Hospital for Maternity and Pediatric. The sample collection was five years from 2014 to 2018 and was for all months of the year for children with meningitis. descriptive statistical approach that includes of frequencies, percentages data were analyzed. May month were recorded the highest percent (12%) as a more frequent of infection. As well as the 2017 were recorded highest percent among 5 years. A fifty seven percent of male gender as a majority of 5 years exposed to the infection than the female in under one years of their age.

Keywords: Prevalence, Meningitis, Under Fifteen Years

Introduction

The existence of microorganisms in normally sterile body fluid samples may be representative of dangerous infections ¹. Bacterial meningitis is a universal public health concern, with various accountable etiologic agents that vary by age group and geographical region. Bacterial meningitis, an infection of the membranes (meninges) and cerebrospinal fluid (CSF) surrounding the spinal cord and brain, is the main reason of decease and disability worldwide ². Bacterial meningitis can be deadly in fifty percent of cases if untreated. Even when diagnosed early and treated adequately eight–fifteen percent of the patients die, typically within twenty-four and forty-eight hours of symptom onset ³. Furthermore, ten–twenty percent of the survivors are prone to permanent sequelae involving brain harm, hearing lack, and learning disabilities ⁴. In the united states, bacterial meningitis was responsible for an estimated 4100 cases and 500 decease yearly between 2003 and 2007 ⁵. In developing, nations face the highest burden of illness ³. In African Meningitis Belt, comprising 26 nations in the sub-Saharan area has the highest meningitis illness rate; in 2009, an estimated 80000 suspected cases of meningitis, resulting in more than 4000 decease, were reported WHO, (2017). The etiologic agents responsible for bacterial meningitis vary by age group. between newborns ⁵. Most cases of bacterial meningitis are due to, Escherichia coli, group B Streptococcus agalactiae, and Listeria monocytogenes, while most cases in babies and adults are caused by Streptococcus pneumonia and Neisseria meningitis ⁶. Although Haemophilus influenza is implicated in bacterial meningitis in all age groups, it is preponderant in babies under five years of age ⁷,⁸. Given the variability in causative agents across regions and bacterial meningitis incidence clear differentiation

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between them is essential to treat cases of bacterial meningitis. Bacterial meningitis can be decreased by the use of prevention strategies against these etiological agents, like a vaccination against H. influenzae type B (Hib), S. pneumoniae and N. meningitidis. Pneumococcal conjugate vaccines and Hib were introduced in the 1990s and 2000s, and the implementation of additional prevention programs utilizing these vaccines has decreased the occurrence of bacterial meningitis. Presently, there are no vaccines available against E. coli, group B S. agalactiae or L. monocytogenes. Another prevention strategy involves using chemoprophylaxis to prevent secondary illness in high-risk persons.

**Study Aim:** To assess the prevalence of meningitis in children less than 10 years for the last 5 years.

**Methodology**

**Study Design:** A descriptive (retrospective) study used assessment approach was carried to explore prevalence of meningitis for the period of September 1st 2018 to January 1st 2019.

**Study Sitting:** Conducted at Statistics Unit in Babylon Teaching Hospital for Maternity and Pediatric.

**Sample of Study:** A sample convenience sample of (N=884) was collected five years from (2014, 2015, 2016, 2017, and 2018) and was for all months of the years for children with meningitis. As a medical records of statistic considered a study tools.

**Statistical Data Analysis:** A descriptive statistical (SPSS) version XX analysis approach that includes, frequencies, percentages, and graphical presentation of Chart.

**Results and Discussion**

Results depicts that the May is the most frequent month of meningitis in the last five years. Findings reveals that 2017 recorded the highest percentage in the prevalence of meningitis, while the year 2018 recorded the lowest percentage. Findings presence that the male patients have been the most exposed to meningitis infections in compared to female in the last four years. This results come as being may be that more births are of the male gender. These results come in the same line with a cross sectional study was conducted in three hospitals of Gaza strip -Palestine during the period 2009. Their results indicated that the male gender were a most common exposed to amenities than the female, it constituted (62%) out total number of the study sample. Findings indicate that the age groups of under one years were most exposed to meningitis infections in compared to female in the last four years. This results come because this age group of children is more prone to infection than others as an immature immune system. Results consistent with study has been investigated Bacterial Meningitis in Malawian. Their findings depicts that more infection was in the age group of 1-month-two years with frequency (44%). These age groups for the children have considered as development age and they are more susceptible to infection than elder one.

<table>
<thead>
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<td>22.1</td>
</tr>
<tr>
<td>2015</td>
<td>212</td>
<td>24.0</td>
</tr>
<tr>
<td>2016</td>
<td>168</td>
<td>19.0</td>
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<tr>
<td>2017</td>
<td>233</td>
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</tr>
<tr>
<td>2018</td>
<td>76</td>
<td>8.6</td>
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<tr>
<td>Total</td>
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</table>

<table>
<thead>
<tr>
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<th>Percent</th>
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</thead>
<tbody>
<tr>
<td>&lt;1year</td>
<td>508</td>
<td>57.5</td>
</tr>
<tr>
<td>1-4year</td>
<td>234</td>
<td>26.5</td>
</tr>
<tr>
<td>5-9year</td>
<td>110</td>
<td>12.4</td>
</tr>
<tr>
<td>10-14year</td>
<td>32</td>
<td>3.6</td>
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<tr>
<td>Total</td>
<td>884</td>
<td>100</td>
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</table>

<table>
<thead>
<tr>
<th>Gender</th>
<th>No</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>504</td>
<td>57.0</td>
</tr>
<tr>
<td>Female</td>
<td>380</td>
<td>43.0</td>
</tr>
<tr>
<td>Total</td>
<td>884</td>
<td>100</td>
</tr>
</tbody>
</table>
Figure 1: Distribution of Cases in 2014 According Month

Figure 2: Distribution of Cases in 2015 According Month

“Figure” 3: “Distribution of Cases in 2016 According Month
Conclusions

During hot weather, meningitis increases, and frequent among male who under one years. Health institutions (hospitals) need to be consider that the climate play an important role in frequent of meningitis especially those who are under the age of one year to take the necessary measures against infection and dealing with the infected people.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Department of Basic and Medical Science, College of Nursing, Babylon University, Babylon Province, Iraq and all experiments were carried out in accordance with approved guidelines.

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6. Centers for Disease Control and Prevention (CDC). Bacterial Meningitis 2017


Prognostic Importance of Some Hormones in Menopausal Women in Babylon City-Iraq

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ABSTRACT

Estimation of hormone concentrations TSH, T3, T4, and testosterone in menopausal women in Babylon CITY were carried out in this study. There was no significant difference in body mass index (BMI) and age group distribution between cases and controls. P>0.05, while there was a statistical differences in fertility status between two studied groups. P<0.05. According to statistical analysis could been concluded that the level of T3, T4, TSH and testosterone were decreased in menopausal women in comparison with healthy control group and there are differences between patient and control group. P<0.05. While in the study of levels of TSH it has been found that there are no significant differences between various period times. P>0.05.

Keywords: TSH, T3, T4 and Testosterone, menopausal women

Introduction

Menopause usually occurs between ages 48 and 52. The onset of hot flashes, extreme mood swings, insomnia, hair loss, uncontrollable weight gain, skin changes, vaginal dryness, decreased sex drive, the fear of osteoporosis, breast cancer and heart disease all are a part of American women’s experience.1 Menopausal symptoms are more common in women in industrialized nations or with specific diets and lifestyles. Women in the United States and Europe complain more of menopausal symptoms than Asian women or women from less industrialized nations. Women in Asia have no word in their language for hot flash because they are non-existent in their culture. However, if an Asian woman moves to America or Europe and adapts the diet and lifestyle the likelihood of menopausal symptoms is equal to an American woman.2 This phenomenon tells us that menopausal symptoms are not genetic and unavoidable. Diet, lifestyle and the environment play a role in the difficulties experienced during menopause.3 Menopause occurs when a woman permanently stops ovulating or producing an egg that can be fertilized and used for reproduction. Menopause is diagnosed when a woman no longer has a monthly cycle for a year and has an elevated blood level of FSH (follicular stimulating hormone). FSH is elevated when a woman stops ovulating or producing an egg. FSH is not an indicator of estrogen deficiency. Unfortunately, FSH levels are what most doctors use to diagnose menopause. Estrogen is made from a variety of sources.2,4 The ovary is only one of many sources. Estrogen is available because hormones that are made by the adrenal gland can be converted into estrogen in fat, muscle and skin cells. Estrogen is also available through food sources such as soy, and flax seed. We are exposed to many chemical substances in the environment that behave like powerful estrogens. With the abundance of sources of estrogen available in the environment and the other sources available in the body, it seems unlikely that estrogen deficiency is the problem. When estrogen levels are obtained from saliva testing, most menopausal women have normal or elevated levels of estrogen.5,6 Menopause cannot be simply explained by lack of estrogen. While estrogen deficiency may play a role in some women’s experience in most cases it does not. Most women in America are over their ideal body weight.7 It is well documented that overweight women produce too much estrogen. Estrone, an estrogen, is made in fat cells. It is a relatively strong estrogen when compared to estrogens made by the body. Women who are overweight are at an increased...
risk of diseases that are known to be caused by elevated estrone levels. Uterine cancer and breast cancer are more common in women who are overweight.⁸Women that are overweight are more likely to be diabetic. Women who are diabetic are more sensitive to estrogen than women who are not diabetic. Estrogen also increases weight gain and makes it more difficult to lose weight. Women who are overweight should not take standard synthetic estrogen replacement. Women who are not at high risk for osteoporosis should avoid estrogen replacement. Estrogen has two FDA approved indications. One is the relief of hot flashes the other is the prevention of osteoporosis in high risk women.¹⁰Women that have a thin frame, and of North European decent with extremely fair skin, sedentary lifestyle, history of smoking and prolonged steroid use are at risk for osteoporosis.¹¹Women that are not in a high risk group do not need estrogen to maintain normal bone health. African-American women and other people of color are at very low risk for osteoporosis and should not take estrogen for osteoporosis prevention. Although very thin fair skinned African American women may be at risk. ¹²Overweight women do not have to worry about osteoporosis. Osteoporosis is very uncommon in women over their ideal body weight especially if they have no other risk factors. Symptoms of Menopause Totally, women face 34 different symptoms of menopause. They are classified as physiological and psychological in nature. All are frustrating and debilitating. To better understand how these symptoms affect women, here is a categorical breakdown:¹²,¹³,¹⁴

1. **Vascular Instability:** Most of the women suffer a lot based on this kind of symptom because the hormonal imbalances caused by menopause create vascular instability, which means your body struggles to regulate its own internal temperature. The most common symptoms associated with vascular instability are hot flashes and night sweats.

2. **Urogenital Atrophy:** These symptoms are most commonly associated with dryness in private parts, it can lead to bleeding, itchiness and incontinence.

3. **Skeletal Pain:** Normally women suffering from menopause claim to have back or joint problems, and it’s widely recognized that menopause can lead to osteoporosis.

4. **Psychological Damage:** Arguably the worst side effect of menopause is the depression, mental fatigue, memory loss, insomnia, etc. that can debilitating one’s personal and professional life.

5. **Sexual Stagnation:** In addition to dryness in private parts, menopause has been known to cause loss of libido. It’s worth reiterating that while there are 34 recognized symptoms of menopause, not every woman reacts to aging the same way. Some may experience more symptoms than others and some more severely than others. It usually comes down to your personal habits and heritage. The Aims of the study are to Study the concentrated levels of some hormones in such as TSH, T3 T4, and testosterone in menopausal women in Babylon city

### Materials and Method

**Patients Groups:** A total of 50 menopausal women who were admitted to the various hospital in Babylon city were investigated biochemically from March 2018 to December 2018. And women age over than 50 years.

**Control Groups:** The control groups included 50 healthy women with no signs of menopausal status or other diseases, and the ages below than 40 years.

**Collection of Blood Samples:** For each patient (patient groups and control groups) 2-3 ml of blood were aspiration by syringe 5ml, serum was separated by centrifugation at 3000rpm/10 minutes, and kept in 10°C until used and thawing of each frozen sample

**Hormone Kits:** The kits used in this study for estimation of TSH, T3, T4 and Testosterone concentrations were supplied by Spectrum co., Netherlands, and the determination of hormone concentrations would done according to supplied company

**Body mass index (BMI)** was calculated as follows: weight (kilograms)/height² (meters).

**Statistical Analysis:** Results were analyzed using the test T test use of less significant difference (least significant differences) (LSD) at the level of significance (P≤0.05, P≤0.01 and P≤0.001) to show statistically differences.
Results and Discussion

Basic Subject Characteristics: This is a case control study involved 50 menopausal women. These were compared with age matched 50 apparently healthy controls. The basic characteristics of menopausal women and control groups are shown in Table (1). There was no significant difference in BMI and age group distribution between cases and controls. Tables 2-5 and fig 1 illustrate the levels of various hormones in menopausal women According to statistical analysis could been concluded that the level of T3, T4 and testosterone were decreased in comparison with healthy control group and there are a differences between patient and control group. P<0.05. Menopause is the irreversible end of the reproductive stage in a woman’s life. This usually occurs around the age of 50 with menstrual cycles becoming less frequent. Menopause is caused primarily by ovarian failure when the ovaries fail to respond to the gonadotropins (sex hormones) mainly because the follicles and eggs have disappeared through atresia. Although small amounts of estrogen are still secreted into the plasma, largely from the alteration of adrenal androgens to estrogen, menopause is associated with a precipitous fall in plasma estrogen levels. Menopause is associated with osteoporosis (decrease in bone mass and strength), hot flashes, night sweats, vaginal dryness, and increase in cardiovascular disease. Menopause cannot be simply explained by lack of estrogen. While estrogen deficiency may play a role in some women’s experience in most cases it does not. Most women in America are over their ideal body weight. It is well documented that overweight women produce too much estrogen. Estrone, an estrogen, is made in fat cells. It is a relatively strong estrogen when compared to estrogens made by the body. Women who are overweight are at an increased risk of diseases that are known to be caused by elevated estrone levels. Uterine cancer and breast cancer are more common in women who are overweight. Women that are overweight are more likely to be diabetic. Women who are diabetic are more sensitive to estrogen than women who are not diabetic. Estrogen also increases weight gain and makes it more difficult to lose weight. Women who are overweight should not take standard synthetic estrogen replacement. Women who are not at high risk for osteoporosis should avoid estrogen replacement. Estrogen has two FDA approved indications. One is the relief of hot flashes the other is the prevention of osteoporosis in high risk women. Women that have a thin frame, and of North European decent with extremely fair skin, sedentary lifestyle, history of smoking and prolonged steroid use are at risk for osteoporosis. Women that are not in a high risk group do not need estrogen to maintain normal bone health. African-American women and other people of color are at very low risk for osteoporosis and should not take estrogen for osteoporosis prevention. Although very thin fair skinned African American women may be at risk. Overweight women do not have to worry about osteoporosis. Osteoporosis is very uncommon in women over their ideal body weight especially if they have no other risk factors. It is well renowned that menopausal symptoms experienced by women affect their quality of life. Studies show that when compared with peri and post-menopausal, premenopausal women have less menopausal complaints. They were seems to complain significantly more of severe physiological, somatic and psychological symptoms like bladder infections, urinary infections etc. when compared to premenopausal women. During menopause, women often experience some symptoms which may affect their daily activities. In recent years, studies have shown that menopausal symptoms may affect healthrelated quality of life.

Table 1: Basic Subjects Characteristics

<table>
<thead>
<tr>
<th></th>
<th>Cases (No = 50)</th>
<th>Controls (No = 50)</th>
<th>p value</th>
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</thead>
<tbody>
<tr>
<td>Age ( years) Mean ± S.D.</td>
<td>57.7 ± 5.8</td>
<td>59.4 ± 5.7</td>
<td>0.082</td>
</tr>
<tr>
<td>BMI(Kg/m²) Mean ± S.D.</td>
<td>27.0 ± 3.4</td>
<td>26.0 ± 3.3</td>
<td>0.060</td>
</tr>
<tr>
<td>History of infertility: No (%)</td>
<td>40(80%)</td>
<td>45(90%)</td>
<td>0.0</td>
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Table 2: The concentration of T3 in menopausal women and control group. P<0.05

<table>
<thead>
<tr>
<th>T3</th>
<th>P Value</th>
<th>Control</th>
<th>Menopausal women</th>
</tr>
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<tr>
<td></td>
<td>0.05</td>
<td>2.467</td>
<td>0.720</td>
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</table>

Table 3: The concentration of T4 in menopausal women and control group. P<0.001

<table>
<thead>
<tr>
<th>T4</th>
<th>P Value</th>
<th>Control</th>
<th>Menopausal women</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0.001</td>
<td>19.840</td>
<td>5.086</td>
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</table>

Table 4: The concentration of TSH in menopausal women and control group. P>0.001

<table>
<thead>
<tr>
<th>TSH</th>
<th>P Value</th>
<th>Control</th>
<th>Menopausal women</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>0.001</td>
<td>11.658</td>
<td>2.577</td>
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Table 5: The concentration of Testosterone in menopausal women and control group. P<0.001

<table>
<thead>
<tr>
<th>Testosterone</th>
<th>P Value</th>
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<tr>
<td></td>
<td>0.001</td>
<td>15.78</td>
<td>6.342</td>
</tr>
</tbody>
</table>

Conclusion

According to statistical analysis could been concluded that the level of T3, T4, TSH and testosterone were decreased in menopausal women in comparison with healthy control group and there are differences between patient and control group. P<0.05. While in the study of levels of TSH it has been found that there are no significant differences between various period times. P>0.05.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Department of anatomy and histology-College of medicine—university of Babylon, Iraq and all experiments were carried out in accordance with approved guidelines.

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Role of Nurse in Reducing Stress among Female Patients Performing Magnetic Resonance Imaging

Younus Khudhur Baeez1, Abid Salih Kumait AL-Jumaily1, Nazar Ahmed Mahmood2, Qasim Hussein Mohammed1

1Department of Adult Nursing, 2Department of Community Health Nursing, College of Nursing, University of Kirkuk, Iraq

ABSTRACT

Stress is common during Magnetic resonance imaging. Usually, stress more reported in female patients. The study aims to assess patient knowledge regarding magnetic resonance imaging procedure, and evaluate the effectiveness of nursing instruction program on reducing patients stress level during performing Magnetic resonance imaging. The study design is quasi-experimental. The samples were allocated into either the study (experimental) group (taking the program, n = 30) or the control group (not taking the program, n= 30). The extent of samples anxiety during MRI for both study and control group were measured before applying the education program was measured. Post-test assessment performed for both the study and control group after applying for an education program. The results of the study were elicited based on two statistical approaches, first, descriptive statistics and the second is an inferential statistical analysis. The study findings revealed that the majority of the sample were having unsatisfied knowledge regarding MRI procedure before applying for the education program, there was a higher score of anxiety in female patients in control group more than female patients in the study group as a result of receiving the designed instructions before MRI procedure.

Keywords: Stress, Anxiety, claustrophobia, education program, MRI

Introduction

Magnetic resonance Imaging (MRI) has been defined as the most essential medical modernization in the last 25 years. There has been a vast increase in the use of MRI in the clinical setting. More than 80 million MRI procedures are achieved each year in the world. MRI is a noninvasive imaging technique procedure that adopts magnetic range, waves, and computers to manifest deformity. MRI is the best procedure for recognizing a large number of possible problems or abnormal situation in many varies parts of the body. Generally, MRI builds an image that can display variation between normal and abnormal tissues. MRI uses an electromagnet so that patients with any metal tools or pacemakers are not preferred to doing MRI. To reinforce the visualization of internal structures, contrast media can be inserted through intravenous. During the MRI procedure, the patient obligates to lie still for 1 to 2 hours and will listen a rhythmic knocking sound. Patients who suffering claustrophobia can be not able to tolerate the confinement of locked MRI tools without given him sedation. Anxiety is defined as a situation of emotional distress, which can be demonstrated by nervous behaviour and discomfort, muscular tension as well as some other somatic complaints. Anxiety-associated to claustrophobic reactions and some anxiety reduction protocols have been evaluated mainly for MRI tests. MRI is familiar as a physiologically non-invasive procedure. Patients being examined, however, occasionally suffering from anxiety as a result of the procedures or settings. Meanwhile, the procedures, 25–37% of patients may happen anxiety to them, and the causes of anxiety are due to the enclosed nature of the scanner leading to claustrophobic feedback. Most of the patients visiting imaging departments will have a good experience. However, some patients can suffer a wide range of emotions disclose to their scan procedure, including anxiety, fear, and claustrophobia. The methods that the patients experience health care widely depends on the actions of the nurse professionals. Actions such
as giving information, adapt audiovisual systems, health care team training, and anxiety reduces protocols have all been shown to be useful in reducing anxiety, fear, claustrophobia, and the demand for sedation for patients undergoing imaging. Many research examining a different type of interventions to decrease the level of anxiety to minimum level, and to promote patient experience. Moreover, most previous interventions are time-consuming, and difficult to apply into practice, or may cost too much. Patients experience with the new technology of MRI has demonstrated that the test may induce anxiety in some of the patients. Some female patients who are undergoing magnetic resonance imaging examination cannot complete the test because of anxiety and claustrophobia, so nursing instructions for those are very important, which has an impact on reducing anxiety and claustrophobia associated to MRI examination. Magnetic resonance imaging (MRI) has become a common form of examination for patients. Despite, it is non-invasive and has no pain, patients experience anxiety during the procedures. Female patients undergoing MRI test can suffer from anxiety, claustrophobia and fear along the examination and, for some patients, it needs to use medication to sedate the patients. For these reasons, this research is conducted to evaluate the role of the nurse in reducing stress among female patients performing MRI.

Methodology

Design and Sample: A quasi-experimental design was applied to achieve the goal of the study. Non-probability, purposive sample, with the use of pre-post test approach for both study and control group. A sample of (60) patient chosen among patients who attended to the MRI unit at Azadi Teaching Hospital in Kirkuk city. The samples were divided into two groups; (30) patient as a study group was exposed to the education program and the other (30) patients are not exposed to the education program, considered as the control group with the same demographic characteristic for both groups.

The Educational Program: A structured teaching program for imparting knowledge related to stress associated with doing MRI and method of who to getting rid of anxiety was developed by the authors. The content of the educational program was designed based on an extensive review of the literature and expert opinion. The program composed of two modules related to stress. Models content was created and edited by the researchers; the first module included nursing instruction about MRI procedures, while the second model is about methods to cope with anxiety. Before the program is finalized, it has been presented to a group of experts. Those experts were asked to review the education program as well as the instrument for their content, clarity, and adequacy. After the review, some items were excluded and some others are added after face to face discussion with experts and the instrument considered valid after taking all the comments and recommendations in considerations.

Procedure: After ensuring informed consent from the patients, they were given the pre-test questionnaire before the administration of the educational program. Each patient was given a serial number to be followed in the second assessment (post-test). After administration of the pre-test questionnaire, the patients were imparted with an education program by face-to-face interview with the primary author. The face-to-face interview lasted ‘30-35 minute-sessions’ by using booklets and short videotapes. As a reminder, each patient was provided with a copy of the education booklet prepared and designed by the primary author and reviewed by other authors. The content of the booklet was similar to that of the educational program and it summarized the most important points in the program. After undergoing the MRI, THE patients were assessed again for the second time (post-test).

Data Analysis: The data were analyzed by applying SPSS, version 22, with using frequency, percentage, distribution, mean, range and standard deviation. The level of statistically significant was considered at p<0.05. T test was used to determine the differences between study and control group.

Results and Discussion

The finding of the study showed that most of the study and control group were between the ages of 20 - 40 years. As for the level of education, the study reveals that the highest percentage of the study and control group were illiterate. The study findings revealed that the majority of the sample were having unsatisfied knowledge regarding MRI procedure, and this can be attributed to that most of the study sample were illiterate. The results in table two showed that both study group and control group were unsatisfied regarding the knowledge related to
MRI procedures The study supported by Selim, (2001)\(^{14}\) who declared in his study “Effect of Pre-Instruction on Anxiety Levels of Patients Undergoing Magnetic Resonance Imaging examination,” patients who received the designed instructions significantly lower levels of anxiety than the controls group. Revealed a highly significant difference was found between the two groups (study and control groups) in the study group decrease in the level of anxiety than in the control group. The study findings in table number three showed that there was a higher score of anxiety in female patients in control group more than female patients in the study group as a result of receiving the designed instructions before MRI procedure. There was a statistically significant difference between pre and post-test for the study group. The study supported by Mohammed et al., (2013)\(^{15}\) who concluded that there were highly statistically significant difference among levels of anxiety from pretest and post-test. In the same line (Tischler et al., 2011)\(^{16}\) revealed that A highly significant difference was found between the two groups when the total anxiety scores were compared after the procedure of MRI examination and after the designed instructions were given. The findings in table number four showed that the study group reveals high score in term of using different methods to cope with anxiety more than the control group who reveals fewer scores. This also can be attributed to the effectiveness of the education program. Tischler et al., (2008)\(^{17}\) reported that there was a statistically significant difference between anxiety for patients who received information and who did not. Before a scan, many patients feel a need for information. The patients who received information mainly found it useful or very useful. Medeiros et al., (2012)(18) mentioned that according to the values of anxiety obtained by both groups in this study, the experimental group showed lower levels of anxiety. providing information prior to the MRI scan has positive effects, which decreases the state of anxiety of the patients.

### Table 1: Sociodemographic Characteristics of the Study and Control groups

<table>
<thead>
<tr>
<th>Samples Characteristics</th>
<th>Study group (n = 30)</th>
<th>Control group (n = 30)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>No.</td>
<td>%</td>
<td>No.</td>
<td>%</td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt; 20 years</td>
<td>3</td>
<td>10.0</td>
<td>2</td>
</tr>
<tr>
<td>20 - 40 years</td>
<td>17</td>
<td>56.7</td>
<td>15</td>
</tr>
<tr>
<td>&gt; 40 years</td>
<td>10</td>
<td>33.3</td>
<td>13</td>
</tr>
<tr>
<td>Level of education:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Illiterate</td>
<td>10</td>
<td>33.3</td>
<td>12</td>
</tr>
<tr>
<td>Primary school graduate</td>
<td>6</td>
<td>20.0</td>
<td>4</td>
</tr>
<tr>
<td>Preparatory school graduate</td>
<td>4</td>
<td>13.3</td>
<td>5</td>
</tr>
<tr>
<td>Secondary school graduate</td>
<td>5</td>
<td>16.7</td>
<td>3</td>
</tr>
<tr>
<td>University graduate</td>
<td>5</td>
<td>16.7</td>
<td>6</td>
</tr>
</tbody>
</table>

### Table 2: Study and control group knowledge related to MRI procedure along pre-test

<table>
<thead>
<tr>
<th>Level of Satisfaction</th>
<th>Study group (N = 30)</th>
<th>Control group (N = 30)</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>No.</td>
<td>%</td>
<td>No.</td>
<td>%</td>
</tr>
<tr>
<td>Unsatisfied</td>
<td>23</td>
<td>76.6</td>
<td>28</td>
</tr>
<tr>
<td>Satisfied</td>
<td>7</td>
<td>23.3</td>
<td>2</td>
</tr>
</tbody>
</table>

### Table 3: Study and control group anxiety level after MRI test

<table>
<thead>
<tr>
<th>Anxiety level</th>
<th>Study group (N = 30)</th>
<th>The control group (N = 30)</th>
</tr>
</thead>
<tbody>
<tr>
<td>No.</td>
<td>%</td>
<td>No.</td>
</tr>
<tr>
<td>Pre-test</td>
<td>Post-test</td>
<td>Post-test</td>
</tr>
<tr>
<td>Low level of anxiety</td>
<td>16</td>
<td>53.3</td>
</tr>
<tr>
<td>High level of anxiety</td>
<td>14</td>
<td>46.7</td>
</tr>
<tr>
<td>Mean ± SD</td>
<td>17.23 ± 5.57</td>
<td>7.63 ± 3.02</td>
</tr>
<tr>
<td>P value</td>
<td>0.000*</td>
<td>0.000*</td>
</tr>
</tbody>
</table>

* indicates significance at p < 0.05. 
Table 4: Study and control group methods to cope with anxiety along (pre-post) MRI test

<table>
<thead>
<tr>
<th>Anxiety Cope Methods</th>
<th>Study Group</th>
<th>Control group</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Frequency</td>
<td>%</td>
</tr>
<tr>
<td>Another person accompanying the patient</td>
<td>14</td>
<td>46.7</td>
</tr>
<tr>
<td>Close the eyes</td>
<td>5</td>
<td>16.6</td>
</tr>
<tr>
<td>Reading some thing</td>
<td>8</td>
<td>26.7</td>
</tr>
<tr>
<td>Using relaxation Technique</td>
<td>2</td>
<td>6.7</td>
</tr>
<tr>
<td>Using non of them</td>
<td>1</td>
<td>3.3</td>
</tr>
<tr>
<td>Total</td>
<td>30</td>
<td>100</td>
</tr>
</tbody>
</table>

Conclusions

Female patients Knowledge regarding MRI procedure in those patients who take the instructions and guideline from the education program is higher than those who didn’t take the education program. Anxiety level was lower in female patients who take instructions and guideline from the education program about MRI procedure. So that the effect of the nursing role is very important in reducing stress among female patients was performing MRI examination.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Department of Adult Nursing, College of Nursing, University of Kirkuk, Iraq and all experiments were carried out in accordance with approved guidelines.

REFERENCES


Role of Toll Like Receptor-9 Gene Polymorphism among Patients with Exacerbation Chronic Obstructive Pulmonary Disease in Holy Karbala, Iraq

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ABSTRACT
There are few studies investigate the effect of TLR-9 (T1237C) gene polymorphism in the development of Exacerbation Chronic Obstructive Pulmonary Disease (ECOPD), therefore, this study mainly aims to estimate whether (T1237C) polymorphism in TLR-9 gene is associated with ECOPD in Iraqi patients. Case-Control Study was done on patients were diagnosed clinically and confirmed with spirometer test. Attended AL- Hindia hospital and Imam AL-Hussein medical city hospital in Karbala/Iraq. The sampling collection period extended from October 2017 to April 2018, the study included 40 patients with ECOPD and 40 as a healthy control. The permission had been taken from all subjects, venous blood sample with EDTA tube collected, PCR performed for TLR-9 gene detection followed with RFLP technique for revelation of SNP (rs5743836)(T1237), the distribution of genotypes and allele frequency was tested for differences between controls and ECOPD patients. We observed in present study, there were three genotypes for this SNP among ECOPD patients; CC, TC and TT with frequency of 5 (12.5%), 27 (67.5%) and 8 (20%) respectively, whereas, there were only two genotypes among control group; TC and TT with frequency of 17 (42.5%) and 23 (57.5%) respectively.

Keyword: TLR-9 (T1237C), single nucleotide polymorphism, Exacerbation Chronic Obstructive Pulmonary Disease.

Introduction

TLRs are expressed in innate immune cells for example dendritic cells (DCs) and macrophages, just as, non-immune cells like fibroblast cells and epithelial cells.⁰Although TLRs respond to a different Pathogen-Associated Molecular Patterns (PAMPs) such as lipopolysaccharides set on the cell wall of whole Gram-negative bacterial species. it is additionally identify molecules that released with stressed or damaged host cells, known as damage associated molecular patterns (DAMPs) such as heat-shock proteins, hyaluronans and fibronectins. ² TLR9 senses unmethylated CpG motifs which found in microbial DNA.³ It is intracellular communicated in vesicles (e.g endosomes, lysosomes, and the endoplasmic reticulum). ⁴ With pneumococci, the TLR9 appears to contribute to the stimulation of the innate immune response. Activation of eosinophil lead to expressed of TLR9 in the various levels, including delayed survival, enhanced migration and induction of CXCL8 release.⁵ The expression of TLR9 regulated smoke-mediated immune cell induction to the lung that clarify with apoptosis, the expression of granulocyte-colony stimulating factor (G-CSF), matrix metalloproteinase-2 (MMP-2), the CXCL5 protein and protein tyrosine phosphatase 1B (PTP1B) action in the lung.⁶ TLRs performed an important role in defense and it can thus be hypothesized that poor TLR function share extremely to pulmonary disease exacerbation. Reduced TLR function could cause disease worsening because of encompass sensing of viral or bacterial components.⁷ As well as, a reduced ability to bacteria phagocytosis

DOI Number: 10.5958/0976-5506.2019.01414.1
and apoptotic cells. Some TLRs including TLR2, TLR4 and TLR9 are a key mechanism for innate immune recognize and are significant for the host’s response to Strep. pneumoniae. Genetic disorder of TLR which lead for signaling pathway proteins basically, excess the danger of invasive Strep. Pneumoniae infections. Single nucleotide polymorphisms in TLR-9 are able to alter the course of COPD or raise the susceptibility for developing one of the disorders. As well as, TLR-9 up-regulation of cytokines, chemokines and signaling molecules in the lung. Finally, specific study presented by Berenson et al., (2015) corroboration the role of TLR-9 gene polymorphism (T1237C) as one component underlying dysfunctional innate immune responses of alveolar macrophages and progression of COPD. Polymorphism (T1237C) as one component underlying dysfunctional innate immune responses of alveolar macrophages and progression of COPD.

**Materials and Method**

**Sample Collection:** This population Case-Control Study included 80 subjects 40 patients which clinically and with spirometer test confirmed ECOPD also 40 matching healthy smoking control with no history of ECOPD and confirmed with spirometer test. Patients with no exacerbation COPD excluded from this study. After diagnosis, 3ml of peripheral blood was collected with EDTA tube from each patient and healthy control.

**DNA Extraction:** The DNA was extracted by using Genomic DNA Mini Kit(Cat. N. GB100) from Geneaid (USA) as per the manufactures instructions. The extracted DNA was dissolved in nuclease-water and stored at 4°C until use. Quality and integrity of DNA were checked by NanoDrop™ (Thermo Scientific, USA).

**Genotyping for TLR9 Gene:** The TLR9 gene was detected by using Polymerase chain reaction Conventional PCR system Thermal cycler (Cleaver Scientific UK), primer selected as a table (1). PCR was carried out in 25μl reaction mixture containing 1.5μl of genomic DNA, 1 μl of each 10 pmol/μl primer forward and revers primers, ddH2O (Dionized distilled water) 16.5μl with 5 μl master mix (Bioneer/Korea).

<table>
<thead>
<tr>
<th>Method type</th>
<th>Polymorphism Location allele</th>
<th>Sequence (5’→3’) direction</th>
<th>Size of gene bp</th>
<th>Origin</th>
<th>Reference</th>
</tr>
</thead>
</table>

**Thermocycling Conditions:** The amplification condition for SNPs consisted of an initial cycle 95°C for 5 min in a thermocycler followed by 50 cycles, denaturation with 95°C for 45 Second, annealing with 58°C for 45 Second, extension with 72°C for 45 Second and a final synthesis step with 72°C for 7 minute. PCR product, the band (135bp) was visualized by electrophoresis on (3.5%) agarose at 5 volt/cm². 1x TBE buffer for 1:30 hours, compared with DNA ladder (100bp), which was used for TLR9 gene detection (135bp) (Figure-1). Also, SNP genotyping was performed by digestion with the restriction endonucleases BstNI. Moreover, after PCR amplification product was digested and the reaction was conducted in 10μl final volume; at 60°C for 60 minute, for genotyping of studied samples, the digested fragments were electrophoresis on 2.5% agarose gel mixed with Ethidium bromide stain in 0.5x TBE (rs5743836, New England Biolabs) figure(2).

**Figure 1:** Gel electrophoresis for TLR-9 gene PCR products visualized under U. V light after staining with ethidium bromide. M: 100 bp marker; lane:(1to 11) PCR product with positive result. Lane (12) negative results. The size of product is (135)bp The product was electrophoresis on 3.5% agarose at 5 volt/cm². 1x TBE buffer for 1:30 hours. N: DNA ladder (100)
Figure 2: Electrophoresis pattern of PCR product digested with *Bst*NI restriction enzyme (2.5% a garose gel). Lane’s 1, 2, 3, 4, homozygous: TT genotype; Lane’s 5, 6 homozygous: CC genotype; Lane’s 7, 8, 9, 10 heterozygous: TC genotype; Lane11, negative results. M: DNA molecular marker 50bp size by Ethidium bromide stained bands in the gel.

Statistical Analysis: Fisher’s exact correlations and Chi-square were undertaken to determine the relationship between distributed group of demographic data related to exacerbation COPD patients (Age, Gender, Smoking, Type of bacteria, Gold Classification and Genotype). Allel frequency was determined using Hardy Weinberg Equation Statistical significance was defined as *when p ≤ 0.05 and **when p ≤ 0.01 and statistical significances were carried out using Graphpad Prism version 6 (GraphPad Software Inc., La Jolla,CA).

Results and Discussion

Study Population: Population-based Case-Control Study included 140 subjects, presented AL- Hindia hospital and Imam AL-Hussein medical city hospital from respiratory unit care Department at a period from December-2017 to April-2018. The patients were 70(33male and 37female) diagnosed with ECOPD, although the matching control included 70 healthy smoking people (33male, 37female), only 40 of each group inclusive in the study. All of them afford for clinical examination and spirometer to exclude ECOPD disorder. Severe cardiovascular comorbidities, Asthma or A topy, Autoimmune diseases, Cancer, renal and liver complications had been excluded. The high percentage 24 (34%) of ECOPD was found at aged group (61-70) years old, while the lower percentage 2(3%) was found in aged group ≥ 81 years old. It was observed that the number of patients with ECOPD was higher in sever obstructive stage 26 (37%) when compared to other stages. Also, there was no significant difference between females 37 (53%) and males 33 (47%) among ECOPD patients (Figure-3). In present study, the highest incidence of ECOPD was found in smoking patients (68%) compared to non-smoking (9%) and ex smoking (23%) (Figure-4), there was a significant statistical relationship (p ≤ 0.01) between smoking and development of disease. The result of TLR-9 gene was present in (135bp) fragment of Gel electrophoresis of PCR product, as shown in (figure-1). A conventional PCR was used to analyze the presence of TLR-9 gene. PCR product of homozygous wild genotype (TT) include two bands (108 and 27 bp), while heterozygous genotype (CT) is cut into four bands (108, 60, 48 and 27bp). The homozygous mutant genotype (CC) is cut into three bands (60, 48 and 27bp), as shown in (figure-2)table-2). The study results have shown that the single nucleotide polymorphism mutation (T1237C) of TLR-9 genotypes (TC,CC) and allele C frequency have a significant association as a risk factor for ECOPD. The large occurrence of ECOPD patients were at aged group (61-70) years, while the lower occurrence of ECOPD patients at age group (≥80) years, these results agreed with result of the study by Akhila *et al.*, (2017) who demonstrated that the larger occurrence of ECOPD (38%) was at age group (61-70) years and lower occurrence (4%) at age group (≥81)13. Furthermore, the results of present study were differed from a study carried out by Kohansal *et al.*, (2009) and Agustí and Celli, (2017), whose founded that some smokers suffering from decline of lung function value at the age of (25 ) years old that eventually lead to COPD. The differences of these results may be due to different environmental condition and size number.14

Table 2: Genotypes and allele frequency distribution of TLR-9 gene polymorphism in patients and control
The present study reveals a high significant distribution of ECOPD patients in severe obstructive stage which 26 (37%), while low incidence of ECOPD in Mild obstructive stage that 6(9%) and these results agreed with a study in Italy by Tantucci and Modina, (2012), whose founded a high occurrence of ECOPD patients in severe obstructive stage which (38%), while low occurrence of ECOPD in Mild stage (18%).

However, the results of current study were differed from the results of Hurst et al., (2010) who reported that the highest prevalence of ECOPD was observed in very sever stage (47%) of disease. The differences in rate of decline in FEV1 was affected by smoking status, with a decline more among current smokers than among ex-smokers. FEV1 at baseline was lower in patients who reported more exacerbations. Also, effect estimates were adjusted for age, sex, height, and weight at study entry, thus the changes in FEV1 is over time in COPD (Vestbo et al., 2011). In the present study, there was no significant difference between females and males, these results were in agreement with the results of Michael et al., (2013), who reported that the current smokers of male and female had similar relative risks in COPD, (26.61%) for men and (22.35%) for women that almost equal. In addition, the results of current study were differed from the study conducted in Saudi Arabia by Al Ghobain et al., (2015) who found that males were (54%), while females were (46%). The variation of these results may be due to the changing pattern of tobacco smoking. Indeed, some studies reported that women are more susceptible to the effects of tobacco smoke than men (Hagen et al., 2016). In addition smoking COPD is a heterogeneous disease and the prevalence of COPD differed according to the geographic location. Smoking is a major cause of chronic obstructive pulmonary disease (COPD), although individuals show differing susceptibility to smoking-related airflow limitation, because of interacting environmental and host factors. Smoking accelerates decline in forced expiratory volume in first second (FEV1) in susceptible subjects (Berenson et al., 2015).

Conclusion

Our findings indicate that TC and CC genotype and allele C of TLR-9 (T1237C) gene polymorphism are associated with an increased susceptibility to ECOPD in Iraqi population. Further studies with larger sample sizes are necessary to confirm our findings.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the University of Karbala\'s College of Medicine\'s Department of Medical Microbiology & Immunology, Karbala, Iraq and all experiments were carried out in accordance with approved guidelines.
REFERENCES


The Effect of Hidden Arrangement in Creative Thinking

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University of Babylon, Iraq

ABSTRACT

This research aims at recognize the hidden arrangement strategy in expressive performance and creative thinking in the fifth grade, the researcher made a test to measure the performance of the expression and Torrance test to measure the ability of creative thinking, the study has applied in Iraq for the academic year 2018/2019, that consists of (68) pupils in Babylon city, the sample of the research was chosen according to the intentional method. They were randomly divided into two groups, the first one is experimental group which consists of (35) pupils in section (B), have studied according to the hidden arrangement strategy, while the second one was control group that consists of (33) pupils in section (D), who have studied according to the traditional method, after exclusion of students who failed, the final number of the sample became (27) pupils in section (B), and (29) pupils in section (D), in the result the total number became (56) pupils). The study has required the availability of two tools: the construction of a test of expressive performance and the adoption of the Torrance test for creative thinking, after the statistical data collected and analyzed by using the t-test of two independent samples

Keywords: The Hidden Arrangement, Creative thinking, Expression

Introduction

The human mind is a complex system that create in order to processing information through put the sensory stimuli, that transform physical stimuli such as touch, heat, sound waves or light photons into electrochemical signals. ¹ The human mind deals with language that is a sound system that is spoken and heard by the people and the community to understand and express their needs and desires. The importance of the research is highlighted by the importance of the subject and its development in improving the language skills. Language is a sound system that is modest to a group of people or society for understanding each others and the expression of needs and desires and meanings ². The importance of language in relation to thought and thinking is highlighted as there is a close and direct relationship between language and thought. It is clear to us that when we connect the abstraction of thought, the language is a system that works at the level of concepts and abstractions of the arguments and relations and attributes ³. Al-Zwaini pointed out that modern education seeks to develop the learner’s thinking skills. The first of these skills is the development of the higher mental processes of the learners in general. It requires that the mind be mentally active in the case of continuous vitality, so as not to rely on minimal issues such as Conservation and absorption ⁴. It is no longer enough to provide pupils with information and knowledge. Pupils cannot learn all the information in a particular science or subject because of the lack of time within the school to achieve their goals. On the other hand, the scientific and technological progress makes the school look after its pupils the basis of the success of the learner today is not to memorize and absorb the subjects but to learn the correct ways of thinking make him think of any problem of scientific and objective thinking and adds new solutions to those problems ⁵ and that flexibility in thinking is the opposite of mental inertia in problem solving and development, pupils see things more clearly and develop a broader and look more creative in solving problems in order to think about positive thinking, a thinking that leads to a new ideas ⁶ creative thinking is defined as “a deliberate mentality directed towards finding solutions and reaching unfamiliar results and

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characterized by inclusiveness and complexity.” As a guest of language is based on understanding and thinking, it is necessary to master the skills that are capable of good comprehension and understanding. The correct thinking means that mastering the language does not come to anyone but to master their four skills (reading, writing, speaking and listening) and teaching them coherently so that each one of them accompanies each other and is composed in a coherent way to achieve the goal of human learning and learning the language, from Pupils at all grades are clearly weak in expression and show signs of fatigue over their language, the teaching of thinking requires the use of modern teaching methods in the teaching of expression, and access to the largest number of methods successful in the educational process of others, whether orally or in writing, which chose a strategy of cooperative learning strategies that make the student active The strategy of the hidden arrangement is in response to what is called for recent trends on making the learner the focus of the educational process, and this strategy is one of the modern strategies adopted by the educational movement after the validation of its impact and effectiveness, studies have shown that the failure of individuals to perform their tasks is due to the lack of social cooperative skills they enjoy, not to lack of mental abilities. It is a strategy that focuses on cooperative activity and positive learners in educational situations. The basis of the lesson is a learning environment with a cooperative social environment in which students cooperate with some of them in order to collect knowledge. On this basis, the strategy of hidden arrangement is considered as part of the cooperative learning strategy because the learner is active and stressed by the cognitive theories, especially the constructivism. The theoretical basis on which cooperative learning is based is a combination of social learning theories that emphasizes interaction with others and interaction with them in the learning process and behavioral learning theories that focus the learner must be active and theories of cognitive learning that focus on the role of the learner in building knowledge and revitalization and discovery and re-discovery of knowledge, which is based on the face of structural theory, which sees the learner positively active social participant takes with his/her peers and gives with others.

Methodology

Experimental Design: The pilot design is a blueprint or a work program for how to implement the experiment.

The community and sample of the research:

A. The research community: The current research community includes primary schools in the center of Babylon province for the academic year 2018-2019, so the researcher visited the General Directorate for the education of Babylon to find out the schools affiliated with it. Which was (21) schools.

B. The sample of the research: The researcher chose AL- Zahawi primary school because it is close to his work, and the fact that it consists of four sections for the fifth grade, namely (A - B - C - D), and then he chose the B - D randomly to be the two groups of research, (B), the experimental group, and (D) the control group. The total number of pupils in the two groups is (68), (35) pupils in section B and (33) pupils in section D, after exclusion of failure pupils, the final number of the sample was 27 pupils in section B and 29 in section D and the total number of the sample was 56 pupils. The equivalence of the two sets of research, the researcher conducted a statistical equivalence between the two research groups in the following variables: (age with months, the academic achievement of the father, the academic achievement of the mother, the grades of the Arabic language in the final exam for the academic year 2017/2018). Preparation of the teaching plans: The researcher prepared the appropriate teaching plans for the subjects of the experiment to be taught in the light of the independent variable and the content of the Arabic reading book, adopting the hidden arrangement strategy in teaching this subject to the pupils of the experimental group and using the traditional method of teaching the pupils of the control group. The method of conducting the experiment after completion of the requirements of the experiment started by the researcher applied on 5/11/2018, which was devoted to introduce the pupils of the experimental group to the experimental procedures, by telling them that the Arabic reading will be taught by using the hidden arrangement strategy and the role of the researcher is to guide pupils, and supervise their works, while the control group has been studied in a traditional method, the experiment finished on 9/1/2019.
The Two Research Tools: Post-Expression Testing: From the current research requirements, the applying of a test in the expression to measure the performance of pupils of both groups during the duration of the experiment in the subjects that will study the Arabic reading book to be taught for the fifth grade for the academic year 2018 - 2019, and to recognize the differences in the average Performance between the two groups, and finding statistical significance. The researcher did not have a ready-to-use test covering the subjects to be taught. The researcher prepared a test of expression to measure the performance of pupils in the two groups. Validation of the tool: the test is valid when it is able to measure what was put for it. For the purpose of verifying the validity of the test, the researcher presented the subject of the expression to be adopted to measure the performance of the pupils on a group of experts and specialists in Arabic language, teaching methods, measurement and evaluation. For this purpose, after reviewing the opinions of the experts, the necessary modifications were made to the test. Stability of the test: the test is constant when it is able to achieve the same results if applied twice to the same group. To ensure the stability of the test, the researcher followed the method of re-correction over time to measure stability, applied to a sample of 30 pupils of the same school, Followed by stability using the Pearson correlation coefficient between the two degrees. The stability coefficient was (0.84) which was appropriate in the non-standardized. Test of creative thinking: The researcher adopted the Torrance test to measure the ability of creative thinking expressed by Sayyid Khair Allah in 1974, which is the appropriate test for the present study. This test has been prepared in the Arab environment and has been used in many Arab studies. Begin with the fourth grade to the university level.

Attitudes: It requires the examinee to find out how to behave in some situations and the test consists of two attitudes: If you be responsible of charge for cash at the club and a member of the club tries to enter into the thinking of others that you are not honest. What do you do? The researcher changed this attitude to: If you be a responsible of your colleagues for collecting donations in the classroom to do something and one of them tries to enter into the thinking of others that you are not honest, what are you doing? If all schools were not at all (or canceled), what would you do to become educated? (The time of each attitude is 5 minutes).

Development and improvement: in which the researcher is asked to propose several methods to become some things familiar to him/her such as the bicycle and pen (each one 5 minutes). Each of these five tests measures the three components of creative thinking, intellectual fluency, automatic flexibility, and the ability to understand the meaning of the word “Authenticity. The total score of the three components of creative thinking represents the overall degree of creative thinking. (Khair Allah, 1981: 10-12) This test is valid and characterized by stability for the great use in studies and research in the field of teaching methods.

Statistical Method: Pearson correlation coefficient to determine the correlation coefficient to calculate stability. Test test (TTest) for two independent samples, used to perform the parity process, and to calculate the difference between the two groups in the post-achievement test. Kai square (Ka 2) in the equivalence of the two groups of research in the level of parental

Results and Discussion

The results of the first objective were identified: The effect of the strategy of the covert arrangement on the expression performance of the students in the first five grade according to the researcher of the average scores of the students in the experimental and control groups in the expression performance test. The test was then used for two independent samples to test the difference between the averages As in table (1) Table (1) shows that the average score of the experimental group (37.6), the difference (96.04), the mean of the control group (28.9), the degree of variance (86.49), and the calculated T value (3.8) (0.000) at the level of significance (0.05) and the degree of freedom (65). This indicates that the students of the experimental group who studied using the hidden order strategy exceeded the students of the control group who studied the traditional method of expressive performance Interpretation of the results related to the first objective. In the light of the results presented, the researcher believes that the reason for the superiority of the experimental group on the control group is due to:

A. The strategy of the hidden arrangement made students develop the process of self-regulation before and during the reading, and after that, which led to a greater understanding of what they
read texts, because the inclusion of the strategy of hidden arrangement in the content of the study leads to a significant change in self-organization of students.

B. The use of the strategy of hidden arrangement in teaching increased the motivation of students to read, and thus increase their understanding of what they read.

Table 1: The test was then used for two independent samples to test the difference between the averages

<table>
<thead>
<tr>
<th>Group</th>
<th>No.</th>
<th>M.C.</th>
<th>Variables</th>
<th>F.D.</th>
<th>T. Value</th>
<th>Level of significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experimental</td>
<td>27</td>
<td>37.6</td>
<td>96.04</td>
<td>65</td>
<td>3.8</td>
<td>2.000 Statistically significant (0.05)</td>
</tr>
<tr>
<td>Control</td>
<td>29</td>
<td>28.9</td>
<td>86.49</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 2: Calculated and tabular and the statistical significance of the scores of the two groups of research in the creative thinking test

<table>
<thead>
<tr>
<th>Group</th>
<th>No.</th>
<th>M.C.</th>
<th>Variables</th>
<th>F.D.</th>
<th>T. Value</th>
<th>Level of significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experimental</td>
<td>27</td>
<td>136.7</td>
<td>973.4</td>
<td>65</td>
<td>2.7</td>
<td>2.000 Statistically significant (0.05)</td>
</tr>
<tr>
<td>Control</td>
<td>29</td>
<td>118.4</td>
<td>529.9</td>
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</tr>
</tbody>
</table>

Conclusion

Through the findings of the researcher can be concluded as follows: The strategy of the hidden arrangement has an impact on the formation of the students’ new cognitive structures. The strategy of hidden arrangement has contributed to the reorganization of experiences and information obtained by students.

Financial Disclosure: There is no financial disclosure.

Conflicts of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the College of Basic Education/University of Babylon, Iraq and all experiments were carried out in accordance with approved guidelines.

References

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The Efficacy of 6 Weeks Course of 0.05 % Topical retin-A in the Treatment Molluscum Contagiosum: A Cohort Study

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1Dermatology Specialist, Department of Medicine, College of Medicine, University of AL-Qadisiyah, Iraq

ABSTRACT

Aim of the study: to evaluate the role of 0.05 % topical retin-A in the treatment of molluscum contagiosum. The present cohort study included 23 patients with molluscum contagiosum. The study was has been carried out at dermatology unit at Al-Diwaniyah teaching hospital, Al-Diwaniyah Province, Iraq during the period from June 2018 through January 2019. Age, gender and number of lesions were the main variables included in the study. All patients were given a topical retin-A cream, 0.05% concentration in a dose of one bed time application per day. There was highly significant reduction in mean number of lesions from 8.65 ± 3.20 to 0.87 ± 1.46 (P < 0.001) and the cure rate was 65.2 %. The current study included 23 patients with molluscum contagiosum with a mean age of 13.26 ± 8.60 years and an age range of 3 to 23 years; 16 (69.6 %) children and 7 (30.4 %) adults. The study included 13 (56.5 %) and 10 (43.5 %), male and female patients respectively. The use of topical 0.05% rein-A can be justified in patients with molluscum contagiosum because of high rate of cure and negligible side effects.

Keywords: topical retin-A, molluscum contagiosum

Introduction

The well-known molluscum contagiosum is a dermatological disease that is caused by a double-stranded DNA poxvirus 1. There are four subtypes of this virus, MCV-1, MCV-2, MCV-3 and MCV-4. MCV-1 is mainly seen in children; whereas, MCP-2 is seen in patients with HIV. MCV-3 and MCV-4 are frequently seen in Australia and Asian countries 2. The virus is transmitted most commonly by direct and indirect contact; other ways of transmission include autoinoculation, sexual transmission and vertical transmission 3. The typical presentation of this superficial skin disease, also known as water wart, is in the form of dome shaped popular lesion that is purple pinkish, sometimes white in color, 2 to 5 mm in diameter. The number of these lesions is often in the range of 1 to 20; however, a number such as 100 has been reported 3.5. Very large lesions (more than 1.5 cm), secondary bacterial infection and multiple lesions are often seen in immune compromised patients 6. Abdomen, inner thighs and genitalia are the usual sites of involvement in adults whereas in children lesions are mainly seen in areas such as face, trunk and limbs 7,8. The disease is a common clinical problem all over the world particularly in warm humid areas. It has been estimated that about 122 million subjects were suffering the disease in 2010. The principal age groups affected by the disease include children between 2 and 5 years of age and adults who are sexually active. The prevalence rate is even higher in immune compromised patients, particularly HIV patients in whom it may reach up to 18 %. There disease is equally common in males and females 9. The virus typically infects keratinocytes and the lesion is limited to epidermis. The virus has the ability to interfere with host innate immunity through production of specific viral proteins 10. Typical histopathological features of skin biopsy include the cup shaped epidermal indentation and Henderson-Paterson bodies 11. The disease is self limiting; however, infected individuals or their parents seek medical advice for cosmetic reasons, to void transmission of the disease to other members in the family, or because the disease may lasts unusually for long periods 12-14. Treatment approaches may be in the form of physical

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removal of the lesion, topical application of certain medical preparation and sometimes systemic approach; however, there is no clear consensus about an effective mode of therapy. Physical removal may be done by cryotherapy or curettage and topical medications include benzoyl peroxide, salicylic acid, potassium hydroxide and podophyllotoxin. Topical retin-A cream has been described by a number of recent literatures; nonetheless, the results were controversial. In view of the available data about the lack of effective mode of treatment of molluscum contagiosum and because of sufficient controversy about the use of retin-A topical preparation, the planning and conductance of the current study were justified.

Methodology

The present cohort study included 23 patients with molluscum contagiosum. Those patients were selected from the pool of patients visiting the dermatology consultation unit at Al-Diwaniyah teaching hospital, Al-Diwaniyah Province, Iraq during the period from June 2018 through January 2019. The first patients was selected randomly out of 13 patients seen during the first week of study according to a random number generated by random function of a calculator; the rest of patients were selected as one of every other three. Age, gender and number of lesions were the main variables included in the study. All patients were given a topical retin-A cream, 0.05% concentration in a dose of one bedtime application per day. The patients were followed up 6 weeks later with two main outcomes being looked for: the number of lesions and possible side effects. The study was approved by the institutional ethical approval committee and a verbal consent was obtained from each participant or his parents, in case of children, after full illustration of the purpose and the procedure of the current study. Obtained data were then transferred into an SPSS (version 23) spread sheet. Numeric data were expressed as mean, range and standard deviation, whereas, categorical data were expressed as number and percentage. Willcoxon test was used to compare the mean number of lesions before and after treatment. The level of significance was set at $P \leq 0.05$.

Results and Discussion

The current study included 23 patients with molluscum contagiosum with a mean age of $13.26 \pm 8.60$ years and an age range of 3 to 23 years; 16 (69.6 %) children and 7 (30.4 %) adults, as shown in table 1. The study included 13 (56.5 %) and 10 (43.5 %), male and female patients respectively, table 1. Statistical indexes and number of lesions before and after topical retin-A treatment are shown in table 2. There was highly significant reduction in mean number of lesions from $8.65 \pm 3.20$ to $0.87 \pm 1.46$ ($P < 0.001$) and the cure rate was 65.2 %, as shown in table 2. Current study showed that the use of topical 0.05% retin-A for the treatment of skin lesions caused by molluscum contagiosum was effective and resulted in cure of approximately 65 % of patients and reduced the lesions in the rest of patients significantly. On the other hand, daily bed night administration of topical 0.05% retin-A was free of side effects in all patients. In another Iraqi study, the cure rate was 65% after the same period of treatment (6 weeks); thus our findings agree with the finding of this study. In addition, the previous Iraqi study has reported no significant side effect with the exception of some mild irritation which needed no discontinuation of the treatment. This finding also solidifies our finding that the use of retin-A in treatment of molluscum contagiosum for six weeks is associated with minimal if any side effects. In another comparative study, carried out by Rajouria et al, the use of retin-A topically was able to reduce mean number of lesions from $8.35 \pm 2.82$ to $2.00 \pm 1.00$ (19); whereas our study showed a reduction in the mean number of lesions from $8.65 \pm 3.20$ to $0.87 \pm 1.46$. Indeed, the concentration and the application way used by Rajouria et al was the same as that used by the present study; however, the duration treatment in the current study was longer than that of Rajouria et al’s study, 6 weeks versus 4 weeks. In view of the present data obtained from the current study and some previous studies, the use of topical 0.05% retin-A can be justified in patients with molluscum contagiosum because of high rate of cure and negligible side effects. However, to validate the results of the present study a larger sample multi-centre randomized controlled clinical trial is needed.

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Value</th>
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<tbody>
<tr>
<td>Number of cases</td>
<td>23</td>
</tr>
<tr>
<td>Age</td>
<td></td>
</tr>
<tr>
<td>Mean ± SD</td>
<td>13.26 ± 8.60</td>
</tr>
<tr>
<td>Range</td>
<td>3-23</td>
</tr>
<tr>
<td>&lt; 15 years</td>
<td>16 (69.6 %)</td>
</tr>
<tr>
<td>≥ 15 years</td>
<td>7 (30.4 %)</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>13 (56.5 %)</td>
</tr>
<tr>
<td>Female</td>
<td>10 (43.5 %)</td>
</tr>
</tbody>
</table>
Table 2: Number of lesions before and after 0.05 % topical retin-A treatment

<table>
<thead>
<tr>
<th>Index</th>
<th>Number of lesion before treatment</th>
<th>Number of lesions after treatment</th>
<th>P †</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean ± SD</td>
<td>8.65 ± 3.20</td>
<td>0.87 ± 1.46</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Range (min. – max.)</td>
<td>3 - 15</td>
<td>0 - 5</td>
<td></td>
</tr>
<tr>
<td>Median (IQR)</td>
<td>8 (6)</td>
<td>0 (2)</td>
<td></td>
</tr>
<tr>
<td>Number of patients with no lesions</td>
<td>0 (0 %)</td>
<td>15 (65.2 %)</td>
<td></td>
</tr>
</tbody>
</table>

Conclusion

All patients were given a topical retin-A cream, 0.05% concentration in a dose of one bed time application per day. There was highly significant reduction in mean number of lesions from 8.65 ± 3.20 to 0.87 ± 1.46 (P < 0.001) and the cure rate was 65.2 %. The current study included 23 patients with molluscum contagiosum with a mean age of 13.26 ± 8.60 years and an age range of 3 to 23 years; 16 (69.6 %) children and 7 (30.4 %) adults. The study included 13 (56.5 %) and 10 (43.5 %), male and female patients respectively. The use of topical 0.05% rein-A can be justified in patients with molluscum contagiosum because of high rate of cure and negligible side effects.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Department of Medicine/College of Medicine/University of AL-Qadisiyah, Iraq and all experiments were carried out in accordance with approved guidelines.

REFERENCES


A Study of Risk Factors and Associated Symptoms among Patients with Bronchial Asthma Attending Al-Hillah Teaching Hospital

Fakhria Jaber Mubabes1, Salma Kadum Jehad2, Hussien Jassim Mohammed2, Dia S Abdul-Hadi3
1Adult Nursing, 2Community Health Nursing, College of Nursing, University of Babylon, Iraq; 3University of Tartu

ABSTRACT
Bronchial asthma is a chronic disorder of respiratory system. It is considered as an important worldwide public health problem. Objectives of the study are to: Identify the risk factors and symptoms which are associated in patient with bronchial asthma and find out the relationship between the risk factors of asthma and symptoms with some demographic variables. Methodology: A descriptive study was started from 25/5/2016 to 7/2/2017 in Al-Hilla teaching hospital. a purposive sample of (100) patients with bronchial asthma admitted to Al-Hilla teaching hospital were selected. Results: Most of the patient were male (55%), the highest percentage of their age group were more than (58) years old. This study showed the differences between the risk factors, according to time of attack,” evening” reported the highest mean of occurrence (2.20), while the seasonal factors showed that high mean in “spring” accounted (2.62). However, this study revealed that there is a significant association between the gender, marital state, academic level and the clinical manifestations. Conclusion: this study showed that there were several factors associated with development of bronchial asthma such as age, economic status stress, smoking, and environmental factors.

Keywords: risk factors, symptoms, patients, bronchial asthma

Introduction
Bronchial asthma is a chronic disorder of respiratory system. It is considered an important public health problem, the incidence of this disease gradually increasing in various countries affecting more than 300 million individuals worldwide. It may occur in children and adults and in various age groups. High prevalence of this disease cause a considerable burden on health care resources, while effective management reducing the morbidity and increasing the utilization of health care facilities 1. Asthma can be considered as a disease that changes a person’s physical functioning, decrease physical exercise endurance, felt unhappy in his live and may further affect an individual psychologically and socially, in addition patients complained from the need to be admitted to hospital, missing their work, job or school. There is an inadequate data about asthma risk factors and prevalence in Iraq and Middle East countries, Nevertheless a study carried out by (Abuekteish, et al.1996) showed that the prevalence of asthma and wheezing among school children aged 6–12 years in the northern part of Jordan was (4.1%) and (8.3) respectively. While other study conducted by (Muhabes & Alyeassery 2014), they concluded that Asthma had impact on patients physical status, as well as causing psychological and social disruptions; the majority of the sample patients in their study were facing various stressors which had impacts on their lives. Despite the availability of effective medications and treatment strategies, many patients continue to report hospitalizations, missed school or work days, and suboptimal pharmacotherapy, one reason for this may be fluctuations in patients, asthma symptoms3. Patient with asthma may experiences various symptoms, they are different in severity and frequency in adults or in children and may be changed periodically. These changes in asthma symptoms may be various and they may be
aggravated after the exposure to different factors which may effect on the severity and increase the sequences of attack. currently experiencing worsening of upper respiratory track symptoms such as coughing, sputum production or shortness of breath, and chest tightness need for higher doses of medication, Moreover, Poorer asthma control and symptoms attack may impair an individual’s normal function and lifestyle. Various factors can lead to an increase (or decrease) in symptoms of this disease at the severity and intensity level of these symptoms may be a response to the individuals environment (e.g. seasonal variation, cigarette smoke, and air pollutants) or personal. Yawn (2008). In addition to day-to-day and day-to-night changes in asthma symptoms, various factors are known to aggravate the disease exposure to these intrinsic and extrinsic factors makes it appear as though patients are shifting from one level of severity classification to another over time (e.g. mild persistent to moderate persistent), and this can trigger periodic exacerbations or “attack”. Patient’s must be aware about the symptoms and the risk factors, therefore, it is very important to study those factors and symptoms which may affect asthma prognosis to help in controlling them and providing them the necessary treatment.

**Methodology**

**Design of the study:** A descriptive analytical study design

**Sample of the study:** probability (purposive sampling) was selected by randomized system which consists of (100) patients with bronchial asthma from Al-Hilla teaching hospitals.

**Setting of the study:** Al-Hilla teaching hospitals data collected from the period of 31st of June 2016 to 10th February 2017.

**Instruments:** The questionnaire was constructed for the purpose of the study. They were consisted of three parts: data was gathered by interviewing patients and the questionnaire was completed by the researchers. All the participants were informed about the objectives of the study and informed consent were taken from all of them. Ethical considerations were approved by the college and the particular hospital.

**Part 1: Demographic Data Sheet:** This part concerned with personal information include, the patient (Age, Gender, Marital status, Academic level, Job, Residency, economic status).

**Part 2:** items related to patient risk factors (8) items related to information of disease (3) items related to symptoms of different systems (12) items

These items were rated according to two level Likert scale (Yes, No) and scored (1, 2), and three level Likert scale (Never, Sometimes, Always),

**Statistical Analysis:** Data were analyzed using the Statistical Package for Social Sciences (SPSS) version 19. Through the application of descriptive statistical data analysis include (Frequencies and Percentages) and arithmetic mean with standard deviation, Mean of score (M.S.) with their Standard Deviation (SD), and inferential statistics $\chi^2$-test and Pearson Correlation.

**Results and Discussion**

Table (1) showed the highest percentage of the sample reported at age ranged (58 years old and more) and they are accounted (32%). Most of them were males (55%).The greater number of them were married accounted (68%). (43%) of patients were primary school graduates, regarding the sample job results demonstrated that (32%) were employed. The highest percentage of the sample (place of residence recently) were at rural setting and they were accounted (56%), in addition sample represents (54%) economically satisfied to some extent. Finally the majority of the participants were smokers they constitutes (56%). Table (2) declared that the highest percentage represents (56%) of study samples answer (yes) for having family history of disease occurrence. (52%) their family were smokers, (53%) of the sample were suffering from disease for 5-8 years, higher percentage reported (65%) with (No) chronic diseases, while (58%) of them were not obese. The majority had (No) allergy from foods, Such as Banana (88%). Moreover (86%) of the present sample had (No) allergy from drugs, Such as Penicillin. Regarding the environmental factors results indicated that the majority of the sample were not exposed to dust constitutes (55%) and smoke (62%). However, allergy from Plants results showed that (57%) of the study population with (No) history of being affected, While (53%) of them say (yes) for perfumes. At the same time the sample showed negative exposure to pets. Finally most of study sample did not live near factories which were constituted (75%). Table (3) presented the specific risk factors of the disease, it showed the differences between such variables, according to time of attack, “evening” reported the highest mean of occurrence (2.20), while...
the seasonal factors showed that high mean in “spring” accounted (2.62). The last factors which was the stress events had a high mean in regard to the “economic stressors” (2.44). Table (4) illustrated the sample according to symptoms related to disease. Regarding the respiratory disorders, sample mean reported highly affected by “wheezing” (2.71), while C.N.S disorders indicated “sleeping disturbance” had a high mean (2.20). Table (5) showed the relation between age and symptoms of the disease, it is illustrated that there was a significant relationship between the participants age and all the symptoms, Nausea and vomiting, Wheezing, Sleep disturbance, and Urticaria, (124.934, 72.314, 127.633, and 124.934) respectively at P<value (0.001).

Table (6) revealed the association between demographic data, signs and symptoms of the sample, it showed that there was a significant association between the gender, marital state, and academic level and the clinical manifestations at P<value (0.001). The current study reported that the sample mean of age was (59.0), (range 18–72 years), most of the subjects were male (55%), in addition this study found the educational level of the sample in the present study was at low level. Regarding to exposure to pet the results indicated that the sample of this study were non-exposed this is supported by who reported that pets allowed in bedroom, saw cockroach inside home in past 30 days, or saw or smelled mold in past 30 days) were no longer significant.

Table 1: Distribution of sample according to their Socio-demographic characteristics

<table>
<thead>
<tr>
<th>Demographic variables</th>
<th>Frequency</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18-28</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>29-38</td>
<td>15</td>
<td>15</td>
</tr>
<tr>
<td>39-48</td>
<td>15</td>
<td>15</td>
</tr>
<tr>
<td>49-58</td>
<td>28</td>
<td>28</td>
</tr>
<tr>
<td>More than 58</td>
<td>32</td>
<td>32</td>
</tr>
<tr>
<td><strong>Mean</strong></td>
<td>59</td>
<td></td>
</tr>
<tr>
<td><strong>Gender</strong></td>
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</tr>
<tr>
<td>Male</td>
<td>55</td>
<td>55</td>
</tr>
<tr>
<td>Female</td>
<td>45</td>
<td>45</td>
</tr>
<tr>
<td><strong>Marital State</strong></td>
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<tr>
<td>Single</td>
<td>30</td>
<td>30</td>
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<tr>
<td>Married</td>
<td>68</td>
<td>68</td>
</tr>
<tr>
<td>Widow</td>
<td>2</td>
<td>2</td>
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<tr>
<td>Divorce</td>
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<td>-</td>
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</table>

Conted...

<table>
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<tr>
<th>Academic Level</th>
<th>Responses</th>
<th>Freq.</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unable to read and write</td>
<td>5</td>
<td>5</td>
<td></td>
</tr>
<tr>
<td>Read &amp; Write</td>
<td>31</td>
<td>31</td>
<td></td>
</tr>
<tr>
<td>Primary</td>
<td>43</td>
<td>43</td>
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</tr>
<tr>
<td>Secondary</td>
<td>20</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>University</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>Post graduate</td>
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<td>-</td>
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</table>

<table>
<thead>
<tr>
<th>Job</th>
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<tr>
<td>employee</td>
<td>32</td>
<td>32</td>
</tr>
<tr>
<td>retired</td>
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</tr>
<tr>
<td>Without work</td>
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<td>10</td>
</tr>
<tr>
<td>Household</td>
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</tbody>
</table>

Table 2: Distribution of Patients according to their risk factors

<table>
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<th>Sample Risks Factors</th>
<th>Responses</th>
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<th>%</th>
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</thead>
<tbody>
<tr>
<td>Family history of Disease occurrence</td>
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<td>56</td>
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<tr>
<td></td>
<td>No</td>
<td>44</td>
<td>44</td>
</tr>
<tr>
<td>Smoking in family</td>
<td>Yes</td>
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<td>52</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>48</td>
<td>48</td>
</tr>
<tr>
<td>Duration of disease</td>
<td>1-4 years</td>
<td>32</td>
<td>32</td>
</tr>
<tr>
<td></td>
<td>5-8 years</td>
<td>53</td>
<td>53</td>
</tr>
<tr>
<td></td>
<td>9 and more</td>
<td>15</td>
<td>15</td>
</tr>
<tr>
<td>Obesity</td>
<td>Yes</td>
<td>42</td>
<td>42</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>58</td>
<td>58</td>
</tr>
<tr>
<td>Allergy from foods Such as Banana</td>
<td>Yes</td>
<td>12</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>88</td>
<td>88</td>
</tr>
<tr>
<td>Allergy from drugs Such as Penicillin</td>
<td>Yes</td>
<td>14</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>86</td>
<td>86</td>
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<table>
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<tr>
<th>Environmental Factors</th>
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<td></td>
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<tr>
<td>Smoke</td>
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<tr>
<td></td>
<td>62</td>
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<tr>
<td>Plants</td>
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<td>57</td>
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<td>Perfumes</td>
<td>53</td>
<td>53</td>
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<tr>
<td></td>
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<tr>
<td>Pet exposure</td>
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<td>67</td>
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<tr>
<td>Living near factories</td>
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<tr>
<td><strong>Total</strong></td>
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Table 3: Distribution of sample according to specific risk factors of disease

<table>
<thead>
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<th>Disease Specific Variables</th>
<th>Never</th>
<th>%</th>
<th>Sometimes</th>
<th>%</th>
<th>Always</th>
<th>%</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Time of Attack</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Morning</td>
<td>17</td>
<td>17</td>
<td>68</td>
<td>68</td>
<td>15</td>
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<td>1.98</td>
<td>.568</td>
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<tr>
<td>Midday</td>
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<td>30</td>
<td>32</td>
<td>32</td>
<td>38</td>
<td>38</td>
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<td>.825</td>
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<tr>
<td>Evening</td>
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<td>20</td>
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<td>40</td>
<td>40</td>
<td>40</td>
<td>2.20</td>
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<td>20</td>
<td>40</td>
<td>40</td>
<td>2.00</td>
<td>.899</td>
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<tr>
<td>2. Seasonal Factor</td>
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<td></td>
<td></td>
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<td></td>
<td></td>
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</tr>
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<td>Summer</td>
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<td>25</td>
<td>30</td>
<td>30</td>
<td>45</td>
<td>45</td>
<td>2.20</td>
<td>.816</td>
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<tr>
<td>Winter</td>
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<td>34</td>
<td>18</td>
<td>18</td>
<td>2.20</td>
<td>.816</td>
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<tr>
<td>Autumn</td>
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<td>10</td>
<td>45</td>
<td>45</td>
<td>45</td>
<td>45</td>
<td>1.74</td>
<td>.774</td>
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<tr>
<td>Spring</td>
<td>8</td>
<td>8</td>
<td>22</td>
<td>22</td>
<td>70</td>
<td>70</td>
<td>2.62</td>
<td>.632</td>
</tr>
<tr>
<td>3. Stress Events</td>
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<td></td>
<td></td>
<td></td>
<td></td>
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<td>Family stressors</td>
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<td>50</td>
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<td>43</td>
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<td>.612</td>
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<td>Work stressors</td>
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<td>10</td>
<td>65</td>
<td>65</td>
<td>25</td>
<td>25</td>
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<td>.575</td>
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<td>Economic stressors</td>
<td>8</td>
<td>8</td>
<td>40</td>
<td>40</td>
<td>52</td>
<td>52</td>
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<td>.641</td>
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Table 4: Distribution of sample according to symptoms related to disease

<table>
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<tr>
<th>Body systems symptoms</th>
<th>Never</th>
<th>%</th>
<th>Sometimes</th>
<th>%</th>
<th>Always</th>
<th>%</th>
<th>Mean</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Respiratory disorders</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Wheezing</td>
<td>5</td>
<td>5</td>
<td>19</td>
<td>19</td>
<td>76</td>
<td>76</td>
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<td>.556</td>
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<td>Rhinitis</td>
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<td>20</td>
<td>34</td>
<td>34</td>
<td>46</td>
<td>46</td>
<td>2.26</td>
<td>.774</td>
</tr>
<tr>
<td>Sinusitis</td>
<td>35</td>
<td>35</td>
<td>30</td>
<td>30</td>
<td>35</td>
<td>35</td>
<td>2.00</td>
<td>.841</td>
</tr>
<tr>
<td>Shortness of breathing</td>
<td>10</td>
<td>10</td>
<td>40</td>
<td>40</td>
<td>50</td>
<td>50</td>
<td>2.41</td>
<td>.653</td>
</tr>
<tr>
<td>Chest tightness</td>
<td>20</td>
<td>20</td>
<td>34</td>
<td>34</td>
<td>46</td>
<td>46</td>
<td>2.26</td>
<td>.774</td>
</tr>
<tr>
<td>Coughing with sputum</td>
<td>30</td>
<td>25</td>
<td>48</td>
<td>48</td>
<td>22</td>
<td>22</td>
<td>2.02</td>
<td>.724</td>
</tr>
<tr>
<td>Dry coughing</td>
<td>25</td>
<td>25</td>
<td>45</td>
<td>45</td>
<td>30</td>
<td>30</td>
<td>2.05</td>
<td>.744</td>
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<td>Skin disorders</td>
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<td></td>
</tr>
<tr>
<td>Urticaria</td>
<td>45</td>
<td>45</td>
<td>35</td>
<td>35</td>
<td>20</td>
<td>20</td>
<td>1.75</td>
<td>.770</td>
</tr>
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<td>G.I.T. disorders</td>
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<td></td>
</tr>
<tr>
<td>Nausea and vomiting</td>
<td>52</td>
<td>52</td>
<td>30</td>
<td>30</td>
<td>18</td>
<td>18</td>
<td>1.67</td>
<td>.766</td>
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<tr>
<td>C. N.S. disorders</td>
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<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Dizziness</td>
<td>25</td>
<td>25</td>
<td>55</td>
<td>55</td>
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<td>20</td>
<td>1.95</td>
<td>.672</td>
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<td>Headache</td>
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<td>30</td>
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<td>50</td>
<td>20</td>
<td>20</td>
<td>1.90</td>
<td>.704</td>
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<tr>
<td>Sleep disturbance</td>
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<td>16</td>
<td>58</td>
<td>58</td>
<td>26</td>
<td>26</td>
<td>2.20</td>
<td>.620</td>
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Table 5: Relationship between age and symptoms of the disease

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<th>Age</th>
<th>18-28</th>
<th>29-38</th>
<th>39-48</th>
<th>49-58</th>
<th>More than 58</th>
<th>χ²-test</th>
<th>P-value (*)</th>
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<tbody>
<tr>
<td>Nausea and vomiting</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Never</td>
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<td>15</td>
<td>10</td>
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<td>10</td>
<td>124.934</td>
<td>.000</td>
</tr>
<tr>
<td>Sometimes</td>
<td>0</td>
<td>0</td>
<td>5</td>
<td>28</td>
<td>2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Always</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>20</td>
<td></td>
<td></td>
</tr>
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</table>
Conted…

<table>
<thead>
<tr>
<th>Wheezing</th>
<th>Never</th>
<th>Sometimes</th>
<th>Always</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>5</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>4</td>
<td>0</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>0</td>
<td>11</td>
<td>15</td>
<td>28</td>
</tr>
<tr>
<td></td>
<td>22</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
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<td>.000</td>
<td></td>
<td></td>
<td></td>
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</table>

<table>
<thead>
<tr>
<th>Sleep disturbance</th>
<th>Never</th>
<th>Sometimes</th>
<th>Always</th>
<th>Total</th>
</tr>
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<td></td>
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<td>0</td>
<td>1</td>
</tr>
<tr>
<td></td>
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<td>15</td>
<td>15</td>
<td>19</td>
</tr>
<tr>
<td></td>
<td>0</td>
<td>0</td>
<td>9</td>
<td>22</td>
</tr>
<tr>
<td>Sig.</td>
<td>.000</td>
<td></td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Urticaria</th>
<th>Never</th>
<th>Sometimes</th>
<th>Always</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>10</td>
<td>15</td>
<td>10</td>
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</tr>
<tr>
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<td>0</td>
<td>0</td>
<td>5</td>
<td>28</td>
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<tr>
<td></td>
<td>0</td>
<td>0</td>
<td>0</td>
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</tr>
<tr>
<td>Sig.</td>
<td>.000</td>
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Table 6: Association between some demographic data, signs and symptoms of the sample

<table>
<thead>
<tr>
<th></th>
<th>Shortness of breathing</th>
<th>Chest tightness</th>
<th>Coughing with sputum</th>
<th>Dry coughing</th>
<th>Urticaria</th>
<th>Nausea and vomiting</th>
<th>Dizziness</th>
<th>Headache</th>
<th>Sleep disturbance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>.849**</td>
<td>.828**</td>
<td>.722**</td>
<td>.740**</td>
<td>.885**</td>
<td>.795**</td>
<td>.684**</td>
<td>.732**</td>
<td>.652**</td>
</tr>
<tr>
<td>Marital state</td>
<td>.704**</td>
<td>.774**</td>
<td>.778**</td>
<td>.781**</td>
<td>.664**</td>
<td>.607**</td>
<td>.779**</td>
<td>.849**</td>
<td>.614**</td>
</tr>
<tr>
<td>Academic level</td>
<td>.798**</td>
<td>.799**</td>
<td>.860**</td>
<td>.847**</td>
<td>.838**</td>
<td>.788**</td>
<td>.832**</td>
<td>.864**</td>
<td>.803**</td>
</tr>
</tbody>
</table>

Conclusion

Based on the findings of this study, it can be concluded that the overall sample characteristics were old, males, married, educated up to primary school and most of them were smokers, the participants reported family history of disease occurrence, duration of disease for 5-8 years, fortunately subjects did not have history of food allergy or drugs. Moreover the results showed a high mean of time occurrence at evening and at spring season. Mostly participants reported respiratory disorders, there was a relationship between age, gender, marital state, academic level and the symptoms of the disease.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Adult Nursing College of Nursing, University of Babylon, Iraq and all experiments were carried out in accordance with approved guidelines.

REFERENCES


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Assessment of Nurses’ Knowledge Concerning Management of Fractures in Orthopedic Wards

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Department of Adult Nursing, University of Kufa, Faculty of Nursing, Iraq

ABSTRACT
The main purposes of fractures care are to support injured joints and prevent joint injury, correct and support weak or deformed extremities, prevent worsening of abnormal curves in the spine and support in a specific positions in healing. Objectives of the study to order to assess nurses’ knowledge concerning management of fractures and to Find out the relationship between nurses’ knowledge and their demographic characteristics of age, gender, level of education, type of ward, training session, duration of session and years of experience in orthopedic wards. Descriptive Cross-Sectional Design carried out in Al-Sadder Medical City and adopted in the current study to achieve the early stated objectives. The study started from October 1st, 2016 until April, 20th, 2017. A Non-Probability (Convenience Sample) of (40) nurses were including in the present study. Sample collect from orthopedic wards. Data collected through using of a well-designed questionnaire consist of two parts: part I consists of (7) items, which included age, gender, level of education, type of ward, training session, duration of session and years of experience in orthopedic wards, and part II consists of (36) items, which included questions about anatomy, definition, types, treatment and general information about the fractures.

Keywords: Assessment, Nurses, Management, Knowledge, Fractures

Introduction
A fracture is a complete or incomplete disruption in the of bone structure and is defined according to its type and extent. Fractures occur when the bone is subjected to stress greater than it can absorb. Fractures may be caused by direct blows, crushing forces, sudden twisting motions, and extreme muscle contractions. When the bone is broken, adjacent structures are also affected, resulting in soft tissue edema, hemorrhage into the muscles and joints, joint dislocations, ruptured tendons, severed nerves, and damaged blood vessels. Body organs may be injured by the force that caused the fracture or by fracture fragments 1. Nursing staff that interfaces between physicians and patients plays a key role in health’s promotion as an important determinant of health and welfare of the patient-citizen 2. Fracture incidence is multifactorial and often complicated by such factors as the patient’s age, sex, co-morbidities, lifestyle, physiological status, and occupation. In the United States, 5.6 million fractures occur each year, corresponding to a 2% incidence. Almost 6000 fractures were treated in an orthopedic trauma unit in Edinburgh, Scotland, in one year. The overall fracture incidence in the Scottish case series was 1.13% in men and 1.16% in women. Interestingly, there was a bimodal distribution of fractures in males, with a high incidence in young men and a second rise in men starting at the age of 60 years. In women, there was a unimodal distribution of fractures, with a rise around the time of menopause 3. Nursing management is a service based on scientific knowledge and skill, as well as trust, that the nurse will do what is right, what is needed and what will benefit the patient and their well-being 5. All type of fractures are associated with a significant morbidity, but the hip and spine fractures are also associated with an increased mortality, with an incidence of around 24% in the first year after a hip fracture. In addition, these fractures cause significant problems in terms of economic resources. In
most European Countries, the annual costs associated with hospitalization for fractures (in terms of length of the hospitalization) were higher than those due to other chronic illnesses such as chronic obstructive bronchial pulmonary disease, stroke, myocardial infarct. Due to a better understanding of the causes, an easy access to diagnosis and therapeutically options, before fractures occur, is now possible providing a real prevention to OP and its related complications. The risk factors for fractures-extremes of age, altered mental status, multi-trauma and distracting injuries, developmental delay, altered sensation (nerve blocks, neuropathies),diabetes, immune compromise and cerebral palsy/spasticity. X-ray examination is designed to give information additional to that obtained by clinical judgment (X-rays) in at least two planes, usually at right angles, are essential. A injury may be missed if only one film is taken. Some injury may elude both clinical and radiological diagnosis. The main purposes of fractures care are to support injured joints and prevent joint injury, correct and support weak or deformed extremities, prevent worsening of abnormal curves in the spine and support in a specific positions in healing. The potential complications of cast application are; compartment syndrome, cast syndrome and pressure ulcers. Orthopedic care is a specialty that required staff to have the knowledge, skills and attitudes that will enable them to competently meet the needs of patients required and wearing musculoskeletal complications. The treatment of orthopedic conditions must account for a variety of factors that includes; casts, and supports, braces medications, surgery, and rehabilitation therapy. Orthopedic medical devices have been extremely successful in restoring mobility, reducing pain, and improving the quality of life for millions of individuals. Fracture management modalities include a wide variety of devices including wires, pins, screws, plates, spinal fixation devices and artificial ligaments. Physicians often make decisions about the use of casts and splints in the management of musculoskeletal disorders. Because of this, they need to be familiar with indications for application, proper technique, and the potential pitfalls of casting and splinting to optimize Patient care when treating common orthopedic injuries. Nurses should always observe for sign and symptoms of circulation, pain, swelling, tingling, numbness, diminished, absence pulse, paralysis, cool to touch. The pillow are needed to achieve high elevation of the leg, after improving of circulation and swelling controlled the evaluation can be gradually reduced.

Materials and Method

Design of the Study: Descriptive Cross-Sectional Design is adopted in the current study to achieve the early stated objectives. The study started from October 1st, 2016 until April, 20th, 2017.

Setting of the Study: The study is conducted in Al-Najaf City/Al-Najaf Al-Ashraf Health Directorate/Al-Sadder Medical City.

Sample of the Study: A Non-Probability (Convenience Sample) of (40) nurses were including in the present study. Sample collect from orthopedic wards.

Study Instrument: An assessment tool is adopted and developed by the researcher to assess nurses’ knowledge concerning management of fractures. The complete instrument of the study consists of (2) parts:

Part I: Demographic Data: This part consists of (7) items, which included age, gender, level of education, type of ward, training session, duration of session and years of experience in orthopedic wards.

Part II: Nurses’ Knowledge Concerning Management of Fractures: This part of the questionnaire comprised of (36) items, which included questions about anatomy, definition, types, treatment and general information about the fractures.

Data Collection: The data collection is done by utilization of the semi-structured questionnaire and by means of self – reported technique with the object and the researcher use Arabic version of the questionnaire. The data collection process started from February, 15th, 2017 to February, 28th, 2017.

Validity of the Instrument: A content validity of the study instrument conducted through a group of experts who have more than 10 years of experience in nursing field.

Statistical Analysis: The data were analyze through application of the descriptive and inferential data analysis methods, included:

- Frequency, percentage, and Statistical mean and standard deviation.
- Measures of central tendency: Mean, Mean of scores (MS) And the two points likert scales with two levels of assessment, poor (mean of score less than 1.5), good ( mean of score more than 1.5) for Nurse’s knowledge about management of fracture.
• Chi-square : to test independency distribution of observed frequencies, and for measuring the association between the studies variables according to its type.

Results and Discussion

Table (1) shows that the majority of the study sample (75%) are within (19-27) years old. Regarding gender, the study results revealed that the majority (65%) are female and remaining are male. In addition, the study results present that (55%) of the sample are technical institute, while (32.5%) are Secondary nursing school. Additionally, the study results revealed that (65%) of the sample are public ward. Also (62.5%) are haven’t training sessions in orthopedic wards. In regards to number of training sessions, (25%) of the study sample have one training sessions in orthopedic wards. While concerning duration of training sessions (22.5%) is between (1-3) day. Additional to highest percentage (80.0%) at Years of experience (<=1) years and lowest percentage (2.5%) more than (7) years. Table (2) shows that the overall assessment for nurses knowledge are poor. Table (3) shows that there is a non- significant relationship between the nurses’ knowledge and their demographic data except with their duration of training sessions at p-value 0.009. (Tables 1) Show that there are (75%) among nurses of sample study is within (19 – 27 years). This outcome is reinforced by a study done by Sathiya, et al., (2015) and El Enein, et al., (2012) they concluded in their results that the dominant age of the study sample are 21-30 years old 13,14. Regarding gender, the results reveal, that the majority are (65%) of subjects are females. Both studies Al-Barwari, et al., (2006) and Cohen, and Stellenberg (2012) mentioned that females are the dominant gender for nurses 15,16. Concerning educational levels, the higher percentage (55%) are technical institute. This result is in agreement with other studies Abd and Georgies, (2005) and (Radhi, and Tawfiq 2015) in their studies found that the majority of the study subjects are technical institute 17,18. Concerning type of ward, the highest percentage of participant (65%) from public ward. This come is consistent with another study of (Radhi, and Tawfiq 2015) reveals in their studies that most of the study sample from public wards 18. The present study shows that (62.5%) of nurses were not participating in the training sessions concerning management of fractures. In other study Al-Barwari shows that (95%) of nurses were not participating in the training sessions related to care of fractures 15. Also in El Enein study results 97.5% had no training sessions towards fracture care 14. Concerning duration of training session, approximately (22.5%) from those who share in training has period (1-3) days, this result agree with Kadhim, (2013) who demonstrate that the (80%) of studied sample had training session period less than (3) days. The study sample indicated that (80%) from nurses have (<= 1) years of experience in the orthopedic wards. Al-Barwari study results indicated that (65%) from nurses have 1-5 years of experience in the orthopedic in Duhok and (55%) in Arbil 15. While in Bader Study results indicates that (53.8 %) of the study sample having 1-5 years of experience in orthopedic wards. Finally Mohamed study results views that The (75%) of participants were experience within 1-5 years in the orthopedic wards. The results of previous mentioned studies are in agreement with the present study finding regarding years of experience in orthopedic wards. (Tables 2) The study results indicate that the most of the nurses’ knowledge for management of fractures is poor at general mean of score. (1.45). These results agreed with Sathiya et al., (2015) and Al-Barwari, et al., (2006) reveals in their studies that most of the nurses’ knowledge for management of fractures is poor 13,15. (Tables 3) The study results indicate that there is a non- significant relationship between the nurses’ knowledge and their demographic data except with their duration of training sessions at p-value 0.009. these results come because the issue of management of patients with fracture is missed in the secondary nursing schools curriculums, so the levels of education and other demographic data are not affects the nurses knowledge, and the practice area is the source of knowledge for nurses.

Table 1: Demographic Data of the Study Sample

<table>
<thead>
<tr>
<th>Demographic data</th>
<th>Rating and intervals</th>
<th>Frequency</th>
<th>Percent</th>
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<tbody>
<tr>
<td>Age/Years</td>
<td>19-27</td>
<td>30</td>
<td>75</td>
</tr>
<tr>
<td></td>
<td>28.00 - 34.00</td>
<td>4</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>35.00 - 41.00</td>
<td>5</td>
<td>12.5</td>
</tr>
<tr>
<td></td>
<td>49.00+</td>
<td>1</td>
<td>2.5</td>
</tr>
<tr>
<td>Gender</td>
<td>Male</td>
<td>14</td>
<td>35</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>26</td>
<td>65</td>
</tr>
<tr>
<td>Levels of educations</td>
<td>Secondary nursing school</td>
<td>13</td>
<td>32.5</td>
</tr>
<tr>
<td></td>
<td>Technical institute</td>
<td>22</td>
<td>55</td>
</tr>
<tr>
<td></td>
<td>College of nursing</td>
<td>5</td>
<td>12.5</td>
</tr>
</tbody>
</table>
Conted…

<table>
<thead>
<tr>
<th>Ward type</th>
<th>Public</th>
<th>26</th>
<th>65</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Private</td>
<td>14</td>
<td>35</td>
</tr>
</tbody>
</table>

| Training sessions | Yes | 15 | 37.5 |
|                   | No  | 25 | 62.5 |

| Number of training sessions | 1 | 10 | 25 |
|                            | 2 | 3  | 7.5 |
|                            | 3 | 1  | 2.5 |
|                            | 5 | 1  | 2.5 |

| Duration of training sessions/days | 1-3 | 9 | 22.5 |
|                                   | 4 and more | 6 | 15 |

| Years of experience | <= 1.0 | 32 | 80 |
|                     | 1.1 - 4.0| 5  | 12.5 |
|                     | 4.1 - 7.0| 2  | 5   |
|                     | 7.1+    | 1  | 2.5 |

Table 2: Overall Assessment of Nurse’s knowledge about management of fracture

<table>
<thead>
<tr>
<th>Main domain</th>
<th>Rating</th>
<th>Frequency</th>
<th>Percent</th>
<th>m.s.</th>
<th>Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Overall</td>
<td>Good</td>
<td>12</td>
<td>30</td>
<td>1.45</td>
<td>Poor</td>
</tr>
<tr>
<td></td>
<td>Poor</td>
<td>28</td>
<td>70</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>40</td>
<td>100</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 3: Relationship between the Nurses’ Knowledge and their Demographic Data

<table>
<thead>
<tr>
<th>Demographic Data</th>
<th>Chi-Square Value</th>
<th>D.F.</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age/Years</td>
<td>3.492</td>
<td>3</td>
<td>0.322</td>
</tr>
<tr>
<td>Gender</td>
<td>0.021</td>
<td>1</td>
<td>0.885</td>
</tr>
<tr>
<td>Levels Of Education</td>
<td>0.959</td>
<td>2</td>
<td>0.619</td>
</tr>
<tr>
<td>Word Type</td>
<td>0.021</td>
<td>1</td>
<td>0.885</td>
</tr>
<tr>
<td>Training Sessions</td>
<td>0.127</td>
<td>1</td>
<td>0.722</td>
</tr>
<tr>
<td>Number of Training Sessions</td>
<td>2.825</td>
<td>4</td>
<td>0.587</td>
</tr>
<tr>
<td>Duration of Training Sessions</td>
<td>0.41</td>
<td>2</td>
<td>0.009</td>
</tr>
<tr>
<td>Years of Experience</td>
<td>5.714</td>
<td>3</td>
<td>0.126</td>
</tr>
</tbody>
</table>

Conclusion

Based on the study results the study concluded the following: It is found that the most of nurses are middle age group within (19-27) years old, most of the nurses were female. It is concludes that the most of nurses are secondary nurses graduated, due to a much presence of junior nursing which mostly of the graduates are female nurses, most of the nurses years’ experience in orthopedic wards(<= 1.0) years. Most of the sample have no participating in the sessions training in orthopedic wards. The orthopedic nurses have inadequate knowledge in some aspects for management of fractures.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Department of Adult Nursing, University Of Kufa, Faculty of Nursing, Iraq and all experiments were carried out in accordance with approved guidelines.

REFERENCES


Assessment of the Midwives, Knowledge toward Management and Prevention of Postpartum Hemorrhage at Delivery Rooms in Holly Karbala and Hilla City Hospitals

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1Comunity Health Nursing Department, College Nursing, University of Babylon, Iraq

ABSTRACT

Globally, there is an estimated of (287,000) maternal deaths. This means, every day, about 830 women decease from preventable causes linked to pregnancy and childbirth. One woman dies every two minutes. About 99% of maternal deaths happen in developing countries, while above half of these deaths were preventable. Postpartum hemorrhage (PPH) is a major cause of maternal mortality and morbidity, especially in developing countries, where most pregnancy-related deaths are connected with hemorrhage. It aimed to assess midwives knowledge regarding management and prevention of PPH. A descriptive study was found to be effective for the present study. In this study the target population was consisted of all midwives working in delivery room in hospital of a Holy Karbala and Hilla city. The sampling technique use in this study was (nonprobability) purposive method of sampling; sample were consist of 60 midwives working in delivery room in Karbala and Hilla hospitals. There were 30 items regarding knowledge of management and prevention of PPH. The data analyzed through the use of the descriptive and inferential statistical analysis procedures. Our study reveal that (50%) of midwives had adequate knowledge, (45%) had a moderate knowledge and only 3(5%) midwives had inadequate knowledge.

Keywords: postpartum hemorrhage, Midwives, knowledge toward management prevention of PPH.

Introduction

More than half million women around the World die as a result of complications during pregnancy and childbirth. Common of these deaths occur within few hours of delivery and in most cases are due to (PPH). Approximately 24% of maternal death occur through pregnancy, 16% in the period of labor and births and 61% occur during the postpartum period. 45% of death occur within the earliest 24 hours of birth mostly as a cause of PPH. Postpartum hemorrhage is the major cause of maternal morbidity and mortality worldwide with the main incidence in developing countries. According to (WHO, 2005) obstetric hemorrhage causes 127,000 deaths worldwide and is the leading cause of maternal mortality. Universally, obstetric hemorrhage remains the most significant cause of maternal mortality. It is expected that PPH is the most common cause of maternal deaths across the world, responsible for more than 25% of deaths annually and is a major cause of several maternal morbidity. PPH is one of the obstetric emergencies that can be prevented if the correct skills are employed yet it remains the leading cause of maternal mortality globally. In 2010 nearly 14 million women suffered from PPH worldwide resulting into 287,000 women dying while pregnant or giving birth. 99% of global maternal deaths occur in developing countries, with the maternal mortality ratio (MMR) of 239 per 100,000 live births, 14 times higher compared to the developed regions (17 maternal deaths per 100,000 live births). PPH is accounts for approximately one-quarter of all maternal pregnancy-related deaths. Many studies have recommended that several deaths associated with PPH could be prevented with prompt recognition and more timely and forceful treatment. Morbidity from PPH can be severe, with sequelae including organ failure, shock, edema, compartment syndrome, transfusion complications, thrombosis, acute respiratory
distress syndrome, sepsis, anemia, intensive care, and prolonged hospitalization. The most common etiology of PPH is uterine atony (impaired uterine contraction after birth), which occurs in about 80 percent of cases. Atony may be related to over distention of the uterus, infection, placental abnormalities, or bladder distention. Although the majority of women who develop PPH have no identifiable risk factors, clinical factors associated with uterine atony, such as multiple gestation, polyhydramnios, high parity, and prolonged labor, may lead to a higher index of suspicion. Other causes of PPH include retained placenta or clots, lacerations, uterine rupture or inversion, and inherited or acquired coagulation abnormalities.

Materials and Method

Study Design: A descriptive design study was found to be effective for the present study.

Sample: Sample were consist of 60 midwives working in delivery room in Karbala and Hilla hospitals. The sampling technique use in this study was non probability purposive method of sampling.

Setting: In this study the target population was consisted of all midwives working in delivery room in Maternity Teaching Hospital of a Holy Karbala and Hilla city. This Study is carried out in Holy karbala and Hilla city from December, 3th, 2017 to July, 26th, 2018.

Instrument: The questionnaire was consisted of (30) items of multiple choice questions under 6 categories such as meaning and definition, causes of postpartum hemorrhage, uterotonic drug use in management of postpartum hemorrhage, risk factor that can increase incidence of PPH, signs and symptom of PPH and items related management prevention of PPH. Each question has 4 answer (1 correct answer and 3 false answer), the score “1” was given for correct answer while the score “0” was given for wrong. The result of scores were ranked as follows:

- Maximum midwife’s score gained =22
- Minimum midwife’s score gained = 6
- The range was 22-6=16
- Interval= rang/No of class=16/3=5.3~ 5
  1. In adequate knowledge 6-10.
  3. Adequate knowledge 16-22.

Validity: The content validity of the tool was established in consultation with guide of experts from the field of obstetrics and gynecology department of nursing & medicine and other field specialties. Suggestion of the experts were considered for modification and changes which were made accordingly.

Data Collection: The data collection was carried out during the period from February 4th to May 28th, 2018.

Data Analysis: The collected data was analysis by using descriptive statistics (mean, mean percentage, standard deviation) and T-test to find out the association between the demographic variables and the scores of knowledge.

Results and Discussion

Table (1) demonstrates the frequency and percentage analysis of demographic variables of the study sample and shows that the highest percentage (40%) of study sample were at age group 21-29 years. The preponderance (65%) of them were graduated from secondary school of midwifery. The higher percentage (61.7%) of study sample have (1-5) years of total years of experiences in the delivery rooms. While (35%) of study sample have (6-10) years of service employment. Table (2) demonstrates the frequency and percentage of the subject correct answers regarding management and prevention of postpartum hemorrhage in present study. The total correct answer of knowledge question was (51.8%). The highest was recorded to item 3 (Meaning of primary postpartum hemorrhage) (f=58, 96.7%) and the lowest was found in item 24 (Increase hydration in cases of temperature is 38.8 c and more to a mother delivered 4 hours ago.) (f= 3, 5.0%). Table (3) revealed that 30(50%) of midwives had adequate knowledge, 27(45%) had a moderate knowledge and only 3(5%) midwives had inadequate knowledge. It is observed that the mean ± SD during the present study is found to be 15.60 ± 3.35. The calculated ‘F’ value was 66.98 which was significant at the level of p<0.001. Analysis of the midwives demographic characteristics in the present study, verified that higher percentage constituted less than half of midwives, while the lowest their age (21-29) years old percentage (13.3%) in the age group ≥48 years. This finding agreed with the study done in Nigeria by Onasoga, et al., 2012 who found that the higher percentage represented (40%) of the study sample between (22-30) years old, while the lowest percentage was (6.25%) in the age group between (49-57) years. The most of these midwives (65%) were graduated.
from secondary school of midwifery. While (11.7%) were graduated from secondary school of nursing and the (16.7%) graduated from institute of nursing. This finding supported by an Iraq study conducted by Ghailan, 2005 and showed that the higher percentage represented (33.3) midwives graduated from secondary midwifery school and the lowest percentage (16.0) graduated from technical medical institute\(^8\). The Iraqi ministry of health employed midwives from different programs (from school of midwifery to the institutes) and even nurse who were finished nursing programs. Same table illustrated that less than half of participant have total years of employment between (6-10) years. While the lowest (11-15) years, this finding disagree with a study done in Nigeria by Chigozie A, 2017 who mentioned that the higher percentage (55%) of midwives their total years of employment from (8-14) years and the lowest percentage (4.5%) (29-35) years\(^9\). The highest percentage of midwives were having experience in delivery room (1-5) years and only (13.3%) ≥ 11 years. This finding is supported by Opiah et al., 2013 who conducted a study in Nigeria and found that 59% of midwives have 1-5 years of experiences in delivery room \(^10\). Table (2) demonstrated the knowledge level of midwives toward the management and prevention of postpartum hemorrhage, result shows that majority of the respondents (73.3%) were incorrectly answer the questions regarding definition and classifications of PPH. This result agree with the study done in Al – Ribat by Balla, 2015 which showed that the participant had poor knowledge toward definition of PPH, but they had good knowledge about classification \(^11\). The same table showed that (75%) of participants had agree that uterine atony is the most causes of PPH. This result was incompatible with the study done by Balla, 2015 which showed that (98.7%) of study sample was answered the returned tissue is the most causes of PPH \(^11\). Same table revealed that most of the participant use oxytocine as auterotonic drug to management PPH cases. This result agree with the study done in Nigeria by Onasoga, et al., 2012 they found that use of uterotonics with oxytocin being the most commonly used \(^7\). The current study was showed that more than half of midwives had poor knowledge regarding risk factors that upturn the occurrence of postpartum hemorrhage. Midwives require a deep understanding of all intrapartum risk factors regarding PPH and constantly need to reassess the woman throughout labor including; prolong labor, prolong third stage, retained placenta, febrile illness, instrumental delivery and cesarean section. According to Jhpiego (2001), it is difficult to predict who will have PPH based on risk factors because two-thirds of women who have PPH have no previous risk factors. Therefore, all women are considered at risk of hemorrhage \(^7\). The finding of present study revealed that more than half of study sample (71.7%) was answered correctly that the boggy uterus is the signs of uterine atony and half of midwives answered that the rapid pulse is the sign of shock. When excessive bleeding is suspected and the fundus is boggy midwife should do uterine massage, check the bladder to ensure its emptiness, catheterizing the women if required, weigh blood soaked pads to fix the amount of blood lost. If massage is not effective physician should be notify. The general evaluation of participants knowledge in the current study presented the total percentage and it was found fair in general (51.8%). A comparable findings were reported in Nigeria in 2012 by Onasoga, et al., 2012 showing that majority of the study population had high level knowledge of strategies used in prevention and control of PPH \(^7\). Table (3) revealed that fifty percentage of subjects had adequate knowledge, and only few of them had inadequate. It is observed that the mean ± SD during the present study is found to be 15.60 ± 3.35. The calculated ‘F’ value indicated that there was a significant association at the level of p<0.001. This finding agrees with a study conducted in Nigeria by Chigozie A, 2017on a sample of 60 observed midwives working in PHCs, his study mentioned that participants had possessed high to moderate level of knowledge regarding life skill savings (52.54%) (37.29%) respectively\(^9\).
### Table 2: Distribution of midwives’ knowledge regarding management and prevention of postpartum hemorrhage. N = 60

<table>
<thead>
<tr>
<th>No.</th>
<th>Items related to management and prevention</th>
<th>Correct Answer</th>
<th>Incorrect Answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Definition of postpartum hemorrhage</td>
<td>16 26.7</td>
<td>44 73.3</td>
</tr>
<tr>
<td>2.</td>
<td>Classification of postpartum hemorrhage</td>
<td>16 26.7</td>
<td>44 73.3</td>
</tr>
<tr>
<td>3.</td>
<td>Meaning of primary postpartum hemorrhage</td>
<td>58 96.7</td>
<td>2</td>
</tr>
<tr>
<td>4.</td>
<td>Meaning of secondary postpartum hemorrhage</td>
<td>45 75.0</td>
<td>15 25</td>
</tr>
<tr>
<td>5.</td>
<td>The assessment of postpartum hemorrhage patient include assessment of blood loss directly by kidney dish, pads count and weight and observe vital signs.</td>
<td>41 68.3</td>
<td>19 31.7</td>
</tr>
<tr>
<td>6.</td>
<td>Causes of postpartum hemorrhage that include all of answer, except one.</td>
<td>38 63.3</td>
<td>22 31.7</td>
</tr>
<tr>
<td>7.</td>
<td>The most Uterine common causes of postpartum hemorrhage</td>
<td>45 75.0</td>
<td>15 25.0</td>
</tr>
<tr>
<td>8.</td>
<td>Pre-eclampsia is not a causes of atonic postpartum hemorrhage.</td>
<td>25 41.7</td>
<td>35 58.3</td>
</tr>
<tr>
<td>9.</td>
<td>Atony is the most common causes of postpartum hemorrhage in multiple pregnancy</td>
<td>39 65.0</td>
<td>21 35.0</td>
</tr>
<tr>
<td>10.</td>
<td>Cervical and perineal lacerations are the most causes of continued bleeding occurs during the third stage with contracted uterus</td>
<td>29 48.3</td>
<td>31 51.7</td>
</tr>
<tr>
<td>11.</td>
<td>Choosing one item drug used as a uterotonic drugs</td>
<td>49 81.7</td>
<td>11 18.3</td>
</tr>
<tr>
<td>12.</td>
<td>Selecting drug most commonly used to reduce the blood loss</td>
<td>52 86.7</td>
<td>8 13.3</td>
</tr>
<tr>
<td>13.</td>
<td>Chosen one correct answer when misoprostol can’t be effective</td>
<td>18 30.0</td>
<td>42 70.0</td>
</tr>
<tr>
<td>14.</td>
<td>Uterine inversion is an influence factors of weak uterine contraction</td>
<td>17 28.3</td>
<td>43 71.7</td>
</tr>
<tr>
<td>15.</td>
<td>Fibroids is a risk factor of PPH.</td>
<td>19 31.7</td>
<td>41 68.3</td>
</tr>
<tr>
<td>16.</td>
<td>Hypertension is not a risk factor for PPH</td>
<td>21 35.0</td>
<td>39 65.0</td>
</tr>
<tr>
<td>17.</td>
<td>Choose one of the reasons which is not influencing factors of tears of uterus.</td>
<td>24 40.0</td>
<td>36 60.0</td>
</tr>
<tr>
<td>18.</td>
<td>Uterine atony is a sign of boggy uterus.</td>
<td>43 71.7</td>
<td>17 28.3</td>
</tr>
<tr>
<td>19.</td>
<td>Answering one correct answer related to the sign and symptom of uterine rupture</td>
<td>10 16.7</td>
<td>50 83.3</td>
</tr>
<tr>
<td>20.</td>
<td>Selecting one correct option which is considered a sign and symptom of shock.</td>
<td>30 50.0</td>
<td>30 50.0</td>
</tr>
<tr>
<td>21.</td>
<td>Circle one option that is not a sign and symptom of shock.</td>
<td>26 43.3</td>
<td>34 56.7</td>
</tr>
<tr>
<td>22.</td>
<td>One answer among (4) is a circumstances of most likely causing uterine atony and lead to postpartum haemorrhage</td>
<td>22 36.7</td>
<td>38 63.3</td>
</tr>
<tr>
<td>23.</td>
<td>Midwife must monitor the vital signs of the woman in postpartum period every 15 minutes during first hour.</td>
<td>18 30.0</td>
<td>42 70.0</td>
</tr>
<tr>
<td>24.</td>
<td>Increase hydration in cases of temperature is 38.8 c and more to a mother delivered 4 hours ago.</td>
<td>3 5.0</td>
<td>57 95.0</td>
</tr>
<tr>
<td>25.</td>
<td>Asking mother to urinate and empty bladder before assessing the fundus.</td>
<td>25 41.7</td>
<td>35 58.3</td>
</tr>
<tr>
<td>26.</td>
<td>An increase of pulse from 88-102bpm is an early signs of excessive bleeding.</td>
<td>26 43.3</td>
<td>34 56.7</td>
</tr>
<tr>
<td>27.</td>
<td>Massage fundus until is firm is one of the actions immediate in the postpartum period.</td>
<td>42 70.0</td>
<td>18 30.0</td>
</tr>
</tbody>
</table>
Conted…

Table 3: Knowledge levels of midwives toward Management and Prevention of Postpartum Hemorrhage at Delivery Rooms. N = 60

<table>
<thead>
<tr>
<th>Level knowledge score</th>
<th>F</th>
<th>%</th>
<th>Mean ± SD</th>
<th>F-value</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>In adequate knowledge</td>
<td>3</td>
<td>5.0</td>
<td>7.67 ± 2.08</td>
<td>66.98</td>
<td>0.000**</td>
</tr>
<tr>
<td>moderate knowledge</td>
<td>27</td>
<td>45.0</td>
<td>13.74 ± 1.43</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adequate knowledge</td>
<td>30</td>
<td>50.0</td>
<td>18.07 ± 2.16</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>60</td>
<td>100.0</td>
<td>15.60 ± 3.35</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Conclusion

The present study concludes that the majority of the midwives had adequate knowledge regarding management and prevention of postpartum hemorrhage.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Community Health Nursing Department, College Nursing, University of Babylon, Iraq and all experiments were carried out in accordance with approved guidelines.

REFERENCE

11. Balla B. Assessment of Nurse- Midwives Knowledge regarding nursing Care of PPH at Al Ribat University Hospital and Omdurman Maternity Hospital. Thesis. 2015.
Developing Women’ Information Towards their Hemophiliac Children at Hereditary Blood Disease Center in Al-Nasiriya City

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1Pediatrics Nursing, Instructor, Pediatrics Nursing Department, 2Community Health Nursing, Assistant Lecture, Community Health Nursing Branch, 3Adult Health Nursing, Instructor, Adult Health Nursing Branch, College of Nursing, Al-Muthanna University, Iraq

ABSTRACT

Objectives:

To develop Women’s information toward their hemophilic children. Discover the Association that affecting Women’s information and Demographic data. Quasi study was conduct on a sample consisting of (75) from 110 woman is having hemophilic children who were select randomly from Hereditary Bleeding Disease Center in Nasiriya city. women’s their Children who have hemophilia, carried out in Nasiriya city/Hereditary Blood Disease Center starting from first to 20 Feb. to 14 June 2018. Regard the demographic characteristics data of the hemophilic children in the study and control groups, the results that indicate that the high percentage of children are (6 - 10) years of age, and most of children irregularly attend to school (48.0 %, 63.64 %) respectively or do not attend school (32.0%, 31.83%) respectively in study and control groups. Family history of the disease in the present study found to be (48.5%) in families have one child affected and (25.6%) of families have more than one child affected, in the study group. While the family history in the control group was (60.0%) of families have 1 child affected and (22.8 %) of families have more than 1 child affected.

Keywords: Hemophilia, Women, Children, information.

Introduction

Hemophilia as a rule happens in guys (with uncommon special cases) and around 1 out of 5,500 guys are conceived with hemophilia every year (Bolton and Pasi.2013). Hemophilia B, otherwise called factor IX insufficiency or Christmas sickness, is a X-connected draining issue caused by surrenders in the vitamin K subordinate chemical factor IX of the thickening course 1. Factor IX is otherwise called the Christmas factor, consequently the relationship of hemophilia B with the term Christmas women 2. Enacted Factor IX (factor IX) is the protein in charge of the initiation of consider X to X a response alluded to as the tenase” complex. A cofactor in this response is factor VIII, insufficiencies in which result in hemophilia A 3. Numerous transformations have been distinguish prompting hemophilia (B). A total aggregation of the considerable number of transformations can be established at the hemophilia B database. Hemophilia B brings about a draining issue that is clinically vague from the more typical hemophilia A 4. Hemophilia B happens in around 1 of every 31,000 male births. The other sort of hemophilia will be Hemophilia C, which is a gentle type of hemophilia influencing both genders. In any case, it overwhelmingly happens in Jews. It is the fourth most normal coagulation issue after von Will brand’s infection and hemophilia. In the USA, it is thought to influence 1 out of 100,000 of the grown-up populace, making it 10% as regular as hemophilia. Individual with Hemophilia C has low levels of or is missing totally factor 11 (additionally called FXI or factor XI insufficiency) Hemophilia C is 10 times more uncommon than type An or B. Calculate XI insufficiency Hemophilia C is not the same as alternate
kinds of Hemophilia, since it can appear in the two guys and females. In hemophilia while all intense draining scenes are viewed as genuine and rising, five noteworthy locales of genuine seeping in hemophilia undermine life, appendage, or capacity. They are intracranial or spinal line drains, throat drains, intra-stomach drains, appendage compartment disorders (e.g. calf, thigh, upper arm lower arm,) and visual drains. These territories are portray by seeping into and an encased space, pressure of fundamental tissue, and potential death toll, appendage, or capacity. Since draining scenes likewise cause uneasiness and dread in patients and families, the nursing overseeing and mediations of correspondence, consolation, training, and support will help them through these emergencies.

Methodology

Non–probability (purposive) application was conducted on a sample consisting of (75) women having hemophilic children who were selected randomly from Hereditary Blood Disease Center in Nasiriya city. Five from this study excluded to pilot study. This study was starting from first Feb to 14 June – 2018.

Results and Discussion

Table (1) demonstrate that the study group the highest percentage women age range from (35-40) years old which present (28.50%) while the control group range from (25-30) years old which presents (28.50%). With regard to the level of education of women, the highest percentage of the study and control groups, are primary school graduate which represents (28.60%, 35.20%) respectively. About women occupation, the majority in the control and study groups were unemployed (65.70%, 71.60%) respectively. In respect to the residential areas the majority of women in the control and study groups come from rural areas (51.40%, 62.60%) respectively. Table (2) indicate there is no significant association between women information and their age at the pretest and posttest occasion in the control group. Table (3) shows that there is no significant association between women information and their educational level at the pretest and posttest occasions in the control group. However, no significant association between women information and their educational level at the pretest occasion, but there is high significant statistical association between women educational level and their information at the posttest occasions in the study group. Table (4) indicate that there is no significant association between women information and their occupation at the pre-test occasion, but there is high significant statistical association between women occupation and their information at the post-test occasions in the study group. While, there is no significant association between women information and their residential area at the pretest and posttest occasions in the control group. While, there is no significant association between women information and their residential area at the pre-test occasion, but there is high significant statistical association between residential area and their information at the posttest occasions in the study group. Table (5) indicate there is no significant association between women information and their residential area at the pretest and posttest occasions in the control group. While, there is no significant association between women information and their residential area at the pre-test occasion, but there is high significant statistical association between residential area and their information at the posttest occasions in the study group. Table (6) indicate there is no significant difference between the pretest and posttest and follow up 1 and 2 within the group as well as relative to women information in the control group. While, that there is high significant difference between the pretest and posttest and follow up one and two within the group as well as relative to women information in the study group. The results also were in agreement with that of HFA., Throughout the implementation of the education program, it has been shown that there were no significant changes experienced by the control group between the pretest and the posttest at P < 0.05 (Table 2) This means that care giver and women did not have enough information about management for their hemophilia children during this period. The present result are in agreement with that of Srivastava (2015), who indicated that most women of the world especially in-developed countries need more information and practices about how to manage their hemophilic children and how to prevent complications of hemophilia. It had been found in all age significant differences between women’ information at pretest and posttest and their age in the study group, while in the control group there was no differences between women information at pre and post-test occasions and their age (Table 2). Significant difference was notice between women’s information and pretest and posttest occasions in all educational levels in the study group, (Table 3), while in the control group there was no significant difference between women’s information and pre-and post-test occasions in all educational levels (Table 3). Significant difference was indicate concerning information in the study group at pre and post-test occasions for employed and unemployed women (Table 4). That means both employed and
unemployed women experienced significant increase in their information after the implementation of the educational program. While in the control group there was no significant difference relative to the women information at pre and post-test occasions in respect to women occupation (Table 4). The result of Boyed and others (2014) indicated that occupational status has a significant effect on women’s hemophilia type A information and their children condition this finding is in consistent with to the present study. Significant difference was noticed concerning information at pre and post-test occasions in the study group in respect to residential area, (Table 5), that means both rural and urban women in the study group improved their information after the implementation of the educational program. At the present study, it found that significant difference between women practices at pre and post-test occasions in the study group and their ages. (Table 6). That means the level of women practices were improved after implementation of the educational program in the study group while in the control group there was no significant difference between women practices at pre and posttest occasions and their ages (Table 6). This indicated that the women in the control group did not experience of any changes in their practices when they were exposed to the pre and posttest.

Table 1: Distribution of General Demographic Data Sample of the Study

<table>
<thead>
<tr>
<th>Items</th>
<th>Control Group</th>
<th></th>
<th>Study Group</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Women Age</td>
<td>No.</td>
<td>Percentage</td>
<td>No.</td>
</tr>
<tr>
<td>≥ 20</td>
<td>4</td>
<td>11.30%</td>
<td>5</td>
<td>14.20%</td>
</tr>
<tr>
<td>21-25</td>
<td>6</td>
<td>17.20%</td>
<td>1</td>
<td>2.90%</td>
</tr>
<tr>
<td>25-30</td>
<td>10</td>
<td>28.50%</td>
<td>7</td>
<td>20.0%</td>
</tr>
<tr>
<td>30-35</td>
<td>5</td>
<td>14.30%</td>
<td>7</td>
<td>20.0%</td>
</tr>
<tr>
<td>35-40</td>
<td>8</td>
<td>22.90%</td>
<td>10</td>
<td>28.50%</td>
</tr>
<tr>
<td>40&lt;45</td>
<td>2</td>
<td>5.80%</td>
<td>5</td>
<td>14.40%</td>
</tr>
<tr>
<td>Total</td>
<td>35</td>
<td>100%</td>
<td>35</td>
<td>100%</td>
</tr>
</tbody>
</table>

| Educational Level       |               |            |             |            |
| High institute/college graduate | 9 | 25.70% | 9 | 25.80% |
| Secondary school graduate | 5 | 14.30% | 7 | 20.0%  |
| Primary school graduate  | 11 | 31.60% | 10 | 28.70% |
| Able to read and write. | 6 | 17.10% | 4 | 11.30% |
| Unable to read and write.| 4 | 11.30% | 5 | 14.20% |
| Total                   | 35 | 100%   | 35 | 100%   |

| Occupational status     |               |            |             |            |
| - Unemployed            | 25            | 71.60%     | 23          | 65.70%     |
| - Employed              | 10            | 28.40%     | 12          | 34.30%     |
| Total                   | 35            | 100%       | 35          | 100%       |

| Residential area        |               |            |             |            |
| - Rural                 | 22            | 62.6%      | 18          | 51.4%      |
| - Urban                 | 13            | 37.4%      | 17          | 48.6%      |
| Total                   | 35            | 100%       | 35          | 100%       |

Table 2: The association between age and their women Information relative to the Pretest and posttest in the control group and study group

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pre-test</td>
<td>Post test</td>
<td>Pre-test</td>
<td>Post test</td>
</tr>
<tr>
<td></td>
<td>1 2 3  *T.</td>
<td>1 2 3  *T.</td>
<td>1 2 3  *T.</td>
<td>1 2 3  *T.</td>
</tr>
<tr>
<td>≤ 20</td>
<td>81 28 22 133</td>
<td>88 28 18 132</td>
<td>100 39 26 165</td>
<td>14 31 120 165</td>
</tr>
<tr>
<td>21-25</td>
<td>111 49 39 197</td>
<td>98 58 42 198</td>
<td>19 12 2 33</td>
<td>6 8 19 33</td>
</tr>
<tr>
<td>25-30</td>
<td>194 78 57 331</td>
<td>207 7471 49 330</td>
<td>70 75 85 231</td>
<td>21 30 180 231</td>
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</tbody>
</table>
Conted…

<table>
<thead>
<tr>
<th>Age Group</th>
<th>30 – 35</th>
<th>35 - 40</th>
<th>45 ≤ 50</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>77</td>
<td>133</td>
<td>31</td>
<td>627</td>
</tr>
<tr>
<td></td>
<td>63</td>
<td>120</td>
<td>20</td>
<td>340</td>
</tr>
<tr>
<td></td>
<td>25</td>
<td>30</td>
<td>15</td>
<td>188</td>
</tr>
<tr>
<td></td>
<td>164</td>
<td>266</td>
<td>64</td>
<td>635</td>
</tr>
<tr>
<td></td>
<td>70</td>
<td>130</td>
<td>49</td>
<td>635</td>
</tr>
<tr>
<td></td>
<td>110</td>
<td>22</td>
<td>360</td>
<td>363</td>
</tr>
<tr>
<td></td>
<td>20</td>
<td>23</td>
<td>5</td>
<td>157</td>
</tr>
<tr>
<td></td>
<td>165</td>
<td>264</td>
<td>93</td>
<td>115</td>
</tr>
<tr>
<td></td>
<td>107</td>
<td>252</td>
<td>37</td>
<td>641</td>
</tr>
<tr>
<td></td>
<td>47</td>
<td>47</td>
<td>37</td>
<td>257</td>
</tr>
<tr>
<td></td>
<td>76</td>
<td>31</td>
<td>37</td>
<td>1156</td>
</tr>
<tr>
<td></td>
<td>232</td>
<td>49</td>
<td>165</td>
<td>90</td>
</tr>
<tr>
<td></td>
<td>19</td>
<td>32</td>
<td>110</td>
<td>164</td>
</tr>
<tr>
<td></td>
<td>32</td>
<td>252</td>
<td>165</td>
<td>901</td>
</tr>
</tbody>
</table>

* T=Total

<table>
<thead>
<tr>
<th>Information</th>
<th>X² obs. = 18.8430 P ≥ 0.05</th>
<th>X² obs. = 18.187 P ≤ 0.05</th>
<th>X² obs. = 20.491 P ≥ 0.05</th>
<th>X² obs. = 30.491 P ≤ 0.05</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>X² Crit. = 23.209 df= 9</td>
<td>X² Crit. = 23.209 df= 9</td>
<td>X² Crit. = 23.209 df= 9</td>
<td>X² Crit. = 23.209 df= 9</td>
</tr>
</tbody>
</table>

**Table 3:** The association between women information and their educational level, relative to the pretest and posttest in the control and study group.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pre-test</td>
<td>Post test</td>
<td>Pre-test</td>
<td>Post test</td>
</tr>
<tr>
<td>College graduate</td>
<td>182</td>
<td>93</td>
<td>102</td>
<td>330</td>
</tr>
<tr>
<td>Secondary sch.*</td>
<td>83</td>
<td>48</td>
<td>5</td>
<td>162</td>
</tr>
<tr>
<td>Primary sch.*</td>
<td>197</td>
<td>91</td>
<td>97</td>
<td>330</td>
</tr>
<tr>
<td>Read and write</td>
<td>98</td>
<td>63</td>
<td>101</td>
<td>198</td>
</tr>
<tr>
<td>Not read &amp; write</td>
<td>67</td>
<td>45</td>
<td>68</td>
<td>48</td>
</tr>
<tr>
<td></td>
<td>627</td>
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<td>1155</td>
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<td>115</td>
</tr>
<tr>
<td>Total</td>
<td>157</td>
<td>115</td>
<td>115</td>
<td>115</td>
</tr>
</tbody>
</table>

* T=Total * L= Level
* E= Education
* Sch= School

<table>
<thead>
<tr>
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<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pre-test</td>
<td>Post test</td>
<td>Pre-test</td>
<td>Post test</td>
</tr>
<tr>
<td>Unemployed</td>
<td>520</td>
<td>223</td>
<td>82</td>
<td>825</td>
</tr>
<tr>
<td></td>
<td>514</td>
<td>232</td>
<td>72</td>
<td>825</td>
</tr>
<tr>
<td></td>
<td>489</td>
<td>130</td>
<td>140</td>
<td>759</td>
</tr>
<tr>
<td></td>
<td>53</td>
<td>91</td>
<td>615</td>
<td>759</td>
</tr>
<tr>
<td>Employed</td>
<td>107</td>
<td>127</td>
<td>106</td>
<td>330</td>
</tr>
<tr>
<td></td>
<td>121</td>
<td>131</td>
<td>78</td>
<td>330</td>
</tr>
<tr>
<td></td>
<td>152</td>
<td>127</td>
<td>117</td>
<td>396</td>
</tr>
<tr>
<td></td>
<td>37</td>
<td>73</td>
<td>286</td>
<td>396</td>
</tr>
<tr>
<td>Total</td>
<td>527</td>
<td>340</td>
<td>188</td>
<td>1155</td>
</tr>
</tbody>
</table>

* K= information
* T= Total

<table>
<thead>
<tr>
<th>X² obs. = 6.000 P ≥ 0.05</th>
<th>X² obs. = 5.660</th>
<th>X² obs. = 2.803 P ≥ 0.05</th>
<th>X² obs. = 10.833 P ≤ 0.05</th>
</tr>
</thead>
<tbody>
<tr>
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<td>X² Crit. = 9.210 df= 2</td>
<td>X² Crit. = 9.210 df= 2</td>
<td>X² Crit. = 9.210 df= 2</td>
</tr>
</tbody>
</table>

**Table 4:** The association between occupation and their women’s information, relative to the pretest and posttest occasions in the control and study group.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pre-test</td>
<td>Post test</td>
<td>Pre-test</td>
<td>Post test</td>
</tr>
<tr>
<td>Urban</td>
<td>402</td>
<td>194</td>
<td>128</td>
<td>726</td>
</tr>
<tr>
<td></td>
<td>417</td>
<td>211</td>
<td>98</td>
<td>726</td>
</tr>
<tr>
<td></td>
<td>214</td>
<td>169</td>
<td>174</td>
<td>561</td>
</tr>
<tr>
<td></td>
<td>42</td>
<td>77</td>
<td>440</td>
<td>561</td>
</tr>
<tr>
<td>Rural</td>
<td>225</td>
<td>146</td>
<td>60</td>
<td>429</td>
</tr>
<tr>
<td></td>
<td>218</td>
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<td>59</td>
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<td>427</td>
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<td>599</td>
</tr>
<tr>
<td></td>
<td>48</td>
<td>87</td>
<td>461</td>
<td>594</td>
</tr>
<tr>
<td>Total</td>
<td>627</td>
<td>340</td>
<td>188</td>
<td>115</td>
</tr>
</tbody>
</table>

* K= information
* T= Total

<table>
<thead>
<tr>
<th>X² obs. = 4.020</th>
<th>X² obs. = 4.0980</th>
<th>X² obs. = 5.4660 P ≥ 0.05</th>
<th>X² obs. = 10.9550 P ≤ 0.05</th>
</tr>
</thead>
<tbody>
<tr>
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<td>X² Crit. = 9.2110 df= 2</td>
<td>X² Crit. = 9.2110 df= 2</td>
<td>X² Crit. = 9.2110 df= 2</td>
</tr>
</tbody>
</table>

**Table 5:** The association between residential area and their women’s information, relative to the pretest and posttest in the control and study group.
Table 6: Analysis of Variance for difference between the pretest, posttest and follow up 1 and 2, relative to women information in control and study group

<table>
<thead>
<tr>
<th>Source of Variation</th>
<th>Control Group</th>
<th>Study Group</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Sum of Square</td>
<td>F</td>
</tr>
<tr>
<td>Between Group</td>
<td>7.644</td>
<td>0.787</td>
</tr>
<tr>
<td>Within Group</td>
<td>72.927</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>80.571</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Df = 2</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mean Square</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1.924</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>F critical = 5.432 P ≥ 0.05</td>
</tr>
<tr>
<td></td>
<td></td>
<td>F critical = 5.432 P ≤ 0.05</td>
</tr>
</tbody>
</table>

**Conclusion**

Information of women’s in posttest high significant difference between information at (P < 0.05) after application the education programs in posttest conducts with relative comparison to the pretest occasion in the study group, has been found in all age significant differences between women information at pretest and posttest occasions and their age in study group, while in the control group there was no differences between women information at pretest and posttest occasions and their age, high significant effect on women information toward hemophilia and their children condition (hemophilia) this finding is in consistent with to the present study.

**Financial Disclosure:** There is no financial disclosure.

**Conflict of Interest:** None to declare.

**Ethical Clearance:** All experimental protocols were approved under the Pediatrics Nursing, Instructor, Pediatrics Nursing Department, College of Nursing, Al-Muthanna University, Iraq and all experiments were carried out in accordance with approved guidelines.

**REFERENCES**


11. Hemophilia Foundation Australia (HFA), the student with hemophilia, June, 2014; 3-5.


Evaluation of Pruritus Self-Management among Hemodialysis Patients in Baghdad Teaching Hospitals

Widad K. Mohammod

Assist. Professor, Adults Health Department, College of Nursing, Baghdad University, Iraq

ABSTRACT

Objective(s): To evaluate self-management concerning pruritus among hemodialysis patients and to find-out the association between self-management, sociodemographic characteristic of age, gender, and education qualification. A descriptive design, using the evaluation approach, is carried out in Baghdad teaching hospitals in order to evaluate pruritus self-management from November 16th 2016 to the end of May 17th 2017. Purposive (non-probability) sample, which is consisted of 62 hemodialysis patients. A questionnaire is designed and constructed for the purpose of the study. The questionnaire is comprised of three parts: part 1: Participants’ sociodemographic characteristics composed of (5 items), part 11: participants’ clinical characteristics composed of (3 items) and part 111: description of participants’ self-management composed of (13 items). Reliability and validity of the questionnaire is determined through pilot study. Data are collected through the use of the questionnaire and the structured interview as means of data collection. The results show that the level of pruritus self-management among hemodialysis patients more than a half is fair (n = 32; 51.6%), followed by a poor self-management for more than a third of them (n = 22; 35.5%), and a good self-management for a small proportion (n 8; 12.9%).

Keywords: Evaluation, Hemodialysis patients, Self-management, pruritus

Introduction

Pruritus is an unpleasant feeling of discomfort in the skin affecting many hemodialysis (HD) patients and it is a common problem with multifactorial etiology seen in hemodialysis patients 1, 2. The intensity of uremic pruritus ranges from sporadic discomfort to complete restlessness during day and night time. Pruritus is an intrusive and distressing symptom occurs more frequently at night that leads to sleep disorders, anxiety, depression, and social dysfunction, that affecting the quality of life of patients, worsening prognoses, and increasing the cost of health care 3, 4, 5, 6. Approximately 50–90% of hemodialysis patients complain from pruritus 7. The interventions and self-management to improve uremic pruritus included using Baby oil contains liquid paraffin with high moisturizing properties accordingly, it can relieve or even treat this condition properly, moisturizer the skin at least twice a day by using effective moisturizers include Vaseline skin care products, starch, fragrance-free sensitive skin bar soap (i.e. Dove sensitive skin), avoid excessive bathing or bathing with hot water, protect the skin from the sun – apply sunscreen, avoid wearing rough clothing, such as wool, over itchy areas, use mild detergent for clothes/sheets and rinse well, keep fingernails short and clean, try not to rub or scratch the itchy areas, finally keep the house cool and humid, especially in the winter 8, 9.

Materials and Method

A descriptive design, using the evaluation approach, is carried out in Baghdad teaching hospitals in order to evaluate pruritus self-management from November 16th 2016 to the end of May 17th 2017. Agreement is obtained from each hemodialysis patient for being participant in the present study. The study is conducted in hemodialysis centers at Baghdad Teaching Hospital and Al Yarmouk Teaching Hospital, Al-Emamen Al-Khatemeian, and Al- Karama Teaching hospital in Baghdad City.
Part I: Sociodemographic information sheet

It is consisted of (5) items that include, age, gender, educational qualification, monthly income, marital status.

Part II: Clinical characteristics sheet it is consisted of 3 items


A pilot study is carried out for the determination of the study instrument’s validity and reliability:

1. Validity of the instrument: The content validity of the constructed questionnaire is determined through the use of panel of (10) experts. They are provided with copies of the questionnaire and they are asked to review it for the determination of its clarity and content adequacy. Their responses have indicated that the questionnaire is clear and adequate.

2. Reliability of the instrument: Reliability of the questionnaire is determined through the use of (test-retest) which has been (0.87) for (10) hemodialysis patients.

Data are collected through the use of the questionnaire and the structured interview as means of data collection.

A statistical analysis was performed by using SPSS package (version 19)

Results and Discussion

Participants’ age mean is 42.6 ± 12.73; more than a quarter are within the each of the age groups of (30-39) and (50-59) years-old (n = 16; 25.8%). Most are males (n = 37; 59.7%), and two-fifths are females (n = 25; 40.3%). Concerning marital status, most are married (n = 45; 72.6%), followed by those who are not married (n = 11; 17.7%), and those who are divorced/widow(ed) (n = 6; 9.7%). Regarding educational qualification, more than a quarter are Middle school graduates (n = 16; 25.8%), followed by those who are elementary school graduates (n = 15, 24.2%), those who are High school graduates (n = 13; 21.0%), those who don’t read and write (n = 8; 12.9%), those who hold Bachelor’s degree (n = 6; 9.7%), and those who hold associate degree (n = 4; 6.5%). Ultimately, more than two-fifths described their monthly income as an insufficient (n = 27; 43.5%), followed by those who described it as somewhat sufficient (n = 21; 33.9%), and those who described it as sufficient (n = 14; 22.6%). More than a half reported that the duration of initiating hemodialysis is (1-5) years (n = 51.6%), followed by those who reported that such a duration is less than a year (n = 15; 24.2%), those who reported that such a duration is (6-10) years (n = 11; 17.7%), and those who reported that it is 16 years or longer (n = 4; 6.5%). Concerning the frequency of weekly hemodialysis, the majority of them reported that they have been receiving hemodialysis twice a week (n = 47; 75.8%) followed by those who reported that have been receiving hemodialysis thrice a week (n = 9; 14.5%), and those who reported that they have been receiving hemodialysis once a week (n = 6; 9.7%). Lastly, all participants reported that they experience itching (n = 62; 100.0%). The self-management of more than a half is fair (n = 32; 51.6%), followed by a poor practice for more than a third of them (n = 22; 35.5%), and a good self-management for a small proportion (n = 8; 12.9%). Participants of the age group of (40-49) years-old have a better practice in managing itching related to hemodialysis than those who are in the age group of (30-39) years-old, those who are in the age group of (20-29) years-old, those who are in the age group of (50-59) years-old, and those who are in the age group of (60-69) years-old respectively. However, there is a statistically significant difference in self-management level among age groups (Chi-square = 1.197, DF = 4, p-value = .879). Males have better practice in self-managing itching related to hemodialysis. However, there is a statistically significant difference in practice level among age groups (Mann-Whitney U = 440.000, p-value = .754). Participants who are High school graduates have a better practice in managing itching related to hemodialysis than those who hold an associate degree and do not read and write, those who hold a Bachelor’s degree, and those who are Elementary school graduates respectively. However, there is a statistically significant difference in practice level among educational qualification groups (Chi-square = .473, df = 5, p-value = .993).
### Table 1: Participants’ Sociodemographic Characteristics (N = 62)

<table>
<thead>
<tr>
<th>List</th>
<th>Variables</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Age: Mean (SD) = 42.6 ± 12.73</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>20-29</td>
<td>11</td>
<td>17.7</td>
</tr>
<tr>
<td></td>
<td>30-39</td>
<td>16</td>
<td>25.8</td>
</tr>
<tr>
<td></td>
<td>40-49</td>
<td>12</td>
<td>19.4</td>
</tr>
<tr>
<td></td>
<td>50-59</td>
<td>16</td>
<td>25.8</td>
</tr>
<tr>
<td></td>
<td>60-69</td>
<td>5</td>
<td>8.1</td>
</tr>
<tr>
<td></td>
<td>≥ 70</td>
<td>2</td>
<td>3.2</td>
</tr>
<tr>
<td>2.</td>
<td>Gender</td>
<td></td>
<td></td>
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<tr>
<td></td>
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<td>25</td>
<td>40.3</td>
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<tr>
<td></td>
<td>Male</td>
<td>37</td>
<td>59.7</td>
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<td>Marital Status</td>
<td></td>
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<tr>
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<td>Married</td>
<td>45</td>
<td>72.6</td>
</tr>
<tr>
<td></td>
<td>Not married</td>
<td>11</td>
<td>17.7</td>
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<tr>
<td></td>
<td>Divorced/Widowed</td>
<td>6</td>
<td>9.7</td>
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<tr>
<td>4.</td>
<td>Educational Qualification</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Does not read and write</td>
<td>8</td>
<td>12.9</td>
</tr>
<tr>
<td></td>
<td>Elementary school</td>
<td>15</td>
<td>24.2</td>
</tr>
<tr>
<td></td>
<td>Middle school</td>
<td>16</td>
<td>25.8</td>
</tr>
<tr>
<td></td>
<td>High school</td>
<td>13</td>
<td>21.0</td>
</tr>
<tr>
<td></td>
<td>Associate degree (Diploma)</td>
<td>4</td>
<td>6.5</td>
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<tr>
<td></td>
<td>Bachelor’s Degree</td>
<td>6</td>
<td>9.7</td>
</tr>
<tr>
<td>5.</td>
<td>Monthly Income</td>
<td></td>
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<tr>
<td></td>
<td>Insufficient</td>
<td>27</td>
<td>43.5</td>
</tr>
<tr>
<td></td>
<td>Somewhat sufficient</td>
<td>21</td>
<td>33.9</td>
</tr>
<tr>
<td></td>
<td>Sufficient</td>
<td>14</td>
<td>22.6</td>
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</table>

### Table 2: Participants’ Clinical Characteristics (N = 62)

<table>
<thead>
<tr>
<th>List</th>
<th>Variables</th>
<th>Frequency</th>
<th>Percent</th>
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</thead>
<tbody>
<tr>
<td>1.</td>
<td>Duration of initiating hemodialysis (Year)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>&lt; 1</td>
<td>15</td>
<td>24.2</td>
</tr>
<tr>
<td></td>
<td>1-5</td>
<td>32</td>
<td>51.6</td>
</tr>
<tr>
<td></td>
<td>6-10</td>
<td>11</td>
<td>17.7</td>
</tr>
<tr>
<td></td>
<td>≥ 16</td>
<td>4</td>
<td>6.5</td>
</tr>
<tr>
<td>2.</td>
<td>Frequency of hemodialysis per week</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Once</td>
<td>6</td>
<td>9.7</td>
</tr>
<tr>
<td></td>
<td>Twice</td>
<td>47</td>
<td>75.8</td>
</tr>
<tr>
<td></td>
<td>Thrice</td>
<td>9</td>
<td>14.5</td>
</tr>
<tr>
<td>3.</td>
<td>Do you experience itching?</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>62</td>
<td>100.0</td>
</tr>
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</table>

### Table 3: Description of Participants’ Self-management Level

<table>
<thead>
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<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Poor</td>
<td>22</td>
<td>35.5</td>
</tr>
<tr>
<td></td>
<td>Fair</td>
<td>32</td>
<td>51.6</td>
</tr>
<tr>
<td></td>
<td>Good</td>
<td>8</td>
<td>12.9</td>
</tr>
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</table>

### Table 4: Differences in Self-management Level among Age Groups

<table>
<thead>
<tr>
<th>Ranks</th>
<th>Age Group</th>
<th>N</th>
<th>Mean Rank</th>
<th>Chi-Square</th>
<th>df</th>
<th>Asymp. Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Practice</td>
<td>20-29</td>
<td>11</td>
<td>31.14</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>30-39</td>
<td>16</td>
<td>32.34</td>
<td>1.197</td>
<td>4</td>
<td>.879</td>
</tr>
<tr>
<td></td>
<td>40-49</td>
<td>12</td>
<td>33.00</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>50-59</td>
<td>16</td>
<td>27.81</td>
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<tr>
<td></td>
<td>60-69</td>
<td>5</td>
<td>25.80</td>
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<td>Total</td>
<td>60</td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

### Table 5: Differences in Self-management Level between Gender Groups

<table>
<thead>
<tr>
<th>Ranks</th>
<th>Gender</th>
<th>N</th>
<th>Mean Rank</th>
<th>Sum of Ranks</th>
<th>Mann-Whitney U</th>
<th>Asymp. Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Practice</td>
<td>Female</td>
<td>25</td>
<td>30.60</td>
<td>765.00</td>
<td>440.000</td>
<td>.745</td>
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<tr>
<td></td>
<td>Male</td>
<td>37</td>
<td>32.11</td>
<td>1188.00</td>
<td></td>
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<tr>
<td>Total</td>
<td>62</td>
<td></td>
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</tr>
</tbody>
</table>

### Table 6: Differences in Self-management Level among Educational Qualification Groups

<table>
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<tr>
<th>Ranks</th>
<th>Educational Qualification</th>
<th>N</th>
<th>Mean Rank</th>
<th>Chi-Square</th>
<th>df</th>
<th>Asymp. Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self-management</td>
<td>Does not read and write</td>
<td>8</td>
<td>31.75</td>
<td></td>
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<td></td>
</tr>
<tr>
<td></td>
<td>Elementary school</td>
<td>15</td>
<td>29.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Middle school</td>
<td>16</td>
<td>32.06</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>High school</td>
<td>13</td>
<td>33.50</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Diploma</td>
<td>4</td>
<td>31.75</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Bachelor’s Degree</td>
<td>6</td>
<td>31.42</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>62</td>
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<td></td>
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</tr>
</tbody>
</table>
Conclusion

The study concluded that a good self-management for a small proportion of participants and the findings from these studies have association between participants’ gender, age, and educational qualification, and their practice concerning managing itching related to hemodialysis.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Adults Health Department, College of Nursing, Baghdad University, Iraq and all experiments were carried out in accordance with approved guidelines.

REFERENCES


Screening of Obesity, Blood Pressure and Blood Glucose among Female Students Athletes at the College of Physical Education and Sport Sciences in the University of Baghdad

Suhad Q. Saeed¹, Mohammed F. Khalifa², Mawahb H. Noaman³
¹College of Physical Education and Sport Sciences, ²College of Nursing, ³College of Physical Education and Sport Sciences, University of Baghdad, Iraq

ABSTRACT

Objective(s): To initiate screening measurements of body mass index, blood pressure and blood glucose among female students at the College of Physical Education and Sport Sciences in the University of Baghdad. A descriptive design, using the screening technique, is carried throughout the present study for the period of December 13th 2018 through December 27th 2018. A convenient sample of (162) female student are recruited for the study. A screening tool is constructed for the purpose of the study. Validity and reliability of the study instrument is obtained through pilot study in which content validity and internal consistency reliability are determined. Data are collected through the use of the study instrument and the measurement of blood glucose, blood pressure and body mass index. Data are analyzed through the application of descriptive statistical data analysis approach of frequency and percentage. The study depicts that almost one third of the subjects has developed pre obesity (32.09%) and (6.78%) of them has obesity class I and (1.23%) has obesity class II. While (3.7%) has underweight. (20.1%) of subjects has developed elevated blood pressure, (5.55%) has developed high blood pressure stage I, and (1.85%) has experienced high blood pressure stage II.

Keywords: Screening, Body Mass Index, Blood Pressure, Blood Glucose.

Introduction

A cross-sectional study, of (7705) student athletes, confirms the progressive nature of the obesity epidemic and identifies the contribution of obesity to the worsening cardio-metabolic profiles in student athletes. The study also identifies that participation in multiple sports and running sports decreases the individual’s risk for obesity and hypertension. The study emphasizes the importance of screening for obesity and elevated blood pressure during the athlete’s pre-participation in physical examination ¹. Another study, of (2700) middle school and high school student athletes, aims at assessing the prevalence of obesity and hypertension-level blood pressures in an urban, athletic adolescent population using pre-participation physical evaluation (PPE) data. The PPE includes biometric information, a history, and a physical examination. Medical volunteers measured blood pressures using a manual blood pressure cuff with an aneroid manometer. The data from each PPE were collected and analyzed for prevalence of obesity ², overweight and hypertension-level blood pressure readings. The study indicates that a large percentage of student-athletes were found to be overweight (20%) or obese (24.0%). Many of these athletes also had stage 1 or 2 level blood pressure readings (14.8%), a finding which strongly correlated with elevated body mass index (P<.00001). The study concludes that the cardiovascular health of this urban adolescent athletic population is a major concern because their rates of obesity and elevated blood pressure place them at increased risk of cardiovascular complications later in life despite their participation in school athletics ². Diabetes is not necessarily as debilitating to a sportsperson’s career as...
some people might think. With proper management, any sport is possible. For longer-distance events, blood glucose levels usually decrease because the intensity is lower than it is for sprint-type activities or high-intensity intervals. Many people with type 1 diabetes train for and compete successfully in endurance events”. For those involved in pursuits, which mandate brief and explosive bursts of energy, the issues are different. “Their intensity causes a large release of glucose-raising hormones that can cause blood glucose levels to rise from the activity 7. More now cases of Type 1 diabetes are diagnosed each year in people age 20 and younger. It is no secret that exercise and physical activity are important for all kids, especially for youth with diabetes 4. Not only do exercise and physical activity improve blood glucose control in kids with Type 1 compared to being sedentary (engaging in fewer than 30 minutes a day of activity), but they also improve blood cholesterol and blood pressure, lower body fat content, increase bone and muscle fitness, and improve well-being 5. When youth with Type 1 diabetes are athletic, it is key that parents help their children learn to plan ahead to assure they have the opportunity to be their best athletic selves. The type of athletic activity can affect blood glucose response, as can the time and duration of exercise and the order of activities. Activities that involve aerobic, sprint, or resistance training can result in widely varying blood glucose responses. Many times, your child’s insulin doses and food intake will need to be adjusted to prevent hypoglycemia or hyperglycemia (high blood glucose) before, during and/or after activity 7. Based on the early stated evidence, the study ought to detect obesity, hypertension and diabetes among female students’ athletes at the College of Physical Training and Sports Sciences in the University of Baghdad.

Materials and Method

A descriptive study using mass screening as an approach to detect obesity, hypertension and diabetes among female students’ athletes at the College of Physical Training and Sports Sciences in the University of Baghdad for the period of December 13th 2018 through January 24th 2019. Convenient sample of (162) female students athletes is collected for the purpose of the present study. Ethical consideration is performed when personal agreement is obtained from each participant in the study to guarantee confidentiality and privacy for them. Screening tool is constructed for collecting data for the study. Content validity is determined for the tool through the utilization of panel of (10) experts. Internal consistency reliability is applied for the tool through employment of split-half technique and the computation of Cronbach alpha correlation coefficient (r=0.86). Data are collected through the application of the screening tool and initiation of structured interview with each participant. Data are analyzed through the application of the descriptive statistical data analysis approach of frequency, percentage and range.

Results and Discussion

The results out of table 1 depict that almost one third of the subjects has developed pre obesity (32.09%) and (6.78%) of them has obesity class I and (1.23%) has obesity class II. While (3.7%) has underweight. Table 2 presents that (20.1%) of subjects has developed elevated blood pressure, (5.55%) has developed high blood pressure stage I, and (1.85%) has experienced high blood pressure stage II. While (72.2%) of them has normal blood pressure. Table 3 indicates that more than half of the subjects has normal blood glucose level (59.25%), (38.27%) of them has pre diabetic, and (2.46%) are diabetic. Throughout the course of data analysis, the study depicts that third of the subjects has advanced pre obesity (32.09%) and (6.78%) of them has obesity class I (Table 1). Such findings can be interpreted in a way that these female students are being at risk of weight gain. So, they should be regularly monitored for the purpose of protecting them from such risk. Those who are at normal weight should be aware of the benefit of maintaining health weight status as far as they are performing their role as athletes. With respect to their blood pressure level, the findings indicate that (20.1%) of subjects has settled elevated blood pressure, (5.55%) has established high blood pressure stage I, and (1.85%) has experienced high blood pressure stage II (Table 2). Female students, who have problems with blood pressure as being candidates for hypertension in the future, have to monitor their blood pressure and follow up healthy eating habits and modifying their lifestyle to fit with their career as athletes. A cross-sectional study, of (7705) student athletes, approves the progressive nature of the obesity epidemic and identifies the contribution of obesity to the deteriorating cardio-metabolic profiles in student athletes. The study also recognizes that participation in multiple sports and running sports declines the individual’s risk for obesity and hypertension 1. Feenie (2018) has found high rates of obesity and high blood pressure in the student athlete population. 20% of
participants were overweight, 24% were obese and 14.8% had high blood pressure readings. Georgeson and others (2017) find that the prevalence of obesity is (11%), and (19%) of participants were overweight. Many of the athletes have an elevated blood pressure (15%). There is a significant association (P<0.001) between weight and elevated blood pressure. Among athletes with elevated blood pressure, (50%) are either obese or overweight. Ramsey and colleagues (2016) recommend that athletes, during their careers, should seek nutritional counseling by which they guarantee that most of their weight gain is muscle not fat. Counseling also should be provided to athletes at the end of their competitive careers to help them effectively change their eating habits and maintain a reasonable exercise program to transition into a healthy weight for life. With regard to their glucose level, the study reveals that (38.27%) of the female students has pre diabetics, and (2.46%) are diabetic (Table 3). Such findings suggest that female students who are diabetic and those who are at the risk of developing diabetes have visit physicians on a regular base to have control on their glucose level and track medical instructions to avoid any possible consequences or complications that may result due to diabetes.

### Table 1: Body Mass Index Levels among Female Students

<table>
<thead>
<tr>
<th>List</th>
<th>Range</th>
<th>Levels</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>&gt;18.5</td>
<td>Underweight</td>
<td>6</td>
<td>3.7%</td>
</tr>
<tr>
<td>2</td>
<td>18.5-24.9</td>
<td>Normal weight</td>
<td>91</td>
<td>56.17%</td>
</tr>
<tr>
<td>3</td>
<td>25.0-29.9</td>
<td>Pre obesity</td>
<td>52</td>
<td>32.09%</td>
</tr>
<tr>
<td>4</td>
<td>30.0-34.9</td>
<td>Obesity class I</td>
<td>11</td>
<td>6.79%</td>
</tr>
<tr>
<td>5</td>
<td>35.0-39.9</td>
<td>Obesity class II</td>
<td>2</td>
<td>1.23%</td>
</tr>
<tr>
<td>6</td>
<td>Above 40</td>
<td>Obesity class III</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td></td>
<td>162</td>
<td>100%</td>
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</table>

### Table 2: Blood Pressure levels for Female Students

<table>
<thead>
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<th>Range</th>
<th>Levels</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Less than 120/80</td>
<td>Normal</td>
<td>117</td>
<td>72.2%</td>
</tr>
<tr>
<td>2</td>
<td>120-129/80</td>
<td>Elevated</td>
<td>33</td>
<td>20.1%</td>
</tr>
<tr>
<td>3</td>
<td>130-139/80-89</td>
<td>High blood pressure stage I</td>
<td>9</td>
<td>5.55%</td>
</tr>
<tr>
<td>4</td>
<td>140 higher/90 higher</td>
<td>High blood pressure stage II</td>
<td>3</td>
<td>1.85%</td>
</tr>
<tr>
<td>5</td>
<td>Higher than 180/higher than 120</td>
<td>Hypertensive crisis (emergency care)</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td></td>
<td>162</td>
<td>100%</td>
</tr>
</tbody>
</table>

### Table 3: Blood Glucose Levels for Female Students

<table>
<thead>
<tr>
<th>List</th>
<th>Range</th>
<th>Levels</th>
<th>Freq.</th>
<th>Percentage</th>
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</thead>
<tbody>
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<td>1</td>
<td>Less than 100</td>
<td>Normal</td>
<td>96</td>
<td>59.25%</td>
</tr>
<tr>
<td>2</td>
<td>100-125</td>
<td>Pre diabetic</td>
<td>62</td>
<td>38.27%</td>
</tr>
<tr>
<td>3</td>
<td>More than 126</td>
<td>Diabetic</td>
<td>4</td>
<td>2.46%</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td></td>
<td>162</td>
<td>100%</td>
</tr>
</tbody>
</table>

### Conclusion

According to the discussion and interpretation of the study findings, the study concludes that: Significant proportion of female students may progress the risks of obesity (weight gain), hypertension and diabetes. The study emphasizes the importance of screening for obesity, elevated blood pressure and blood glucose level during the athlete’s pre-participation in physical examination.
Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the College of Physical Education and Sport Sciences, University of Baghdad, Iraq and all experiments were carried out in accordance with approved guidelines.

REFERENCES

Study to Diagnose the *Entamoeba histolytica* Parasite from Patients with Diarrhea Attended to General Education Hospital in Al-Qadisiyah Province Use PCR Conventional for Detecting

Saafa Ressan Abdullah Al-Kaeebi  
*College of Nursing, Al-Qadisiyah University, Iraq*

**ABSTRACT**

The present study designed to diagnose the *Entamoeba histolytica* parasite from patients with diarrhea attended to General Education Hospital in Al-Qadisiyah province, Aged between 18 to 40 years at the period from the beginning of March to the end of December 2017. The number of samples that have been collected (210) stool samples, and the number of samples infected is (72) sample ; After samples were examined in direct wet smear method using normal saline, include the study to investigate and to emphasize the presence of virulence factors amoebapore in parasite using Conventional PCR Technique. The result showed that the infection rate was 34.28%. The age group of 24-29 years showed the highest rate of infection (33.33 %), while patients aged 35-40 years showed the lowest rate of infection (18.05 %). The infection rate in male was higher (58.3 %) than in female (41.6%). It was found that the majority of cases (63.88 %) were from Urban areas. After amplified using special designed for primers *E. histolytica* virulence factor genes that was called amoebapore for DNA. The results showed that the mentioned factors is present in all positive samples of *E. histolytica*.

**Keywords:** *Entamoeba histolytica*, diarrhea, age group, virulence factors genes, gender, and Conventional PCR Technique.

**Introduction**

Amebiasis is caused by *Entamoeba histolytica*, a protozoan that is found worldwide. The highest prevalence of amebiasis is in developing countries where barriers between human feces and food and water supplies are inadequate. There are several factors that help spread and increase the incidence of amoeba, especially in the tropics and sub-tropical areas because of the health conditions. That are usually suitable for survival of the cyste longer and thus provide a greater chance of infection, and these factors. Infection of children under the age of five is usually less than that of older children and adults. The incidence is high in crowded areas such as shelters, prisons, and hospitals. The social situation plays an important role, and the rate of infection is high among members of poor communities. The transmission of amoeba dysentery can occur through food or drink contaminated with mature cystes and is the most common and arises from the carriers of the disease. Carriers, who cast the infection stages in the faeces. Food or drink contamination can be due to the use of a contaminated water source or lack of hygienic conditions, especially restaurant workers or the use of faeces as fertilizer for vegetables. The mechanical carrier (flies and cockroaches) plays an important role in food and drink contamination. Direct contact in crowded places such as shelters, and prisons stored hosts such as monkeys, rodents, dogs and pigs play an important role in the spread of infection. The diagnosis was made through a clinical diagnosis based on the symptoms of the disease. This diagnosis is not useful because of the involvement of symptoms with other diseases, but it is useful in the infected areas or through laboratory diagnosis, which proves the presence of parasite in the faeces or in body fluid or tissue obtained from an infected member. Or culture of substances containing amypia in the middle of the plant or the use of serological or immunological methods such as ELISA.
or Use PCR Conventional for detecting. Virulence is a complex phenomenon that depends on two general properties; the invasiveness, or ability of microorganism to multiply and to cause localized tissue destruction, and toxigenicity, or the ability to produce and secrete substances that can cause distant lesions. However, the virulence of *E. histolytica* related strains likely depends mainly on the tissue-damaging potential of individual trophozoites and the number of invasive amoebae in the infected host. The major pathogenic function and the most prominent property of *Entamoeba histolytica* is its remarkable cytolytic capacity. A number of *E. histolytica* molecular components have been thoroughly established as contributors to its pathogenesis. During initial intestinal colonization, a protein Twenty years ago termed amoebapore(AP) which is capable of forming ion channels, or pores in lipid membranes, and depolarizing target cells, was discovered in *E. histolytica*. Trophozoites of *E. histolytica* secrete pore-forming peptides known as ‘amebapores’ that assemble within host cell membranes to trigger cell death. Amoebapores insert into the membranes of bacteria or eukaryotic cells and form pores that result in lysis of the target cells. The addition of purified Amoebapores to eukaryotic cells results in cell necrosis and possibly apoptosis.

### Materials and Method

**Samples Collections:** 210 Fecal samples were collected for patients with diarrhea from Microbiology laboratory of General Education in Al-Qadisiyah Hospital for six months and were collected in plastic containers with information on the patient’s sex, age and living area. then transported to laboratory and stored in freeze.

**Microscopic Examination:** Using microscopic examination (direct method, Wet mount,) were tested at the laboratories. and examine under the microscope on the two powers 25X,40X.

Positive Samples were quickly frozen for DNA detection by Real time PCR.

**Genomic DNA Extraction:** Genomic DNA was extracted from stool samples by using “Stool DNA grabbing Kit, Bioneer. Korea”, The grabbing was done according to company instructions by using stool lysis method with Proteinase K. After that, the Grabber gDNA was checked by Nanodrop spectrophotometer, and then stored at -20C at freeze until used in PCR amplification.

**Polymerase Chain Reaction (PCR):** PCR was performed for detection virulence factors genes in *Entamoeba histolytica* using specific primer which was designed in this study for amoebapore C by using Genbank NCBI database and primer3plus. These were provided by (Bioneer company, Korea), as the:

**Primer Sequence amplicon Genbank**

F TCCAGTTCTTTGTCTGGTTTG
amoebapore C 229bp AY956434.2
R ACATGCATGAATCAACCA

After that, PCR master mix was prepared by using, (AccuPower® PCR PreMix kit, Bioneer. Korea). The PCR premix tube contains freeze-dried pellet of (Taq DNA polymerase 1U, dNTPs 250µM, Tris-HCl (pH 9.0) 10mM, KCl 30mM, MgCl2 1.5mM, stabilizer, and tracking dye) and the PCR reaction prepared according to kit instructions in 20ul total volume by added 5uL of purified genomic DNA and 1.5ul of 10pmole of forward primer and 1.5ul of 10pmole of reverse primer, then complete the PCR premix tube by deionizer PCR water into 20ul and briefly mixed by Exispin vortex centrifuge (Bioneer. Korea). The reaction was performed in a thermocycler (Mygene Bioneer. Korea) by set up the following thermocycler conditions; initial denaturation temperature of 95 °C for 5 min; followed by 30 cycles at denaturation 95 °C for 30 s, annealing 60 °C for 30sec, and extension 72 °C for 1 min and then final extension at 72 °C for 5 min. PCR products( 420bp) were examined by electrophoresis in a 1% agarose gel, stained with ethidium bromide, and visualized under U.V transilluminator.

### Results and Discussion

**Prevalence of *E. Histolytica* According to Microscopical Examination:** A total of 210 samples were collected and examined during the period mentioned above by persons of different age groups (4 age groups). Prevalence of *E. Histolytica* in Human according to direct wet smear, 72 out of 210 stool samples were positive distributed, over the study is shown in the figure (1).
Prevalence of *E. Histolytica* According to the age groups: The results of the present study showed the high percentage (33.33%), which was recorded in age group (18-23 years), while the lowest percentage infect (18.05%) in the age group (35-40 years) with significant difference at p<0.05. Table (1)

Table 1: The prevalence of *E. Histolytica* parasite according to four age groups

<table>
<thead>
<tr>
<th>Age groups</th>
<th>The number of infected Patients</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>18-23</td>
<td>19</td>
<td>26.38 ab</td>
</tr>
<tr>
<td>24-29</td>
<td>24</td>
<td>33.33 a</td>
</tr>
<tr>
<td>30-34</td>
<td>16</td>
<td>22.22 bc</td>
</tr>
<tr>
<td>35-40</td>
<td>13</td>
<td>18.05 c</td>
</tr>
</tbody>
</table>

Prevalence of *E.histolytica* According to the sex: The results showed that 42 (58.3%) out of 72 and 30 (41.6%) out of 72 of male and female were positive respectively with significant differences at p < 0.05. Table (2).

Table 2: The prevalence of *E. histolytica* parasite according to sex

<table>
<thead>
<tr>
<th>Sex</th>
<th>The number of Patients</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>male</td>
<td>a</td>
<td>42</td>
</tr>
<tr>
<td>female</td>
<td>a</td>
<td>30</td>
</tr>
</tbody>
</table>

Prevalence of *E.histolytica* According to the nature of residence. 3: The results showed that the incidence of *E. histolytica* in rural areas amounted to 36.11%, which is less than the urban 63.88%. Results of statistical analysis showed that there were significant differences in the incidence between infect rates and the nature of residence at the level of probability (p< 0.05) as shown in Table (3).

Table 3: The prevalence of *E. histolytica* parasite according to residence

<table>
<thead>
<tr>
<th>Nature of residence</th>
<th>The number of Patients</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urban area</td>
<td>46</td>
<td>a 63.88</td>
</tr>
<tr>
<td>Rural areas</td>
<td>a 26</td>
<td>b 36.11</td>
</tr>
</tbody>
</table>

Molecular Study: Results of positive samples *E. histolytica* by PCR showed that all these samples 100% contain pathogenic virulence factor under study which are, amoebapore as the picture show 2 the molecular weight factor of the AP factor, at PCR product size is 229 bp. and it was examined by electrophoresis in a 1.5% agarose gel. stained with ethidium bromide, and examined under UV transilluminator. *Entamoeba histolytica* is the third leading cause of death due to parasites, after malaria and schistosomiasis. Amoebiasis presents a high index of morbidity and mortality, mainly in developing countries. According to the World Health Organization (WHO), 500 million people are infected with amoebae; 10% of infected individuals have virulent *E. histolytica*, resulting in 40,000–100,000 deaths annually (9). The result showed that the infection rate was 34.28% proved the high infection, use PCR conventional in detection AP factor. The results founded the prevalence of cases in the age groups between (18-40 years) the number of infection ownership amounted to 72 of (210) cases of infection were highest (24-29 years), reaching (33.33%), which was recorded in age group (18-23 years), while the lowest percentage infect (18.05%) in the age group (35-40 years) 41%. this agreed with the study in Thi-Qar Governorate (17) The study recorded the prevalence of infection stood at 42%. The study recorded the number of infection in male of 42 infection and the prevalence is 58.3 % and females number of 30 cases and the percentage of 41.6 %. Our study agreement with the results of (18) infection rate. Males were 54.6%, while females were 45.4%. and (19) respectively. Diwaniyah governorate, where the percentage of males was 64.2%. The females were 5.99%. while 20 In Erbil where. The percentage of males was 27.35%, which is lower than the percentage of females. Which amounted to 33.37%. The study showed prevalence in rural areas is (38.8%). and in Urban area is (61%). Our results also agreed with 20 records recorded in Erbil. The rate of infection to the population of the city amounted to 34.69%, which is higher than of the population of rural areas, which accounted for
25.49%. However, the results of the current study were not consistent in study 21 in Tikrit. The city’s infection record was 7.26%, which is less than the rate of injury to the rural population, which amounted to 9.77%. Results proved the existence of the factor of 100% of samples positive for infection 22. Use PCR technique to identify the spread of E. histolytica parasites and 23 the same technical to differentiate between these two types of amoeba (E. histolytica and E. dispar) in Mexico to identify the genetic patterns of pathogenic parasites. By highly sensitive molecular methods is of great importance in preventing unnecessary drug treatment and providing us with information on the epidemiology and spread of the parasite 24.

Conclusion

After amplified using special designed for primers E. histolytica virulence factor genes that was called amoebapore for DNA. The results showed that the mentioned factors is present in all positive samples of E. histolytica.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the College of Nursing, Al-Qadisiyah University, Iraq and all experiments were carried out in accordance with approved guidelines.

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The Histological Study of Proventriculus Stomach in Iraqi Black Francolin (Francolinus francolinus) and Common Teel (Anas Crecca)

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ABSTRACT

Six adult of Black Francolin and six of adult of common Teel were prepared for the histological study of true stomach. The samples from proventriculus of two birds which stained with routine staining by hematoxylin and eosin. The wall of proventriculus in two types of birds consists of four layers or tunics: the first was tunica mucosa had longitudinal folds and lined by simple columnar epithelium. The lamina propria contained simple tubular gland, the super facial gland in Common Teel was longer than in the black Francolin. The tunica sub mucosa contained compound tubular gland, the tunica muscularis in the in both species was consist of two type of smooth muscles inner, circular and outer longitudinal the tunica musculris in Black Francolin were thicker than in the Common Teel the tunica serosa in the both species about loss connective tissue contained blood and lymph vessels.

Keywords: Stomach, Histology, Common Teel, Black Francolin

Introduction

The digestive system and stomach morphology show considerable variation among animals based on phylogenetic food type the size of the animal and variation environmental pressures. The bird’s digestive system has a larger number of organs, which have greater, inter organ cooperation, than do mammals ¹. The fowl stomach is formed of two parts: gastric (Proventriculus or true stomach which lay posterior to the esophagus and the ventricular or gizzard which is located posterior to the glandular part ². The proventriculus and gizzard constitute the first important site of enzyme activity. The main function of true stomach is production of gastric juice and propulsion of juice and food in to the gizzard which is the main site of gastric proteolysis ³. The true stomach is lined with glandular mucous tunic which secreted gastric juice like pepsin and HCL by this mechanism, the ingested food with its juices passes quickly to the gizzard in which the food particles are reduced to fine particles took by the intestine for more digestion and absorption ⁴. The purpose of this study was to study the histological features of glandular stomach of Common Teel and Black Francolin.

Materials and Method

Six adult of both sex from male and female each species Black Francolin and Common Teel during the period between the winter and spring from the 2017 year used in this study. The birds in which good health and stayed in cage for three days and feed with grain, insect and fish then humanely killed by used ethyl ether then dissected the birds for intake specimens for the histological preparation and then histological sections stained routinely with hematoxylin _eosin stain. The sections were documented by light microscope, with a common digital camera 18.0 mega pixel.

Results and Discussion

The results sections show the wall of the glandular part of stomach in two type of bird consist of four tunics;
tunica mucosa, tunica sub mucosa, tunica muscularis and tunica serosa (fig1a,1b). The tunica mucosa of proventriculus of Black Francolin and Common Teel were longitudinal folds as finger like structure. These branched were lined by simple columnar epithelium, the epithelial of mucosa were rested on lamina propria which contain simple tubular gland (fig2A,B). These glands opened in the cavity of proventriculus through ducts. The superficial gastric gland of Black Francolin has (420µm) was longer than the superficial gastric gland in the stomach Common Teel the mean which has length was (310 µm) as appeared of histological section (fig3B, fig3A). Lamina propria separated from under lining tunica by the muscularis mucosa which is smooth muscle fibers (fig2A,2B). in both species, the tunica sub mucosa appears consist of loose connective tissue containing proventriculus glands which simple tubular glands (fig3A,3B). The tunica muscularis in two bird consist of two layer inner circular and outer longitudinal (fig4A,4B). The mean thickness of tunica muscularis in Black Francolin was (195.12µm) while in the Common Teel was (130.14µm), there were no differences in both species of tunica serosa which appeared contained loose connective tissue, blood vessels and nerve plexus(fig4A,4B). The results of this study show the wall of proventriculus (true stomach) of Black Francolin and Common Teel consist of four tunics the first tunic is tunica mucosa, tunica sub mucosa, tunica muscularis and tunica serosa this result resemble with 5-7 who were recorded in fowl, with 3 who recorded in guinea fowl, pigeon, and conformable with(9) who recorded in Anas platyrhynchos. In both species the tunica mucosa of proventriculus of Black Francolin and Common Teel was folded and lined by simple columnar epithelial. The type gland in mucosa simple tubular gland located in the lamina propria this glands open in collecting duct this result parallel with 10,11 who recorded in avian, jungle fowl, and pigeon while disagreement with 12 were recorded the epithelial layer simple cuboidal epithelial in the partridge and disagreement with 13 when referred to the gland in croot bird was branched tubular gland. the muscularis mucosa consist of two type of muscle inner circular and outer longitudinal, this result agreement with 13 who appeared same result recorded in Coot bird he tunica sub mucosa was connective tissue occupied by some of sub mucosal glands which are compound ramified or tubular, these result agree with 14 in partridge. The tunica muscularis consist of inner layer circular and outer longitudinal these finding agree with 15 who observed in proventriculus of fulica armillata. The outer layer was serosa which was consist of loose connective tissue contain blood and lymph vessels these result agreed with 16,17 were recorded in chicken and partridge. we suggest that the increasing in the thickness in the tunica muscularis of the proventriculus for Black Francolin compare with Common Teel, because the differences of the food for these bird, therefor the Black Francolin need more muscle for processes of digestion as the remain of 18 who mention that the food of Francolinus is ground grain in the terrestrial environment, while 19 mention the nutrition of Common Teel are the wet seed, insect larva and fish. It is clear from the above that the food of Black Francolin needs increasing of grinding and pushing for transmission which requires thickness of tunica muscularis in the proventriculum.

Fig. 1A, 1B: Show the tunics of proventriculus in Francolinus Francolinus and Anas Crecca. Tm:tunica mucosa, Tsm :tunica submucosa, TM:tunica muscularis, Ts:tunica serosa. H&E 10X
Fig. 2A, 1B: Black arrow show the fold in tunica mucosa of proventriculus in *Francolinus Francolinus* and *Anas Crecca*. H&E 40X

Fig. (3A): Cross section in the proventriculi in *Anas Crecca* shows: 1 - superficial gland 2 - deep facial gland 3 - serosa. H&E 10X

Fig. 3B: Cross section in the proventriculi in *Francolinus Francolinus* shows: 1 - superficial gland 2 - deep facial gland 3 - serosa. H&E 10X
Fig. 4A, 4B: Show the tunica muscalris(Tm) and tunica serosa(Ts) of proventriculus in Francolinus Francolinus and Anas Crecca.HaE 10X

Conclusion

The tunica sub mucosa contained compound tubular gland, the tunica muscularis in the in both species was consist of two type of smooth muscle; inner, circular and outer longitudinal the tunica muscularis in Black Francolin were thicker than in the Common Teel the tunica serosa in the both species about loss connective tissue contained blood and lymph vessels.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Collage of Education for pure Scienceses, Wasit University, Iraq and all experiments were carried out in accordance with approved guidelines.

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The Significance of p53, Bcl-2, and HER-2/neu Protein Expression in Iraqi Females Breast Cancer Cell Line (AMJ13)

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ABSTRACT

Breast cancer is a significant cause of death affecting females globally. It is the first cause of death from cancer in females in Iraq. AMJ13 Cell line derived from Iraqi female patient was established and used for drug development as in vitro model in cancer research. There are two apoptotic pathways—the extrinsic pathway (activated by ligand engagement of cell surface death receptors) and the intrinsic (mitochondrial) pathway: The biochemical assay for the Her2neu, P53, and Bcl-2 receptors have shown the clinical value of knowing the concentration of the receptor within the tissue. The immunocytochemical assay is rapidly taking over from the biochemical assay. This approach should apply to many more biomarkers detected by immunohistochemistry.

Keywords: hormone receptor negative, quantitative image analysis, immunocytochemistry

Introduction

Breast cancer is a diverse disease with varying biological and clinical characteristics. Breast cancer has emerged as a grave danger in the last 50 years. It is a common cancer-related deaths among women in Iraq according to the latest Iraqi Cancer Registry. Cancer incidence increased in Iraq linked to environmental pollution related to conflicts. AMJ13 breast cancer cell line was established from the primary tumor of Iraqi female that suffer from infiltrating ductal carcinoma and found to be useful as in vitro cancer model. Changes or loss in cell factors could have a significant impact on tumor growth or regression. Alterations in different genes are involved in the development of this tumor and alterations in essential pathways related to proliferation and apoptosis have been used as targets for treatment. A large percentage of cell loss in tumors was due to apoptosis. Apoptosis is a well-regulated process responsible for the removal of damaged and unnecessary cells that regulated by several factors. Tumor suppressor genes such as P53 plays a critical role in preventing human cancer formation. In response to different stress signals, p53 becomes activated and induces cell cycle arrest and apoptosis. It is a sequence-specific DNA binding protein that regulates transcription. P53 functioning in response to DNA damage and various cellular stresses induced by deregulated oncogenes. There are extrinsic and intrinsic apoptotic pathways, intrinsic is characterized by mitochondrial outer membrane permeabilization (MOMP), resulting in the release of cytochrome-c into the cytoplasm. This apoptotic pathway is governed by interactions between pro-apoptotic and anti-apoptotic Bcl-2 proteins (B-cell lymphoma 2). Bcl-2 is a protein that supports cell survival through antiapoptotic activity. In breast cancer, bcl-2 expression also correlates with ER positivity. Its shown that women with bcl-2-positive tumors have better overall survival compared with those with bcl-2-negative tumors. The human epidermal growth factor receptor-2 gene (Her-2/neu) is a member of HER family and encodes a receptor. The key function of HER2 is to enhancing cell survival by suppressing apoptosis to induce uncontrolled tumor growth. These receptors are single transmembrane
proteins consisting of an intracellular tyrosine binding domain with various tyrosine phosphorylation sites and an extracellular domain for ligand binding and a cytoplasmic tail. After dimerization, Her-2 promote numerous cellular functions such as cell differentiation, survival, and growth by a different cascade. HER-2 is the most frequent amplified oncogene in breast cancer. Gene amplification and protein overexpression of the HER-2 has been reported to be linked to the sensitivity to Herceptin and anthracycline-based therapy as well as the prognosis for breast cancer. This study aimed to estimate the expression of the oncoproteins HER2/neu, BCL2 and tumor suppressor protein p53 in AMJ13 Iraqi breast cancer cell line. The expression status is important to understand this cell line as model for use in drug development and cancer research.

Materials and Method

Cell Maintenance: The AMJ13 breast cancer cell line was cultured in a RPMI-1640 medium (USBiological, USA), and supplied with 10% fetal bovine serum (FBS) (Capricorn-Scientific, Germany), 100 units/mL penicillin, and 100 μg/mL streptomycin and incubated at 37 °C. The cell line was supplied by the Cell Bank Unit, Experimental Therapy Department, Iraqi Center for Cancer and Medical Genetic Research, Mustansiriyah University.

Immunocytochemistry: P53, HER2/neu, and Bcl-2 proteins were detected in Iraqi breast cancer cell line (AMJ13) using immunocytochemistry assay. Cells were cultured in RPMI-1640 supplemented 10% fetal calf serum (Thermo Scientific, Waltham, MA, USA). The cells were cultured in mini tissue culture plastic Petri dishes and maintained at 37°C in a humidified incubator with 5% CO₂ to allow the cells for developing a monolayer of adherent cells within one day. Before fixation, PBS was used to wash the monolayer cells twice. Cells were fixed for 5 min in cold acetone. Endogenous peroxidase activity was neutralized by incubation for 10 min in a solution consisting of 3% H2O2. The cells were washed with PBS, blocked for 1 h at room temperature in PBS containing 1% fetal bovine albumin, and reacted with selected primary antibodies, mouse anti-human-BRCP and mouse anti-human-MDRP1 (Santa Cruz Biotechnology, USA). The antibodies were diluted (1:50–100) according to the manufacturer’s recommendations. Color development was performed with the chromogen diaminobenzidine (0.6 mg/ml) in a solution containing 0.02% H2O2 at pH 7.6. After counterstaining of nuclei with hematoxylin, cells were examined with a leica light microscope.

Quantitative Image Analysis: The digital images of immunocytochemistry were used for quantitative analysis protocol for the hematoxylin – DAB staining slides were taken by leica inverted microscope and camera (Leica microsystems, Germany), three different staining zones of ICC images of each slide were analysed in this study. firstly, color de-convolution technique was used to un-mix the DAB, hematoxylin stained areas leaving a complimentary image. As we got three new images. First image is the hematoxylin stain, the second one is the DAB image, and we quantify the DAB image. the number of pixels of a specific intensity value vs. their respective intensity was raised using “Fiji” version of ImageJ from http://fiji.sc. We converted the intensity numbers in the results window to Optical Density (OD) numbers with the following formula: OD = log (max intensity/ Mean intensity), where max intensity = 255 for 8-bit images.

Statistical Analysis: All data were shown as mean ± standard deviation. For ICC experiment, n = 3 images were used. One-way analysis of variance (ANOVA) multiple comparision was done to show variations among groups. The statistical analyses were performed using (GraphPad Prism version 6.07 for Windows, GraphPad Software, San Diego, CA, USA). and p < 0.05 was considered to be statistically significant.

Results and Discussion

Immunocytochemistry of Cultured Breast cancer cell: The expression proteins P53, Bcl-2 and human epidermal growth factor receptor (HER2/neu) in breast cancer cells was tested by immunocytochemistry assay. Under the light microscope, the results of immunocytochemistry showed no brown staining in control cells that was not exposed to primary antibody, it was exposed to the secondary antibody only (Figure-1a). The results showed positivity to P53, weakly positivity to Bcl-2 and Her2neu proteins, (Figures-1b, c and d).
Figure 1: The result of immunocytochemistry by used primary antibodies marker (Her-neu2, P53 and Bel-2) marker with immunocytochemistry staining kit, A: Negative Control (200x), B: Positive P53 receptor (20X), C: weakly positive of Bcl-2 receptor (20X), and D: weakly positive of Her-neu2 receptor (20x). E: Digital Image Scoring showing significant proteins expression when stained with relative mAbs against the markers that analyzed using ImageJ program.

Digital Image Scoring: Images of ICC stained AMJ13 breast cancer cells were further analyzed by using ImageJ program. Figure-1e shows demonstrative zones and pixel intensity analysis of ICC images. The analysis showed that the three proteins were significantly expressed when compared to control not stained cells using ANOVA one-way multiple comparison test. The results reported the P53 protein is weakly expressed by AMJ13 cell line, yet it is significant when compare to control unstained AMJ13 cells using quantitative image analysis method. P53 is a tumour suppressor protein that acts as a major defense against cancer but has been found to be mutated in 50% of all human cancers. All grade I invasive breast carcinoma (IBC) were negative for p53, 50% of grade II and 91% of grade III IBC were positive for p53. P53 expression increased significantly with increased tumor grade of IBC. Many therapeutic agents act by damaging DNA, which may in certain contexts function as a signal to trigger apoptosis. P53 is a nuclear phosphoprotein capable of binding to specific DNA sequences and activating specific target genes. Normal p53 exerts its antiproliferative action by inducing reversible or irreversible cell cycle arrest, or apoptosis. Cells with non-functional or mutated p53 no longer have the G1 checkpoint and accumulate in the G2/M phase, a target of mitotic arrest by the taxanes. The current investigation confirmed that Her-2/neu protein is expressed to certain level and these results in agreement with the establishment report that showed this protein as low expressed. Her-2/neu (also known as ErbB2/c-erbB2/HER-2) proto-oncogene is the most frequently amplified oncogene in breast cancer. ERBB tyrosine receptor kinases activate several pathways, including PI3K-AKT and RAS-MAPK pathways, which regulate many cell functions including proliferation, migration, survival, and cell growth among others. Hyperactivation or overexpression of these receptors can lead to uncontrolled cell growth and proliferation leading to cancer development. Amplification/overexpression of HER-2 is observed in 25–30% of human BCs, and has been associated with poor outcome, in both node-negative and node-positive early BC. HER-2/neu overexpression predicts altered chemosensitivity to different forms of cytotoxic drugs. The cytological immunostaining for BCL-2 was insignificantly a lower expression that P53 expression. BCL-2 has an important role in inhibiting apoptosis thus it is expected that there is a close relationship between the over expression of BCL-2 and tumorgenesis of different tissues. Tumor resistance to apoptosis is frequently acquired through deregulated expression of BCL-2 family members or mutations in the p53 tumor suppressor pathway that ablate the ability of this transcription factor to induce BH3-only proteins (such as PUMA and NOXA), which are critical for the initiation of apoptosis. Taxanes have been reported to induce post-translational serine phosphorylation of the Bcl-2 protein. The Bcl-2 and P53 proteins expression has been found to have correlation with each other and the proliferation activity in invasive ductal carcinoma of the breast. The ICC images were analyzed to further confirm the accuracy, precision, and reproducibility of the results for breast cancer cells. Quantitative image analysis provided valued evidence to create a approach to investigate HER2 in ICC for breast cancer as described by college of American pathologists.
In conclusion, we shown that P53, BCL2 and HER2 proteins expresses significantly in AMJ13 breast cancer cell line. The expression insignificantly differs among the tested proteins of AMJ13 breast cancer cells. Further sequencing study is required to confirm the functionality of P53 gene in this cell line.

**Conclusion**

There are two apoptotic pathways—the extrinsic pathway (activated by ligand engagement of cell surface death receptors) and the intrinsic (mitochondrial) pathway: The biochemical assay for the Her2neu, P53, and Bcl-2 receptors have shown the clinical value of knowing the concentration of the receptor within the tissue. The immunocytochemical assay is rapidly taking over from the biochemical assay. This approach should apply to many more biomarkers detected by immunohistochemistry.

**Financial Disclosure:** There is no financial disclosure.

**Conflict of Interest:** None to declare.

**Ethical Clearance:** All experimental protocols were approved under the Baghdad University, college of science, Department of Biotechnology, Iraq and all experiments were carried out in accordance with approved guidelines.

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Use *Siphoviridae* Bacteriophage as a Treatment for Mice Infected with MDR *Pseudomonas aeruginosa* and Histopathology Study

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ABSTRACT

The study was carried out to isolate, purify and quantification of bacteriophages against Multiple Drugs Resistance (MDR) *P. aeruginosa*, and using a bacteriophage as a treatment for mice experimentally. Four groups (Intraperitoneal injection group, local swab group, Positive group, and Negative group) of animals were tested for purpose of using lytic phages of *Siphoviridae* family as a treatment for MDRs *P. aeruginosa* isolated from patients suffering from moderate to severe burns wound infection. The current study presents evidence in murine models that animals can be successfully treated with specific bacteriophages that target these MDRs microbes.

*Keywords:* *Siphoviridae*, *Pseudomonas aeruginosa*, bacteriophages, Histopathology study

Introduction

Burn wound infection is an extensive health problem in many countries of the world. *P. aeruginosa* is an opportunistic pathogen that can cause serious diseases in patients. Its strains can cause nosocomial infections such as pneumonia, bacteremia, urinary tract infection, as well as skin infections. In addition, they are involved in chronic and acute infections, especially in immunocompromised patients. It is found as a dominant colonizer of the burns wound.

Materials and Method

Determination of Bacterial Density and Colony Forming Units: MDR *P. aeruginosa* was grown in BHI broth and incubated at 37°C for 24 h. Serial dilution and The colony forming unit (CFU) was performed and the cell density was determined at OD600 has corresponded to approximately $3 \times 10^4$ and $3 \times 10^8$ cells/ml, then the visible colonies were counted and the CFU/ml was calculated. The dilutions were spun down at 8000 rpm for 10 min, 4°C. The pellet was washed and suspended in 10 ml normal saline (pH 7.4).

Mouse Model and Animal Experiment: The animal experiment was performed according to with some modification. The lytic phage of *Siphoviridae* family was used in the current experiment. A 7 week’s old BALB/c male mice (n=21, in four groups) with weighing 20 to 25 gm and placed in the cages (30×25×20 cm) and left for 48 h. to adapt at controlled room temperature, distributed in cages where each group consisting of three animals. After 24 h., the animals were anesthetized with chloroform and burned using a spatula about 90°C by placing it on the skin for 10 sec. to make superficial burns with stage II wound. In acute infections, the first group of animals is an intraperitoneal (I.P) injection group, and the second group is local swab group which consist of two subgroups, one of which was challenged by local infection of MDR *P. aeruginosa* with ($\sim 3 \times 10^4$ CFU/ml) while the other was challenged with ($\sim 3 \times 10^8$ CFU/ml). Following the bacterial challenge, each animal in subgroups was treated with injections, about 1 mL of phage ($26 \times 10^5$PFU/ml), administered for intraperitoneal (in an (i.p) injection group) and local swap (in local swap group) at 30 min and 24h. Then given a daily oral...
dose of phage. The third group was kept as a positive control without phage therapy, but infected with MDR *P. aeruginosa*. The fourth group served as the negative control, which only administered intraperitoneal of phage without bacterial infection. Infected mice and controls were observed under the sterile condition for one week, also the wounds were follow up and recorded by photography. The number of deaths was counted every 24h. In chronic infections, one week after infections with the bacteria, the chronically infected mice (positive control group) was treated with two doses of phage administered (i.p) injection. The second dose was administered 24 hours after the first infection and then given daily oral doses of phage.

**Histopathological Study:** The tissues were prepared depending on the method of Luna (1968)\(^1\).

### Results and Discussion

#### The Therapeutic Effectiveness of **Siphoviridae** Phage:

In acute infections, the results were very encouraging as it was found in response to treatment in the intraperitoneal (I.P) injection group in different doses than the treatment with local swap group in which one animal died (in the dose \( \sim 3 \times 10^4 \) CFU/ml) on the first day after the injection and was also suffering from sleep and red eyes in each animal in subgroups. Furthermore, in the positive group, there was death one animal after the first day of challenge with bacteria and the death of the rest on the fifth day. Also, all animals in the negative group were intact and active. In chronic infections, the animals were challenged by local infection of MDR *P. aeruginosa*, and before the death of these animals, they treated with doses of lytic phage via I.P injection and daily oral dose after three days after the injection. The results showed that all animals were cured after a week of treatment with no side effects were recorded. The culture of animal blood showed no bacterial growth, while it showed successful infection with *P. aeruginosa* in positive groups.

#### Histological changes

**A. Acute infection**

**1. Negative Group**

**Liver Sections:** The results revealed to histological changes with liver sections from the negative group, normal hepatocytes polygonal shape, arranged as hepatic plates around the central vein, most hepatocytes with two nuclei, kupffer cells showed within the sinusoids (Figure, 1).

![Figure 1: Section in mice liver from the Negative Group, Showed normal polygonal hepatocytes ( ), kupffer cells showed within the sinusoids ( ), hepatocytes with two nuclei ( ), part from portal duct visible ( ) (H&E stain 40X)](image)

**2. Positive group**

**Liver Sections:** Histological examination on liver sections of mice infected with bacterial dose of \( \sim 3 \times 10^4 \) CFU/ml and untreated with phage showed vacuolated hepatocytes, congested portal duct, and appearance of rod-like bacteria (Figure 2).

![Figure 2: Liver section of mice infected with bacterial dose of \( \sim 3 \times 10^4 \) CFU/ml, Showed vacuolated hepatocytes ( ), Congested Portal vein ( ), and Rod Bacteria ( ) (Gram stain 40 X)](image)

**Lung sections:** Lung sections from mice infected with bacterial dose of \( \sim 3 \times 10^4 \) CFU/ml and untreated with phage showed severe changes included heavy infiltration of inflammatory cells, mostly neutrophils and macrophages, thick alveolar septa with the collection of red blood cells, bronchus epithelium hyperplasia and degeneration of lining epithelial layer and collapse of most alveolar sacs, there was hyperplasia of bronchioles walls and thickening alveolar sacs wall, deposition of collagenous
fibers and increased with pneumocytes (type II) was observed (Figure, 3).

Figure 3: Cross Sections in mice lung infected with bacterial dose of ~3×10^4 CFU/ml, showed thickening of alveolar septa ( ), degeneration of lining epithelial layer ( ), collapsed alveoli and diffuse cellular infiltration ( ) (H&E stain 10X)

3. Intraperitoneally injection group

Liver sections: The results of microscopic examination of liver sections from mice infected with bacterial dose of ~3 × 10^4 CFU/ml and treated intraperitoneally with 1 mL of *Siphoviridae* phage, was observed hepatocytes more regular arranged around the central vein, normal sinusoids, normal polygonal hepatocytes, some with two nuclei, arranged hepatic plates with normal kupffer cells (Figure, 4).

Figure 4: Liver section of mice infected with bacterial dose ~3×10^4 CFU/ml, Showed Normal Hepatocytes ( ), Some with two nuclei ( ), Clear Sinusoids ( ), and normal Kupffer Cells ( ) (H&E stain 40X)

4. Locally group

Liver Sections: The results of liver section from mice infected with bacterial dose of ~3×10^4 CFU/ml and treated locally with 1 mL of *Siphoviridae* phage showed hepatocytes with oval, vesicular nuclei, the hepatic plates separated by sinusoids, some kupffer cells, hypertrophied and other crescent shapes. Also, inflammatory cells around the central vein, some hepatocytes appeared hypertrophy with large oval nuclei. normal hepatocytes, some inflammatory cells, kupffer cells aggregated to form granuloma (Figure, 5).

Figure 5: Liver section of mice infected with bacterial dose ~3×10^4 CFU/ml, showed normal hepatocytes ( ), kupffer cells aggregated to form granuloma ( ), and focal degeneration ( ) (H&E stain 40X)

B. Chronic infection

Liver Sections: The observations on liver sections of chronic group that infected with a dose of ~3×10^8 CFU/ml and treated intraperitoneally with 1 mL of *Siphoviridae* phage after fifth day of infection showed the hepatocytes arranged regularly around the central vein and regular hepatic plates, the hepatocytes with normal nuclei and some of the mitotic figures appeared in this section, although mild region with hemorrhage and aggregation of inflammatory cells (Figure 6).

Figure 6: Liver section of mice infected with bacterial dose ~3×10^8 CFU/ml, showed degenerated hepatocytes ( ), others hypertrophy ( ), vacuolated and accumulation of kuffer cells ( ) (H&E stain 40X)
Discussion

The therapeutic effectiveness of Siphoviridae phage: *P. aeruginosa* can enter the bloodstream, sepsis and bacteremia could be occurred leading to increasing death rates among burn patients. Despite the significant development of antibiotics against microbial infection, the existence of therapeutic alternatives remains a major challenge for many countries. Many experiments have been conducted on humans and animals to assess the efficiency and effectiveness of the phage, especially against *P. aeruginosa* where recorded that the survival rate of mice infected with bacteria alive after giving the phage ranged from 80-100% 7. The current study presents evidence can be successfully treated with specific bacteriophages that target these MDRs microbe and the culture of animal blood proved that there were no bacteria in it, while blood culture of the positive groups showed that it is infected with bacteremia. Also, the present results showed that giving the dose phage via I.P injection and orally were more effective than the local dose after the bacterial challenge. The intraperitoneal injection and oral administration of phage is the best method to understand the effects of phage in vivo. This method makes murine safe from bacteria and death and few numbers of *P. aeruginosa* in their blood, liver, and spleen after blood culture. Another study shows the phage in the bloodstream in the first hour and even after 3-4 h. after the injection, but the number of phages was low at 24 h. and completely absents within 36 h. in the body of mice 8. Likewise, the effectiveness of phage in chronic infection appeared in 6 days 9.

Histopathological Study: The histopathology study supported the animal experiment which showed that the mice treated with bacteriophage. The percentage of large tissue collapse after infected with a bacterial infection is mainly due to the contribution of virulence factors. Some of the studies have indicated that the exoenzyme S produced by MDR *P. aeruginosa* plays a clear role in pulmonary infection. Tillotson and Lerner (1968) observed when they studied histopathological changes of ten cases of *P. aeruginosa* pneumonia where spread abscesses and alveolar cell-wall necrosis but not seen arterial wall necrosis, perivascular infiltration, and thrombosis. In a study conducted by Forristal *et al.*(1991) using a burned mouse model, proved that the Exotoxin A-Binding Protein(PE) produced by *P. aeruginosa* plays important role in in inhibition of protein synthesis, hepatotoxicity and depletes elongation factor2 in mouse. Because the liver is a prominent target of toxins in animals, Snell *et al.*(1978) 16 noted the production of toxin in the burning mice and infected with bacteria are lead to rapid depletion of liver elongation factor 2 in the liver and other tissues.

Conclusion

The results showed that all animals were cured after a week of treatment with no side effects were recorded, indicating the safety of phage as a treatment, indicates its ability to kill the bacteria directly.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Department of Pathological Analyzes techniques, Al-Kunooze University College, Iraq and all experiments were carried out in accordance with approved guidelines.

REFERENCES


Vitamin D Insufficiency is a Risk Factor for Infertility: Case Control Study

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ABSTRACT

Aim of the study: To study the prevalence of vitamin D insufficiency in infertile women and see its impact as a risk factor through a case control study. This case control study was conducted at Al-Diwaniyah maternity and child teaching hospital in Al-Diwaniyah province, Mid-Euphrates region of Iraq. The study started on February 2018 and extended through February 2019. The study included 52 apparently healthy and fertile women serving as control group and 35 infertile women serving as study group. The age ranges of control and study groups were 21 – 39 and 20 -40 years, respectively. Venous sample was obtained from each woman and sent to the central laboratory of Al-Dewaniyah maternity and child teaching hospital to measure serum vitamin D level. Mean serum vitamin D of infertile women was lower than that of fertile women, 20.57 ± 8.69 ng/ml versus 24.85 ± 5.85 ng/ml, respectively and the difference was highly significant (P = 0.007). Moreover, the prevalence rate of vitamin D insufficiency (< 20 ng/ml) was significantly higher among infertile women in comparison with fertile women, 40 % versus 19.2 %, respectively (P = 0.035). Vitamin D appears as a risk factor for women infertility.

Keywords: vitamin D insufficiency; fertility.

Introduction

The problem of vitamin D deficiency is relatively common and universal as it happens in almost all geographic regions around the globe 1. This wide spread of such health problem is attributed mainly to inadequate nutritional supply 2-6. Vitamin D is widely known for its contribution to the health and wellbeing of musculoskeletal system 7,10; however, its role in extraskeletal abnormalities has been highlighted by a number of observational studies such as the link among vitamin D deficiency and neoplastic disorders, neurologic abnormalities, immune disorders and cardiac problems 9,11. Despite that, the outcome of randomized clinical control trials failed in the majority of reports to support the validity of replacing vitamin D in correction of such extraskeletal abnormalities 12,14 leading to the belief that vitamin D deficiency by itself is not able to cause such extraskeletal manifestation rather being a risk factor among multiple other factors working together to produce specific extraskeletal manifestations 15. The link between vitamin D and female fertility has been the aim of several recent published articles 16-20. In western countries, one of the interesting findings is that the highest pregnancy rate coincides with the seasons of highest serum vitamin D levels namely autumn and summer 16. Studying the outcome of assisted reproductive techniques revealed that women with adequate vitamin D level had better outcome in terms of biochemical pregnancy, clinical pregnancy and live birth rates 19,21. Early spontaneous pregnancy loss has been linked to undernormal serum vitamin D concentration 23,24. Polycystic ovary syndrome and endometriosis, conditions that are associated with reduced fertility rates, have been shown in some studies to be associated with vitamin D deficiency 16,18. Receptors for both vitamin D and 1-α-hydroxylase have been found in a number of tissues involved in female reproductive health such as endometrium, placenta, ovaries and pituitary gland in...
addition to the finding in experimental studies of vitamin D metabolites in the above mentioned tissues making an insight on the possible role of vitamin D in women fertility 26,27. On the contrary, some authors deny the existence of a significant association between fertility rate and outcome of assisted reproductive techniques and women vitamin D status (28-30). Vitamin D is included among the umbrella of fat-soluble vitamins and has a role in the intestinal absorption of calcium, zinc, magnesium, iron and phosphate. The principal molecular forms of this vitamin are cholecalciferol and ergocalciferol 31. According to some authors levels of vitamin D in the serum that define a deficiency state is below 20 ng/ml 32. In our country and in regions that from the intimate borders of our country in the Middle East, vitamin D deficiency is claimed to happen because of inadequate exposure to sun light attributed to women dressing habits in these nations 31. For that reason we planned and conducted the present case control study in order to estimate serum vitamin D concentration in infertile women and comparing the results with that of fertile women of comparable age.

Subjects and Method

This case control study was conducted at Al-Diwaniyah maternity and child teaching hospital in Al-Diwaniyah province, Mid-Euphrates region of Iraq. The study started on February 2018 and extended through February 2019. The study included 52 apparently healthy and fertile women serving as control group and 35 infertile women serving as study group. The age ranges of control and study groups were 21 – 39 and 20 -40 years, respectively. Venous sample was obtained from each woman and sent to the central laboratory of Al-Dewaniyah maternity and child teaching hospital to measure serum vitamin D level. The study was approved by the Ethical Approval Committee of the College Of Medicine/University of A-Qadisiyah. Verbal consent was obtained from each women following comprehensive explanation of the study aim and procedure. Data presentation and analysis was accomplished using statistical package for social sciences (SPSS version 23). Numeric data were expressed as mean, range and standard deviation whereas nominal data were expressed as number and percentages. Chi-square was used to study association between categorical variables while independent samples t-test was used to compare mean vitamin D levels between control and study groups. The level of significance was considered at P ≤ 0.05.

Results and Discussion

The present study included 35 infertile women with an age range of 20 – 40 years and a mean age of 27.34 ± 4.52 years and 52 fertile women with an age range of 21 – 39 years and a mean age of 27.34 ± 4.52 years. There was no significant difference in mean age between control and study groups (P = 0.249), ensuring statistical matching between the two enrolled groups, table 1. There was also insignificant difference in mean body mass index (BMI) between the two groups, 27.71 ± 3.35 kg/m² and 27.69 ± 2.91 kg/m² (P = 0.947), table 1. Distribution of women according to occupation discloses no significant difference, employment versus housewife (P = 0.757) in addition to lack of significant difference in their distribution according to residency, urban versus rural (P = 0.554), table 1. Mean serum vitamin D of infertile women was lower than that of fertile women, 20.57 ± 8.69 ng/ml versus 24.85 ± 5.85 ng/ml, respectively and the difference was highly significant (P = 0.007), as shown in figure 1. Moreover, the prevalence rate of vitamin D insufficiency (< 20 ng/ml) was significantly higher among infertile women in comparison with fertile women, 40 % versus 19.2 %, respectively (P = 0.035), table 2. Estimation of odds ratio showed that vitamin D insufficiency is associated with 2.8 fold rise in the risk of infertility in comparison to women with adequate vitamin D (95 % confidence interval of 1.07 - 7.36) and the etiologic fraction of vitamin D insufficiency in association with infertility was 0.38, as shown in table 2. Regarding infertile group, serum vitamin D showed insignificant correlation to age of women, BMI, occupation or residency, table 4. The present study showed that vitamin D deficiency is significantly associated with infertility in such a way that women with vitamin D level lower than 20 ng/ml are approximately 3 times more liable to be infertile than women with serum vitamin D of 20 or more ng/ml. Pagliardini et al. (2015) reported in a cross sectional study that about 40.1 % of included infertile women had vitamin D < 20 ng/ml and this observation is similar to our finding that 40 % of infertile women had vitamin D insufficiency. Indeed vitamin D insufficiency (< 20 ng/ml) is a frequent observation in women seeking fertility centers 34. Several other studies estimated the prevalence rate of vitamin deficiency in infertile women to be ranged from 21 up 99 % (35-39). During the last decades a number of studies supposed that vitamin D has a role in the modulation of the reproductive events in female because of the expression of vitamin D receptor and 1α-hydroxylase in reproductive organs such as placenta, uterus and ovary as well as the hypothalamus and the pituitary gland. In addition, vitamin D plays a role in
the control of sex hormone biosynthesis. Emerging data suggests that vitamin D could have a role in “polycystic ovary syndrome (PCOS)-associated manifestations”, such as insulin resistance, ovulatory dysfunction and hyperandrogenism. Vitamin D insufficiency has also been observed to take part in the pathogenesis of endometriosis because of its anti-inflammatory and immunomodulatory characteristics. Observation from assisted reproductive techniques reported that fertility parameters such as fertilization, clinical pregnancy and implantation rates are significantly higher in women with adequate vitamin D (> 20 ng/ml) in comparison with women with vitamin D insufficiency (< 20 ng/ml). However, other authors deny any role for vitamin D in women fertility. In view of the available findings and previous reports we suggest using vitamin D supplementation for infertile women to increase the chance of pregnancy in addition to other assisted reproductive measures.

Table 1: Demographic characteristics of control and study groups

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Control group n = 52</th>
<th>Study group n = 35</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean age ± SD (years)</td>
<td>28.50 ± 4.59</td>
<td>27.34 ± 4.52</td>
<td>0.249 *</td>
</tr>
<tr>
<td>Age range (years)</td>
<td>21 - 39</td>
<td>20 - 40</td>
<td>NS</td>
</tr>
<tr>
<td>Mean BMI ± SD (kg/m²)</td>
<td>27.69 ± 2.91</td>
<td>27.71 ± 3.35</td>
<td>0.947 *</td>
</tr>
<tr>
<td>BMI range (kg/m²)</td>
<td>22 - 35</td>
<td>20 - 35</td>
<td>NS</td>
</tr>
<tr>
<td>Occupation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Employed, n (%)</td>
<td>18 (34.6 %)</td>
<td>11 (31.4 %)</td>
<td>0.757 †</td>
</tr>
<tr>
<td>Housewife, n (%)</td>
<td>34 (65.4 %)</td>
<td>24 (68.6 %)</td>
<td>NS</td>
</tr>
<tr>
<td>Residency</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Urban, n (%)</td>
<td>34 (65.4 %)</td>
<td>25 (71.4 %)</td>
<td>0.554 †</td>
</tr>
<tr>
<td>Rural, n (%)</td>
<td>18 (34.6 %)</td>
<td>10 (28.6 %)</td>
<td>NS</td>
</tr>
</tbody>
</table>

Table 2: The prevalence rate of vitamin D deficiency in control and study groups

<table>
<thead>
<tr>
<th>Vitamin D status</th>
<th>Study group n = 35</th>
<th>Control group n = 52</th>
<th>P</th>
<th>Odds ratio</th>
<th>95 % CI</th>
<th>EF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insufficient (&lt; 20 ng/ml)</td>
<td>14 (40.0 %)</td>
<td>10 (19.2 %)</td>
<td>0.034 *</td>
<td>2.80</td>
<td>1.07 - 7.36</td>
<td>0.38</td>
</tr>
<tr>
<td>Adequate (≥ 20 ng/ml)</td>
<td>21 (60.0 %)</td>
<td>42 (80.0 %)</td>
<td></td>
<td>S</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 3: Correlation between vitamin D level and demographic characteristics of study group

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>r</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>-0.340</td>
<td>0.045 S</td>
</tr>
<tr>
<td>BMI</td>
<td>0.162</td>
<td>0.351 NS</td>
</tr>
<tr>
<td>Occupation</td>
<td>-0.084</td>
<td>0.631 NS</td>
</tr>
<tr>
<td>Residency</td>
<td>-0.087</td>
<td>0.621 NS</td>
</tr>
</tbody>
</table>

Figure 1: Mean serum vitamin D in fertile women (control group) and infertile women (study group)
Conclusion

Vitamin D appears as a risk factor for women infertility

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Al-Diwaniyah child and maternity hospital/Department of Obstetrics and gynecology/Al-Diwania/Iraq and all experiments were carried out in accordance with approved guidelines.

REFERENCES


Congenital Heart Diseases in Consanguineous Marriages in Tikrit-Iraq

Mejbil Ahmed Abd¹, Rikan sulaiman², Ashoor R Sarhat³
¹Salahdeen Health Directorate, Iraq; ²Tikrit Medical College, Iraq; ³Tikrit Nursing College, Iraq

ABSTRACT

Consanguineous marriage means a union occur between related individuals as second cousins or closer. Iraq as part Middle Eastern States show a high rate of consanguineous marriage due to tribal society. In Iraq, consanguineous marriage is a socially supported custom. To study the association of consanguinity as a risk factor for congenital heart diseases (CHDs). Patients with suggestive signs of CHD admitted Tikrit teaching hospital were subject to diagnostic investigations. Case data includes: name, age, gender, and cause of admission. Parents data includes: age, residence, degree of consanguinity, and history of family recurrent CHDs. Congenital heart diseases was slightly higher in females than males, and there is 40% of studied cases were from positive consanguinity families. This study shows that the least congenital heart disease age reported was neonatal period, and the highest in ages between 1-5 years. Consanguinity in CHD was present in 81 cases (40%) and absent in 123 cases (60%). Family history in CHD was positive in (38%). most common congenital abnormality associated with CHD was Down’s syndrome.

Keywords: Congenital Heart Diseases in Consanguineous Marriages-Iraq, CHD and Consanguineous Marriages.

Introduction

CHD is one of the leading causes of mortality during the first year of life ¹, and represent the major human birth defect globally ², it is prevalence 1% of live births ². From linguistic point of view, consanguinity comes from Latin word, “con” which mean common and “sanguineus” which mean blood, so it is known as a relationship occur between two persons sharing a common ancestor. ³ According to clinical genetics, a consanguineous marriage defined as the one with union between two persons related as second cousins or closer. ⁴ The functional or structural abnormalities present at time of birth defined as birth defects or congenital malformations, which result in devastating illness and usually associated with long term sequela which may cause increased morbidity and mortality. Around 270,000 neonates die during the first neonatal period yearly because of congenital defects ⁵. The etiology of most CHD are unknown. Multifactorial origin of CHD form the main explanation for CHD which revealed interaction of genetic and environmental factors. Chromosomal abnormalities were form a small percentage of CHD specially, Down 21, 13, 18 and Turner syndrome. Heart disease is found in more than 90% of patients with trisomy 18, 50% of patients with Down syndrome, and 40% of those with Turner syndrome, and about 2% are attributed to known environmental factors. CHD has an increased risk of recurrence of CHD if a first-degree relative (parent or sibling) is affected ⁶,⁷. Variety of researches, all around the world have shown the elevated risk of congenital abnormalities associated with inbreeding. Iranian study revealed 43.6% consanguinity in parents of affected children mostly having congenital diseases like psychomotor and mental retardation ⁸. An Indian research revealed that the percentage of CHD to be 3.37% which rose to 4.41% in first cousins when children born to consanguineous marriages were compared to those born to a non-consanguineous marriage, which was found to be 1.22% ⁹. An Iranian study showed that with consanguinity positive in 59.7% of cases and 31.5% in controls, odds of congenital malformation were 3.22 times more in

DOI Number: 10.5958/0976-5506.2019.01428.1
consanguineous group. Because of Due to the crippling sequelae of birth defects and the powerful relation with consanguineous marriages, this research aimed to describe the association between the two so that the ways to lower the disease’s possible burden may be tried. Patient and methods: written ethical approval & study execution permission were gained from Tikrit College of Medicine. Parental consent was taken. This is an observational cross-sectional study which was conducted during the period extending for 6 months and conducted in Tikrit Teaching Hospital. The sample of (204) cases. Were selected by convenient sampling technique from those patients with CHD attending pediatrics clinic. A special questionnaire used to get information about sex, age, address, family history, consanguinity, sign & symptom of CHD, growth & developmental parameters, socioeconomic status. All cases of CHD which were diagnosed by echocardiography. Exploratory data analysis was performed using descriptive measures. Data put in tables and figures, statistical analyses was done by Chi- square using p-value. P-value less than 0.05 considered significant.

### Results and Discussion

The types and distribution of CHD were as follows; VSD 72 (35.2%), TOF 29 (14.2%), ASD 28 (13.7%), PDA 15 (7.35%), PS 11 (5.4%), TGA 10 (4.9%), COA 7 (3.4%), AVSD 6 (2.95%), and miscellaneous 26 (12.7%). The frequency of 26 miscellaneous types of CHD in 204 Iraqi children were as follows: Aortic stenosis 4 (1.96%), ASD+PS 3 (1.47%), VSD+PS 3 (1.47%), DORV3 (1.47%), Dilated CMP3 (1.47%), Pulmonary atresia 2 (0.98%), Truncus arteriosus 2 (0.98%), Single ventricle 2 (0.98%), VSD+PDA 1 (0.49%), TAPVR1(0.49%), Hypertrophic CMP1(0.49%), Aortopulmonary window 1(0.49%). The least CHD age reported was in neonatal period (11%), and the highest in ages between 1-60 months (44%) (Table 1). Consanguinity in CHD was present in 81 cases (40%) and absent in 123 cases (60%). Family history in CHD was positive in (38%). most common congenital abnormality associated with CHD was Down’s syndrome 60% of cases, and Edward 20% of cases. It is different from another study in the same center in 2017 which found that Down syndrome (70%), and (10%) of them had Edward syndrome.

<table>
<thead>
<tr>
<th>Age group</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Neonate</td>
<td>11%</td>
</tr>
<tr>
<td>2. Infant</td>
<td>18%</td>
</tr>
<tr>
<td>3. Preschool (2-5 years)</td>
<td>44%</td>
</tr>
<tr>
<td>4. 5 years</td>
<td>27%</td>
</tr>
</tbody>
</table>

### Table 2: Consanguinity & family history in CHD

<table>
<thead>
<tr>
<th></th>
<th>Positive</th>
<th>Negative</th>
</tr>
</thead>
<tbody>
<tr>
<td>Consanguinity</td>
<td>81 (40%)</td>
<td>123 (60%)</td>
</tr>
<tr>
<td>Family history</td>
<td>78 (38%)</td>
<td>126 (62%)</td>
</tr>
</tbody>
</table>

### Table 3: Congenital abnormalities associated with CHD

<table>
<thead>
<tr>
<th>Congenital abnormalities</th>
<th>NO (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Down syndrome</td>
<td>3 (60%)</td>
</tr>
<tr>
<td>2. Edward syndrome</td>
<td>1 (20%)</td>
</tr>
<tr>
<td>3. TEF</td>
<td>1 (20%)</td>
</tr>
</tbody>
</table>

### Conclusion

Congenital heart diseases was slightly higher in females than males, and there is 40% of studied cases were from positive consanguinity families. Consanguinity and family history are important risk factors in congenital heart diseases.
Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Tikrit Nursing College, Iraq and all experiments were carried out in accordance with approved guidelines.

REFERENCES


Decrease the Severity of Spasticity Symptom for Patients with Multiple Sclerosis after Performance of Structured Self-Management Training Program (Theoretical Framework)

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ABSTRACT

Multiple sclerosis is a chronic neurological autoimmune diseases which affect adults female more than male at productive age and distributed among more than 2 million peoples around the world, occupy the second neurological reason for disability and interact with the quality of life. Objectives: To evaluate the effectiveness of structured training program to decrease spasticity symptom severity for patients with multiple sclerosis. Middle Euphrates Neuroscience Center in AL-Najaf City choice as a proper setting to carry out this study, a purposive sample of (61) patients diagnosed with MS are divided to (31) experimental group and (30) control group, structured self-management training program prepared to decrease the spasticity level, special form prepared to evaluate the level of spasticity contain of Modified Ashworth Scale, data were collected by interview and of reliability was calculated as (0.78). the results show that the highest percentage of participant were female (59%), between age group the (31-40) years, with primary school (37.7%), (80.3%) were married, overall assessment for (61) MS patients related to spasticity shows severe spasticity symptom in pre-test. while in posttest shows improvement of spasticity symptom associated with performance of structured training program among experimental group members.

Keywords: Spasticity symptom, Self-Management Training Program

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Introduction

Multiple sclerosis (MS) is one of the known chronic neurological autoimmune diseases drive by pathological inflammatory demyelination of central nervous system distribute among more than 2 million peoples around the world, and it considered one of the main cause of disability in young adult how are affected by this disease.¹ The disease can affect any part of the brain or spinal cord that’s why it may present with motor symptoms, sensory symptoms, visual disturbance, cerebellar symptoms, sphincters dysfunction, psychological or cognitive dysfunction. The diagnosis of MS is based on the clinical findings and supporting evidence from ancillary tests, such as magnetic resonance imaging (MRI) of the brain and/or spinal cord and/or cerebrospinal fluid examination.² Multiple sclerosis typically diagnosing at early stages of life commonly between 20-50 years of life, the females are commonly affected by this disease in two to three times more than males. Limitation in mobility may appear as a clear symptom, disability, fatigue, spasticity, weakness, and imbalance, are most significant symptoms which may be seen in MS patients, the self-management is the effective way to decrease the intensity of these problems.³ Epidemiological studies show that the female/male ratio ranged from 0.8 in Oman to 4.3 in Saudi Arabia. MS prevalence ranged from 14.77/100,000 population in Kuwait to 101.4/100,000 in Turkey. The overall MS prevalence in the region was 51.52/100,000. The mean age at disease onset ranged from 25.2 years in Kuwait to 32.5 years in Northeastern Iran, with an overall estimate of 28.54 years.⁴ Orem’s self-care theory consider as one of the important nursing theories deal with the care used as framework to transfer the patients from dependent role to independent in providing of self-care to him/herself by considering that all human being have a potential to develop intellectual...
and practical skills when the essential motivation in self-care used as a base. Nurses play important role in improving health of MS patients by interaction with patients and their families to provide knowledge and practices that MS patient’s needs.

**Methodology**

Middle Euphrates Neuroscience Center in AL-Najaf City used to carry out this study, in order to obtain the study objectives the quasi-experimental design used as a proper design, a purposive sampling method used to select the sample of (61) patients who previously diagnosed with MS, this sample was divided in to (31) patients act as experimental group and the others (30) patients were assigned as a control group who frequently visit the center for treatment and consultation, a Modified Ashworth Scale (MAS) a spasticity scale used to assess the level of spasticity. Self-management training program prepared and special form constructed to assess the severity of spasticity, the form content two parts the first part content demographical characteristics from the study sample, while the second part include Modified Ashworth Scale (MAS) to assess the severity of spasticity. The content and clearance of the program and the form were obtained by (10) expert panel, while the reliability of the form were statistically calculated after a pilot study which recorded as (0.78); agreement of participants were obtained by assigning special consent form which content the objectives and brief of the study. Data in pretest were collected form the study sample (experimental and study groups) as a base data to assess the change in severity of the spasticity, after that the experimental group members involved in training sessions which content theoretical presentation and practical administration of self-management training program to reduce the severity of spasticity. Two posttest performed to evaluate the effectiveness of the training program, the first posttest data were collected after four weeks, while the second posttest data were collected after two months later.

**Results and Discussion**

Table (1) present the distribution of demographical data for (61) patient with multiple sclerosis those agree to participate in the study, divided in to two groups (31) patients as experimental group and (30) patients as control group related to age the table shows that the higher percentage 14 (45.2), 12 (40%) of the experimental and control group were between (31-40) years age group. In relation to gender the high percentage 16 (51.6%), 20 (66.7%) of both groups were female. Both group recorded high percentage 22 (71%), 27 (90%) were married, related to educational level the results shows that the high percentage of the experimental group 10 (32.3%) were secondary school and college level, while the high percentage 14(46.7%) among the control group were with primary school level. 20 (64.3%) of the experimental group were urban area residency, while the control group show equal distribution 15 (50%) between urban and rural as residency area. The patients with MS who participate in the experimental group recorded high percentage 13 (41.6%) were officeholder, while the result of the control group patients show that 7 (23.3%) were house wife. Table (2) depict the results of response of control and experimental groups related to spasticity symptom, and these results shows a significant differences in result between control and experimental group, The control group shows no significant changes during follow up period presented upon their general mean for their pre-test and First Post-test which is achieved after four weeks (5.16 ± 2.29), (5.16 ± 3.49), and the second Post-test after eight weeks (5.14 ± 4.57), while the experimental group members presented changes which were clearly recorded among their general mean between pre-test (5.13 ± 0.03) and first Post-test (5.10 ± 0.02), the second Post-test (5.04 ± 0.02).That indicated the effectivenss of educational program toward decreasing the spasticity symptom for patients who attend to sessions. Spasticity is considered as the common and traditional symptom for many neurological defects and diseases such as MS, stroke, and spinal cord trauma and injuries, many epidemiological studies reported that highest prevalence of spasticity distributed among patients with MS than those with stroke and patients with traumatic brain injury. Spasticity level in current study decrease after applying the educational symptoms management program regularly by experimental group, while those not attending to sessions and not applying the program were not achieve the improvement that lead to fact that the applying of program content related to good prognosis of spasticity, these result in compatibility with the Adar S., et. al. at 2017 finding of exercises ability in improvement of spasticity management and motor function.
Table 1: Allocation of participants related to their characteristics

<table>
<thead>
<tr>
<th>Variables</th>
<th>Groups</th>
<th>Total (N = 61)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Control (N = 30)</td>
<td>Experimental (N = 31)</td>
</tr>
<tr>
<td></td>
<td>F</td>
<td>%</td>
</tr>
<tr>
<td>Age groups</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(30) years ≥</td>
<td>9</td>
<td>30.0</td>
</tr>
<tr>
<td>31-40 years</td>
<td>12</td>
<td>40.0</td>
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<tr>
<td>(41) years ≤</td>
<td>9</td>
<td>30.0</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<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>Marital Status</td>
<td></td>
<td></td>
</tr>
<tr>
<td>single</td>
<td>3</td>
<td>10.0</td>
</tr>
<tr>
<td>married</td>
<td>27</td>
<td>90.0</td>
</tr>
<tr>
<td>Level of Educational</td>
<td></td>
<td></td>
</tr>
<tr>
<td>read and write</td>
<td>4</td>
<td>13.3</td>
</tr>
<tr>
<td>Primary school</td>
<td>14</td>
<td>46.7</td>
</tr>
<tr>
<td>Secondary school</td>
<td>6</td>
<td>20.0</td>
</tr>
<tr>
<td>College</td>
<td>6</td>
<td>20.0</td>
</tr>
<tr>
<td>Residency</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Urban</td>
<td>15</td>
<td>50.0</td>
</tr>
<tr>
<td>Rural</td>
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<td>50.0</td>
</tr>
<tr>
<td>Occupation</td>
<td></td>
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</tr>
<tr>
<td>Jobless</td>
<td>11</td>
<td>36.7</td>
</tr>
<tr>
<td>Free working</td>
<td>3</td>
<td>10.0</td>
</tr>
<tr>
<td>Office holder</td>
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<td>20.0</td>
</tr>
<tr>
<td>House wife</td>
<td>7</td>
<td>23.3</td>
</tr>
<tr>
<td>Retired</td>
<td>3</td>
<td>10.0</td>
</tr>
</tbody>
</table>

Table 2: Responses of the Experimental and Control Groups Related to Spasticity Symptom

<table>
<thead>
<tr>
<th>No.</th>
<th>Items</th>
<th>Control</th>
<th>Experimental</th>
<th>p</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Pre-test</td>
<td>Post-test (1)</td>
<td>Post-test (2)</td>
<td>Pre-test</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Mean ± SD</td>
<td>Mean ± SD</td>
<td>Mean ± SD</td>
<td>Mean ± SD</td>
</tr>
<tr>
<td>1</td>
<td>Left side upper limb</td>
<td>5.16 ± 2.449</td>
<td>5.17 ± 3.688</td>
<td>5.16 ± 4.980</td>
<td>5.12 ± 5.419</td>
</tr>
<tr>
<td>2</td>
<td>Left side lower limb</td>
<td>5.20 ± 2.366</td>
<td>5.16 ± 3.633</td>
<td>5.08 ± 4.604</td>
<td>5.15 ± 5.947</td>
</tr>
<tr>
<td>3</td>
<td>Right side upper limb</td>
<td>5.10 ± 2.966</td>
<td>5.13 ± 4.472</td>
<td>5.15 ± 5.099</td>
<td>5.10 ± 4.792</td>
</tr>
<tr>
<td>4</td>
<td>Right side lower limb</td>
<td>5.18 ± 3.688</td>
<td>5.18 ± 5.292</td>
<td>5.19 ± 5.514</td>
<td>5.17 ± 5.672</td>
</tr>
<tr>
<td></td>
<td>General Mean</td>
<td>5.16 ± 2.29</td>
<td>5.16 ± 3.49</td>
<td>5.14 ± 4.57</td>
<td>5.13 ± 0.03</td>
</tr>
</tbody>
</table>

Conclusion

The structured training program shows significant effectiveness upon the severity of spasticity among the experimental group members who attending the training program, while the severity of spasticity remain without improvement for MS patients who participate in the control group.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Faculty of Nursing, University of Babylon, Iraq and all experiments were carried out in accordance with approved guidelines.

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Determination of Daily Living Activities of School Age Children with Sickle Cell Anemia in Al Nasiriya City

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ABSTRACT

Objective: The study aim to Assess Daily Living Activities Domains. And find out the relationships between daily living activities domains and their demographic characteristics (age, gender, parent’s level of education, parent’s occupation and economic status) of School Age Children with sickle Cell Anemia in Al Nasiriya Centre for Hereditary blood Diseases Quantitative design (a descriptive study) of one hundred children was selected. All the patients for both sexes diagnosed as having sickle cell anemia, for the period from 11th November 2018 through to 12th February 2019. The collection of data is performed out of the utilization of developed questionnaire and by means of structured interview technique with the subjects who were individually interviewed by the using of Arabic version of the questionnaire in Al Nasiriya Centre for Hereditary Blood Diseases. The results of the study indicate more than third 31% of age is 6-7 years, more than half 51% in 1-2 days is male, there is 18% child isn’t in school, child in first class is 24.4%, absence number from school is 40% and most of them have a moderate level activities of daily living 65.0%.

Keywords: Daily living activity; Sickle cell anemia; School age children

Introduction

The World Health Organization has classified sickle cell disease as a major public health priority, given the severe impact of the disease on patients, their families, and the community. Therefore, In 2006, the World Health Organization (WHO) recognized sickle cell disease as a global public health problem 1. Sickle cell is a life-threatening blood disorder that is characterized by red blood cells that assume an abnormal, rigid sickle shape. Sickled cells can stop or slow blood flow to parts of the body, causing less oxygen to reach different areas, resulting in a pain crisis and other complications 2. In the United States, over 80,000 people have sickle cell anemia. Each year about 1,000 babies are born in America with sickle cell disease. It is estimated that 3.5 million Americans carry sickle cell trait 3. Sickle cell anemia as hereditary diseases effect on any organ or system of the human body. Lifelong problem, in sickle cell anemia the red blood become (sickle like shapes). The sickle-shaped cells become clogged in small blood vessels, causing obstruction of the microcirculation, which in turn results in damage to and destruction of various tissues 4. Prevalence of Sickle Cell Anemia (SCA) is a common hematologic problem in Basrah in Southern Iraq around 6.48% of population are carriers for the sickle cell gene 5. Most affected births occur in Asia, Africa, Mediterranean, Caribbean, Arabian, and Indian 6. The disease comes to Iraq due to migration or as a result of population movement it spread to different areas of the world. SCA is inherited disorder that means the children who get abnormal hemoglobin genes from parents, in the Basrah governorate because of its high carrier rate due to the frequency of consanguineous marriages high rate is 56.4%. Therefore, the SCA appear 7. In children, especially the school age group, normally very active with sickle cell anemia (SCA) is more limited general health and physical functioning, more limitations in their academic functioning and social activities attributed to their physical health, and more behavior and emotional problems8. Daily living activities that important part of an individual’s quality of life, that means things normally do on a daily basis, including any daily activity perform

for self-care. These are activities that are absolutely necessary for someone to live independently such as of daily living activities, personal hygiene, school activities dressing, eating, sleeping, transferring, social activities and play. When body does not have an adequate number of red blood cells present due to damage, destruction red blood cells (RBCs), anemia occurs, fatigue that causes low activities, because insufficient oxygen levels will sap energy.

Methodology

Quantitative design (a descriptive study) of one hundred children was selected. All the patients for both sexes diagnosed as having sickle cell anemia, for the period from 11th November 2018 through to 12th February 2019. The collection of data is performed out of the utilization of developed questionnaire and by means of structured interview technique with the subjects who were individually interviewed by the using of Arabic version of the questionnaire in Al Nasiriya Centre for Hereditary Blood Diseases.

An assessment tool was adopted and developed by the investigator design for the purpose of the study. Questionnaire format that used of one hundred child was designed and constructed by the researcher depending on

1. Translates the scales (Katz ADL, Lawton ADL and Bristol ADL) from English to Arabic and select appropriate to measure the variables underlying the present study.
2. Extensive review of available literature and studies related to the concept of daily living activities and sickle cell anemia.
3. Meeting with parent and children having sickle cell anemia were carried out and opened questions used related to their disease and how it effects on their daily living activities.

Data was collected through using a questionnaire modeled and made up of three parts, the first part included children’s demographic data and parent’s demographic data with socio-economic status of children’s family, the second part included clinical data and clinical manifestations of children and three part daily living activities of school age children with sickle cell anemia domains.

Results and Discussion

Table 1 shows (51%) of the children are males, their age is 6-7 years old (31%) and the mean and standard division of age is 8.90 (2.067), children in school are (82%), in first class (24.4%) while third class is (23.1%), mean and standard division of absence number from school is 2.73 (3.149) of high percent 40 of 1-2 days, and the socioeconomic status of children’s family is (71%) middle. Table 2 shows the mean age of onset is 2.92 ± 2.058, the age onset for most of children is 1-2 years (n=57; 57.0%), the mean of ill brothers is 0.93 ± 0.832, less than half of families have one ill child (n=45; 45.0%), the mean of blood transfusion is 0.6 ± 0.72, most of children have no blood transfusion (n=52; 52.0%), two third of them have one blood transfusion (n=40; 40.0%), the mean of hospital admission is 0.99 ± 0.75, most of children have hospitalized once (n=58; 58.0%), the mostly reported clinical manifestations are pallor (n=82; 82.0%), fatigue (n=78; 78.0%), loss of appetite (n=77; 77.0%), joint pain (n=73; 73.0%), more than two fifth of families visit health clinic, and visit hospitals when clinical manifestation appear on child (n=41; 41.0%) for each of them. Table 3 shows that more than half of participants have a moderate level activities and motors (transferring) (n=55; 55.0%), two fifth of them have a moderate level school activities (n=40; 40.0%), more than half of them have a moderate level play activities (n=53; 53.0%), the majority of them have a poor personal hygiene (n=72; 72.0%), more than half of them have a moderate level dressing activities (n=51; 51.0%), the vast majority of them have a poor level eating and drinking activities (n=95; 95.0%), more than half of them have a moderate level sleep (n=53; 53.0%), more than half of them have a moderate level social activities (n=56; 56.0%), and most of them have a moderate level activities of daily living (n=65; 65.0%). Table 4 shows age of onset negatively correlates with child’s activities of daily living (r=-0.206; P<0.05), while child’s absence number, number of blood transfusion and hospital admission positively correlate with child’s activities of daily living( r= 0.574; P<0.05),( r= 0.361; P<0.05), (r= 0.257; P<0.05) respectively.

The children with days of school absence with sickle cell anemia. This study finding the mean 2.73(3.149) with high frequency of school days absences were (1-2) days. These findings agree and supported with results obtained from study done by Day and Chismark(11). They
reported children who have a school absence have a high incidence of (1-2) days, which indicates to sickle cell anemia table (1). Table (2) also shows significant relationship between age onset( diagnosis ) and daily living activities ($r=-0.206; P < 0.05$) this finding agree with results obtain from study done by Animasahun et al (12) children with sickle cell anemia (70%) were first diagnosed above one year of age at the onset of children’s illness. The researcher thinks that there is association between age diagnosis and daily living activities. Diagnosis is often made when child show up with clinical manifestations through visit health clinic or hospital. The relationship between number of blood transfusions and daily living activities with sickle cell anemia, table (4) shown ($r=0.361; P<0.05$) of children, the finding shows that mean 0.6(0.72) and the majority of non-blood transfusion was 52%, these findings agreed and supported with results obtained from study done by Arceci(13). Who reported of blood transfusion of sickle cell anemia can occur in more than 30% of patients usually administered every 3–4 weeks. Also shown there is significant relationship between number of hospital admission in children and daily living activities ($r=0.257; P<0.05$), the study indicates to more than half of sample 58(58%) were have once of hospital admissions, this finding agree with results obtain from study done by Ezenwosu et al (14), the study result indicate that the most of the hospital admission were 55 (61.1%) of 90 children with sickle cell anemia in age school. This finding disagree with results obtain from study done by Ali et al (15) they reported with children were less than 12 years with sickle cell anemia, that result mentioned to 43(16%) of children have once of hospital admissions. Also shown there is more than fourth five of sample 82% is pallor, this result less than the report indicate to 51.8% of patients complained of pallor in children with sickle cell anemia in Nigeria with results obtain from study done by Juwah et al (16). Also more than third quarter of sample 78%, 77% are fatigue and loss of appetite, fatigue is consider a key symptom of anemia this report agree and supported by the results obtained from study done by Ameringer and Smith(17). Also the study shows 73% of joint pain children with sickle cell anemia (SCA), this result similar report and supported with study done by Yusuf et al(18) who reported indicate to the most common reason for the hospital or specially center visits is joint pain symptom (67%) from patient with sickle cell anemia. Throughout the course of the present study table( 3 ), the study results showed the effected of the daily living activities by 8 indictors under three levels scales of good, moderate and poor. The transferring activities, school activities, play activities, dressing activities, sleeping activities and social activities all those domains the sickle cell anemia(SCA) effect on it moderate effect, but the effect sickle cell anemia(SCA) on personal hygiene.

Table 1: Distribution of the Study Sample by their children’s demographic Characteristics

<table>
<thead>
<tr>
<th>List</th>
<th>Variable</th>
<th>F</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Age(year): Mean (SD) = 8.90 (2.067)</td>
<td>6-7</td>
<td>31</td>
</tr>
<tr>
<td></td>
<td></td>
<td>8-9</td>
<td>30</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10-11</td>
<td>24</td>
</tr>
<tr>
<td></td>
<td></td>
<td>12</td>
<td>15</td>
</tr>
<tr>
<td>2.</td>
<td>Gender</td>
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</tr>
<tr>
<td></td>
<td></td>
<td>Female</td>
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</tr>
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<td>3.</td>
<td>Is child in school</td>
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<td></td>
<td></td>
<td>No</td>
<td>18</td>
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<td>4.</td>
<td>Class (n= 82) (child’s education level)</td>
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<tr>
<td></td>
<td></td>
<td>Second</td>
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</tr>
<tr>
<td></td>
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<td>Third</td>
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<td></td>
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<td>5.</td>
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<tr>
<td></td>
<td></td>
<td>1-2 days</td>
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<td>3-4 days</td>
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<td>7-8 days</td>
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<td>≥ 9 days</td>
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<td>6.</td>
<td>Socioeconomic status</td>
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<td></td>
<td></td>
<td>Middle</td>
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<tr>
<td></td>
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<td>Low</td>
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Table 2: Distribution of the Study Sample by their children’s Clinical data and complications of children

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<th>List</th>
<th>Variable</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
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<tbody>
<tr>
<td>1</td>
<td>Age onset: Mean (SD) = 2.92 (2.058)</td>
<td>1-2 years</td>
<td>57</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3-4 years</td>
<td>22</td>
</tr>
<tr>
<td></td>
<td></td>
<td>5-6 years</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td></td>
<td>≥ 7 years</td>
<td>6</td>
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Conted…

<table>
<thead>
<tr>
<th>Number of Ill Brothers: Mean (SD) = 0.93 (0.832)</th>
</tr>
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<tbody>
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<td>None</td>
</tr>
<tr>
<td>1</td>
</tr>
<tr>
<td>2</td>
</tr>
<tr>
<td>3</td>
</tr>
<tr>
<td>≥ 4</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Number of Blood Transfusion: Mean (SD) = 0.6 (0.72)</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
</tr>
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<td>1</td>
</tr>
<tr>
<td>2</td>
</tr>
<tr>
<td>≥ 3</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Number of Hospital Admission: Mean (SD) = 0.99 (0.75)</th>
</tr>
</thead>
<tbody>
<tr>
<td>None</td>
</tr>
<tr>
<td>1</td>
</tr>
<tr>
<td>2</td>
</tr>
<tr>
<td>≥ 3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Clinical manifestations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chest Infection</td>
</tr>
<tr>
<td>Joint Pain</td>
</tr>
<tr>
<td>Jaundice</td>
</tr>
<tr>
<td>Pallor</td>
</tr>
<tr>
<td>Fatigue</td>
</tr>
<tr>
<td>Loss of Appetite</td>
</tr>
<tr>
<td>Splenomegaly</td>
</tr>
<tr>
<td>Heart Disorder</td>
</tr>
<tr>
<td>Leg Ulcer</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Family role when clinical manifestations appear on child</th>
</tr>
</thead>
<tbody>
<tr>
<td>Visit health clinic</td>
</tr>
<tr>
<td>Visit the hospital</td>
</tr>
<tr>
<td>Stay in home</td>
</tr>
<tr>
<td>Other</td>
</tr>
</tbody>
</table>

Table 3: Assessment Participant’s Daily Living Activities Level. It’s Association with Sickle Cell Anemia

<table>
<thead>
<tr>
<th>List</th>
<th>Level</th>
<th>Rate</th>
<th>P</th>
<th>M</th>
<th>G</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Activities and motor (transferring)</td>
<td>Frequency: 13</td>
<td>55</td>
<td>32</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Percent: 13.0</td>
<td>55.0</td>
<td>32.0</td>
<td>100.0</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>School Activities</td>
<td>Frequency: 37</td>
<td>40</td>
<td>23</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Percent: 37.0</td>
<td>40.0</td>
<td>23.0</td>
<td>100.0</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Play Activities</td>
<td>Frequency: 11</td>
<td>53</td>
<td>36</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Percent: 11.0</td>
<td>53.0</td>
<td>36.0</td>
<td>100.0</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Personal Hygiene</td>
<td>Frequency: 72</td>
<td>27</td>
<td>1</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Percent: 72.0</td>
<td>27.0</td>
<td>1.0</td>
<td>100.0</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Dressing Activities</td>
<td>Frequency: 15</td>
<td>51</td>
<td>34</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Percent: 15.0</td>
<td>51.0</td>
<td>34.0</td>
<td>100.0</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Eating and Drinking Activities</td>
<td>Frequency: 95</td>
<td>5</td>
<td>0</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Percent: 95.0</td>
<td>5.0</td>
<td>0</td>
<td>100.0</td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Sleep Activities</td>
<td>Frequency: 24</td>
<td>53</td>
<td>23</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Percent: 24.0</td>
<td>53.0</td>
<td>23.0</td>
<td>100.0</td>
<td></td>
</tr>
</tbody>
</table>
Table 4: Association between Participants’ children’s-demographic Characteristics and Their Activities of Daily Living

<table>
<thead>
<tr>
<th></th>
<th>Age</th>
<th>Class</th>
<th>School absent</th>
<th>Age onset of illness</th>
<th>No: brother illness</th>
<th>No: blood transfusion</th>
<th>Hospital admission</th>
<th>Daily living activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>1</td>
<td>.744**</td>
<td>.202</td>
<td>.295**</td>
<td>.078</td>
<td>.032</td>
<td>.135</td>
<td>-.022</td>
</tr>
<tr>
<td>Class</td>
<td>.744**</td>
<td>1</td>
<td>.310**</td>
<td>.291**</td>
<td>.176</td>
<td>-.231*</td>
<td>-.162</td>
<td>.034</td>
</tr>
<tr>
<td>School absent</td>
<td>.202</td>
<td>.310**</td>
<td>1</td>
<td>.039</td>
<td>1</td>
<td>-.121</td>
<td>.061</td>
<td>.126</td>
</tr>
<tr>
<td>Age onset of illness</td>
<td>.295**</td>
<td>.291**</td>
<td>.039</td>
<td>1</td>
<td>-.121</td>
<td>-.040</td>
<td>-.091</td>
<td>-.206*</td>
</tr>
<tr>
<td>No: brother illness</td>
<td>.078</td>
<td>.176</td>
<td>.155</td>
<td>-.121</td>
<td>1</td>
<td>-.061</td>
<td>.031</td>
<td>.167</td>
</tr>
<tr>
<td>No: blood transfusion</td>
<td>.032</td>
<td>-.231*</td>
<td>.189</td>
<td>-.040</td>
<td>.061</td>
<td>1</td>
<td>.542**</td>
<td>.361**</td>
</tr>
<tr>
<td>Hospital admission</td>
<td>.135</td>
<td>-.162</td>
<td>.126</td>
<td>-.091</td>
<td>.031</td>
<td>.542**</td>
<td>1</td>
<td>.257**</td>
</tr>
<tr>
<td>Daily living activities</td>
<td>-.022</td>
<td>.034</td>
<td>.574**</td>
<td>-.206*</td>
<td>.167</td>
<td>.361**</td>
<td>.257**</td>
<td>1</td>
</tr>
</tbody>
</table>

**Conclusion**

The study shows significant relationship between ages of onset negatively correlates with child’s activities of daily living. While child’s class, child’s absence number and number of blood transfusion positively correlate with child’s activities of daily living.

**Financial Disclosure:** There is no financial disclosure.

**Conflict of Interest:** None to declare.

**Ethical Clearance:** All experimental protocols were approved under the College of Nursing, University of Basrah, Iraq and all experiments were carried out in accordance with approved guidelines.

**REFERENCES**


9. Blank R, Hengvoss S, Rollhausen E. Validation of a screening questionnaire for activities of


Determine of Osteoporosis Knowledge among Female Students at Institutes in Middle Al-Furat at Iraq

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ABSTRACT

Objectives: To determine the knowledge among osteoporosis for female students and identify the association between overall assessment knowledge osteoporosis with demographic characteristics among female students. The study design a quantitative research by a descriptive study, the sampling it is non-Probability “purposive” sample was conducted on 200 Female Students among Osteoporosis Knowledge at Institutes in Al-Furat of Middle for the period from February 7, 2018 to March 16, 2018. A questionnaire it has used as a tool of data collection to fulfill the study, which consist of three parts, include demographic characteristics, medical history, and the health Protective behaviors. A content validity, which is carried out through 13 panel of experts. A panel of experts determines validity, while reliability use split half. A descriptive and inferential statistics are used to analyze the data. Results: Findings stated that the higher percentage were (68%) at age group (18-20) years, (91.5%) from urban areas, (74.5%) singles, and relative to source of information (48.5%) had more than source, followed by (23.5%) internet and social networking web. Also majority of those students (54%) were in fair level knowledge about osteoporosis disease, followed by (46%) had a good level of knowledge.

Keyword: osteoporosis, risk factors of osteoporosis, complication of osteoporosis.

Introduction

Osteoporosis defined as a reduction in bone mass per unit volume such that fractures may occur with minimal trauma. It is the most common metabolic bone disease in the Western world. There are many causes, but by far the most common and most important is postmenopausal osteoporosis, which affects most women by the end of their lives ¹. Osteoporosis is the most common silent disease in the world, where it is estimated that a woman of every (3) women, and a man of every (5) men will suffer from fractures resulting from the disease after the age of fifty years ². Osteoporosis is a disease that causes the bones to become fragile and weak, leading to increased risk of fractures in the bones. Osteoporosis patients may be fractured due to a minor collision or falling from a rise during daily activities ³. Osteoporosis refers to it’s often affects the elderly. Bone loss with aging process is a global phenomenon, but it becomes a disease when bones become more vulnerable to breakage ⁴. Despite an increasing awareness of the importance of osteoporosis in some sections of the population, many women are still not sufficiently aware of the condition, do not appreciate the way in which it may affect their lives and, most importantly, do not understand that it is preventable. It is the duty of healthcare professionals to provide women with an impartial account of the current knowledge regarding osteoporosis ¹. Osteoporosis can be defined as low bone mass leading to structural fragility; it is difficult to determine the extent of the condition described in these qualitative terms. Using the World Health Organization’s quantitative definition based on bone density measurement, there are roughly 10 million Americans over age 50 with osteoporosis.

DOI Number: 10.5958/0976-5506.2019.01431.1

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Iraq
Email: Dr.Radha.M@alameed.iq.edu
and an additional 34 million with low bone mass or “osteopenia” of the hip, which puts them at risk for osteoporosis, fractures, and their potential complications later in life. Osteoporosis was defined previously by a consensus panel as a “disease characterized by low bone mass and micro architectural deterioration of bone tissue leading to enhanced bone fragility and a consequent increase in fracture incidence.” According to this definition, the diagnosis of osteoporosis requires the presence of a fracture. Osteoporosis develops in older adults when the normal processes of bone formation and resorption become uncoupled or unbalanced, resulting in bone loss. Fractures are the result of decreased bone mass and strength, and, in the case of wrist and hip fractures, they usually involve a fall. Osteoporosis prevention and treatment programs should therefore focus on strategies that minimize bone resorption and maximize bone formation, as well as on strategies that reduce falls. Optimal treatment and prevention of osteoporosis require modification of risk factors, particularly smoking, physical activity, and diet, in addition to pharmacologic intervention. Osteomalacia, a less common disorder, occurs when bone is inadequately mineralized; the result is a syndrome of bone loss accompanied by bone pain, myopathy, fatigue, and fractures. Osteoporosis unless the patient has a fracture, so it is disease is often called silent disease. The fracture due to osteoporosis often occurs in several areas such as the wrist, upper arm, pelvis, thigh, spine, and can cause severe pain and inability to move significantly and may cause death. Aims of the study: To assessment the knowledge regarding osteoporosis of a selected sample of female students. To find out the relationship between knowledge osteoporosis with demographic characteristics of female students.

Methodology

A descriptive quantitative study was carried out in order to achieve the stated objective. The study was begun from February 7, 2018 to March 16, 2018, Study Sample. A non-probability Purposive sample of 200 female students of institute in Al-Furat of middle. Several statements of this questionnaire were modified and developed to increase the validity of this instrument and to be more appropriate for achieving the aims of the present study. The study instrument consisted of (4) parts as the following: Demographic data, risk factors, etiology of osteoporosis, treatment of osteoporosis and complication of osteoporosis, Each item answered by one of these (Always, Sometime, Never). The collected data were statistically analyzed by two methods:

1. A descriptive statistical method (frequencies and percentages).
2. Inferential statistical method (Correlation Coefficient and P. Value).

Results and Discussion

The observed frequencies and percentages of the studied demographic characteristics variables which are distributed according to the study sample. Findings stated that the higher percentage were (68%) at age group (18-20) years, (91.5%) from urban areas, (74.5%) singles, and relative to source of information (48.5%) had more than source, followed by (23.5%) internet and social networking web. Table 1 shows that the majority of risk factors for study subject responded for women are more exposed than men, over-drinking coffee and tea, family history of disease, lack of exercise, lack of calcium and vitamin d, increased salt intake, lack of exposure to sunlight, increased intake of dietary fiber, non-pregnancy, refrain from breastfeeding, extreme thinness respectively. Table (1) indicated that most of the study sample had responded as (Don’t know) (46%, 39.5%, 45.5%, 46%) for kidney disease, thyroid diseases, psychological diseases, surgical removal of ovaries respectively. the highest percentage (64.5%), (66%), (56.5%) majority of these students had responded as (Yes) to backache and arching, decrease in length, exposed body bones to fracture respectively. the vast majority of the study sample had responded as (Yes) (63%, 70.5%, 68%, 72%, 69.5%, 72.5%, 61.5%, 53%) for regular exercise, refrain from smoking and alcohol, drink milk and eat its products, adequate exposure to sunlight, hormonal therapy, follow the doctor, encourage breastfeeding, surgical treatment respectively. Table (3) shows that majority of those students (54%) were in fair level knowledge about osteoporosis disease, followed by (46%) had a good level of knowledge. The study finding observed frequencies and percentages of the studied demographic characteristics variables, which are distributes according to the study sample. The Findings of the study indicate that the higher percentage age group (18-20) years within age groups. Concerned with residence of the study sample are urban areas which inconsistency with Awan and others (2016) in their study.
they mentions the majority of study sample from the rural settings of our study which has early sleeping habits and less room for electronic media entertainment. This result consistent with Kamran, and others (2016), who studies knowledge and behavior regarding osteoporosis in women. Also regarding the marital status are singles this results are disagree with of studied that indicate the women related marital that about three quarters (75.9%, n =404) of them were married, 16.5%, n = 87 were widows, 5.3%, n =28 were single and 21% divorces by El-Tawab and others (2016). Relative to source of information had more than source, followed by internet and social networking web. Many studies is consistent with such as Jalili and others (2007) that findings high percentage for sources information from internet and media. The study finding concerned with overall assessment knowledge about osteoporosis indicate that the majority of the study sample responses are fair of knowledge. This finding of the study are come with study that indicate Knowledge, attitudes and activity regarding osteoporosis among Iranian women (n=729) Knowledge score (total) mean and standard division (44.3) (21.5) by Askari1 and others (2016). Also another studies such Green and others (2005) who there is not enough knowledge about risk factors, one does not consider them as serious threats and so does not look for prevention and treatment. Hossien and others (2014), who founding through study osteoporosis knowledge among female adolescents in Egypt, that indicate knowledge of about osteoporosis, it was found that 38.4% of the studied sample didn’t know the meaning of osteoporosis, more over 75.9% of them didn’t know what to do in the case of osteoporosis this results is agree with finding of the study. Concerned with correlation between knowledge among osteoporosis and their demographic characteristics for study sample the finding of the study that the indicate there is no significant between demographic characteristics variables (residence, source of information, age) which disagree with Riaz and others (2008), in their study found the association between the knowledge score for osteoporosis and women’s age its non-significant (P =0.075). Also others study are agree with study finding such El-Tawab and others (2016) in their study they mention no correlation between age groups and sources information with knowledge for osteoporosis disease.

Table 1: Distribution of the study subjects according to knowledge about risk factors of osteoporosis

<table>
<thead>
<tr>
<th>Items</th>
<th>Rating</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Women are more exposed than men</td>
<td>NO</td>
<td>55</td>
<td>27.5</td>
</tr>
<tr>
<td></td>
<td>Don’t know</td>
<td>43</td>
<td>21.5</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>102</td>
<td>51</td>
</tr>
<tr>
<td>Aging</td>
<td>NO</td>
<td>79</td>
<td>39.5</td>
</tr>
<tr>
<td></td>
<td>Don’t know</td>
<td>68</td>
<td>34</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>53</td>
<td>26.5</td>
</tr>
<tr>
<td>Prenatal interruption early</td>
<td>NO</td>
<td>84</td>
<td>42</td>
</tr>
<tr>
<td></td>
<td>Don’t know</td>
<td>56</td>
<td>28</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>60</td>
<td>30</td>
</tr>
<tr>
<td>Smoking abuse</td>
<td>NO</td>
<td>90</td>
<td>45</td>
</tr>
<tr>
<td></td>
<td>Don’t know</td>
<td>94</td>
<td>47</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>16</td>
<td>8</td>
</tr>
<tr>
<td>Alcohol abuse</td>
<td>NO</td>
<td>63</td>
<td>31.5</td>
</tr>
<tr>
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<td>Don’t know</td>
<td>77</td>
<td>38.5</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>60</td>
<td>30</td>
</tr>
<tr>
<td>Over-drinking coffee and tea</td>
<td>NO</td>
<td>41</td>
<td>20.5</td>
</tr>
<tr>
<td></td>
<td>Don’t know</td>
<td>37</td>
<td>18.5</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>122</td>
<td>61</td>
</tr>
<tr>
<td>Over-drinking soft drinks</td>
<td>NO</td>
<td>71</td>
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</tr>
<tr>
<td></td>
<td>Don’t know</td>
<td>66</td>
<td>33</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>63</td>
<td>31.5</td>
</tr>
<tr>
<td>Family history of disease (hereditary)</td>
<td>NO</td>
<td>56</td>
<td>28</td>
</tr>
<tr>
<td></td>
<td>Don’t know</td>
<td>21</td>
<td>10.5</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>123</td>
<td>61.5</td>
</tr>
<tr>
<td>Lack of exercise</td>
<td>NO</td>
<td>47</td>
<td>23.5</td>
</tr>
<tr>
<td></td>
<td>Don’t know</td>
<td>46</td>
<td>22.5</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>107</td>
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</tr>
<tr>
<td>Lack of calcium and vitamin D</td>
<td>NO</td>
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<td>27.5</td>
</tr>
<tr>
<td></td>
<td>Don’t know</td>
<td>66</td>
<td>33</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>79</td>
<td>39.5</td>
</tr>
<tr>
<td>Increased salt intake</td>
<td>NO</td>
<td>25</td>
<td>12.5</td>
</tr>
<tr>
<td></td>
<td>Don’t know</td>
<td>19</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>156</td>
<td>78</td>
</tr>
<tr>
<td>Lack of exposure to sunlight</td>
<td>NO</td>
<td>49</td>
<td>24.5</td>
</tr>
<tr>
<td></td>
<td>Don’t know</td>
<td>56</td>
<td>28</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>95</td>
<td>47.5</td>
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</table>
Increased intake of dietary fiber such as fruits and vegetables, cereals and legumes

<table>
<thead>
<tr>
<th></th>
<th>Rating</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>NO</td>
<td>39</td>
<td>19.5</td>
<td></td>
</tr>
<tr>
<td>Don’t know</td>
<td>43</td>
<td>21.5</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>118</td>
<td>59</td>
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</table>

Non-pregnancy

<table>
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<tr>
<th></th>
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<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>NO</td>
<td>51</td>
<td>25.5</td>
<td></td>
</tr>
<tr>
<td>Don’t know</td>
<td>67</td>
<td>33.5</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>82</td>
<td>41</td>
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</tbody>
</table>

Frequent pregnancy

<table>
<thead>
<tr>
<th></th>
<th>Rating</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
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<tbody>
<tr>
<td>NO</td>
<td>88</td>
<td>44</td>
<td></td>
</tr>
<tr>
<td>Don’t know</td>
<td>55</td>
<td>27.5</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>57</td>
<td>28.5</td>
<td></td>
</tr>
</tbody>
</table>

Refrain from breastfeeding

<table>
<thead>
<tr>
<th></th>
<th>Rating</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>NO</td>
<td>49</td>
<td>24.5</td>
<td></td>
</tr>
<tr>
<td>Don’t know</td>
<td>46</td>
<td>23</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>105</td>
<td>52.5</td>
<td></td>
</tr>
</tbody>
</table>

Table 2: Distribution of the study subjects according to knowledge about medical reasons of osteoporosis

<table>
<thead>
<tr>
<th>Items</th>
<th>Rating</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heart disease</td>
<td>NO</td>
<td>98</td>
<td>49</td>
</tr>
<tr>
<td></td>
<td>Don’t know</td>
<td>72</td>
<td>36</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>30</td>
<td>15</td>
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<tr>
<td>Gastro-intestinal disease</td>
<td>NO</td>
<td>75</td>
<td>37.5</td>
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<td></td>
<td>Don’t know</td>
<td>75</td>
<td>37.5</td>
</tr>
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<td></td>
<td>Yes</td>
<td>50</td>
<td>25</td>
</tr>
<tr>
<td>Kidney disease</td>
<td>NO</td>
<td>65</td>
<td>32.5</td>
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<tr>
<td></td>
<td>Don’t know</td>
<td>92</td>
<td>46</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>43</td>
<td>21.5</td>
</tr>
<tr>
<td>Thyroid diseases</td>
<td>NO</td>
<td>64</td>
<td>32</td>
</tr>
<tr>
<td></td>
<td>Don’t know</td>
<td>79</td>
<td>39.5</td>
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<td>57</td>
<td>28.5</td>
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<td>Psychological diseases</td>
<td>NO</td>
<td>75</td>
<td>37.5</td>
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<tr>
<td></td>
<td>Don’t know</td>
<td>91</td>
<td>45.5</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>34</td>
<td>17</td>
</tr>
<tr>
<td>Surgical removal of ovaries</td>
<td>NO</td>
<td>74</td>
<td>37</td>
</tr>
<tr>
<td></td>
<td>Don’t know</td>
<td>92</td>
<td>46</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>34</td>
<td>17</td>
</tr>
</tbody>
</table>

Table 3: Summery statistics for the knowledge osteoporosis overall domain

<table>
<thead>
<tr>
<th>Overall assessment for knowledge</th>
<th>Rating</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>fair</td>
<td>108</td>
<td>54</td>
<td></td>
</tr>
<tr>
<td>pass</td>
<td>92</td>
<td>46</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>200</td>
<td>100</td>
<td></td>
</tr>
</tbody>
</table>

Conclusion

The majority of the study sample is from age group (21-25) years, and place living in urban. The main source of information for study sample about osteoporosis it is from internet. The vast of study sample suffer from deficit of knowledge about osteoporosis.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the College of Nursing, University of Al-Ameed, Ministry of Higher Education and Scientific Research, Iraq and all experiments were carried out in accordance with approved guidelines.

REFERENCES


DNA Genetic Recombination based Image Encryption using Chaotic Maps

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ABSTRACT

In this paper, a new encryption algorithm is proposed for grey scale image. The proposed algorithm consists of two main stages: the DNA stage and the chaotic map stage. In the DNA stage, each pixel in plain image can be represented by four nucleotide bases by carrying out DNA coding and decoding to produce the plain image in DNA strands form. While chaotic stage exploits the Lozi Map, Logistic Map and Clifford system in keys generation to be used in the substitution, genetic recombination and permutation processes respectively. Accepted key space and sensitive key are gained by the proposed method, and the evaluation of the algorithm illustrates it has high effectiveness to resist exhaustive statistical attack.

Keywords: Chaotic maps, DNA encoding, Genetic Recombination.

Introduction

The protection of data such as image, text, and videos from disclosure and altering its content is an urgent issue due to the insecure communication channels through the internet. Various approaches of encryption have been suggested to protect the images, some of these approaches can be simply attacked such as substitution, transposition, and other approaches is very complex such as public key encryption. Recently, the chaotic maps concept has been proposed to enhance the security and quality of image cryptosystems. This approach can be characterized by: firstly, the ergodicity property of chaotic signals resembles the confusion property in cryptography. Secondly, High sensitivity of chaotic signals to their initial conditions / system-parameters resembles the diffusion property of cryptography and noise-like behavior of chaotic sequences resembles the key sequences used in cryptography. Finally, the highly sensitive response of chaotic systems to initial conditions makes their trajectory unpredictable and highly random. However, the direct overlaying of a chaotic sequence and the pixel grey value of the image to achieved encryption have made the existing algorithms to be attacked easily by the statistical analysis or differential attack. In the other hand, image encryption based on DNA approach have recently emerged. This approach characterized by its massive parallelism, bulk storage, and ultralow power consumption. The DNA approach generally consists of three stages: DNA encoding, DNA operations, and DNA decoding. In the DNA encoding, an encoding rules are used to encrypt the stream of bit in image as DNA sequences. In the DNA operation, a various kind of operations such as logical addition, subtraction, and exclusive XOR are used to perform on DNA. The kinds of encoding and operations are usually controlled by chaotic sequences. The results of DNA operations are decoded to bits with the counterpart of corresponding encoding rules. In this article, proposed method for Image Encryption based on “DNA” approach and the “Chaotic map” is proposed (IE-DC). The DNA encryption is added in order to overcome the limitations of the chaotic map. The algorithm has exploited a combination on one, two, and three dimension of chaotic system depended on the DNA encoding and decoding and genetic recombination. The evaluation of the proposed algorithm has been illustrated a promising results in the image encryption.

The remainder of the article is organized as follows: Section 2 illustrates the chaotic Lozi map, Logistic map,
Clifford system, DNA encoding, decoding and genetic recombination principle. Section 3 and 4 explain the main steps of the IE-DC algorithm. The evaluation of the IE-DC algorithm is presented in Section 5. Finally, section 6 Conclude the article.

**Methodology**

The main aim of this study is to develop a method based on DNA and chaos map. To get hold of this aim a methodology of three steps are done as follows:

**Chaotic Maps:** In mathematics, a chaotic map is a map that shows some kind of chaotic behavior. There are various kind of chaotic map such as Lozi map, Logistic map, and Clifford system.

**i. Lozi Map:** Lozi is a 2-D discrete-time dynamical system as defined in Equation (1) and Equation (2):

\[ x_{zn+1} = 1 - \alpha \cdot \text{abs}(x_{zn}) + y_{zn} \quad \ldots(1) \]
\[ y_{zn+1} = \beta \cdot x_{zn} \quad \ldots(2) \]

Where \((x_{zn}, y_{zn})\) and \((x_{zn+1}, y_{zn+1})\) are the present and the next chaotic values respectively. Note that, the chaotic values are controlled by two factors \(\alpha\), \(\beta\). Facts of Lozi map can be found in [5]. Frequently, the initial values of controlled vector set to factors \(\alpha = 1.4\) and \(\beta = 0.3\).

**ii. Logistic Map:** Logistic map is a good example of 1D chaotic map, as describe in Equation (3):

\[ x_{ln+1} = \mu x_{ln} (1 - x_{ln}) \quad \ldots(3) \]

Where \((x_{ln})\) and \((x_{ln+1})\) are the present and the next chaotic values respectively. \(\mu \in [0, 4]\), \(x_{ln} \in (0, 1)\) and \(n = 0, 1, 2, \ldots\) The examination outcome displays that the system is in chaotic state under the condition that \(3.56994 < \mu \leq 4\[6]\).

**iii. Clifford system (attractor):** Clifford system is described as follows:

\[ x_{cn+1} = \sin(a) \quad \ldots(4) \]
\[ y_{cn+1} = \sin(b \cdot x_{cn}) + d \cdot \cos(b \cdot y_{cn}) \quad \ldots(5) \]
\[ z_{cn+1} = \sin(e \cdot y_{cn}) + f \cdot \cos(e \cdot z_{cn}) \quad \ldots(6) \]

Where \(x_{cn}, y_{cn}\) and \(z_{cn}\) are the present chaotic values, \(x_{cn+1}, y_{cn+1}\) and \(z_{cn+1}\) are the next chaotic values. The chaotic values are controlled by six factors “a, b, c, d, e, f”. Facts of Clifford system can be found in [8].

**DNA Encoding and Decoding:** A sequence of DNA composed of 4 nucleic acid bases “Adenine (A), Cytosine (C), Guanine (G) and Thymine (T)” Where (A, T), (C, G) are integral pairs. Therefore, 8 types of encoding groups can be used due to the integral link between DNA 4 nucleic acid passes only. Relationships of DNA acids (Eight kinds) \{AGCT, AGCT, CATG, CTAG, GATC, GTAC, TGCA, TGCA\} as Each pixel in For 8 bit/pixel grayscale image can be encoded into a nucleotide string of 4 bits length. For example, if the gray value of pixel \(I(r, c)\) is 39, then the binary representation of pixel \(I\) is \([00100111]\), the corresponding DNA sequence is \[AGCT\] using the 1st DNA encoding rule. \[AGCT\] using the 2nd DNA encoding rule, \[CTAG\] using the 3rd DNA encoding rule, and so on. [9, 10]. Exclusive-OR operations for DNA sequences are performed according to traditional Exclusive-OR in the traditional binary systems.

**Genetic Recombination:** Genetic recombination can be defined from the biological perspective as the construction of offspring with mixtures of traits that vary from those originate in either parent. DNA strand is split, combined to another slice of a different DNA molecule, and then a new DNA molecule appears. In this article exchange recombination or crossover is adapted. Exchange recombination referring to exchange particular genes of any broken DNA strand with the corresponding part of another DNA strand [11].

**Benefit of recombination**
- Greater variety in offspring.
- Negative selection can remove.

Eventually, the Exchange recombination or crossover with one point cross over and two point are supported as described in Fig. 1.

**Figure 1: Exchange recombination or crossover**
The IE-DE Algorithm: The IE-DE algorithm consists of two stages: the DNA stage and chaotic map stage. The main steps of the IE-DE algorithm is illustrated in algorithm 1 and Fig. 2.

Algorithm 1

Input: Plain image (L×L), DNA mask key, column and row scrambling keys

Output: Encrypted image

Step 1: Read Image: Load the plain image into an array \( \text{img}(L \times L) \)

Step 2: DNA Encoding: convert the \( \text{img}(L \times L) \) to its equivalent binary representation array \( \text{img}_{\text{bin}}(L \times L \times 8) \). Subsequently carry out DNA encoding to \( \text{img}_{\text{bin}} \) according to section 2.2, thus an encoded array \( \text{img}_{\text{DNA}}(L \times L \times 4) \) is gained.

Step 4: Masking Operation: \( \text{img}^{'}_{\text{DNA}} \) is obtained by constructing of mask key \( \text{MK}_{\text{DNA}} \) (as explained in algorithm 2) with the same size of matrix \( \text{img}_{\text{DNA}} \). The Exclusive-OR operation between mask key \( \text{MK}_{\text{DNA}} \) and matrix elements \( \text{img}_{\text{DNA}} \) resulted from (step 3). Masking operation is performed by following formula:

\[
\text{img}^{'}_{\text{DNA}}(i, j) = \text{img}_{\text{DNA}}^{'}(i - 1, j) + \text{img}_{\text{DNA}}(i, j) \oplus \text{MK}_{\text{DNA}}^{'}(k, j) \quad \cdots (7)
\]

Step 5: Genetic Recombination: \( \text{img}_{\text{DNA}}^{''} \) is gained by implementing genetic recombination on \( \text{img}^{'}_{\text{DNA}} \) as explained in algorithm 3.

Step 6: Scrambling Operation: Gain \( \text{img}_{\text{DNA}}^{'''} \) by generation of scrambling key 1 and 2 (SK_{1r}, SK_{2c}) as explained in algorithm 4 in order to accomplish row and Column scrambling to \( \text{img}_{\text{DNA}}^{''} \) resulted from step 4.

Step 7. DNA Decoding: Gain encrypted image \( \text{Enc}_{\text{img}} \) by convert \( \text{img}_{\text{DNA}}^{'''} \) the transformed matrix resulted from (step 6) into binary matrix whose size is \( (L \times L \times 8) \) then transform the binary matrix to decimal matrix to obtain the encrypted image.

Note that \( \oplus \) in step 3 denoted the Exclusive-OR operation, \( i = 1, 2, \ldots, N, j, = 1, 2, \ldots, N \times 4, k = N, N - 1, \ldots, 1 \).

Key Generation Process: In this section, the masking key, genetic recombination process, and scrambling keys will be will be generate according to algorithms 2,3 and 4.

Masking Key Generation: The replacement procedure is controlled by the mask key, in which the pixel's values are transformed to other values with no altering their positions in the input image. The main steps of the mask key generation algorithm is illustrated in algorithm 2 Fig. 3A

Algorithm 2

Input: initial condition \((xz, yz)\), facts \((\sigma, \beta)\) in the acceptable intervals.

Output: mask key (MK_{\text{DNA}})

Step 1: Generate initial sequences \( \{x_{z_1}, \ldots, x_{z_L}\} \), \( \{y_{z_1}, \ldots, y_{z_L}\} \) by iterating Lozi map Equations (1,2) for \( L \times L \times 2 \) times with its facts and initial values \( x_{z_0} \) and \( y_{z_0} \). Where \( L \) is the row and column numbers of the DNA encoded image \( \text{img}_{\text{DNA}} \).
Step 2: Construct matrix \( x_{sc} \) of size \( L \times L \times 4 \) by cross couples of \( x_i \) and \( y_i \), outcomes from step 1.

Step 3: Transform real values of \( x_{sc} \) into integer form by using the following formula:

\[
I_i = \text{mod}(\text{Abs}(\text{floor})(\text{matrix } x_{sc}) \times 10^{44}), 8) \quad \ldots(8)
\]

Note that \( i = 1, 2, \ldots, L \times L \times 4 \). According to \( I_i \) the mask key elements is determined.

Genetic Recombination Process: Algorithm 3 illustrated the base steps of the genetic recombination.

Algorithm 3:

Input: \( \text{img}_{DNA}^{'}, \) initial condition (\( x_i \)), facts (\( \mu \)) in the acceptable intervals.

Output: \( \text{img}_{DNA}'' \)

Step 1: Generate initial sequence \( x_l = \{x_l^1, x_l^2, \ldots, x_{L+L\times4}^4\} \) by iterating Logistic map equations (3) for \( L/2 \) times with its facts and initial values \( x_{li0} \). Where \( L \) is the row and column numbers of the DNA encoded image \( \text{img}_{DNA}^{'} \).

Step 2: Perform genetic recombination according to section 2.3 on each two rows depending on \( x_{li} = \{x_l^1, x_l^2, \ldots, x_{L+L\times4}^4\} \) items.

\[
\text{img}''_{DNA} = \begin{cases} 
\text{perform one point cross over depending on row number if } x_l^i \geq 0.5 \\
\text{perform two point cross over depending on row number if } x_l^i < 0.5 
\end{cases}
\]

Where \( i = 1, 2, 3, \ldots, L/2 \). Note that row number will determine the size of the fix point of the parent DNA strands for example row 1 and 2 will have one fix point, while row 3 and 4 will have two fix point and so on.

Permutation Key Generation: Two keys will be constructed the first key is used for row scrambling while the second key is used for column scrambling. Algorithm 4 and fig. 3B illustrated the base steps of the scrambling keys generation.

Algorithm 4:

Input: \( \text{img}_{DNA}'' \), initial condition \( \{x_c, y_c, z_c\} \), facts \( \{a,b,c,d,e,f\} \).

Output: \( \text{img}_{DNA}''' \)

Step 1: Three initial sequences \( x_c = \{x_c^1, x_c^2, \ldots, x_{L+L+L\times4}^4\}, y_c = \{y_c^1, y_c^2, \ldots, y_{L+L\times4}^4\} \) and \( z_c = \{z_c^1, z_c^2, \ldots, z_{L\times4}^4\} \) are generated by iterating Clifford System Equations (4,5,6) for \( L + L \times 4 \) times with its control parameters and initial values \( x_c^0, y_c^0 \) and \( z_c^0 \).

Step 2: Divide the position sequences \( x_c, y_c \) and \( z_c \) into groups \( G_l = \{1, 2, 3, \ldots, 6\} \) and they can be denoted as:

\[
G_1 = \{x_c, y_c, z_c\}, G_2 = \{x_c, x_c, y_c\}, G_3 = \{x_c, x_c, z_c\}, G_4 = \{y_c, z_c, x_c\}, G_5 = \{z_c, x_c, y_c\}, G_6 = \{z_c, y_c, x_c\}
\]

Step 3: Convert the \( L + L \times 4/3 \) items of \( x_c^i \) to integer values by the following equation:

\[
M_i = \text{mod}((\lfloor x_c^i \rfloor - \lfloor \text{floor}(x_c^i) \rfloor) \	imes 10^{14}, 6) \quad \ldots(10)
\]

Where \( i = 1, 2, \ldots, L\times L\times4/3 \), \( M_i \) belongs to \( [1,6] \).

Select the group \( G_i \) according to \( M_i \) value. According to \( M_i \), a temporary matrix \( \text{Temp}_j \) \( (j=1,2,3,4,5,6) \) is determined. For example, \( M_1 \) corresponds to \( G_1 \) in step 2, and \( M_2 \) corresponds to \( G_2 \), and so on.

Step 4: Copy first \( L \) items of \( \text{Temp}_i \) into \( R \) which is used to form key row permutation \( \text{SK}_1 \). and the second \( L \times 4 \) items into \( C \) which is used to form column permutation of \( \text{img}_{DNA}'' \). fig. 3 C shows the permutation process.

Simulation Result: In the next sections, the evaluation of the IE-DC algorithm is conducted in terms of numerical attack, differential examination, key space, and sensitivity. Numerical attack covers: histogram, correlation, and entropy. Differential examination covers: NPCR and UACI [12,13,14,15].

The IE-DC algorithm has been established using C#, and the tests have been conducted under the environment of Windows-10 operating system, laptop computer processor: Intel Pentium Dual CPU T230, 1.60 GHz, and (8 GB) RAM. Four images of size 256 x 256 with gray-scale were used. Fig.4 (A,B) showed the outcomes of the IE_DC algorithm which are explaining system performance.

Suggest Algorithm Analysis: The performance of the IE_DC algorithm is tested in term of three metrics: histogram peaks, correlation coefficient, and the entropy
score. Firstly, the results show that the histogram of the encrypted image is more flat and contains less peaks compared with the plain image histogram. Note that, the flat histogram will make the analysis of ciphered image more complex. Secondly, the correlation coefficient of the pixels pair is calculated and the result shows that there is no relationship between neighboring pixels in the encrypted image as illustrated table (1) and Fig. (4 E,F). Finally, it is clear that the entropy scores for the encrypted image are close to the ideal value 8 which means that there are no duplicate patterns in the encrypted image also the IE_DC algorithm is highly sensitive to a small change in the secret key as shown in table 1.

### Table 1: The Adjacent Pixels Correlation, Entropy, NPCR and UACI values

<table>
<thead>
<tr>
<th>Case</th>
<th>Plain Image</th>
<th>Encrypted Image</th>
<th>NPCR</th>
<th>UACI</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Horizontal</td>
<td>Vertical</td>
<td>Diagonal</td>
<td>Horizontal</td>
</tr>
<tr>
<td>1</td>
<td>0.9684</td>
<td>0.9613</td>
<td>0.9405</td>
<td>0.0453</td>
</tr>
<tr>
<td>2</td>
<td>0.9435</td>
<td>0.9705</td>
<td>0.9180</td>
<td>-0.0035</td>
</tr>
<tr>
<td>3</td>
<td>0.9519</td>
<td>0.9228</td>
<td>0.8855</td>
<td>0.0008</td>
</tr>
<tr>
<td>4</td>
<td>0.9766</td>
<td>0.9725</td>
<td>0.9585</td>
<td>0.0016</td>
</tr>
</tbody>
</table>

### Key Space Analysis: Key space size which represents the total number of different keys that can be used in the encryption. For a $10^{-14}$ floating point precision, all keys parameters (3) introductory status, (3) facts to mask key and (3) introductory status, (6) control parameters to transformation key can take $10^{14}$ possible values. Therefore, the key space comes out as $(10^{-14})^{15}$, which is big as much as necessary to defend against the brute force-attack.

### Key Sensitivity Test: The key sensitivity of the IE_DC algorithm is tested based on two experiments:

1. Experiment one uses the same secret key.
2. Experiment two uses a different secret key. The recovered image is meaningless as illustrated in Fig. (5B).

Therefore, it can be concluded that the IE_DC algorithm is sensitive to the initial key, any change of the key will recover a completely different decryption result and cannot recover the plain-image.

### Conclusion

In this paper, a new encryption algorithm is proposed for gray scale image. The IE_DC algorithm consists of two stages: the DNA encoding stage, chaotic stage. The DNA coding stages is used to overcome the limitations of the chaotic map. The Experimental outcome illustrated that in the encrypted image there are very low bordering pixel connection, roughly homogeneous histogram distribution, and can be considered as an approximately random image. In the security analyses, the scheme is responsive to the encryption key, and has enough large key space. Thus, the encryption schema is of high security and can defy against “common attacks”.

### Financial Disclosure: There is no financial disclosure.

### Conflict of Interest: None to declare.

### Ethical Clearance: All experimental protocols were approved under the Department of Computer Science,
College of Science, Mustansiriyah University, Baghdad-Iraq and all experiments were carried out in accordance with approved guidelines.

REFERENCES


Effectiveness of Structured Educational Symptoms Management Program upon Muscle Strength for Patients with Multiple Sclerosis

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ABSTRACT

Objectives: To identify the effectiveness of structured educational symptoms management program on the muscle strength for patients with multiple sclerosis. Quantitative quasi-experimental designed was selected to obtain the objective of the current study, the out patients consultation clinic for multiple sclerosis (MS) in the Middle Euphrates Neuroscience Center at AL-Najaf City chose functionally as a proper area to carry out this study, special form prepared to collect the data which contains two parts (demographical characteristics and Muscle Strength Grading Scale (Oxford Scale)) was used to determine the level of muscle strength. Purposive sample from (61) patients with MS were distinguished to participate in the study, they divided to two groups (30) patients as control group and (31) patients assigned as experimental group. The results shows that the highest percentage of participate were female (59%), between age group the (31-40) years, were with primary school (37.7%), (80.3%) were married. The first assessment (pretest) of patients shows deterioration in muscle strength for both experimental and control group, while posttest and second posttest shows an improvements in muscle strength for experimental group after applying of structured symptoms management educational program.

Keywords: Multiple Sclerosis, Educational Symptoms Management Program, Muscle Strength

Introduction

Multiple sclerosis disease most commonly occupy the second neurological reason for disability to adults at productive age, this non cure disease will alter the quality of life for MS patients especially when the symptoms related to this disease interfere with their daily functions and activities progressively then impairing their tasks and jobs.¹ Multiple sclerosis typically diagnosing at early stages of life commonly between 20-50 years of life, the females are commonly affected by this disease in two to three times more than males. The limitation in mobility may appear as a clear symptom in addition to disability, fatigue, spasticity, weakness, and imbalance, with bowel and bladder dysfunction are significant symptoms may be seen in MS patients. Self-management is the effective way to decrease the intensity of these problems.² Studies on life expectancy for MS patients shows increased mortality rates caused by serious injuries after falls. Cardiovascular diseases, infections, and injuries which cause falls.³ The symptoms of MS, such as weakness, sensory loss, and ataxia, which are directly related to demyelination and axonal loss, along with other symptoms such as reactive depression or social isolation, can result in functional limitations, disability and reduced quality of life (QOL).⁴ Patient with MS disease refer to rehabilitation when there is a gradual worsening, impairing or limitation in functioning that interacting with dependency, mobility or/and QOLs of patients, at this point time it is important to discuss the complications with the patients and prepare plans to avoid the progression in potential and actual problems in order

DOI Number: 10.5958/0976-5506.2019.01433.5
to reduce or prevent these problems that will improve QOLs for MS disease and decrease dependency.5

Methodology

Quasi-experimental design was carried out at Middle Euphrates Neuroscience Center in AL-Najaf City to achieve the study objectives, a purposive sample of (61) patients previously diagnosed with MS were selected, divided as (31) patients assigned in the experimental group and (30) patients act as control group, all participant have frequent visit to the center for treatment and consultation, a proper form which consist of two parts, the first part contain demographical data and the second part depend on the Oxford Muscle Strength Grading Scale. The validity was obtained by experts panel and the reliability was determined statistically (0.78) after the pilot study which performed upon (10) MS patients.

A special consent form used to obtain the participant agreement as one of the patients right protections. The data were collected by interview to full the first part and physical examination to determine the level of muscle strength, pretest performed as a baseline data for all participants, then the experimental group members attend the educational program sessions after four weeks posttest were performed, then follow up posttest were performed after eight weeks. The researcher need (20 to 30) minutes to complete the full of the form for each patients.

Results and Discussion

The higher percentage 14 (45.2), 12 (40%) of the experimental and control group were between (31-40) years age group. In relation to gender the high percentage 16 (51.6%), 20 (66.7%) of both groups were female. Both group recorded high percentage 22 (71%), 27 (90%) were married, related to educational level the results shows that the high percentage of the experimental group 10 (32.3%) were secondary school and college level, while the high percentage 14(46.7%) among the control group were with primary school level. 20 (64.3%) of the experimental group were urban area residency, while the control group show equal distribution 15 (50%) between urban and rural as residency area. The patients with MS who participate in the experimental group recorded high percentage 13 (41.6%) were officeholder, while the result of the control group patients show that 7 (23.3%) were house wife. Table (1) shows a significant differences in the results between control and experimental group, the general mean (2.98 ± 0.79) of the control group recorded no significant changes extended to their pretest and the first posttest (3.03 ± 0.77) and even the second posttest (2.92 ± 0.87), while the result of patients in the experimental group recorded general mean and SD (3.09 ± 0.65) in pretest significant changes presents in the level of the muscle strength symptoms after four weeks first Posttest (4.04 ± 0.54), then they shows more improvement in muscle strength symptom level during the second posttest (4.02 ± 0.61) after two months this result shows the effectiveness of educational program. The main objectives of this study is to evaluate the effectiveness of symptoms management educational program to decrease the severity of the spasticity symptom for patients with MS. The finding of current study shows that the highest percentage (59%) of the study sample were female, this finding supported by a study published in (2018) the finding revealed that female are commonly effected with MS than male.6 More than (81%) of cases were female, while less than (19%) were male according to Marck et al, 2016.7 Muscles strength defects are focused in current study because it one of the major symptoms that the patients with MS are complain during disease course, the finding in table (2) presented effectiveness of structured educational symptoms management program in improvement muscles strength level for MS patients who attend the educational program (experimental group), this result in compatibility with Moradi M et al. (2015) who investigate the effect of training program on men with MS involve the regular resistance exercise for 8 weeks, they find the resistance training is effective to improving muscle strength, functional ability.8 Nazari M. et. al. (2016) catch the same result of the study focused on muscle strength which performance on young active girls shows positive effect of resistance training exercise on muscles strength.9
Table 1: Responses of the Experimental and Control Groups Related to muscles strength Symptom

<table>
<thead>
<tr>
<th>No.</th>
<th>Items</th>
<th>Control</th>
<th>Experimental</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Pre-test Mean ± SD</td>
<td>Post-test (1) Mean ± SD</td>
<td>Post-test (2) Mean ± SD</td>
</tr>
<tr>
<td>1</td>
<td>Left side upper limb</td>
<td>3.07 ± 0.868</td>
<td>3.10 ± 0.662</td>
<td>3.00 ± 0.788</td>
</tr>
<tr>
<td>2</td>
<td>Left side lower limb</td>
<td>2.93 ± 0.785</td>
<td>2.90 ± 0.803</td>
<td>2.80 ± 0.887</td>
</tr>
<tr>
<td>3</td>
<td>Right side upper limb</td>
<td>3.07 ± 0.691</td>
<td>3.13 ± 0.860</td>
<td>3.00 ± 0.947</td>
</tr>
<tr>
<td>4</td>
<td>Right side lower limb</td>
<td>2.87 ± 0.819</td>
<td>3.00 ± 0.788</td>
<td>2.90 ± 0.885</td>
</tr>
<tr>
<td></td>
<td>General Mean</td>
<td>2.98 ± 0.79</td>
<td>3.03 ± 0.77</td>
<td>2.92 ± 0.87</td>
</tr>
</tbody>
</table>

Conclusion

The structured educational program shows significant effectiveness upon the results of the experimental group in reducing symptoms of MS patients.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Faculty of Nursing, University of Babylon and all experiments were carried out in accordance with approved guidelines.

REFERENCES


Epidemiology of Congenital Heart Diseases in Tikrit Teaching Hospital

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¹Tikrit Nursing College, Iraq; ²Tikrit Medical College, Iraq; ³Salahdeen Health Directorate, Iraq

ABSTRACT

Congenital heart disease is a very significant health problem and the leading cause of death in children with congenital malformations. The aims of this observational cross sectional study is to decrease morbidity and mortality among patients with CHD by early detection of cardiac lesion using clinical evaluation, radiological, ECG, Echo finding. This study involved (204) patients attended to pediatrics cardiac clinic in Tikrit Teaching Hospital (106 females and 98 males). Between 204 cases of CHD studied, ventricular septal defect present in 32% of cases. CHD was higher in females than males, and the most affected age group was 1-5 years. The most common symptom was of congestive heart failure and recurrent chest infection and most common sign was heart murmur. It is concluded that early detection of neonatal CHD remains challenging because clinical findings may be subtle or absent immediately after birth, and prenatal screening does not reliably detect all cases of CHD.

Keywords: Congenital Heart Diseases, Epidemiology, Tikrit Teaching Hospital

Introduction

CHD is one of the major causes behind mortality during infancy ¹, and represent the major human birth defect globally ², it is prevalence 1% of live births ². The etiology of most CHD are unknown. Multifactorial origin of CHD form the main explanation for CHD which build upon interaction of genetic and environmental factors. Chromosomal abnormalities were form a small percentage of CHD, heart disease, for example is found in more than 90% of patients with around 2% are due to known environmental factors. CHD has an increased risk of recurrence of CHD if a first-degree relative affected ³,4. Gender differences seen in certain CHD ³. The group of acyanotic CHD can be divided on the base of the predominant physiologic load that place on the heart. The most frequent CHD are those that cause a volume over load, and the more common of these are left-to-right shunt lesions such as VSD, ASD ⁴. The group of cyanotic CHD divided depending on the pathophysiology: if pulmonary blood flow is lowered (TOF, pulmonary atresia with an intact septum, tricuspid atresia, total anomalous pulmonary venous return with obstruction) or elevated (TGA), single ventricle, truncus arteriosus, total anomalous pulmonary venous return without obstruction)⁵.

Methodology

Patient and Method: written ethical approval, & study execution permission were gained from Committee of Iraqi Board for medical specializations. Parental consent before data collection and assessment of baby was taken. The study has been conducted in Tikrit Teaching Hospital in which all cases with CHD were included during the study period. This is an observational cross-sectional study which was conducted during the period extending for 6 months. A Convenient sampling technique which has been used to collect samples from those patients with CHD attending pediatrics clinic with regular working hours within 2 days per week. During the study period the total (204) cases. The questionnaire was developed to collect all data relevant to the objectives of study. The questionnaire include information about sex, age, address, sign & symptom of CHD, growth & developmental parameters, and socioeconomic status. The study includes interviewer administration of questionnaire, anthropometric measurements. All cases of CHD were
diagnosed by echocardiography. The following age groups were considered: newborns, infant, preschool children, schoolchildren. The following conditions were excluded: cardiac arrhythmias, PDA in premature newborns and newborns, bicuspid aortic valve, MVP, mirror-image dextrocardia, patent foramen ovale and right sided aortic arch. Examination: each child was assessed for: general and specific cardiac examination. Any child showing an abnormal heart condition was checked by electrocardiogram, and chest X-ray, and complete echocardiography examinations. Echocardiography examination was conducted Exploratory data analysis was performed using descriptive measures. Data put in tables and figures, statistical analyses was done by Chi-square using p-value. P-value less than 0.05 considered significant.

**Results and Discussion**

The total No. of cases were 204 case, female was 106 case, male 98 cases, most common defect was VSD, male: female ratio 1:1.08. Most of cases were VSD 72 case (35.2%) and most common was large VSD, followed by TOF, 29 case (14.2%), least CHD, TAPVR and AP window as in table (1,2). Total cases of VSD was (72). The frequency of types of VSD were as follows; small VSD (24 cases), moderate VSD (22 cases), and large VSD (29% cases). The age distribution of CHD was as follows; neonate (11%), infants (18), (1-5 years) (44%), and children > 5 years (27%). The sex distribution of CHD was as follows; CHD in female was (106 case), in males (98 case), with male to female ratio =1:1.08 (table 3) Family history in CHD female was (106 case), in males (98 case), with male to female ratio =1.08 (table 3) Family history in CHD was seen in TOF. This is consistent with that reported in Jordan (15). In this study most cases were underweight, like other studies done by Krieger I, Forchielli ML, and Pittman JG, which also demonstrate same results 19-21. The cause of growth retardation in CHD is multifactorial 15,19. Inadequate caloric intake, malabsorption, and increased energy requirements caused by increased metabolism may all contribute. However, inadequate caloric intake appears to be the most important cause of growth failure in CHD 15. When heart failure is mild the infant commonly overfeeds, and fluid and sodium overload disturb cardiac haemodynamics, leading to decompensation of heart failure and decreased intake. As a result, the individual’s overall nutrient intake is inadequate. 22 In this research family history was present in 38% similar to that reported in Saudi Arabia (14), but not consistent with that reported in Iceland the high ratio in this study may due to cultural habits of relative marriage 18. Developmental mile stone was normal in
This is consistent with that reported in Jordan, but it is higher than found in the USA. This variation in the result may be related to high level of medical care in the developed country. A USA study showed that there was an increase in incidence of CHD in low economic status population may be related to high level of medical care and high incidence of infectious diseases among this social class. This study revealed Tikrit city have more cases of CHD (19.6%) and the least cases were from Al-dijieal. The probable reason of this difference is that in our study most of the children were referrals cases. In this study most common symptom was of heart failure and recurrent chest infection and most common sign was heart murmur, other studies in Tikrit-Iraq, USA and India obtained the same results. However, in general signs and symptoms of patient presenting with CHD in children are tachypnoea, tachycardia, edema, wheeze, growth failure, pallor, feeding difficulty, sweating, irritability pulmonary crackles, hepatomegally, repeated chest infections and failure to thrive.

<table>
<thead>
<tr>
<th>Type of malformation</th>
<th>No. of cases</th>
<th>Percentage of total</th>
</tr>
</thead>
<tbody>
<tr>
<td>VSD</td>
<td>72</td>
<td>35.2%</td>
</tr>
<tr>
<td>TOF</td>
<td>29</td>
<td>14.2%</td>
</tr>
<tr>
<td>ASD</td>
<td>28</td>
<td>13.7%</td>
</tr>
<tr>
<td>PDA</td>
<td>15</td>
<td>7.35%</td>
</tr>
<tr>
<td>PS</td>
<td>11</td>
<td>5.4%</td>
</tr>
<tr>
<td>TGA</td>
<td>10</td>
<td>4.9%</td>
</tr>
<tr>
<td>COA</td>
<td>7</td>
<td>3.4%</td>
</tr>
<tr>
<td>AVSD</td>
<td>6</td>
<td>2.95%</td>
</tr>
<tr>
<td>Miscellaneous</td>
<td>26</td>
<td>12.7%</td>
</tr>
<tr>
<td>Total</td>
<td>204</td>
<td>100%</td>
</tr>
</tbody>
</table>

Table 2: Frequency of 26 miscellaneous types of CHD in 204 Iraqi children

<table>
<thead>
<tr>
<th>Type of malformation</th>
<th>No. of cases</th>
<th>Percentage of total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aortic stenosis</td>
<td>4</td>
<td>1.96%</td>
</tr>
<tr>
<td>ASD+PS</td>
<td>3</td>
<td>1.47%</td>
</tr>
<tr>
<td>VSD+PS</td>
<td>3</td>
<td>1.47%</td>
</tr>
<tr>
<td>DORV</td>
<td>3</td>
<td>1.47%</td>
</tr>
<tr>
<td>Dilated CMP</td>
<td>3</td>
<td>1.47%</td>
</tr>
<tr>
<td>Pulmonary atresia</td>
<td>2</td>
<td>0.98%</td>
</tr>
<tr>
<td>Truncus arteriosus</td>
<td>2</td>
<td>0.98%</td>
</tr>
<tr>
<td>Single ventricle</td>
<td>2</td>
<td>0.98%</td>
</tr>
<tr>
<td>VSD+PDA</td>
<td>1</td>
<td>0.49%</td>
</tr>
<tr>
<td>TAPVR</td>
<td>1</td>
<td>0.49%</td>
</tr>
<tr>
<td>Hypertrophic CMP</td>
<td>1</td>
<td>0.49%</td>
</tr>
<tr>
<td>Aortopulmonary window</td>
<td>1</td>
<td>0.47%</td>
</tr>
<tr>
<td>Total</td>
<td>26</td>
<td>12.7%</td>
</tr>
</tbody>
</table>

Table 3: Gender distribution of CHD according to sex with male to female ratio

<table>
<thead>
<tr>
<th>Type of malformation</th>
<th>Sex</th>
<th>M/F Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>F</td>
</tr>
<tr>
<td>VSD</td>
<td>30</td>
<td>42</td>
</tr>
<tr>
<td>TOF</td>
<td>19</td>
<td>10</td>
</tr>
<tr>
<td>ASD</td>
<td>9</td>
<td>19</td>
</tr>
<tr>
<td>PDA</td>
<td>5</td>
<td>10</td>
</tr>
<tr>
<td>PS</td>
<td>6</td>
<td>5</td>
</tr>
<tr>
<td>TGA</td>
<td>6</td>
<td>4</td>
</tr>
<tr>
<td>COA</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>AVSD</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Miscellaneous</td>
<td>16</td>
<td>10</td>
</tr>
<tr>
<td>Total</td>
<td>98</td>
<td>106</td>
</tr>
</tbody>
</table>

Table 4: Relationship between Social class and congenital heart diseases

<table>
<thead>
<tr>
<th>Type of malformation</th>
<th>High</th>
<th>%</th>
<th>Middle</th>
<th>%</th>
<th>Low</th>
<th>%</th>
<th>Total cases of CHD</th>
</tr>
</thead>
<tbody>
<tr>
<td>VSD</td>
<td>23</td>
<td>11.3</td>
<td>28</td>
<td>13.7</td>
<td>22</td>
<td>10.7</td>
<td>72</td>
</tr>
<tr>
<td>TOF</td>
<td>11</td>
<td>5.4</td>
<td>7</td>
<td>3.5</td>
<td>11</td>
<td>5.4</td>
<td>29</td>
</tr>
<tr>
<td>ASD</td>
<td>9</td>
<td>4.4</td>
<td>8</td>
<td>4</td>
<td>11</td>
<td>5.4</td>
<td>28</td>
</tr>
<tr>
<td>PDA</td>
<td>6</td>
<td>3</td>
<td>4</td>
<td>2</td>
<td>5</td>
<td>2.5</td>
<td>15</td>
</tr>
<tr>
<td>PS</td>
<td>3</td>
<td>1.5</td>
<td>4</td>
<td>2</td>
<td>5</td>
<td>2.5</td>
<td>11</td>
</tr>
<tr>
<td>TGA</td>
<td>4</td>
<td>2</td>
<td>2</td>
<td>1</td>
<td>3</td>
<td>1.5</td>
<td>10</td>
</tr>
<tr>
<td>COA</td>
<td>2</td>
<td>1</td>
<td>4</td>
<td>2</td>
<td>1</td>
<td>0.5</td>
<td>7</td>
</tr>
<tr>
<td>AVSD</td>
<td>1</td>
<td>0.5</td>
<td>3</td>
<td>1.5</td>
<td>2</td>
<td>1</td>
<td>6</td>
</tr>
<tr>
<td>Miscellaneous</td>
<td>9</td>
<td>4.4</td>
<td>8</td>
<td>4</td>
<td>9</td>
<td>4.4</td>
<td>26</td>
</tr>
<tr>
<td>Total</td>
<td>68</td>
<td>33.3%</td>
<td>67</td>
<td>32.84%</td>
<td>69</td>
<td>33.86%</td>
<td>204</td>
</tr>
</tbody>
</table>
### Table 5: Symptoms in cases of congenital heart disease

<table>
<thead>
<tr>
<th>Symptoms</th>
<th>No. of Cases</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heart failure</td>
<td>65</td>
<td>31.86%</td>
</tr>
<tr>
<td>Recurrent Respiratory Infections</td>
<td>42</td>
<td>20.5%</td>
</tr>
<tr>
<td>Developmental Delay</td>
<td>12</td>
<td>5.8%</td>
</tr>
<tr>
<td>Congenital Abnormality</td>
<td>5</td>
<td>2.45%</td>
</tr>
<tr>
<td>Palpitations</td>
<td>4</td>
<td>1.96%</td>
</tr>
<tr>
<td>Dyspnoea</td>
<td>22</td>
<td>10.78%</td>
</tr>
<tr>
<td>Squatting</td>
<td>13</td>
<td>6.4%</td>
</tr>
<tr>
<td>Fatigue</td>
<td>7</td>
<td>3.43%</td>
</tr>
<tr>
<td>Found on RE</td>
<td>8</td>
<td>3.92%</td>
</tr>
<tr>
<td>Increased sweating</td>
<td>4</td>
<td>1.96%</td>
</tr>
<tr>
<td>Chest Pain</td>
<td>2</td>
<td>1%</td>
</tr>
<tr>
<td>FTT</td>
<td>20</td>
<td>10%</td>
</tr>
</tbody>
</table>

### Conclusion

This study involved (204) patients attended to pediatrics cardiac clinic in Tikrit Teaching Hospital (106 females and 98 males). Between 204 cases of CHD studied, ventricular septal defect present in 32% of cases. CHD was higher in females than males, and the most affected age group was 1-5 years. The most common symptom was of congestive heart failure and recurrent chest infection and most common sign was heart murmur. It is concluded that early detection of neonatal CHD remains challenging because clinical findings may be subtle or absent immediately after birth, and prenatal screening does not reliably detect all cases of CHD.

**Financial Disclosure:** There is no financial disclosure.

**Conflict of Interest:** None to declare.

**Ethical Clearance:** All experimental protocols were approved under the Tikrit Nursing College, Iraq and all experiments were carried out in accordance with approved guidelines.

### REFERENCES


Evaluation of Nurse Role in Management of Patients with Heart Attack

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¹Department of Adult Nursing, College of Nursing, Kirkuk University, Kirkuk, Iraq; ²Department of Adult Nursing, College of Nursing, Hawler Medical University, Erbil, Iraq

ABSTRACT

The study aims to evaluate the effectiveness of a nursing education program on the nurses practice toward cardiac rehabilitation in patients with heart attack. A quasi-study design study was carried out at Azidi Teaching Hospital. A total of (50) samples were allocated into either the study (experimental) group (taking the program, n = 25) or the control group (not taking the program, n= 25). The extent of samples knowledge about the assessment of the heart, assessment chest pain, evaluated Cardiogenic shock, evaluated activity daily living and health education for both study and control group were measured before applying the education program was measured. The structured teaching program for imparting knowledge about cardiac rehabilitation after diagnosis of the disease was developed based on a literature review and expert opinion. Post-test assessment performed for both the study and control group after applying for an education program. The data were analysed through the application of descriptive and inferential statistical analysis. The results of the study were elicited based on two statistical approaches, first, descriptive statistics and the second is an inferential statistical analysis.

Keyword: Heart attack; nursing; education program; cardiac rehabilitation.

Introduction

Heart attack also is known as myocardial infarction (MI), happens at the blood flow reduce or stops to heart muscle which leads to permanent damage to these muscles.¹ The most familiar manifestation is chest pain which may move to the shoulder, left arm, back, neck, or jaw, the pain may be felt like heartburn.² Further manifestation often includes shortness of breath, nausea, feeling faint, fatigue, and sweating.³ Chest pain often not present in female patients, but instead of it there may have neck pain, arm pain, or feel tired. Among those over 75 years old, about 5% have had a heart attack with a light or no manifestation.⁴ A heart attack may cause heart failure, an irregular heartbeat, cardiogenic shock, or cardiac arrest. Most heart attack cases occur due to coronary heart disease. Most risk factors of the disease include increased blood pressure, smoking cigarette, diabetic history, shortage of exercise, increase weight, increase cholesterol, and excessive alcohol intake.⁵ A number of tests are useful to help with diagnosis, including ECG, blood tests, and coronary angiography. An ECG, which is a recording of the heart’s electrical activity, may confirm an ST elevation MI (STEMI) if ST elevation is present. Commonly used blood tests include troponin.⁶ Cardiac rehab is a medically supervised program designed to improve cardiovascular health. If you have experienced a heart attack, heart failure, angioplasty or heart surgery. The role of cardiac rehabilitation has been the spotlight of attention by the massive literature. Effective rehabilitation is multifactorial management requiring including nurse with health professionals.⁷ The chief goal of cardiac management is to prompt patients to participate in their therapeutic treatment regimen to such an extent that they can achieve living almost a normal life. Cardiac management programs comprising prescriptive exercise, health education, and counselling, yield compelling improvements in cardiac morbidity and mortality of

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Department of Adult Nursing,
College of Nursing, University of Kirkuk, Iraq
participants. Furthermore, detection, diagnosis and monitoring of psychological distress should be part of cardiac management since after admission patients frequently experience clinically significant levels of anxiety or depression that may persist for long thus affecting the outcome of the cardiac disease. Usually, health professionals fail to recognize psychological distress in patients with coronary artery disease because they perceive it as a normal reaction to the stressful event of acute myocardial infarction. As a result, symptoms are misdiagnosed as physical problems while the underlying cause remains. Education is the process of acquiring knowledge and skills that can lead to changes in human behaviour, necessary for the maintenance or improvement of health. More in detail, to achieve optimal benefit for patients, education should involve definition of goals, assessment of patients’ needs, modification of patient’s behavior towards more self-control, active participation in decision making, development of self-care to handle the disease and possible complications, assessment of personal risk factors, implementation of realistic goals, support to adopt a positive attitude towards the disease and alleviate psychological distress. The learning process (ways of learning, duration of sessions) differs among individuals and depends mainly on the apprehension of participants and their personal goals. Cardiac rehabilitation programs are intended to enhance the effect of acute treatment actions and to prevent risk factors, thus leading to an improvement in the patient’s well being and recovery. Accordingly, all cardiac rehabilitation activities do not take place at the same time, which is the reason why the nurse’s role changes in character over time.

### Methodology

A quasi-experimental design was applied to achieve the goal of the study. Non-probability, purposive sample, with the use of pre-post test approach for both study and control group. A sample of (50) patient chosen among patients who attended to the Azadi Teaching Hospital in Kirkuk city. The samples were divided into two groups; (25) patient as a study group was exposed to the education program and the other (25) patients are not exposed to the education program, considered as the control group with the same demographic characteristic for both groups. An educational program designed for imparting knowledge to the nurses related to health assessment of the heart; assessment of chest pain; evaluating cardiogenic shock; evaluating daily activity living of the patient. Observation checklist was used as the study instrument for nurses’ practice and was developed by the researchers for the purposive of the study, the instrument content two parts: self-administration sheet related to demographic nurses and observation checklist for nurses practice regarding cardiac rehabilitation program phase one. The observation checklist consists of (50) item divided in to five parts: part one deals the health assessment of the heart, composed of (10) items, part two deals the assessment chest, compromised of (14) items, part three is about evaluation of cardiogenic shock, content (10) items. The last part is about daily activity evaluation which consists of (16) items. After ensuring informed consent from the patients, they were given the pre-test questionnaire before the administration of the educational program. Each sample was given a serial number to be followed in the second assessment (post-test). These items were rated according to the Liker scale always (3), sometimes (2), never (1). The levels of scale which were scored as a total of three episodes of events were observed for each respondent; practices as the mean of data collection (3) or (2) correct practices out of three episodes were rated as always. (1) Correct practices out of (3) episodes were rated as sometimes and uncorrected practices were rated as never. The result of the present study was analysis through application of statistical approaches. The descriptive statistical approach that includes (Frequencies, Percent, Standard Deviation) and inferential statistical approach (t-test).

### Results and Discussion

Analysis of nurse’s demographic characteristics ensures equivalence in both groups and there are no significant differences between study and control group. The study revealed that the majority of the study sample with age ranged from 20-59 years with the mean age of the nurses was (28.65 ± 5.70) years for the study group and (31.42 ± 7.23) years for the control group. Relative to their level of educational, most of the samples in the study group (56%) were graduated from nursing college, and also in the control group (60%) were graduated from nursing college. Joanne and Timothy, (2013) reported that majority of the study sample (66.7%) of the nurses had a Bachelor of Science in Nursing degree and (33.3%) had an Associate of Science or Associate of Arts Degree in Nursing. (88.9%) of the nurses claimed that they had experience teaching cardiac patients. The researcher confirmed that the majority of the nurses in CCU who graduate from
university and institute showed poor theoretical knowledge and demonstrated willingness and motivation for courses in basic life. (14) This study showed that there are highly significant differences between pre - post-tests of the study group in (table 2). The researcher confirms that to increase the understanding, competence and confidence of nurses by developing their skills in a way that will enable them to engage effectively with patients in responding to their needs. (15) Catherine G, et al., (2017) mentioned that patient education program for cardiac patients is an essential part of the quality of nursing staff working in cardiac unit only if the nurses acquire practice regarding cardiac rehabilitation they can improve the practice of patient with heart attack. (16) reported that effective patient education will be provided when nurses have enhanced their patient teaching skills a lack of teaching skills and a lack of utilizing teaching skills will impact on nurses abilities to provide effective patient education. The researcher confirms that the negative correlation between nurses‘ practice in pre and post-test in relation to their educational level.(17)

### Table 1: Sociodemographic Characteristics of the Study and Control groups

<table>
<thead>
<tr>
<th>Variables</th>
<th>Samples Characteristics</th>
<th>Study group (n = 25)</th>
<th>Control group (n = 25)</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No.</td>
<td>%</td>
<td>No.</td>
<td>%</td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20 – 29</td>
<td>7</td>
<td>28</td>
<td>8</td>
<td>32</td>
</tr>
<tr>
<td>30 – 39</td>
<td>11</td>
<td>44</td>
<td>12</td>
<td>48</td>
</tr>
<tr>
<td>40 – 49</td>
<td>6</td>
<td>24</td>
<td>4</td>
<td>16</td>
</tr>
<tr>
<td>50 – 59</td>
<td>1</td>
<td>4</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>Mean and SD</td>
<td>28.65 ± 5.70</td>
<td>31.42 ± 7.23</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>13</td>
<td>52</td>
<td>11</td>
<td>44</td>
</tr>
<tr>
<td>Female</td>
<td>12</td>
<td>48</td>
<td>14</td>
<td>46</td>
</tr>
<tr>
<td>Level of education</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Preparatory Nursing school graduate</td>
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<td>Nursing Institute graduate</td>
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<tr>
<td>Nursing college graduate</td>
<td>14</td>
<td>56</td>
<td>15</td>
<td>60</td>
</tr>
</tbody>
</table>

### Table 2: Study and control group knowledge related to nurse role in the management of heart attack along pre-test

<table>
<thead>
<tr>
<th>Group</th>
<th>Tests</th>
<th>No.</th>
<th>Mean</th>
<th>SD</th>
<th>Standard Error</th>
<th>t-test</th>
<th>P-value</th>
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</thead>
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<td>25</td>
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<td>0.105</td>
<td>0.016</td>
<td>-0.280</td>
<td>0.000</td>
</tr>
<tr>
<td></td>
<td>Posttest</td>
<td>25</td>
<td>1.669</td>
<td>0.102</td>
<td>0.014</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Control</td>
<td>Pretest</td>
<td>25</td>
<td>1.656</td>
<td>0.104</td>
<td>0.023</td>
<td>-38.146</td>
<td>0.392</td>
</tr>
<tr>
<td></td>
<td>Posttest</td>
<td>25</td>
<td>1.877</td>
<td>0.113</td>
<td>0.021</td>
<td></td>
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</tr>
</tbody>
</table>

### Conclusions

The study concluded that there is an increase in nurse knowledge and also increase in nurse practice for that nurse who takes the educational program about the role of the nurse in the management of heart attack.

**Financial Disclosure:** There is no financial disclosure.

**Conflict of Interest:** None to declare.

**Ethical Clearance:** All experimental protocols were approved under the Department of Adult Nursing, College of Nursing, Kirkuk University, Kirkuk, Iraq and all experiments were carried out in accordance with approved guidelines.

### REFERENCES


Prevalence of Hypertension and Myocardial Infarction in Relation with Blood groups in Open Cardiac Center at Al-Najaf City

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¹Sub Department of Basic Science, ²Department of Community Health Nursing, ³Sub Department of Basic Science, College of Nursing, University of Kufa, Iraq

ABSTRACT

Objectives: To estimate the prevalence of hypertension and myocardial infarction among patient attending Open Cardiac Center at Al - Najaf city and investigated them in relation with blood groups. A study was conducted on 100 patients (55 males and 45 females) from which (9 male and 18 female) with hypertension and (25 male and 12 female) with MI who were admitted to Al- Sadar Hospital to perform surgical operations in the period from March 2018 to December 2019, and a total of 19 healthy persons were considered as a control group. Their ages ranged from (18–70) old years. The results show the male patients (55) %, significantly increase (p≤0.05) as compared with the females (45) %, and are observed in younger ages (18-40) old year the females (22) % were recorded significantly elevate (p≤0.05) in comparison with the male (14) % at the same ages. The results demonstrate that there was no significant different among all blood groups, but, the blood group O+ of control sample (healthy persons) is recorded high rate ((51.2) % as compared with other blood groups of control samples and with patients of (hypertension and myocardial) groups.

Keywords: Hypertension, myocardial infarction, Blood Groups.

Introduction

High blood pressure (Hypertension) is the main health problem, that is because it does not cause symptoms. In addition, several people have hypertension without knowing it. Evidence has proven that modifiable factors like overweight, obesity, that is measured by body mass index, visceral adiposity measured by waist circumference, as well as increasing age, are related to the high incidence of hypertension ¹². Previous studies have been found there are a relationship between the ABO blood group and certain health problems. However, a few of these studies have been done to find out the association of hypertension with individual’s blood groups ³. Cardiovascular diseases (CVDs) have been found to be the main cause of premature mortality and long term disability, globally ⁴. In addition, acute myocardial infarction (AMI), as a subtype of CAD, is considered the most common cause of death. Myocardial infarction (MI) is the irreversible death (necrosis) of the heart muscle, which is a result of prolonged ischemia or knows as lack of oxygen supply. frequently when the coronary arteries, which supply blood to the heart become totally obstructed. This obstruction is usually caused by the build-up of plaque in the artery walls or a thrombus in the coronary artery which is developing over the years ⁵. In the United States, around, 1–1.5 million people have found suffer from MI of which about 33% die of the disease yearly ⁶. In 2015, it was estimated that approximately 7.92 million cases of AMI have recorded, according to a review study in 2016, Iran. in-hospital case fatality rate of MI was 12.1% that ST-segment elevation myocardial infarction and age over 84 years were such contributing factors ⁷. According to above the prevalence of AMI in Iran is high and has increased in recent years ⁸. The ABO blood group that is one of the best known genetic traits because of its importance in transfusion medicine, it was discovered by Karl Landsteiner in 1900 ⁹. In addition, there is a lot of evidence supporting the notion that ABO antigens are involved in the pathogenesis of various systemic
multifactorial traits, including infectious, neurological, cardiovascular disorders as well as cancers. The aim of this study estimate of prevalence of hypertension and myocardial infarction among patient attending Open Cardiac Center, Al - Najaf city and investigated them in relation with blood groups.

**Subjects and Method**

This study conducts on 100 patients (55 males and 45 females) from which (9 males and 18 female) with hypertension and (25 males and 12 female) with MI who were admitted to Al- Sadar Hospital/Cardiac center/Najaf/Iraq to perform surgical operation in the period from March 2018 to December 2019, and a total of 50 healthy persons were considered as control group with no history of heart disease or diabetes mellitus. Their ages ranged from (18–70) years, others data were collected include the important symptom which they suffer from it and the type of operation. The diagnosis was made by the consultant medical staff at the hospital. It was based on a clinical examination and other confirmatory investigations. Regarding the hypertensive group, a subject whose blood pressure was more than 140/90 mm Hg were included in the study group. Blood pressure measurements were done by physicians with all patients and the determination of ABO using anti-sera.

**Statistical Analysis:** Social Package for Statistical Analysis (SPSS) version 19 was used, the chi-square test was performed to test the significant difference between all findings in this study. The probability (P) equals or less than 0.05 was considered significant.

**Results and Discussion**

A total of (100) patients in this study who prepare to perform one form of these operations are illustrated in (figure 1). The male patients (55) %, significantly increase (p≤0.05) as compared with the females (45) %, but, in younger ages (18-40) old year the females (22) % were recorded significantly elevate (p≤0.05) in comparison with the male (14) % at the same ages as shown in (table 1). In an investigated the hypertension and myocardial among patients, the results show there was a significant decrease (p≤0.05) of these parameters (27) % of hypertension and (37) % of myocardial as compared with non hypertension and myocardial of both male and female patients, table (2). The results show the non hypertension patients significantly increase (p≤0.05) as compared with hypertension patients in all age groups, on the other hand, the results observe the hypertension patients significantly higher (p≤0.05) in younger ages (18-40) old year than elderly ages (41-70) are observed in figure (2). In contrast, the result demonstrates there was a significant increase (p≤0.05) of non myocardial patients in comparison with myocardial patients, also the patients with myocardial have significantly higher in elderly ages (41-70) old year than younger ages (18-40) old year as shown in (figure 3). The results observe that the infection with heart disease greater among Rh+ than Rh-, also, Rh+ groups are predominate in healthy persons. So, there was no significant different between patients and healthy control, (table 3). The statistical analyses in present finding reveal that the heart disease, no association with blood groups, no significant different between patients with (hypertension, non hypertension, myocardial and non myocardial) and blood groups as shown in table (4) and (5). In addition, this result observe the blood group A+ and O+ are a predominant groups comparing with other blood groups of heart patients. The results in table (6) demonstrate that there was no significant different among all blood groups, but, the blood group O+ of control sample (healthy persons) is recorded high rate ((51.2) % as compared with other blood groups of control samples and with patients of (hypertension and myocardial) groups, otherwise, present study, observe that the blood group A+ was recorded higher rate in patients were (38.4) % and (44.1) % of (hypertension and myocardial) respectively followed by group O+, B+ and AB+ and the blood group A+ was equal to blood group O+ in patient with hypertension. In the current study the most common symptom in patient with heart diseases was chest pain, fatigue ability and fitting attach. The rate of a woman patient in younger age (22) % higher than the rate of men (14) %, this disagreement with Gupta and Gupta (2017) who revealed that in males coronary artery disease (CAD) develops around ten years before a woman. The results in the present study, observe the hypertension factor significantly elevation in ages (18-40) old year patients in comparison with elderly patients (41-70) old years, but, in comparison with non hypertension patients the present results show that the hypertension significantly decline, So, there may be other factors that have led to increased heart disease except hypertension and have not been reported in the current study. Aggarwal, et al (2014), concludes that in
young with smoking (age ≤ 45 years), the existence of high blood pressure (hypertension), overweight, diabetes and metabolic syndrome can determine as a subset at increased risk for future (ACAD) acute Coronary artery disease. Other investigations were revealed risk factor of ischemic heart disease are distributed in the old person age (male and female), stress of mind (male and female), diabetes mellitus, high blood pressure, Smoking, and absence of regular exercise.8,11 The current finding shows the myocardial infarction significantly increased in patients at ages (41-70) old year as compared with age (18-40), while, there was significantly elevated at age (18-40) old year in non myocardial patients compared with elderly patients (41-70), in agreement with Gupta and Gupta (2017), who has mentioned that the extreme number of patients located in the late forties. Furthermore, this study observes the men are recorded rate of infection (25%) with myocardial more than a women (12%) %. This agreement with Mohseni et al. (2017) who show the prevalence of AMI is higher in men. Hormones in females play significant role in the delay of (IHD) ischemic heart disease. Current investigation demonstrates there was no significant difference of blood groups in hypertension and myocardial patients in comparison with non hypertension and non myocardial patients, and there was no significant difference among blood groups in hypertension and myocardial patients, so no correlation among patients and blood groups.

Generals the heart diseases were recorded regardless the sex or age or blood groups. Smoking, body mass index (overweight), physical stillness and custom of junk food can lead to earlier of coronary artery diseases and myocardial infarction (MI). Otherwise, in this study, the dominant blood group was A+ and O+ among the patients followed by the blood group B+ and AB+, this finding is in accordance with Chowdhary et al. (2016) who reported that ischemic heart patient highest with blood group A+, but did not agree with Chowdhary et al. (2016), when found a significant difference between blood groups and ischemic patients, in addition, they were found the blood group O+ was the low rate among patients. Present study found the blood group O+ was the highest among controls, in accordance with Al-Katib et al (2015) who observe that blood group O predominates in controls in study conducted in Al - Najaf city, but this study disagreement with Al-Katib et al (2015) who reveal that blood group O predominates in patients with coronary artery disease followed by A, B, and AB, also disagree with Jassim (2012) and Dibby (2015), who show that blood group O is more predominant among high blood pressure patients and Chandra and Gupta (2012) and Sadiq (2017), who conclude the B blood group was more susceptible to high blood pressure and overweight (obesity). Distributions of blood groups have some variations whilst occur in one small country in various areas.

### Table 1: Distribution of heart patients according to sex and age

<table>
<thead>
<tr>
<th>Age</th>
<th>Male</th>
<th>Female</th>
<th>Total</th>
<th>X²</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>18-40</td>
<td>14</td>
<td>22</td>
<td>36</td>
<td>4.961</td>
<td>0.026</td>
</tr>
<tr>
<td>41-70</td>
<td>41</td>
<td>23</td>
<td>64</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>55</td>
<td>45</td>
<td>100</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Table 2: Distribution of hypertension and myocardial patient according to sex

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Male</th>
<th>Female</th>
<th>Total</th>
<th>X²</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hypertension</td>
<td>9</td>
<td>18</td>
<td>27</td>
<td>7.015</td>
<td>0.008</td>
</tr>
<tr>
<td>Non hypertensive</td>
<td>46</td>
<td>27</td>
<td>73</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>55</td>
<td>45</td>
<td>100</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Myocardial infarction</td>
<td>25</td>
<td>12</td>
<td>37</td>
<td>3.748</td>
<td>0.053</td>
</tr>
<tr>
<td>Non myocardial</td>
<td>30</td>
<td>33</td>
<td>63</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>55</td>
<td>45</td>
<td>100</td>
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</table>
Table 3: The statistical comparison of studied samples according Rh (rhesus factor)

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Hypertension</th>
<th>Non hypertension</th>
<th>Myocardial</th>
<th>Non myocardial</th>
<th>Control</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rh+</td>
<td>26 (64%)</td>
<td>64 (34%)</td>
<td>53 (34%)</td>
<td>41 (82%)</td>
<td></td>
</tr>
<tr>
<td>Rh-</td>
<td>1 (6%)</td>
<td>9 (4%)</td>
<td>2 (9%)</td>
<td>11 (22%)</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>27 (73%)</td>
<td>73 (47%)</td>
<td>36 (11%)</td>
<td>64 (22%)</td>
<td></td>
</tr>
</tbody>
</table>

| X²        | 6.024        |
| p-value   | 0.197        |

Table 4: The statistical analyses of hypertension and non according to blood groups

<table>
<thead>
<tr>
<th>Blood groups</th>
<th>Hypertension</th>
<th>Non hypertension</th>
<th>X²</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>A+</td>
<td>10 (40%)</td>
<td>20 (20%)</td>
<td>2.521</td>
<td>0.520</td>
</tr>
<tr>
<td>B+</td>
<td>5 (20%)</td>
<td>17 (17%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>O+</td>
<td>10 (40%)</td>
<td>19 (19%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AB+</td>
<td>1 (4%)</td>
<td>8 (8%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>26 (64%)</td>
<td>64 (64%)</td>
<td></td>
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</table>

Table 5: The statistical analyses of myocardial and non according to blood groups

<table>
<thead>
<tr>
<th>Blood groups</th>
<th>Myocardial</th>
<th>Non myocardial</th>
<th>X²</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>A+</td>
<td>15 (41.7%)</td>
<td>17 (41.7%)</td>
<td>4.210</td>
<td>0.240</td>
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<tr>
<td>B+</td>
<td>6 (10.9%)</td>
<td>14 (25.9%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>O+</td>
<td>12 (25.9%)</td>
<td>15 (25.9%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AB+</td>
<td>1 (2.9%)</td>
<td>7 (13.8%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>34 (41.7%)</td>
<td>53 (58.3%)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 6: The statistical comparison of studied groups according to blood groups

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Hypertension</th>
<th>Myocardial</th>
<th>Control</th>
<th>X²</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>A+</td>
<td>10 (38.4%)</td>
<td>15 (44.1%)</td>
<td>11 (26.8%)</td>
<td>5.197</td>
<td>0.519</td>
</tr>
<tr>
<td>B+</td>
<td>5 (18.5%)</td>
<td>6 (17.6%)</td>
<td>5 (12.1%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>O+</td>
<td>10 (38.4%)</td>
<td>12 (35.2%)</td>
<td>21 (51.2%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>AB+</td>
<td>1 (3.8%)</td>
<td>1 (2.9%)</td>
<td>4 (9.7%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>26 (41.7%)</td>
<td>34 (41.7%)</td>
<td>41 (41.7%)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Conclusion

The present finding reveals that the heart disease, no association with blood groups, no significant different between patients with (hypertension, non hypertension, myocardial and non myocardial) and blood groups. In addition, this results observes the blood group A+ and O+ are a predominant groups comparing with other blood groups of heart patients. Otherwise, the blood group O+ is predominant in control sample (healthy persons).

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the college of nursing, University of Kufa, Iraq and all experiments were carried out in accordance with approved guidelines.

REFERENCES


Prevalence of Serratia Species Isolated from Children with Diarrhea and Studying their Virulence Factors

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College of Nursing, Basic Science Dept. University of Kirkuk, Iraq

ABSTRACT
The aim of the current study is to find out the prevalence of Serratia species in stool samples of diarrheal cases in children less than five years old in Kirkuk City. In addition to study the virulence factors produced by the isolates under investigation. Patients and methods: Four hundred and seventy six stool samples were collected from children under five years with diarrhea during 1st of June 2016 to end of August 2018. The collected samples were cultured directly on different types of media for primary isolation of the Enterobacteriaceae then the suspicious colonies were selected for definitive microscopic examination, culture characteristics, biochemical testing and API 20E System for identifying Serratia species. Later the virulence factors for Serratia isolates were investigated. The results showed 10 (2.1%) isolates of Serratia species were recovered, which were distributed as follow; 4 (0.8%) belonged to S. marcescens, in which only 1(0.2%) isolate was pigmented S. marcescens, 4 (0.8%) were S. liquifaciens and 2 (0.4%) belonged to S. rubidea. The results showed that the distribution of the virulence factors were differ among the tested isolates. All the ten isolates (100%) were siderophores producers. Moreover, all S. marcescens isolates were able to produce, gelatinase, DNase, licithinase.

Keywords: Serratia species, S. marcescens, virulence factors, diarrhea, prevalence

Introduction
Numerous pathogens can cause diarrhea, but the causative agents of many cases are unknown. Therefore, identification of pathogenic species within intestinal microbes is important. The genus Serratia is a member of the Family Enterobacteriaceae that is consists of 14 species and two recognized subspecies. It is a gram-negative bacterium that cause disease in a wide range of hosts including plants, insects, and vertebrates. Serratia marcescens is the most frequently isolated Serratia species from human infections. It was considered previously to be non pathogenic, but it know becoming an important cause of hospital acquired infections that can be life threading. Furthermore, the non pigmented strains are clinically more prevalent. It has been improved to be associated with urinary tract infection, blood infection, surgical wounds, cerebrospinal fluid infection, respiratory tract infections. Fecal specimen of patients with diarrhea. However, they are more frequently cause outbreaks in neonates intensive care units, as well as it affects weak and immunocompromised patients. The infection has been acquired via ingestion of contaminated foods, and contaminated hospital environments. The pathogenicity of this species attributed to intrinsic resistance that considered virulence factors which including hemolysin, various enzymes as urease enzyme, siderophore and extracellular protease like gelatinase, lipopolysaccharide, chitinase, lipase, DNase, chloroperoxidase. In addition to its ability to acquire resistant to multiple antibiotic agents. Moreover, the cytotoxicity of clinical strains in vitro were investigated by other investigators, who suggested that S. marcescens induces changes in the intestinal epithelial cells in culture as inflammation, cytotoxicity, adherence, and invasion. Whereas, Carbonell, et al. improved the cytotoxic activity of most their pigmented isolates of S. marcescens on various tissue culture, and virulent for mice with LD50 = 10^7 bacteria ml^-1. Accordingly, the aims of the current study were to find out the prevalence
of Serratia species in stool samples of diarrheal cases in children less than five years in Kirkuk City. In addition to study some of the virulence factors produced by the isolates in order to better understanding the characteristics of Serratia species that aid in preventing its dissemination in the hospital environments.

Methodology

Sample Collection: The study was carried out on out and inpatients (children less than five years) suffering from diarrhea attending Pediatric hospital in Kirkuk City, from 1st of June 2016 to the end of August 2018. There were 476 stool samples collected in disposable, clean screw-capped containers. The samples were processed immediately. The Carry Blair transport media used if samples delayed for 1-2 hours after their collection then immediately. The Carry Blair transport media used if samples delayed for 1-2 hours after their collection then cultured. All samples were cultured directly on MacConkey agar, nutrient agar and blood agar to detect beta hemolytic isolate (6). All isolates incubated aerobically at 35 °C for 24 hours, and suspicious colonies were selected for microscopic examination, culture characteristics, biochemical testing, and API 20E System (BioMérieux/ France) for identifying Serratia species.

Bacterial Isolation and Identification: Collected samples were cultured directly on MacConkey agar, nutrient agar and blood agar to detect beta hemolytic isolate (6). All isolates incubated aerobically at 35 °C for 24 hours, and suspicious colonies were selected for microscopic examination, culture characteristics, biochemical testing, and API 20E System (BioMérieux/ France) for identifying Serratia species.

Detection of Some Virulence Factors: The Hemolysin production, Gelatin liquefaction, Extracellular protease, DNase production, Lecithinase production, Urease activity, Binding to Congo red by the tested isolates determined according to 18. The method of Sambrook was adopted for production of Siderophores, and Lipase test according to Branson. All S. marcescens were submitted to pigment production test as described in 16.

Results and Discussion

Isolation and Identification: The results of identification showed that out of 476 stool samples from children with diarrhea, 10 (2.1%) isolates belong to the genus Serratia were recovered during two years. Table (1); demonstrates the distribution of species into 4 (0.8%) S. marcescens, from which 1(0.2%) was pigmented S. marcescens (Figure-1), while the other 3(0.6%) isolates were non pigmented S. marcescens, 4 (0.8%) S. Liquifacience, and 2 (0.4%) belonged to S. rubidea. However one isolate of S. rubidea found to be in association with K. oxytoca and three isolates of S. Liquifacience were isolated with E. coli and Proteus mirabilis. The identification and characterization of the isolated Serratia species were based on morphological, cultural characteristics, and biochemical tests as well as the results of API 20E System. The finding of current study demonstrate the low distribution of Serratia species including S. marcescens in stool samples of children with diarrhea, This result was found to be lower than that reported by 21, who isolated (2.26%) of S. marcescens out of 398 hospital environmental samples in Baghdad. It had been found that these bacteria may be detected more frequently in the stool of patients with diarrhea than in asymptomatic control children 16. Other researchers found that only (3.4%) of 938 clinical isolates of S. marcescens were pigmented, which improved the higher frequency of non pigmented strains among clinical isolates of S. marcescens. 6. These finding were matched with the results of current study. Table 2 illustrates the frequency of Serratia infections among males were higher than that of females, the ratio of male/female is 1.5:1, as well as the infection is more frequent among age group (2-12) months rather than other age groups. Adamson, et.al. 10 reported prolonged outbreak of S. marcescens in a neonatal intensive care unit, including cases of necrotizing enterocolitis in children 22. S. marcescens can cause rapid spreading outbreaks of severe and fatal infections in neonatal units 23. The increased incidence in this age is most likely the result of greater exposure to enteropathogenic bacteria as well as the presence of susceptible host 24, and the immaturity of the immune system of the infant 25. The results also showed that Serratia infections were more frequent among inpatients 8(1.68%) rather than outpatients. Infection of Serratia acquired through contaminated hospitals’ equipments, the hands of medical staff, as well as contaminated food 12. Other investigators reported that S. marcescens is an opportunistic human pathogen and is responsible for increasing nosocomial infections in hospitalized patients which can be life threatening 26. It survive in hospital environment 22, and resistant to most antibiotics, in addition to producing potent virulence factors 27.

Table 1: Distribution of Serratia spp. (n=10) isolated from stool samples

<table>
<thead>
<tr>
<th>Bacterial isolates</th>
<th>Number of isolates (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Serratia marcescens</td>
<td>4 (0.8%)</td>
</tr>
<tr>
<td>Serratia liquifacience</td>
<td>4 (0.8%)</td>
</tr>
<tr>
<td>Serratia rubidea</td>
<td>2 (0.4%)</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>10 (100%)</strong></td>
</tr>
</tbody>
</table>
Table 2: Distribution of Serratia spp. according to patient’s sex and age groups

<table>
<thead>
<tr>
<th>Bacterial isolates</th>
<th>Group</th>
<th>2m-1y Male</th>
<th>2m-1y Female</th>
<th>1.1m-5y Male</th>
<th>1.1m-5y Female</th>
<th>Total (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Serratia marcescens</td>
<td></td>
<td>2</td>
<td>1</td>
<td>-</td>
<td>1</td>
<td>4 (40%)</td>
</tr>
<tr>
<td>Serratia liquifaciens</td>
<td></td>
<td>2</td>
<td>-</td>
<td>1</td>
<td>1</td>
<td>4 (40%)</td>
</tr>
<tr>
<td>Serratia rubidea</td>
<td></td>
<td>1</td>
<td>1</td>
<td>-</td>
<td>-</td>
<td>2 (20%)</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td>5</td>
<td>2</td>
<td>1</td>
<td>2</td>
<td>10 (100%)</td>
</tr>
</tbody>
</table>

Virulence Factors of Serratia Species: The identification and characterization of bacterial virulence factors is important for effective treatment of bacterial infections, and prevent their dissemination. Hens, some of virulence factors of selected isolates were characterized as shown in (Table.3) and (Figur.1).

Table 3: Virulence factors possessed by Serratia spp. (n = 10)

<table>
<thead>
<tr>
<th>Virulence factors</th>
<th>Isolates</th>
<th>S. marcescens n = 4 (%)</th>
<th>S. liquifaciens n = 4 (%)</th>
<th>S. rubidea n = 2 (%)</th>
<th>Total (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Siderophores</td>
<td></td>
<td>4</td>
<td>4</td>
<td>2</td>
<td>10 (100%)</td>
</tr>
<tr>
<td>Gelatin liquefaction</td>
<td></td>
<td>4</td>
<td>2</td>
<td>2</td>
<td>8 (80%)</td>
</tr>
<tr>
<td>Deoxyribonuclease</td>
<td></td>
<td>4</td>
<td>1</td>
<td>1</td>
<td>6 (60%)</td>
</tr>
<tr>
<td>Invasiveness (binding to congo red)</td>
<td></td>
<td>2</td>
<td>2</td>
<td>0</td>
<td>4 (40%)</td>
</tr>
<tr>
<td>Haemolysin</td>
<td></td>
<td>3</td>
<td>0</td>
<td>1</td>
<td>4 (40%)</td>
</tr>
<tr>
<td>Lecithinase</td>
<td></td>
<td>4</td>
<td>0</td>
<td>0</td>
<td>4 (40%)</td>
</tr>
<tr>
<td>Lipase</td>
<td></td>
<td>4</td>
<td>0</td>
<td>0</td>
<td>4 (40%)</td>
</tr>
<tr>
<td>Protease</td>
<td></td>
<td>4</td>
<td>0</td>
<td>0</td>
<td>4 (40%)</td>
</tr>
<tr>
<td>Urease</td>
<td></td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>1 (10%)</td>
</tr>
<tr>
<td>Red pigment production</td>
<td></td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>1 (10%)</td>
</tr>
</tbody>
</table>

Figure 1: A-pigmented and non-pigmented Serratia spp. on nutrient agar media.

B- pigmented Serratia marcescens on Mac Conkey agar media.

C-The opacity around the streaking culture represent lecithinase producer Serratia marcescens on Egg Yolk agar media.

D-The opacity around the streaking culture represent protease producer Serratia marcescens on Skim milk agar media.

E-Clear zone on DNA agar with methyl green around the colony represent DNase producer Serratia marcescens on DNase agar media.

F-The opacity around the streaking culture represent lipase producer Serratia marcescens on Sierra media.

G- pigmented Serratia marcescens on nutrient agar.

H-The clear zone around the colony represent beta-hemolysis on blood agar.

Siderophore and Hemolysin: The results revealed that all 10 (100%) of the isolates were able to produce siderophore (in presence of dipyridil). While only three isolates of Serratia species were able to produce hemolysin on blood agar, including three isolates of S. marcescens. However other investigators in Baghdad reported that all nine isolates of S. marcescens from
different clinical sources were hemolytic\textsuperscript{7}. Hemolysin production is associated with necrotoxicity and cytotoxicity of cell and can destroy the erythrocyte to extract iron from them\textsuperscript{28}. The supply of free iron in the host milieu may be extremely low; many bacteria attempt to secure their supply of iron in the host by secreting high-affinity iron chelators called siderophores\textsuperscript{29}.

**Lecithinase Production:** The results in Table.3 also showed that all 4 \textit{S. marcescens} isolates were lecithinase producers, while other two species were negative for this enzyme. Lecithinase destroys red blood cells and other tissue cells. It is active in phosphatidylserine PS and phosphatidylcholine PC degradation. It hydrolyzes lecithin which is a lipid component of eukaryotic membrane thereby this enzyme destroys the integrity of the cytoplasmic membranes of many cells. The two enzymes (lecithinase and Hemolysin) have a synergistic effect on the ability of the organism to invade host tissues\textsuperscript{30}.

**Extracellular protease, lipase, DNase production, and urease:** Table.3 demonstrates that all the tested isolates of \textit{S. marcescens} were able to produce extracellular protease. This finding is higher than other researchers\textsuperscript{8} who observed that 4.4\% out of 45 bacterial isolates from diarrheal cases of children under 5 years were \textit{S. marcescens} which were protease producers. It considers one of the factors that enhance inflammatory intestinal disease. More than half or two third of the isolates showed ability to produce gelatinase, lipase and DNase including all \textit{S. marcescens}. However only on isolates of \textit{S. marcescens} was produce urease. These finding relatively in agreement with\textsuperscript{21} who reported that all the nine isolates of \textit{S. marcescens} that isolated from Baghdad hospital environment were produce DNase, Protease, Esterase, and Lipase, as well as most of them were able to produce \textbeta- lactamase and adhere to epithelial cells.

**Invasiveness (binding to Congo red):** Regarding invasiveness, the results in Table.3 illustrates that from 10 Serratia species two of \textit{S. marcescens} and \textit{S. liquifaciens} gave positive red colony. This finding is lower than that reported by El-Baghdady, \textit{et. al}.\textsuperscript{31} who reported that all Serratia spp isolated from different clinical samples exhibited both high invasion capability and epithelial cell cytotoxicity. Also Jacobsen \textit{et. al}.\textsuperscript{32} reported invasion, cytotoxicity and biofilm formation of \textit{Serratia} spp. And \textit{Escherichia coli}. Congo red dye agar test was used by researchers as phenotypic marker to differentiated invasive and non- invasive \textit{E. coli} and Shigella species\textsuperscript{21}. It have been observed from above results that the four isolates of \textit{S. marcescens} were posses most of the virulence factors under investigation. This might be attributed to its pathogenicity and potency for causing various nosocomial infections. This finding was in agreement with other investigators who were improved that \textit{S. marcescens} is a potential enteric pathogen, and suggested that this organism interact with intestinal epithelial cells in culture and induces dramatic changes similar to those produced by well known enteric pathogens\textsuperscript{30}.

**Conclusion**

It have been concluded that the \textit{S. marcescens} isolates were the most virulent species in the genus Serratia and causing nosocomial infections, affecting immunocompromised patients especially in children under five years. The identification and characterization of the virulence factors produced by Serratia species especially \textit{S. marcescens} is crucial for effective treatment of infected patients. In addition to develop more effective novel antibiotics, It is recommended to prevent the spread of this organism into the hospital environment and all necessary precautions must be taken, as well as rapid and proper treatment of infected patients.

**Financial Disclosure:** There is no financial disclosure.

**Conflict of Interest:** None to declare.

**Ethical Clearance:** All experimental protocols were approved under the College of Nursing/Basic Science Dept. University of Kirkuk. Iraq and all experiments were carried out in accordance with approved guidelines.

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Some Functions of the Lungs and Emotional Arousal and their Relationship to Achieve the Effectiveness of Running 1500 m for Young Players

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ABSTRACT

This study dealt with several topics including the introduction of the research and the importance which lies in the knowledge of the relationship between some functions of the lungs and emotional excitement and the completion of 1500 m for young players, and through the experience of researchers and follow-up to most local tournaments noted that the functional competence of the lungs have a large role and very important in achieving the high achievement of the race (1500 m). In addition to the fact that emotional arousal aims to enhance the confidence of the player himself and increase the sense of security and psychological stability, especially before the competition and therefore the researchers sought to enter into this experiment by studying the relationship between some functions of the lungs excitement and its relationship to achievement 1500 m for young players. Researchers used the descriptive approach to solving the problem of research. The results of the statistical analysis of the data and their discussion revealed that there is a significant negative correlation between the achievement in the 1500 m race and the function variables of the lungs, vital capacity VC, forced exhalation of the first second (FEV1), peak exhalation force.

Keywords: Effectiveness, Lungs, Emotional arousal

Introduction

Taking the flag progress from year to year and this progress was clear and continuous in most areas of life and reflected positively on the most important manifestations, and here we find that developed countries spare no effort to scientific research in order to get everything that is new so they took rapid progress in the most important aspect of these aspects is the sports aspect, which is considered a fundamental pillar and an important aspect of these countries ¹, which led to the monitoring of large amounts of training and numbers of athletes who are in return for large financial returns to their clubs and their countries. This led to the use of various science and training programs, Data or modern equipment, which led to the high level of various games, whether individual or collective, Athletics is an activity that is influenced by all the elements of fitness and the development of functional devices. Athletics is one of the most popular events. Among these games, the 1500m is one of the most exciting events for athletes. Olympia and the world and a special character with the speed of the runner and run long distances ², and since the competition ran 1500 is a combination of aerobic and anaerobic capacity, the views of many experts in training in determining the rate of development of this event. The process of specialization in athletics activities is to improve the physiological aspects through the development of the work of the circulatory and respiratory systems. The respiratory system is one of the most important functional devices that helps athletes to cope with the high efficiency through the functional efficiency of this device which is responsible for saturation The body cells in sufficient quantities of oxygen inhaled and then supplied ³ to the muscles working after oxidation and disposal of carbon dioxide and therefore the process of breathing and the use of oxygen is of the utmost importance and a significant and clear in the employment efficiency of other functional devices, which Leading to adaptation and economy in

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the process of energy discharge during performance. That the exercise of the effectiveness of 1500 m, whether in training or competition, the player to many of these circumstances and situations and psychological situations are different and often accompanied by excitement and excitement, especially during the competition so the preparation and psychological preparation has become a necessary and urgent for the player so as to be able to control his emotions and control his actions, which helps to increase and improve the efficiency of performance. Hence the importance of research in identifying the relationship between responses to functional and emotional variables and the achievement of the effectiveness of 1500 m for young players.

### Methodology

The curriculum is one of the important factors followed by the researcher to solve the problem and is tested according to the nature of the problem to be studied since the nature of the problem requires researchers to use the approach to describe the method of relationship relations “to see the correlation of two or more variables.

### Community and Research Sample:

The research community was determined by the players of the 1500 m youth of the Middle Euphrates clubs (Al-Khornaq, Midwest, Al-Buzar, Babel, Qassim, Rafidain and Shamiya). (16) runner, and then the sample was selected by the amount of (10) runners to experience the simple random way (lot), and Table (1) shows that.

### Table 1: Shows the population and sample of the research

<table>
<thead>
<tr>
<th>Number of members of the exploratory experiment</th>
<th>Percentage</th>
<th>Number of main experiment personnel</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>25%</td>
<td>10</td>
<td>62.5 %</td>
</tr>
</tbody>
</table>

### Tools and Equipment used in Research:

- Spirometer for measuring (vital capacity and exhalation of the first second and the inspiration reserve).
- Knapsacks.
- Gymnasium.
- Measuring tape (40 meters).
- Sport stopwatch number (2).
- Whistle number (2).
- Office tools (papers and pens).
- Camera type (Canon) number (1).
- Laptop type calculator (Lenovo) number (1).

### Determination of measurements of lung variables:

#### Measurement of Vital Capacity:

The measurement is carried out by the Spirometer device. The laboratory holds the tube connected to the device from the stand position and then takes the maximum possible inhalation and maximal exhalation in the tube. The measurement is done according to the aforementioned device by drawing the graph on the sheet, The end of the device indicator from the curve diagram is the top of the dynamic volume taking into account the position of the payment on the nose.

#### Measurement of exhalation for the first second:

The measurement is carried out by the spirometer. The laboratory takes the maximum possible inhalation and then quickly generates the inside of the tube and is measured by the same sheet of paper that is used to measure the biological capacity.

#### The peak of the rush of the exhalation:

The measurement is performed by the Spirometer device through the same chart that prepares us to plan the breathing process after the referee has taken the maximum possible inspiration.

#### The measure of emotional arousal:

In order to reach the goals that were developed, the researcher adopted the emotional arousal scale prepared by Essam Mohammed Abd al-Rida al-Nahi (1) after making some modifications in the wording of the paragraphs so that the scale becomes more suitable for the sample of the research. The scale may be (31) paragraph, Paragraph

### Test ran 1500 m:

#### Objective:

Measurement of the achievement level of running 1500 m.

#### Tools:

Timing clocks number (3), whistle.

#### Description of the performance:

Start of the situation of the bird where each member of the sample search run 1500 m according to legal rules.
Registration: The assistant team records the time spent for this distance and the nearest part of a second to the mean hour.

Exploration Experiment: The researchers conducted an exploratory experiment to test 1500 m on a sample of the original research community and from the same sample of the study and a number of (4) players on Sunday, 3/2/2019 where the exploratory experiment aims to:

Verify the validity of the devices and tools used in the research.

Identify the time required to perform tests.

Know the obstacles that may arise and avoid mistakes and interference in work.

Main Experience: After the completion of the exploratory experiment and ensure that the researchers applied the main experiment through the application of tests and measurements on the research community and the tests were conducted on Sunday 10/2/2019, as the tests were in the following sequence:

Tests of functional variables of the lungs.

Emotional arousal scale

The test ran 1500 m.

Statistical means used: The researchers used statistical pouch (spss) in analyzing the search results, including:

- Arithmetic mean.
- Standard deviation.
- Mediator.
- Pearson correlation coefficient.

Presentation, analysis and discussion of the results: Presentation of the results of the relationship between some functions of the lungs and completion of 1500 m.

Results and Discussion

The results showed that there is a significant negative correlation between the achievement in the 1500 m race and the function variables of the lungs, vital capacity VC, forced exhalation of the first second (FEV1), peak exhalation force (PEF). It is negative links in the sense that the increase in the size of lung function variables that showed a significant correlation offset by a decrease in the performance time of the contestants and this is due to the specificity of effectiveness. In the view of the researchers that the correlation between the vital capacity and the achievement of (1500 m) output of the ability of the lungs to absorb the largest amount of air at the inhalation as well as the result of increased amount of air paid at the expense of the amount of air remaining in the lungs. To increase the elasticity of the pectoral muscles in the expansion and increase in size of the racers increases the viability of the thorax, which indicates an increase in the volume of oxygen entering the lungs. Qassim Hassan Hussein pointed out that practicing sports training on a regular basis leads to positive functional changes in the respiratory system. These changes achieve additional flexibility in the muscles of the rib cage, which increases their ability to expand and widen, which increases the volume of inhaled air and thus helps to increase the amount of oxygen in the exchange of gases between the blood and the alveoli and the economic breathing movements due to increased bio-capacity. West also noted that sports training leads to increased bio-capacity due to increased chest muscles’ ability to stretch. In the view of the researchers that the moral correlation between the forced exhalation of the first second and the peak of the eruption and the achievement of (1500 m) is the result of the efficiency of breathing muscles, the nature of the breathing method of the process of inhalation and exhale during swimming requires a high effort of breathing muscles to overcome the water resistance that limits the expansion of the rib cage During inhalation and water resistance to exhaled air which leads to increased efficiency of respiratory muscles. As Mohamed Hassan Allawi pointed out, “the volume of forced exhalation is strongly related to the exhalation muscles and the degree of air resistance in the airways” (1). “The physical fitness of athletes may be high or low depending on sports training, they increase with regular training and decrease in case of interruption,” said Abu El-Ella Ahmed Abdel-Fattah. Through these functions of the lungs it became clear to us that the player who has good variables, the results of his achievement is good through the moral links with the completion of (1500 m), which demonstrates the good preparation contestants. This view is in line with what Marwan Abdel Meguid said, “The best measure to measure the efficiency of the respiratory and circulatory systems is the maximum percentage of oxygen used during physical work, ie, the amount of oxygen used per kilogram of body weight per minute.” (3). In the third
The objective is to identify the level of emotional arousal where the total score was calculated for each player if the score increased to (62) degree that the player has a high level of emotional arousal either if the total score is less than (62) or equal to That the player varies to the level of emotional arousal and this so-called theoretical average and to estimate whether the differences are apparent. Table (2) shows that the value of sig is less than the level of significance (0.05) in freedom degree (15) which indicates that athletics and especially the effectiveness of 1500 have a high level of emotional arousal and this gives an impression on the relationship between search variables (Allawi, 1998) Emotional arousal is a subjective state of consciousness in the organism accompanied by internal physiological changes and external expressive manifestations that may often express the type of emotion.

Table 2: Shows the results of the computational environment, standard deviations, simple correlation coefficient (Pearson) and the value of test indication (sig) for some functions of the lungs and emotional arousal and completion of 1500 m

<table>
<thead>
<tr>
<th>landmarks Statistical landmarks</th>
<th>measuring u measuring unit</th>
<th>S - S-</th>
<th>+ p p+</th>
<th>Achievement of 1500 m</th>
<th>Link value Link value</th>
<th>Test ind (sig) Test indication value (sig)</th>
<th>Significance Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vital Capacity VC</td>
<td>liter</td>
<td>6.55</td>
<td>0.69</td>
<td>0.858-</td>
<td>0.003</td>
<td>moral</td>
<td></td>
</tr>
<tr>
<td>Short term exhalation of the first second FEV1</td>
<td>L/s L/s</td>
<td>5.88</td>
<td>0.76</td>
<td>4.19 1.05</td>
<td>0.714- 0.008</td>
<td>moral</td>
<td></td>
</tr>
<tr>
<td>Peak exhalation 89064</td>
<td>L/s L/s</td>
<td>7.42</td>
<td>0.76</td>
<td>1.05 4.19</td>
<td>0.876 0.001</td>
<td>moral</td>
<td></td>
</tr>
<tr>
<td>Emotional arousal</td>
<td>Degree</td>
<td>74.9</td>
<td>2.93</td>
<td></td>
<td>0.85 0.002</td>
<td>moral</td>
<td></td>
</tr>
</tbody>
</table>

**Conclusion**

Based on the research results reached within the research community, the following conclusions were reached: There is a significant correlation between the vital capacity (VC) and the achievement of 1500 m. There was a significant correlation between the forced exhalation volume of the first second (FEV1) and the achievement of 1500 m. There was a significant correlation between peak exhalation force (PEF) and achievement 1500 m. 1500m players have a high level of emotional arousal.

**Financial Disclosure:** There is no financial disclosure.

**Conflict of Interest:** None to declare.

**Ethical Clearance:** All experimental protocols were approved under the Physical Education and Sports Sciences - University of Kufa, Iraq and all experiments were carried out in accordance with approved guidelines.

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Synthesis and Characterization of New Heterocyclic (Triazoline) Anticancer Compounds

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ABSTRACT

Synthesis of triazoline compounds using 1,2,3 propane triol as beginning material. Step syntheses of these triazoline derivatives is the Cu(I)-catalyze azide-alkyne, also known as click reaction, react 4-(azidomethyl)-2,2-dimethyl-1,3-dioxolane(2) with compounds(alkene, anhydride derivatives). The three product compounds were purified and characterized by FTIR, CHN. and 1H NMR, 13C NMR.

Keywords: 2- butanone, acrylamide, maleic anhydride.

Introduction

1,2,3-Triazoles defined as aromatic heterocyclic molecules which have five-membered of exclusively nitrogenated synthetic source, it is usually stable and inert hydrolysis, reduction and oxidation ¹. A result for its high effectiveness the researchers interested in this group of compounds besides major range of biological activities include anti-bacterial², anti-tumor ³ Cytotoxicity ⁴ adding another point the pharmaceutical applications and it’s important for biological activity ⁵,⁶ Triazoles importance privileged medicinal scaffolds as arsul for their important biological activities including anti-allergic anti-HIV ⁷,⁸ anti-microbial ⁹,¹¹, anti-tubercular agent,¹²,¹³ selective adrenergic receptor agonist receptor ¹⁴ antagonists.¹⁵ Huisgen was the first to study the synthesis of triazoles giving rise to the1,3-dipolar cyclo-addition ¹⁶ which involves the reaction of an alkyné and an azide to give and subrogate triazole regioisomer. methodologies were developed involving transition metals the Cu catalyzed alkyné azide cyclo. reaction. Sharpless ¹⁷ and Meldal ¹⁸ product copper catalyzed azide alkyné cyclo-addition reaction, which allowed the region-selective gave the 1,4-regioisomer. Ru catalyzed cyclo-addition gave away the 1,5-regioisomer, different method logie were investigated to rule the regi-oselectivity besides control improve the reaction conditions for the formation of 1,2,3-triazoles ¹⁹.

Methodology

1,2,3 propane triol, 2-butanone, Zncl₂, NaN₃, acrylamide, maleic anhydride, Na₂SO₄, NaAsc, CH₂Cl₂, DMF, H₂SO₄, General chemicals were purchased from Merck or Aldrich, All solvents (Merck).

Instrumentation: FTIR spectra obtained using Shimadzu university of Babylon scan of 4000 to 400 cm⁻¹, were spectra ¹H, ¹³C-NMR recorded on (Iran- Beheshti university) at 300 MHz, using DSMO and TMS as internal standards. Melting points were determined, CHN were determined in Bagdad university.
Procedure

Preparation compound \{(2-Ethyl-2-methyl-1,3-dioxolan-4-yl)methanol\} 1): This Compound were synthesized from propane triol as shown in (Scheme 1). Compound 1 was obtained by the reaction of 2-butanol, 1,2,3 propane triol catalyzed by ZnCl₂, yellow color liquid, yield: 83%

\[ \text{FTIR (cm}^{-1}\text{): } 3444 (\text{NH}), 2980 (\text{CH}_3), 2883.6 (\text{CH}_2), 1377 (\text{CH}), 1103 (\text{C-O}). \]

Results and Discussion

A series of compound was prepared from the reaction glycerol with 2-butanon utilize ZnCl₂, H₂SO₄ (Strong acid to draw water from the reaction and to make the reaction forward) give high product Acetal (83%) (Table 1) According to the principles of green chemistry and easy method.

<table>
<thead>
<tr>
<th>No.</th>
<th>Com</th>
<th>M.Wt</th>
<th>M.F</th>
<th>color</th>
<th>Yield %</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>98</td>
<td>146.18</td>
<td>C₁₃H₁₈O₅S</td>
<td>Yellow liquid</td>
<td>83</td>
</tr>
<tr>
<td>2</td>
<td>171</td>
<td>171</td>
<td>C₇H₁₃N₃O₂</td>
<td>Yellow liquid</td>
<td>65.2</td>
</tr>
<tr>
<td>3</td>
<td>-</td>
<td>242</td>
<td>C₁₀H₁₈N₄O₃</td>
<td>amorphous as a pink color</td>
<td>55.88</td>
</tr>
<tr>
<td>4</td>
<td>-</td>
<td>269</td>
<td>C₁₁H₁₅N₃O₅</td>
<td>amorphous as a yellow color</td>
<td>61.33</td>
</tr>
</tbody>
</table>

The FTIR (cm⁻¹) show the following: 2935 (CH₃), 2129 (NN), 1327 (C-O). The ¹H-NMR (DMSO) show the following: 1.16-1.21 (m, 4H, CH₃), 1.97 (d, 5H, CH), 7.1-7.2 (d, 5H, CH), 7.3-7.4 (d, 3H, CH₂), 7.6 (d, 3H, CH₃). The ¹³C-NMR (DMSO) show the following: 21.2 (CH₃), 28.6 (CH₃), 39.6 (CH), 40.7 (C-N), 83.5 (CO), 125.5 (O-C-O). Elemental analysis: calc. for C₇H₁₃N₃O₂ (MW =171): 49.11% C, 7.65% H, 24.54% N; found: 48.91% C, 7.27% H, 24.77% N.

Cycloaddition Reactions for Preparation of 1,2,3Triazolines (3,4): The azide (2) (1 g, 7 mmol), different compound (9 mmol), t-butyl alcohol (30 mL of D.W/30 mL of t-butyl alcohol), Sodascorbate (0.004 g, 0.2 mmol) CuSO₄·5H₂O aqueous solution (0.0024 g), were added in a round. The mixture was stirred for 8 h at 50°C. After the end of the reaction D.W (10 mL), CH₂Cl₂ (3*20 mL) was added. The organic phase separated, extracts and dried over Na₂SO₄ (Scheme 2)

Synthesis of 1-{(2-ethyl-2-methyl-1,3-dioxolan-4-yl)methyl}-4,5-dihydro-1H-1,2,3-triazole-4-carboxamide (3): The reaction of acrylamide gave 55.8% yield powder as a pink color.

The FTIR (cm⁻¹) show the following: 3358, 3182 (NH₂), 2883 (CH₃), 2802 (CH₂), 1676 (C=O), 1433 (CO). The ¹H-NMR (DMSO) show the following: 1.2 (m, 4H, CH₃), 1.71 (brs, 3H, CH₃), 2.5 (q, 4H, CH₂), 3.4 (d, 3H, CH₂), 4.5 (m, 3H, CH₂), 5.5-5.6 (d, 3H, CH₂), 6.05-6.2 (OCH), 7.1 (m, 2H, NH₂).

The ¹³C-NMR (DMSO) show the following: 10.2 (CH₃), 21.24 (CH₃), 26.261 (CH₂), 55.9 (CH₂), 68.6 (C-N), 79.2 (C-N), 88.66 (C-O), 119.2 (C=O), 176.6 (C=O). Elemental analysis: calc. for C₁₆H₁₈N₄O₇ (MW=242) 49.57% C, 7.49% H, 23.13% N; found 49.03% C, 7.94% H, 22.78% N.
Synthesis of 1-{(2-ethyl-2-methyl-1,3-dioxolan-4-yl) methyl}-1H-furo[3,4-d] [1,2,3] triazole-4,6(3aH,6aH)-dione (4): The reaction of maleic anhydride gave 61.33% yield amorphous as a brown color

The FTIR (cm⁻¹) show the following: 3425.69 (NH), 2953.1 (CH₃), 1649.1 (C=C), g1228 (CO).

The ¹H-NMR (DMSO) show the following: 1.4 (t, 4H, CH₃), 1.9 (m, 2H, CH₂), 2.45 (q, 4H, CH₂), 3.3 (m, 3H, N-CH₃), 3.7 (brs, 3H, N-CH₃), 3.8-4.5 (m, 3H, CH₂), 4.47 (d, 3H, CH₃-N), 5.2 (m, 1H, CHN), 6.8 (m, 5H, CHO).

Elemental analysis: calc. for C₁₁H₁₅N₃O₅ (MW=269): 49.07% C, 5.62% H, 15.61% N; found 48.12% C, 5.09% H, 14.99% N. Another green aspect of CuAAC reaction is the application of alcohol as solvent in the preparation of 1,2,3-triazole use a components reaction of alcohol and NaN₃. Triol is highly hydrophilic, naturally available, inexpensive and environmentally friendly. Triazolene were produce in good to excellent with this green solvent. The published procedure involves the use of azide and different compound, which are easily available reagents as the catalytic system at room temp. This low-cost, simple protocol exhibits wide substrate scope and ambient reaction condition and can be ease utilized for high syntheses. “click” Cu-catalyzed azide-alkyne cycloaddition reactions (CuAAC) have become the focus of many chemists and were found wide application in drug synthesis, chemical biology, anti-cancer among others. Some synthetic aspects of this reaction should be taken into consideration before the preparation of desired 1,2,3-triazole derivative 3, 4:

a. The standard protocol, which consists in using the cost-efficient salt CuSO₄.5H₂O and NaAsc, is usually realized in a mixture of NaN₃, DMF, could all be employed as co-solvents for this cycloaddition reaction, enabling a wide range of substrates to be adapted.

b. Triazol driydivtive (3), common key intermediates in this transformation, are not available and must be prepared from azide and acrylamide.

c. To improve the utility and manipulability of this process for generation of desired products 4, azide component reaction of maleic anhydride, sodium ascorbate.

Conclusion

Synthesis of triazoline compounds using 1,2,3 propane triol as beginning material. Step syntheses of these triazoline derivatives is the Cu(I)-catalyze azide-alkyne, also known as click reaction, react 4-(azidomethyl) -2,2-dimethyl-1,3-dioxolane(2) with compounds (alkene, anhydride derivatives). The three product compounds were purified and characterized by FTIR, CHN, and 1H NMR, 13C NMR.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Faculty of Science, University of Babylon, Iraq and all experiments were carried out in accordance with approved guidelines.

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The Effect of Teaching on the Skills of Logical Thinking in the Achievement of Student’s Achievement in Biology

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ABSTRACT

The aim of the research was to identify the effect of logical thinking skills on the achievement of the fifth grade biology students. To achieve the goal, the researchers put the zero hypothesis which states: There is no statistically significant difference at the level of (0.05) between the averages scores of the female students of the experimental group will be guided by the logical thinking skills. The average number of female students of the control group will study according to the usual method in the biology test. In order for the researchers to apply, the experiment was applied in the second half of the academic year (2018-2019). If the sample consisted of (82) fifth grade female students of Al-Baqir High School for Girls. And random image were divided into two groups of 36 students per group. The two groups were equivalent in the following variables: age, decision scale, testing the previous information of the new material, and in light of the behavioral objectives and the relative importance of the content, (40) paragraph of multiple choice, and the researcher has achieved the specifications of the cycmometric test, the experiment continued to apply for (8) weeks.

Keywords: Logical thinking skills, fifth grade students, biology, achievement

Introduction

Biology aims to help humans to understand the nature that surrounds them, by increasing their ability to test them, and then benefit from them. Biology is part of our general culture and will continue to develop and promote modern science. ¹ noted that with the scientific development in biology that emerged at the turn of the twentieth century, those interested in living had to pause to consider teaching this science at different levels of study and to give students the opportunity to assimilate the concepts of biology. Biology has evolved from being just a branch of natural sciences to the basis and origin of other sciences. It has become necessary for students to understand other basic sciences ². They must absorb many biological concepts that play a fundamental role in the formation of the rest of science, linking the daily life of female students and increasing their biological culture, and clarifying the role of biology in the development of medicine and its applications in society ³. Most of the specialists agree that biology is one of the pillars of natural science and its basis, which is concerned with analyzing the study and investment of natural phenomena, and the revival of the great impact in scientific development, because the biology includes life concepts and medical relationships and questions of conclusion; this is why students have difficulties in understanding and learning this subject which reflected negatively on their motivation and achievement when they learn ³-⁵. This has been demonstrated by previous studies ⁴⁶. This has made teachers look for the best strategies and methods that are more effective in teaching science in general and biology in particular ⁷. It has been found that one of the ways that contribute to the broader understanding of biology and achieve its objectives in the secondary stages, is the use of logical thinking skills because it is a modern methods that help to eliminate the problems that hinder students’ understanding of biology and raise their levels of achievement, and that these skills did not. This study was conducted in order to determine the extent to which there is a difference between the students of the experimental group who study according to logical thinking skills and the students of the control group who study according to the usual method.

DOI Number: 10.5958/0976-5506.2019.01440.2
The logical thinking skills used in the current research are:

1. **Information organizing skills:** the order of information for the use of effectively and include three sub-skills is the skill of comparison, and the skill of classification, and the skill of ranking, as follows:

   A. **The skill of comparison:** Through which the student can identify and the existence of the phenomenon and its various elements by finding points of similarity and differences and examine the relations between them.

   B. **Classification skill:** The basis of building the knowledge of the student, and the task of progress and scientific development, but is one of the most important skills of thinking and used to separate and sort things according to their characteristics, functions and characteristics

   C. **The skill of arrangement:** means the development of things, concepts or events that are interrelated in one way or another in a sequential context according to a certain criterion.

2. **Skills of generating information:** It is a basic skill through which students can predict and formulate hypotheses, and include the following:

   A. **Research skill:** The student seeks information to answer the question posed, with the organization and arrangement of information

   B. **The skill of experimentation:** the ability of the student to subjugate the former probabilities and opportunities in practical procedures.

   C. **Composition skills:** The ability to assemble elements and ideas and produce new buildings, plans and ideas.

   D. **The skill of the conclusion:** is the ability of the student and enable them to get to the conclusion and the reasons or result.

   E. **Predictability:** reliance on prior information in order to predict an event or phenomenon in the future.

   (E). **The skill of representation:** the presentation of concepts or information and their output in tables or graphs or conceptual maps.

**Methodology**

It includes a presentation of the procedures prepared for the achievement of the research objectives, starting with research methodology, experimental design, community identification, research sample, preparation of research tools and requirements, equivalence of research groups (experimental and control), presentation of statistical means and implementation procedures.

**Experimental Design of the Research:** It includes the independent variable (logical thinking skills) and (the usual method), the variable dependent (achievement) and (decision-making), so the researchers used the experimental design and the equivalence of the two sets of research one experimental and the other control.

**Equivalence of the Two Research Groups:** The researchers conducted a statistical equivalence between the students of the experimental and control groups in some variables that affect the results of the experiment, for the difference of the study society between the control and experimental groups, The researchers sought to achieve equivalence with the following variables (age calculated by months, testing the previous information with the new material, decision scale). The researchers performed the equivalence in the variables mentioned for the two research groups.

The results were as follow:

<table>
<thead>
<tr>
<th>Variable</th>
<th>Group</th>
<th>Sample size</th>
<th>Average</th>
<th>Standard deviation</th>
<th>Freedom degree</th>
<th>Fixed value</th>
<th>Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (months)</td>
<td>Experimental</td>
<td>36</td>
<td>171.482</td>
<td>12.253</td>
<td></td>
<td>0.998</td>
<td>Statistically Not significant</td>
</tr>
<tr>
<td></td>
<td>Control</td>
<td>36</td>
<td>174.933</td>
<td>16.454</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Test previous information</td>
<td>Experimental</td>
<td>36</td>
<td>54.658</td>
<td>16.917</td>
<td></td>
<td>0.195</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Control</td>
<td>36</td>
<td>53.875</td>
<td>15.656</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Decision scale</td>
<td>Experimental</td>
<td>36</td>
<td>27.773</td>
<td>7.818</td>
<td>68</td>
<td>0.754</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Control</td>
<td>36</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
**Control of Exotic Variables:** Although the researchers verified the equivalence of the two sets of research to some variables that they think affect the course of the experiment, but they tried to avoid the impact of some variables that affect the process of the experiment and of these variables and how to control it:

**Accidents Accompanying the Experience:** The research experience has not been subjected to any accident or emergency condition that hinders its progress.

**Experimental Absence:** did not get a case of transfer or interruption of any student length of the experiment.

**Sample Selection:** The sample members were chosen intentionally and the equivalence of the two research groups was ascertained.

**Factor of Maturity:** Due to the duration of the experiment in being uniform among the members of the group as well as their age, Therefore, the growth of individuals will return to the same level as the two groups of research, so this factor has no effect in the experiment.

**Effect of Experimental Procedures:** The researcher worked to limit the impact of those procedures that affect the dependent variable during the course of the experiment.

**Methods and tools used to study blood according to logical thinking skills**

**Search tool:** Steps for the search tool (the achievement test) are:

**Determination of the purpose of the achievement test:**
The purpose of the test is to measure the achievement of the fifth grade biology (information, experience and skills) in biology in the study of blood.

**Determination of the objectives of the test:** After determining the primary purpose of the test, the objective of the test is determined to determine the extent to which these objectives are achieved. The researcher formulated a number of behavioral goals

**Test instructions:** The instructions and instructions for how to answer (answer all paragraphs, choose one correct alternative to the paragraph, write the triple name, the row and the division in the specific place, the duration of the answer.

**The test answers correction:** After the test paragraphs were drafted and the choice of the test type was selected, a standard was established to correct the answers. One (one score for the correct test paragraph) and zero for the wrong answer were placed, And the abandoned paragraph that the student did not answer), the upper final score of the test is 40 and the minimum test score is zero.

**Test authentication:** the truthfulness of the test were confirmed The results showed that 80% of the agreement was achieved by the arbitrators and the specialists for the validity of the content. The results showed that all the items in the test are statistically significant, so the test is true. In measuring the comprehension and understanding of fifth graders in biology.

**The second exploratory application:** The test was applied to a sample consisting of (100) female students in the fifth grade of biology, other than the research sample. The purpose of the test is to analyze the paragraphs for the statistical achievement test, which is to distinguish the paragraph, the difficulty of the paragraph, the effectiveness of the wrong alternatives.

**Analysis of the scores of the achievement test statistically:** The sections of the achievement test are analyzed as follows:

**Stability of the test:** The stability coefficient of the test depends on the relationship between all test paragraphs or between each paragraph, and this is evidenced by the consistency of its paragraphs and the stability of its grades. The stability coefficient of the test can be calculated by using the legal relationship between the test units. A good test is to be honest and consistent. Meaningful test must be consistent and true at the same time. Stability indicates a match between test scores when returned at the other time, indicating the stability and balance of the students’ grades in the test.

**Methods of finding the stability of the test:**

**Partition to half method:** This method is one of the most used methods, because it avoids the other defects of some methods and in order to obtain two images of the test researchers have divided the paragraphs of the test To individual and single paragraphs and to the choice of students of the survey sample of (100) answer. And by extracting Pearson correlation coefficient between the single and individual scores, the stability factor was obtained (0.87). Since the half-stability coefficient of
the index does not measure the total homogeneity of the test (because it is only half constant), So the corrective measures were carried out using the Spearman Brown coefficient, which reached (0.93) from the point of view of the specialists is a good stability coefficient.

Koder-Richardson Method 20: The Koder-Richardson equation was applied on the basis of the students’ scores. The researcher found that the stability value of the test is 0.83 and thus is a suitable and good value so the test is stable.

Application of the research tool: The control and experimental research groups were informed a week before the date of the assessment test and was applied after completing the teaching of the material identified for the two research groups at the same time, and supervised the researchers to apply the test.

Statistical Methods: The researchers used the T-test equation for two independent samples for the equivalence between the control and experimental groups, And Pearson’s correlation equation, where they used the equivalent researchers to correct the correlation coefficient between the test parts (single and double paragraph) after being extracted by the spss and the Pearson correlation coefficient.

Results and Discussion

It was found to the students of the experimental group through the use of the microscope that:

<table>
<thead>
<tr>
<th>Character</th>
<th>Red blood cells</th>
<th>White blood cells</th>
</tr>
</thead>
<tbody>
<tr>
<td>Morphology</td>
<td>Small, both sides concave cells</td>
<td>Small cells differ from red blood cells as larger ones</td>
</tr>
<tr>
<td>Nucleus</td>
<td>No nucleus</td>
<td>Nucleus</td>
</tr>
<tr>
<td>Type</td>
<td>One type</td>
<td>Two types: granulate and a granulate</td>
</tr>
<tr>
<td>color</td>
<td>containing hemoglobin</td>
<td>Do not contain hemoglobin and be transparent (colorless)</td>
</tr>
<tr>
<td>Number</td>
<td>(6) million in the micrometer</td>
<td>Their number ranges from (5000-11000) per cubic Mel</td>
</tr>
</tbody>
</table>

The above table shows the difference between red blood cells and white blood cells in some of the basic characteristics that distinguish between them. The white blood cells are based on two basic types: granular and a granular white cells in human blood. Blood has a special process called coagulation, which can be explained by the following diagram: Then the researcher prepared a test after the completion of the educational material for both groups that the researcher taught them as the results showed that the experimental group exceeds the control group according to the following table:

<table>
<thead>
<tr>
<th>Statistic group</th>
<th>Number</th>
<th>Average</th>
<th>standard deviation</th>
<th>Variance</th>
<th>Freedom degree</th>
<th>Fixed values</th>
<th>Significance level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experimental</td>
<td>36</td>
<td>26.03</td>
<td>6.30</td>
<td>39.57</td>
<td>69</td>
<td>21.158</td>
<td>Statistically significant</td>
</tr>
<tr>
<td>Control</td>
<td>36</td>
<td>22.64</td>
<td>6.78</td>
<td>45.84</td>
<td></td>
<td>2</td>
<td></td>
</tr>
</tbody>
</table>

Note from the previous table that the experimental group exceeds the control group in the achievement test. Therefore, there is a statistically significant difference in the level of significance between the average score of the students of the experimental group who studied the biology according to logical thinking skills and the average score of the students of the control group who studied the same subject in the usual way of collection in favor of the experimental group.

This is consistent with the previous studies which confirmed the superiority of the students of the experimental group, which studied according to logical thinking skills on the control group, which studied according to the usual method. In addition, the researcher used the test of Kilmajrov Smirnov, which is a non-parametric test of natural distribution, we can judge by the value of probability p if the value of p is greater than the level of the approved indication, this indicates that there is no difference between the distribution function and the theoretical distribution function of the distribution of the average, i.e. the acceptance of the null hypothesis, that is, the distribution is moderate, p probability values are greater than the level. The significance relied on by the researcher is (0.05) for the experimental and control group in the study achievement variable, the members of the two groups in all search variables follow the normal distribution.
The T-test is used to analyze the variance. This is illustrated by the following table:

<table>
<thead>
<tr>
<th>Group</th>
<th>Test variable</th>
<th>Kolmogorov-Smirnov test</th>
<th>Shapiro-Wilk test</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Statistics</td>
<td>P value</td>
<td>significance</td>
</tr>
<tr>
<td>Experimental achievement</td>
<td>0.087</td>
<td>0.201</td>
<td>Not significant</td>
</tr>
<tr>
<td></td>
<td>Statistics</td>
<td>P value</td>
<td>significance</td>
</tr>
<tr>
<td></td>
<td>0.966</td>
<td>0.340</td>
<td>Not significant</td>
</tr>
<tr>
<td>Control achievement</td>
<td>0.090</td>
<td>0.201</td>
<td>Not significant</td>
</tr>
<tr>
<td></td>
<td>0.981</td>
<td>0.754</td>
<td>Not significant</td>
</tr>
</tbody>
</table>

**Conclusion**

The use of logical thinking skills has a positive impact on increasing the achievement of the fifth grade biology students in biology and increasing their ability to understand information and knowledge and facts and raise their academic level. The use of logical thinking skills to play a role in making students the center of the process of communication through their active participation in educational situations, which increase their self-confidence and encourage them to persevere to raise their scientific level.

**Financial Disclosure:** There is no financial disclosure.

**Conflict of Interest:** None to declare.

**Ethical Clearance:** All experimental protocols were approved under the University of Babylon, College of Basic Education, Babylon, Iraq and all experiments were carried out in accordance with approved guidelines.

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The Effectiveness of a Specimen Collection Edilson in the Fifth grade Unqualified Biological Material in Biology and Thinking Contemplative

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ABSTRACT

The study aimed to measure Effectiveness of the specimen collection Edilson in the fifth grade students in the bio - biology material, and to achieve the goal of the researcher developed a null hypothesis, which states: there is no difference is statistically significant at the significance level (0.05) between the mean scores of the experimental group students who Sidersn according to the specimen Edilson And the average score of students of the control group who will be taught according to the usual method in the test of the collection and reflection of the biology, and to verify the researcher applied its experience in the second half of the academic year (2018 - 2019), where the sample of the study of (60) The two groups were rewarded with the following variables: age, intelligence test scores, half-year grades of biology, and the relative importance of content and purposes. Behavioral, collection test was built Consisting of 40 items of multiple choice test to think Contemplative consisting of (paragraph 30). The researcher from Alsekoumtrah to test yen test properties have been achieved,

Keywords: Edilson specimen, collection, neighborhoods, students fifth grade bio, thinking Contemplative.

Introduction

Modern education is not merely a process of providing the learner with a fixed and limited amount of information, but also enabling him to learn for himself and develop his ability to employ knowledge in his life. It is essential that the learner’s education is comprehensive and integrated in all aspects. And includes the life of the learner in its entirety from cradle to grave and the involvement of several institutions in education, including school, family and society in that and no nation seeks to occupy a prestigious position among the nations and gave the educational process of great interest to be able to build a generation conscious and seeks to grow in his culture and able to To adapt to new developments in order to Enmaa advanced civilization with a society. The education and learning of the Third Millennium Science has come to face a range of challenges and variables, requiring science education and learning professionals to deal with these challenges in an unconventional way. Education is the only way to meet the challenges of the 21st century Salman, 2018 : 9Salman, 2018), And through scientific and scientific education curricula aimed at supply Learner Group From Of experience Scientific studies )) Knowledge, skills Scientific, trends Scientific value (Necessary to be Able On Keeping pace with the age requires attention to understanding the nature of science, applying scientific knowledge related to daily life situations. Science is one of the most important subjects in any education system at the global level. The importance of science and its contribution to the progress and development of nations is significant. The developed countries sought to improve the curricula of science and develop them, and stressed the adoption of methods and methods of modern teaching as it makes the learner the focus of the educational process and try to stimulate the thinking of both the teacher and the learner in the course of the implementation of the lesson. The teaching methods of science, such as biology, emphasize that teaching should be carried out through the practice of the activities carried out by the learner under the direction of the teacher, whether in the classroom or laboratory, as well as the adoption of modern teaching models.

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There are three steps to implement the ADSLON model for use: Motivation or motivation: In this model, “knowing the need and desire for new knowledge” means the motivation to acquire knowledge, and occurs when the learner is confronted with a problem, constraint, gap, activity or event that shows his past knowledge deficits and his need to learn to solve the new problem in knowledge, this two effects occur in the learner: the creation of desire and motivation to acquire new knowledge, and create a context any boot for the introduction of new knowledge into memory and integrated with prior knowledge, and the presence of motivation here achieves the existence of a goal oriented and understanding conscious of the nature of learning. Knowledge building: It means “developing new knowledge” as a result of experiences that enable the learner to add new concepts, to fragment existing concepts or to create new relationships between concepts, bearing in mind that the learner can build new knowledge as a result of the self-experience that allows him to integrate, the learner is active and has the opportunity to observe and integrate into activities or through communication with others or both. Knowledge revision and refinement: It means “organizing and linking knowledge structures” to organize, purify, refine and link knowledge structures, Knowledge and application in learning for use. This step focuses on the organization of knowledge and linking it to other knowledge and promoting it so that it can be retrieved, used and applied in the future. This is achieved through two processes: application and reflection. In this step the third and fourth principles of the model are achieved. The following table shows the procedural steps of Edelson Learning and processes involved in each step and the strategies and activities proposed to implement each process.

**Methodology**

It includes a description of the procedures that have been carried out to achieve the research objectives, starting with the research methodology, experimental design, defining the research community and its design, the equivalence of the research groups (experimental and control), preparation of the research materials and tools, will be displayed as follows:

**Experimental Design Research:** includes the independent variable (specimen Edilson) and (the usual way), and the dependent variable (collection), so the researcher used t of experimental design The partial adjustment of the two experimental and unequal; one other officer.

**The research community and its model:** The current research community represents all fifth grade students in the secondary and preparatory schools of the General Directorate of Education in the province of Baghdad (first Karkh) for the academic year (2018 - 2019), in which the population of the fifth grade is not less than bifurcated, and the sample chose T. researcher of (secondary Sayyyab for girls) in the first province of Baghdad/Karkh center are intentional to conduct his research a found Tha it includes two divisions (a, b), Akhtar T. researcher of the Division (a) way random clouds to represent the experimental group and a number of her students (39 students), which will study according to N. (Model Edilson), the same way the researcher chose T. Division of random (b) to represent the control group and the number of her students (38 students), which will study n according to (the usual way).

**Equality of the two sets of research:** production rate researcher of equal statistically between the experimental and control groups in some of the variables that affect the results of the experiment, although the selection of the researcher of the two groups in a manner of random draw, and although the research sample students from the center of social and economic is similar to a large extent and studying in one school, but it is a keen t on the equivalence of the following procedure variables: chronological age measured in months, first semester grades, IQ test, as the T researcher of parity between the two groups to conduct research in the variables mentioned above showed the results according to the table 1.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Group</th>
<th>Sample size</th>
<th>SMA</th>
<th>Standard deviation</th>
<th>The degree of freedom</th>
<th>T value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age calculated in months</td>
<td>Experimental</td>
<td>3939</td>
<td>199,1919</td>
<td>9.19</td>
<td>7,087, 08</td>
<td>0.9890, 989</td>
</tr>
<tr>
<td></td>
<td>Control</td>
<td>3838</td>
<td>198,9519</td>
<td>9.5</td>
<td>6,366, 36</td>
<td>0.309, 309</td>
</tr>
<tr>
<td>First semester grades</td>
<td>Experimental</td>
<td>3939</td>
<td>69.8969</td>
<td>.89</td>
<td>14,921, 4.92</td>
<td>7575</td>
</tr>
<tr>
<td></td>
<td>Control</td>
<td>3838</td>
<td>68.6468</td>
<td>.64</td>
<td>13,9113, 9.1</td>
<td>0.4980, 498</td>
</tr>
<tr>
<td>IQ test</td>
<td>Experimental</td>
<td>3939</td>
<td>25.22, 5, 2</td>
<td>6,946, 9.4</td>
<td>5,925, 9.2</td>
<td>0.4980, 498</td>
</tr>
<tr>
<td></td>
<td>Control</td>
<td>3838</td>
<td>24,732, 4, 73</td>
<td></td>
<td></td>
<td>0.4980, 498</td>
</tr>
</tbody>
</table>

Table 1: The equivalence of the two groups in some variables
Preparation of research requirements: The requirements search of basic things underlying the research and that the accordingly be implemented research procedures. These are requirements for: scientific material (content) have been identified scientific article that T. folk researcher of taught for students of the two sets of research during the duration of the experiment (second semester) of the academic year (2018 - 2019) m, and scientific material included a study (the last three chapters of the book biology fifth grade bio), as a researcher of 16 prepared a plan for the experimental group that studied according to (specimen Edilson) and the same for a group The control is taught according to the method Normal).

Search Tool: Steps are set for the tool: The research (the achievement test) is as follows:

**Determination of the purpose of the achievement test:** The goal of the achievement test is to measure the achievement of the fifth grade biology students in the study (last three seasons).

**Define test objectives:** Having been identified the purpose of the achievement test is to determine the objectives of the test to determine the extent achieved and the T researcher formulated a number of behavioral goals.

**Identify paragraphs test:** The T researcher identified a number of paragraphs that achievement test consists of which it reached the number of paragraphs of the test (paragraph 40).

**Directed paragraphs of the test:** was drafted paragraphs of test grades as preliminary in the light of the contents of the map of experiential, chose T. researcher of the type of test (multiple choice) which is one of the best objective tests, consisted test of 40 test paragraph, distributed to the levels of cognitive Bloom (Knowledge, understanding, application, analysis, composition, calendar), and the last three topics of biology book for the fifth grade.

**Test Instructions:** Formulate instructions and special instructions on how to answer (Choosing one correct alternative to the paragraph, answering all paragraphs, the time period for answering, writing the triple name, the row and the division in the assigned space).

**Correcting the test answers:** After the test paragraphs were formulated and the type of test was formulated, a response was developed to determine the correct answers. It was put (one score for each correct test paragraph) and zero for the wrong answer and the left paragraph that the student did not have, It has more than one choice) and therefore the highest final score. For the achievement test is (40 degrees) and the minimum score (zero).

**Believe the test:** it was confirmed virtual honesty to test the sincerity of the content, as the results showed that the apparent honesty obtained a ratio of agreement (80%) by the arbiters and specialists, either content sincerity results have appeared that all the paragraphs of the achievement test is statistically significant, so it is a test summative honest

Methods of finding the stability of the test:

**Retail half-way:** This method is one of the most methods widely used, due to a Nha avoid defects some ways the other and in order to obtain two equal test the T researcher of dividing the paragraphs of the test to the individual and even-numbered paragraphs and choose answers students exploratory sample the (100) Reply, and Extracted Pearson correlation coefficient between the scores of odd and even paragraphs were obtained on the consistency factor of (0.8 8 ) As the retail stability of the mid-term test coefficient does not measure the overall homogeneity of the test (because the stability of only half of it), so the patch using the coefficient of procedure Spearman Brown As it amounted to (0.9 2 ) It is a good stability from the point of view coefficient specialists.

**Application search tool:** the media and the two sets of experimental research officer of the date of the achievement test application a week before the vote was applied after the completion of the teaching material specific to the two sets of research at one time, and supervised T. researcher of the testing process application.

**Statistical methods:** Use T. researcher of the test equation Altaia (t-Test) For two independent samples to conduct parity between the experimental and control groups, and Pearson correlation equation used as T. researcher of the equation to correct the correlation coefficient between the partial test (grades odd and even paragraphs) after the Pearson correlation coefficient extracted.

Results and Discussion

For the purpose of verifying the null hypothesis, which states (There is no statistically significant difference at the level of significance (0.05) between the average
scores students in the experimental group who studied according to the specimen Edilson and the average score of the control group who studied on the way according to normal in the Open Waseel material biology).

It was the arithmetic average calculation deviation standard scores both sets of research in test grades were calculating the value of T for two independent samples as in the table (2)

<table>
<thead>
<tr>
<th>Type of test</th>
<th>The group</th>
<th>SMA</th>
<th>Variance</th>
<th>Standard deviation</th>
<th>The degree of freedom</th>
<th>T value Calculated</th>
<th>Table</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eligibility Test</td>
<td>Experimental</td>
<td>29.69</td>
<td>27.98</td>
<td>5.29</td>
<td>75</td>
<td>4.031</td>
<td>2.000</td>
</tr>
<tr>
<td>Control</td>
<td>25.45</td>
<td>39.31</td>
<td>6.27</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Reflective thinking</td>
<td>Experimental</td>
<td>26.69</td>
<td>21.45</td>
<td>4.90</td>
<td>75</td>
<td>3.016</td>
<td>2.000</td>
</tr>
<tr>
<td>Control</td>
<td>22.32</td>
<td>33.12</td>
<td>6.90</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

It is clear from Table (2) that the value of T calculated to test grades (4.031) greater than the value of T Tabulated (2,000) at the degree of freedom (75) and the level of significance (0.05) and that the value of T calculated to test the reflective thinking (3.016) greater than the value T Tabulated (2,000) at the degree of freedom (75) and the level of significance (0.05) therefore rejects the null hypothesis, and thus the students group pilot who was their teaching on according to a specimen Edilson has excelled on the students of the control group who were taught n According to the usual method used in the teaching of biology in the test of achievement and contemplative thinking. -The teaching according to the specimen Edilson has contributed to raising the academic achievement of the students in the fifth grade bio - material biology better than the usual method of teaching, increasing academic attainment. The teaching according to the specimen Edilson has contributed to the lifting of reflective thinking for students in the fifth grade bio - material biology better than the usual way in Altd Rees, increasing of thinking Contemplative.

**Conclusion**

If the specimen Edilson effectiveness of the great increase in the collection of students grade the fifth bio in biology material and increase their ability to understand Almaloma T, facts and knowledge and raise their level of school. That the specimen Edilson role in making the students at the center of the educational process through their participation effective in the educational situation, which would increase their confidence and encourage them to persevere to raise their level of scientific. That the specimen Edilson a significant role in increasing reflective thinking among students in the experimental group through the steps of the specimen (motivation and refinement of knowledge building) and the opposite of the usual way.

**Financial Disclosure:** There is no financial disclosure.

**Conflict of Interest:** None to declare.

**Ethical Clearance:** All experimental protocols were approved under the University of Babylon, College of Basic Education, Babylon, Iraq and all experiments were carried out in accordance with approved guidelines.

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The Impact of Challenge Strategy on Student Achievement of fourth-grade Students in Biology

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ABSTRACT

The aim of the research is to identify the impact of the challenge strategy in the achievement of the fourth grade students of biology. To achieve the goal, the researcher put the zero hypothesis which states: There is no significant difference at the level of significance (0.05) between the average score of students of the experimental group who will study according to the challenge strategy and average The grades of the students of the control group who will study according to the normal method of testing the collection of biology. The study sample consisted of (70) students of the fourth grade in the university’s junior high school. They were randomized to two groups of 35 students in each group. The two groups were rewarded with the following variables: age, IQ test, half-year biology. In the light of the relative importance of content and behavioral purposes, an achievement test consisting of (40) multiple choice types was constructed. The researcher investigated the characteristics of the cytometric test for testing. The experiment lasted 8 weeks. At the end of the experiment, The results were then analyzed and showed that the students of the experimental group who studied according to the challenge strategy.

Keywords: achievement, Biology, Fourth grade students, Strategy Challenge.

Introduction

Biology is a natural science that includes facts, theories, inventions and discoveries that occur around the universe and its components. It also includes various mechanisms of thinking, analysis, experiments, evidence and evidence, as well as being responsible for the interpretation of most phenomena in nature. And the material of biology, and what happens in the universe, and close to them to explain things and how to live organisms. In spite of the importance of the subject of biology, we find that the actual reality of teaching is still characterized by stagnation and boredom because of the use of most teachers the usual methods in the teaching of biology and neglect of the use of Modern and effective teaching strategies, which led to low level of student achievement in biology. Therefore, the biology teachers should search for the best methods and modern strategies that will be more useful in teaching biology. It has been found that strategies that may contribute to a broader understanding of biology and achieve many of the objectives of teaching in the secondary stage, Is the use of strategies of serious innovation, including (challenge strategy) because it is a modern strategies that may help in overcoming the problems that hinder the students' understanding of biology and raise the level of achievement, as well as that this strategy was not placed in the experiment in teaching biology. Therefore, this study was conducted to determine whether there was a difference between the students of the experimental group who were taught according to the challenge strategy and the students of the control group who study according to the usual method. In his development of this type of creativity, De Bono has relied on an understanding of the mechanism in which the brain operates based on what has been achieved in neuroscience. The brain organizes the information it receives through the senses in an organized way. And search for them later, The pattern is the organized configuration of the neurons that make up the brain or the organization of information on the surface of memory. The pattern is a repetitive neuronal sequence. It is a concept, an idea or a picture.
The pattern can indicate a chronological sequence of such ideas or concepts. And it is more like the water that falls from the sky on a soft ground that takes the paths available to it, or forms its own paths in which it takes place. The shape of these courses depends on the nature of the information received and the way which were received. The ability of the brain to shape, recognize, and manipulate patterns makes it effective in dealing with what surrounds it. This gives it the ability to quickly recognize things, and the speed of interaction with them, allowing them to explore their surroundings very effectively. In spite of the effectiveness of the brain, however, in the formation of patterns and dealing with them acquire specific defects affect the performance, and make them captive these patterns, which limits the ability of creativity and launch, and these defects are that the patterns tend to be established and stability over time, and difficult to change and out of the circle. And they are based on a particular pattern and become these patterns belong to him, and consists of a kind of polarization, and these patterns become rigid molds. In order to overcome these shortcomings, DeBono has created a set of strategies. Perhaps the most prominent of these is the strategy of challenge, which is due to the theory of serious creativity or so-called lateral thinking.

Methodology

It includes a presentation of the procedures that have been carried out to achieve the research objectives, starting with the research methodology and experimental design, defining the research community and its design, the equivalence of the research groups (experimental and control), preparation of the research requirements and tools.

Experimental design of the research: includes the independent variable (challenge strategy) and (normal method) and the dependent variable (collection), so the researcher used experimental design with partial control of two equal groups, one experimental and the other control.

The research community and its model: The current research community represents the fourth grade students all in the secondary and preparatory schools of the General Directorate of Education in the province of Babil for the academic year (2018 - 2019), where the people of the fourth grade are not less than two divisions (A, B, C, D), the researcher chose (a) the method of random drawing (the drawing method). To represent the experimental group and the number of students (35) students who will study their students according to (Ast Atejah challenge), the same way the researcher chose randomly Division (c) to represent the control group and the number of students (35 students), which will examine its students according to (the usual way).

Equality of two search groups: made a researcher equal statistically between the two groups experimental and controlled in some variables that affect the results of the experiment, despite the selection researcher the two groups manner drag-random, in spite of the students sample from the Center of social and economic similar to a large extent and they learn in one school, he was keen on an equivalence variables the following: The chronological age is calculated by months degrees of separation first, intelligence test, as the researcher an equivalence between the two sets of research in the variables above showed the results according to the table 1.

Preparation of supplies search: The requirements of the search of the things basic underlying find that According to which the research procedures are carried out and this supplies in: material science (content): were selected art. Scientific by the researcher teach the students my search within an experiment (second semester) of the academic year (2018 - 2019), M., included article scientific study (fish · pigeon pickles, and-papyrus, reptiles and birds and livestock and algae, fungi and, relationships between organisms, environmental pollution), as prepared a researcher 16 plan for the group’s experimental taught to according to (a strategy challenge) ideals the group’s control taught to according to (the way the normal).

Search tool: The steps of the search tool (the collection test) are as follows:

Determine the purpose of the test: The purpose of the test is to measure the achievement of students in the fourth grade scientific (information, skills and experiences) in the biology study (fish and pigeon, Bacillus and papyrus, reptiles, birds and animals, algae and fungi, relations between organisms, environmental pollution).

Determination of the objectives of the test: After the purpose of the test was determined the objectives of the test to determine the extent of achievement and the researcher formulated a number of behavioral goals.

Determination of the test paragraphs: The researcher determined the number of paragraphs that constitute the test achievement as the number of paragraphs of the test (40 paragraphs).
Extracting the test vertebrae: The terms of the test were formulated as preliminary in the light of the test map. The researcher chose the type of test (multiple choice) which is one of the best objective tests, The test consisted of (40) experimental paragraphs, which were distributed at the levels of cognitive knowledge (understanding, understanding, application, analysis, composition, and calendar); and the five topics of the book of biology (fish, dove, Environmental pollution).

Test instructions: Specific instructions and instructions are written on how to answer (choosing one correct alternative to the paragraph, answering all paragraphs, answer time, typing the triple name, row and division in the assigned space).

Correcting the test answers: After the test paragraphs were formulated and the type of test was formulated, a standard was established to correct the answers. It was put (one score for each correct test paragraph) and zero for the wrong answer and the left paragraph that the student did not answer. Selection) and therefore the final score for the achievement test is (40 degrees) and the minimum grade (zero).

The validity of the test was confirmed by the veracity of the test and the validity of the content. The results showed that the apparent honesty obtained 80% of the agreement by the arbitrators and the specialists. As for the validity of the content, the results showed that all the clauses of the test are statistically significant. In measuring the understanding and understanding of students in the fourth grade in biology.

The pilot application for the test of achievement: including the following:

The first survey application: In the first phase of the survey, the achievement test was applied to a group of fourth grade non-research students. The number of students was 40. The purpose of this test was to know the clarity of the instructions and the test instructions, For the test, the researcher recorded the exit time for each student. In calculating the arithmetic mean of time, it was found that the time required to answer all the test paragraphs was (43) minutes.

The second survey application: The test was applied to a sample of (100) students in the fourth grade of scientific research. The purpose of the test is to analyze the statistical achievement test paragraphs, namely paragraph difficulty, paragraph discrimination, effectiveness of the wrong alternatives.

Statistical analysis of the test scores: The test scores were analyzed as follows:

Difficulty of paragraph: The statistical analysis of the terms of the test of achievement found that the coefficient of the difficulty of paragraphs ranging from (0.30 - 0.67) and thus the paragraphs of the test collection are all good and difficult to appropriate.

The distinction of the paragraph: the important characteristics and must be provided in the paragraphs of the test is the characteristic of discrimination and means the possibility of items or paragraphs to identify individual differences of students and the test items are valid as the coefficient of discrimination of items is (20,0) and above, (0.33-0.69), thus the subjects of the achievement test are characterized by a good and appropriate discrimination coefficient.

Effectiveness of the wrong alternatives: The researcher conducted a statistical analysis (highest 27% and lowest 27%) to find the effectiveness of the wrong alternatives ranging from (-0.11 - 0.41) and it turned out that the alternatives of the test paragraphs are all effective and thus the collection of all appropriate.

The stability of the test: The coefficient of the stability of the test depends on the relationship between each paragraph or between the paragraphs of the test all, and this is evidenced by the stability of degrees and consistency of paragraphs, and can calculate the stability of the test using the legal relationship between the units of the test, and the characteristics of the good test to be stable and true and even be The terms of the test have a clear meaning that must be both true and consistent. Stability indicates that the test scores match once again, ie, it indicates the balance and stability of the students' grades in the test.

Methods of finding the stability of the test:

Midterm fragmentation method: This method is one of the most widely used methods, because it avoids the disadvantages of some other methods. In order to obtain two equal images of the test, the researcher divided the test paragraphs into individual and marital paragraphs. Pearson correlation coefficient between the individual and marital scores was obtained by the coefficient of stability (0.87). Since the half-stability coefficient of the test does not measure the total homogeneity of the test (because it is only half stability) Lg (0.91) is a good stability coefficient from the point of view of specialists.
**Koder-Richardson Method 20:** The Koder-Richardson equation is applied according to student scores. The researcher found that the stability value of the test is (0.86) and thus the value is good and suitable so the test is constant.

**Application of the research tool:** The experimental and control groups were informed of the date of application of the test, one week before it was carried out, and it was applied after the completion of teaching the specific material for the two research groups at one time. The researcher supervised the application of the test.

**Statistical Methods:** The researcher used the t-test equation for two independent samples to make the parity between the experimental and control groups and the Pearson correlation equation. The researcher used the equation to correct the correlation coefficient between the test segments (individual and marital scores) after the Pearson correlation coefficient Statistical spss, excel program (Excel)

**Results and Discussion**

For the purpose of verifying the null hypothesis, which states (There is no statistically significant difference at the level of significance (0.05) between the average scores of the experimental group who studied the challenge and the mean scores of the control group who studied according to the usual method of collecting biology. The mean and standard deviation of the scores of the two groups were calculated in the test. The T value of two independent samples was calculated as in Table (1) Table (1) shows that the calculated T value (3.015) is greater than the numerical value T (2000) at the degree of freedom (66) and the significance level (0.05). Therefore, the null hypothesis is rejected. Thus, the students of the experimental group, The challenge strategy has surpassed the students of the control group who were taught according to the usual method of teaching biology in the achievement test. Teaching according to the challenge strategy has contributed to raising the academic achievement of the fourth grade students in biology better than the usual method of teaching.

**Table 1: Equality of two search groups**

<table>
<thead>
<tr>
<th>Level of significant</th>
<th>T-value</th>
<th>The degree of freedom</th>
<th>Standard deviation</th>
<th>Arithmetical average</th>
<th>Sample size</th>
<th>The group</th>
<th>Avariable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not statistically significant</td>
<td>2</td>
<td></td>
<td>66</td>
<td>0.232</td>
<td>0.206</td>
<td>0.389</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>6.08</td>
<td>5.36</td>
<td>15.98</td>
<td>13.92</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>189.17</td>
<td>188.85</td>
<td>62.89</td>
<td>63.64</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>35</td>
<td>33</td>
<td>35</td>
<td>33</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Experimental</td>
<td>Control</td>
<td>Experimental</td>
<td>IQ Test</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Age calculated in months</td>
<td>First semester grades</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Statistical function</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>2.000</td>
<td>3.015</td>
<td>66</td>
<td></td>
</tr>
</tbody>
</table>

**Table 2: The T value of two independent samples**

<table>
<thead>
<tr>
<th>Statistical significance</th>
<th>T-value</th>
<th>The degree of freedom</th>
<th>Standard deviation</th>
<th>Variance</th>
<th>Arithmetical average</th>
<th>The number</th>
<th>Groups</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.05</td>
<td></td>
<td>2.000</td>
<td>3.015</td>
<td>66</td>
<td>5.29</td>
<td>28.69</td>
<td>35</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>5.29</td>
<td>27.98</td>
<td>28.69</td>
<td>33</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>6.27</td>
<td>39.31</td>
<td>24.45</td>
<td></td>
</tr>
</tbody>
</table>

**Conclusion**

The challenge strategy has a positive impact on increasing the achievement of students in the fourth grade in biology and increasing their ability to understand information, facts and knowledge and raise their academic level. The challenge strategy has a role in making students the focus of the educational process through their active participation in the educational situation, which will increase their self-confidence and encourage them to persevere to raise their scientific level.

**Financial Disclosure:** There is no financial disclosure.

**Conflict of Interest:** None to declare.
Ethical Clearance: All experimental protocols were approved under the University of Babylon, College of Basic Education, Babylon, Iraq and all experiments were carried out in accordance with approved guidelines.

REFERENCES


The Impact of Nedham’s Structural Model in the Reflective Thinking to Develop the Habits of Mind for Students

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ABSTRACT

The objective of this research was to identify the effectiveness of the teaching of the Nidham structural model in the reflective thinking of the applied fifth grade students. The experimental design of the two groups (experimental group and control group) with the post-test was adopted according to this design, it has been selected the research’s sample (Al-Jamaa secondary school) intentionally whereas the sample composed of (64) students distributed on two sections the experiment sample (A) which composed of (32) students and the control group (B), consisting of (32) students and excluded (4) students statistically because they are failed in their classes which has effect on the experiment and its results and then made a set of equivalences between the two search’s groups and several variables including (age in months, IQ test, the parents educational level). After the end of the experiment, it has been applied a test of the contemplative thinking on the two research’s groups, The data were collected and processed statistically using the SPSS, EXEL, The results showed that there was a statistically significant difference between the experimental group and the control group in the reflection test and for benefit of the experimental group.

Keywords: Neidham constructivist model, reflective thinking, the applied fifth grade students, physics.

Introduction

The science of physics is one of the oldest natural sciences. It was known 3,000 years before BC. The civilizations of the Sumerians and the ancient Egyptians used this science to know the predictions of the movements of the sun, the moon and the stars. The stars represented a s gods for them to worship. Although, this science was ancient and unscientific and lacked much evidence to prove their theories, and the origins of Western astronomy ¹, which is currently used to know the constellations and the movement of celestial bodies in Greece, were present in Mesopotamia, and are still used so far. In the study of physics, we are in dire need of inventing modern strategies, methods and ways to learn scientific concepts. The teacher must extend his hand from behind the walls of modernity to capture a fertile imagination in which he invites these concepts to his scientific table to achieve endless dialogues with video and segments and images to come in line with the spirit of the age away from the usual methods of learning monotonous ², which stands in the way of the learner’s understanding of the learner, depending on the narration of information and fill it in the mind of the learner without organization or arrangement, creative ideas must make the love of material increases in the student. To accommodate concepts in new ways. The criterion of success in this article is the preservation of the material and the student’s ability to solve the physical problems and neglect educational activities that develop multiple thinking patterns and multiple skills, which causes the negative understanding of the material and does not achieve the actual objectives of teaching ². One of the modern methods of teaching that develop student thinking and facilitate the understanding of the process of education is the structural model Nidham. This model was proposed by researcher Richard Nedham in the United Kingdom. The program was designed to enhance the ability of learners to understand the scientific concept and motivate them to participate themselves, actively and effectively within the classroom. Nedham proposed this model, which was based on the foundations of

DOI Number: 10.5958/0976-5506.2019.01443.8
Orientation or Attention: It draws the attention of learners and raised their abilities towards the subject of the lesson by the teacher, as follows: Presenting the subject in the form of pictures or in the form of stereotypes or video clips. Allowing learners to think about those topics, and then find solutions to those topics or scientific phenomena studied.

3 - the ability to predict the causes of the phenomenon, and what the consequences of it, and the mechanism to develop possible solutions. To develop appropriate justification for such predictions before commencing the implementation of such scientific and practical activities. Receive views and ideas on topics of learners in individual form. The production of ideas Generation of Idea: At this stage the teacher determines the amount of previous ideas owned by the learner and through: Receiving and recording learners’ predictions about the problem or phenomenon presented to it. put a set of questions that raise learners to think about the problem, then recording answers. The work of binaries Restructuring of Idea: Here begins the role of the teacher in rebuilding the previous ideas, which are originally false ideas for learners: The learners are divided into two groups, each of which contains (5-6) learners. Urge learners to cooperate through conducting scientific activities and the use of surveys and problem solving during the activities. Recording all observations, interpretations and conclusions. Conducting an open dialogue among the members of the same group in order to identify the contradictions that resulted from the predictions in the guidance stage. Each group presents the scientific expertise they have obtained on the rest of the groups within the class. Open dialogue between the groups on the scientific expertise they reached.

**Methodology**

It includes a presentation of the procedures that have been carried out to achieve the research objectives, starting with the research methodology and experimental design, identifying the research community and its design, the equivalence of the research groups (experimental and control), preparation of the research requirements and tools, The empirical design of the research includes the independent variable (the Nedham model), the normal method, and the dependent variable. The researcher used the partial experimental design of two equal groups, one experimental and the other control.

The research community and its sample: The current research community represents the fifth grade students in all the secondary and preparatory schools in the governorate of Babil for the academic year (2018-2019), which has at least two divisions. The researcher chose (a), (b) the random sampling method (the drawing method) to represent the experimental group and the number of its students (30) students who will study their students according to (Anmoz Nedham), the same way the researcher chose randomly Division (b) to represent the control group and the number of students (30 students), which will examine its students according to (the usual way).

The equivalence of the two search groups:

The researcher conducted a statistical equivalence between the experimental and control groups in some variables that affect the results of the experiment. Although the researcher chose the two groups in the random drawing method, although the students of the research sample from the social and economic center are very similar and study in one school, The equivalence of the following variables: the age of time calculated in months, the first semester, the IQ test. The researcher conducted the equivalence between the two research groups in the variables mentioned above and the results were shown in the table 1. Control of Exotic Variables: The researcher tried to avoid the effect of some of the extraneous variables in the course of the experiment. Some of these variables and how to control them are as follows: Accidents Accompanying the Experiment: Experiment in the research has not been subjected to any emergency or accident that hinders its progress. For each student throughout the experiment, the sample was selected: The two groups were randomized and the two groups were confirmed. The maturity factor: Since the duration of the experiment is uniform between the two research groups as well as the age of the students in the two groups, the growth will return to both groups at the same level., So for This factor has no effect on research, the effect of experimental procedures: the researcher’s work to limit the effect of experimental procedures that may affect the dependent variable during the course of the experiment.
Preparation of Search Tools:

Scientific Material (Content): The scientific material that the researcher is teaching was selected for the students of the two research groups during the period of the experiment (the second semester) of the academic year (2018 - 2019). The researcher prepared 16 a plan for the experimental group, The structural model of Nedham) and the same for the control group, which is taught according to the “normal method”.

Research Tool: The “Collective Test” has been prepared according to the following steps:

Determination of the purpose of the test Reflective thinking: The goal of contemplative thinking is to measure the achievement of students in the fifth grade applied (information, skills and experiences) in physics in the study of (circular and rotational movement, vibration movement, wave, sound, electric current).

Determination of Behavioral Goals: After the purpose of the test was determined the contemplative thinking behavioral goals are determined to determine the extent of achievement and the researcher formulated a number of behavioral goals.

Determining the Test Paragraphs: The researcher prepared a specification table and a test map. In light of this, 30 test cases were identified.

The test subjects were designed as a preliminary test in the light of the experimental map. The researcher chose the type of test (multiple choice) which is one of the best objective tests. The test consisted of (30), Understanding, application, analysis).

Test Instructions: Specific instructions and instructions are written on how to answer (selecting one correct alternative to the paragraph, answering all paragraphs, answer time, writing the triple name, row and division in the assigned space).

Correcting the Test Answers: A standard was set for correcting the answers by placing one score for each correct test paragraph, zero for the wrong answer, the left paragraph that the student did not answer, and the paragraph for which he placed more than one choice. Thus, (30 degrees) and the minimum score (zero).

The validity of the test: The veracity of the test was verified and the validity of the content was confirmed. The results showed that the apparent honesty obtained the percentage of agreement (85%) by the arbitrators and specialists. As for the validity of the content, the results showed that all the paragraphs of the test reflective thinking is statistically significant. Reflective in measuring the comprehension and comprehension of students in the fifth grade applied in physics.

The Exploration Application for the Achievement Test: which included the following The first survey application: The test was applied in the first phase of the study. The students were 30 students. The purpose of the test was to

### Table 1: The equivalence between the two research groups

<table>
<thead>
<tr>
<th>Variable</th>
<th>Groups</th>
<th>Size of sample</th>
<th>Surplus Marketing Administration</th>
<th>Standard deviation</th>
<th>The degree of freedom</th>
<th>Value T</th>
<th>Level of significance</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Experiment</td>
<td>30</td>
<td>205.5</td>
<td>11.884</td>
<td>58</td>
<td>1.939</td>
<td>Not statistically significant</td>
</tr>
<tr>
<td></td>
<td>Control</td>
<td>30</td>
<td>200.87</td>
<td>5.428</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Experiment</td>
<td>30</td>
<td>75.17</td>
<td>9.169</td>
<td>58</td>
<td>1.275</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Control</td>
<td>30</td>
<td>60.30</td>
<td>9.858</td>
<td></td>
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<td></td>
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<tr>
<td></td>
<td>Experiment</td>
<td>30</td>
<td>8.33</td>
<td>2.309</td>
<td>58</td>
<td>4.926</td>
<td>Significance</td>
</tr>
<tr>
<td></td>
<td>Control</td>
<td>30</td>
<td>7.73</td>
<td>2.333</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Table 2: t-test of two independent samples of the experimental and control groups in the test of the Reflective thinking

<table>
<thead>
<tr>
<th>Groups</th>
<th>No. of students</th>
<th>SMA</th>
<th>Differences</th>
<th>Degree of freedom</th>
<th>T value</th>
<th>Statistical significance at level (0.05)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Experiment</td>
<td>30</td>
<td>35.06</td>
<td>19.98</td>
<td>58</td>
<td>4.926</td>
<td>Significance</td>
</tr>
<tr>
<td>Control</td>
<td>30</td>
<td>30.38</td>
<td>6.66</td>
<td>58</td>
<td>2.000</td>
<td></td>
</tr>
</tbody>
</table>
know the clarity of the instructions and instructions of the
test and the understanding and clarity of the paragraphs
of the news to the students and the calculation of the
time period. The researcher calculated the exit time for
each student. In calculating the arithmetic mean of time,
it was found that the time needed to answer all the test
paragraphs was (44) minutes.

**The second test application:** The test was applied to
a sample of (100) students in the fifth grade applied
without the research sample. The purpose of the test is to
analyze the test paragraphs. The theoretical thinking is
the difficulty of the paragraph.

Statistical analysis of the test paragraphs Reflective
thinking: The test paragraphs were analyzed as follows:
The difficulty of the paragraph: The statistical analysis
of the test paragraphs Theoretical thinking found that the
coefficient of difficulty of paragraphs ranged from (0.39 -
0.72) and thus the test paragraphs are all reflective thinking
acceptable and difficult appropriate. The distinction
of the paragraph: the important qualities and must be
provided in the paragraphs of the test is a distinguishing
feature and means the possibility of items or paragraphs
to identify the individual differences of students and the
test items are valid as the coefficient of discrimination
of items is (0.2) and above, the value of the coefficient
discrimination test paragraphs reflective thinking
(0.32 - 0.68). Thus, the test paragraphs are considered
to have a good and appropriate discriminating factor.

Effectiveness of the wrong alternatives: The researcher
conducted a statistical analysis (highest 54% and lowest
54%) to find the effectiveness of the wrong alternatives
ranging from (0.05 - 0.41 -) and it turned out that the
alternatives of the test paragraphs reflective thinking are
all effective and thus the collection of all appropriate.

**Methods of finding the stability of the test:** The midterm
split method: The researcher divided the test paragraphs
into individual paragraphs and double paragraphs and
chose the answers of the sample of the survey sample
(100). In the Pearson correlation coefficient between the
individual and marital scores, the stability coefficient
was obtained (0.78) The midpoint of the test does not
measure the overall homogeneity of the test (because
it is stable for only half). Therefore, the correction was
done using the Sperman Prowan coefficient, which
reached (0.88) a good stability coefficient from the point
of view of the specialists.

**Koder-Richardson Method:** The Koder-Richardson
equation is applied according to student scores. The stability
coefficient was calculated by equation (0.79) as the test is
good if the coefficient of stability (0.70) and more

**Application of the research tool:** The experimental and
control groups were informed about the date of application
of the test. The study was conducted one week before the
completion of the teaching of the specific material for
the two research groups at the same time. The researcher
supervised the application of the test.

**Statistical Methods:** The researcher used the t-test
equation for two independent samples to make the parity
between the experimental and control groups and the
Pearson correlation equation. The researcher used the
equation to correct the correlation coefficient between
the test segments (individual and marital scores) after
the Pearson correlation coefficient. The spss program,
the Microsoft Excel 2007 program (Excel). Results
showed that the experimental group was superior to the
control group and the following table shows the results
of t-test of two independent samples of the experimental
and control groups in the test of the Reflective thinking.

**Conclusion**

The students in the experimental group showed a
significant difference in the level of significance (0.05)
between the average score of the experimental students
who study the science according to the Nidham model
and the average score of the students of the control group
who studied The same material in the usual way in the
test of contemplative thinking and for the benefit of the
experimental group.

**Financial Disclosure:** There is no financial disclosure.

**Conflict of Interest:** None to declare.

**Ethical Clearance:** All experimental protocols were
approved under the University of Babylon/College of
Basic Education, Iraq and all experiments were carried
out in accordance with approved guidelines.

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   according to the cognitive model in the
development of higher thinking skills and the
adjustment of misconceptions and qualitative
achievement in the subject of physics at the request


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Analysis and Measurement the Standards and its Impact the Reflective Thinking to Develop the Habits of Mind for Students

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¹Assist. Prof., ²Faculty of Basic Education, Babylon University, Department of Graduate Studies, Methods of Teaching Social Sciences, Iraq

ABSTRACT

This research aims at identifying the availability of USC standards In the content of a book founded the geography and techniques for the fourth grade literary, and included (NCSS) for social studies Society of Search Book Content The Foundations of Geography and its Techniques for the Fourth Literary Class in Iraq 10th Edition (2018) for the academic year (2019-2020) and the number (143), has been excluded from the book (Introduction, The index, questions, and images) and thus the number of pages of the book analyzed (107) pages. Issued by the National Council for Social Studies, which concerns (NCSS) the researcher adopted standards Article geography is taught for the fourth grade literary, after the translation into Arabic, and to verify its sincerity in First and then its relevance to the Iraqi environment, and was finalized in ten areas of sixty-nine A standard, obtained stability through persistence over time, and stability with analysts have been good proportions, and have been Use the idea as a unit for analysis and replication as a unit of census and the analysis on the basis of fixed steps.

Keywords: Techniques, NCSS, Fourth Grade

Introduction

Analysis and measurement, the geo-curricular approach has seen recent leaps as well as content. Scientific, where specialists in the field of geography to deal with topics that did not exist and are known. Previously, for example, global warming, environmental pollution, and the spread of dangerous and common diseases. Drugs, climate change resulting from human activities and geographic information systems ¹. Hence, the contemporary interpretation of geography as well as the description of the land is a study of what exists On the surface of the study of scientific and accurate and real, and know all what affects their manifestations, and what is affected by, and statement Laws that define geographical relations as natural, human and economic². In order to achieve these objectives, an analysis of the approach to vulnerability should be undertaken Diagnose negatives and develop appropriate solutions, by using specific and appropriate criteria During the process of analysis, it is necessary to know what has achieved this content, and in order to be in line The curriculum with the rapid changes taking place in the world must be analyzed ³. In light of the above, we find an urgent need to know the extent to which the content is adopted by the standards and objectives through which it is developed. The content must be analyzed and described quantitatively and quantitatively, so analysis can not be abandoned by experts, experts, researchers and developers of the curriculum. That through the process of analysis we identify the content of the educational curriculum that we want to present and teach to our students and the contents of the concepts, facts, subjects and skills because it is a tool of the curriculum that reflects the content and as a result led to the urgent need to know the concept of content analysis as well as the characteristics and uses related to it ⁴. On this basis, content analysis is a common common value among all research and studies that follow the same method. The accurate and reliable objective observations measure the frequency of certain

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characteristics of the content. The alternative to self-impressions and accurate calculations of the frequency of phenomena in aspects of scientific research and studies is found. The curriculum can issue a judgment on the availability of standards in the curriculum, the strengths and weaknesses of the textbook currently being studied, and the development of rules and principles for review and development when necessary. Based on the great importance of educational curricula, it is necessary to conduct the analysis process to see the extent of its suitability and pace of scientific development in order to achieve a high degree of admissibility in the mastery of work, and the high level of performance to the maximum that can be aspired to the goal that everyone seeks to achieve and hope that aspire To achieve it and the desired end. Based on the above, this research was conducted to analyze the content of the book based on the geography and techniques of the fourth grade literary according to the standards of the National Council for Social Studies (NCSS), to see the extent to which these standards are comprehensive and keep pace with the scientific and technological developments in the contemporary world in quantity and quality.

**Methodology**

This chapter includes a description of the research methodology and procedures followed by the researcher in order to achieve the goal of the research, which is the analysis of the content of the book bases the geography and techniques of the fourth grade literary according to the standards of the National Council for Social Studies (NCSS), and description of the research community and eye and how to rely on the search tool and its relevance to honesty and stability And the application of the tool and the statistical means I use to analyze and process data. The most appropriate approach to the nature of the research is descriptive because it is appropriate to the requirements of its research, which is based on monitoring and accurate follow-up of a particular event or event in quantitative or qualitative manner in a period of time or for many periods in order to identify the phenomenon or event in terms of content and content to reach the results and generalizations help to understand, and that “content analysis” is one of its methods and prepares a structured and accurate description of the content of texts written or audible by determining the subject of the study and its purpose and the definition of the study community to be chosen

**Research Community and its Eye:** It is difficult to obtain a representative sample unless the original community and its description are accurately described, because each community has its own characteristics. The research community, the book of the foundations of geography and its techniques for the fourth grade in Iraq, the tenth edition (2018 - the Committee of the Ministry of Education) to be taught in the academic year (2019-2020 m) the researcher adopted the entire research community as a sample for his research, the book consists of (142), The researcher excluded the pages that contain (the introduction, the index, the illustrations and the questions that appear at the end of the chapters of the book). The pages under analysis have become (107) pages.

**Search Tool:** The form designed by the researcher to collect the data and monitor the frequency of the phenomena digitally in the materials analyzed content is called (analysis tool) (absolute and alive, 149: 2013). That the number of the tool many benefits may be the most important:

1. Monitoring the frequency of phenomena digitally, and thus can be used data in more than one way to achieve more than one goal.
2. shortening the time and effort.
3. followers of one system in data analysis.
4. Complete the elements of analysis.

Therefore, the researcher worked on the preparation of a tool in the light of which analysis of the content of the book bases the geography and its techniques

For the fourth grade literary in Iraq to be taught in the academic year (2019-2020 m), and followed The following steps:

A. access to literature and previous studies

**B.** Obtaining the standards of the National Council for Social Studies (NCSS)

The Department of Education in the United States of America has developed the curriculum and used these criteria in the field of geography, which includes areas (culture, time, continuity and change, people, places and environments, identity and individual development, individuals, groups and institutions, power and government, production, distribution and consumption, science and technology). Society, global associations, ideals and civil practices). These areas consist of (69) criteria.
To use and guide the opinions of experts and specialists in the field of educational and psychological sciences and to obtain a tool to achieve the goal of research translated the list of standards of the National Council for Social Studies (NCSS) from English to Arabic, the list included ten areas comprising 69 sub-criteria.

Tool Validation: One of the conditions that must be met in the research tool is honesty and is honest if it measures what is already measured. The research tool must belong to the subject to be examined. There are several ways to achieve honesty. The apparent honesty of the search tool is presented by a group of experts and research specialists to judge the validity of the paragraphs and the items contained in the tool to measure what they have set for it.

In order for the researcher to verify the validity of the research tool, follow the following procedures:

1. Verifying the veracity of the translation by presenting the standards translated into Arabic with English standards on a group of specialists in English, in order to demonstrate the accuracy and clarity of the translation.

2. Calculation of the proportion of their agreement on the paragraphs using the square of Kai, and found that the paragraphs have the truth of translation, exceeded the criterion of 80%, and to verify the validity of the tool in terms of appropriate standards of the Iraqi environment, the researcher follow the following procedures:

   A. Presentation of the standards translated into Arabic on a group of arbitrators and specialists in educational sciences, psychological and geographical in order to demonstrate the adequacy of standards for the Iraqi environment, as well as verification of the credibility of the tool, the experts agreed And specialists on the appropriate standards for the Iraqi environment and therefore the tool is able to measure what has been prepared to measure already.

   B. The proportion of their agreement on the paragraphs was calculated using the square of Kai, and found it to be verifiable paragraphs.

Analysis

The analysis is carried out in order to uncover and explore knowledge as well as to examine it thoroughly and critically and then to present it in full to add to the knowledge that has been reached because it is a method that helps solve certain problems. This proves that there is a close correlation between the content analysis and the research problem.

The result can be followed by this method or method of research in reaching the answer to a problem question

Research (to what extent the NCSS standards are available in the content of the book The Foundations of Geography and Techniques for the Fourth Grade).

Rules and Analysis of Analysis: The research has several rules and bases followed by the researcher:

1. When there are two ideas in one sentence or more, one was cause and the other result or “one means And the other is an end, both are treated as one idea.

2. When there are two ideas in the same phrase, and can not be fragmented then the researcher resort to the strongest idea

3. If an idea does not show a certain significance because it is linked to the idea before or after, then the researcher returns to the previous or subsequent idea of diagnosing the current idea he

Wishes to Analyze: Steps of analysis

1. working on obtaining a list of standards, which are the standards of the National Council for Social Studies (NCSS) and translated into Arabic.

2. reading each of the topics of the book founded the geography and techniques of the fourth grade literary to identify Ideas in general.

3. a second reading of each line in the same subject for the purpose of reaching the extraction of phrases that include an idea.

4. Determine the terms to which each idea refers to and then classification, application of the registration unit.

5. To discharge the results of the analysis in the form of analysis and give a repeat for each area and the standard number Which refers to the resulting idea of analysis.
6. Calculate the frequency of availability of standards for each field in the book content of the foundations of geo and its techniques.

**Statistical and Arithmetic Methods**

1. Pearson correlation coefficient
2. square as any
3. percent

**Results and Discussion**

Your search yielded the following results: focus on some areas and calibration, such as the area of people, places and environments, if it got high values. And few in other areas such as the sphere of influence, power and government, and the researcher discussed these results. Some criteria, such as the criterion of different maps of the globe, are high, compared with some criteria that were not included in the book as the criterion of privatization in commercial companies. The researcher believes that the results of the research are due to the authors’ emphasis on highlighting the relationship between geography and the history that emerged. In the field of time and continuity and change as they are branches of social materials, and although it is a positive factor because history is the basis of the understanding of geography, but it was a degree carried with weakness in the other areas of geography included in the standards (NCSS).

**Conclusion**

The researcher used the square of Kai to obtain honesty and Holistic equation to obtain coefficient of stability and proportion As a computational method for calculating the frequencies. The results of the research showed a focus on some areas and their criteria, such as time, continuity and change. He obtained high values and said in other fields, such as the sphere of influence, power and government. The researcher discussed these results.

**Financial Disclosure:** There is no financial disclosure.

**Conflict of Interest:** None to declare.

**Ethical Clearance:** All experimental protocols were approved under the Faculty of Basic Education/Babylon University, Department of Graduate Studies - Methods of Teaching Social Sciences, Iraq and all experiments were carried out in accordance with approved guidelines.

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Assessment of Secondary School Female Students’ Knowledge about Reproductive Health in Basra City

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ABSTRACT

The study started from November 2018 to April 2019. Validity of the questionnaire is determined through a panel of (12) experts and the reliability through the pilot study. Descriptive and inferential statistical analysis were employed for data analysis. The results show that the highest percentage of girls (82.5%) was in age (14-18) year’s age, (60.2%) from student have between 1-4 brothers, (92%) of students was lives in urban area, (93.0%) of them was lives with their parents, (34.8%) of the student fathers was government employing, and (54.4%) of the student mothers have income, the majority of students’ family have low income (34.9%), (34.9%) of student at good level of attainment, external books were the first source of information (62.5%) of respondents. This study shows that student knowledge toward all domain of reproductive health were moderate level which as the total means (0.81), while student’s knowledge about Sexually transmitted diseases was low level of knowledge which of the total means was (0.68). This study present that there were significant association between the student knowledge and their frequency among brother, and external reading from internet, and there were no significant between the student knowledge and their age, and living of student at P≤0.05 level.

Keywords: Assessment, Knowledge, Reproductive Health.

Introduction

Adolescence is the period of human growth and development that occurs after childhood and before adulthood, from 10 to 19 years of age. Adolescence is a period of potent developmental and emotional interval. Most of adolescents yet neither have approach to information and education on sexuality, reproduction, contraception and sexual and reproductive health and rights, nor do they have access to preventive and curative service. Teenage pregnancies look as high-risk pregnancies result in unsafe abortions, low birth weight, and high maternal morbidity and mortality. Almost 40% human immunodeficiency (HIV) virus infection is found within teenagers. Study was performing with objective to study the knowledge and attitude regarding menstruation, contraception and sexually transmitted diseases among secondary and higher secondary school girls. Adolescents need to know how to keep themselves from Human immunodeficiency virus (HIV), sexual transmitted diseases (STDs) and early pregnancies, for this sex education is the best way, it should be a lifelong learning process based on the knowledge and skills and positive attitude, it helps the young people to enjoy sex and relationships that are based on qualities such as positive knowledge, cross respect, confidence, conversation and enjoyment. Focusing on adolescent reproductive health is both a challenge and an occasion for health care providers. While adolescence generally is a healthy period of life, many adolescents are less informed, less experienced, and less comfortable accessing health services for reproductive health than adults. Adolescents often loss basic reproductive health information’s, knowledge, and access to affordable confidential health services for reproductive health. Many do not sense comfortable in exploring reproductive health parents. Parents, health care workers, and educators frequently are unable to provide entire, accurate, and age-appropriate
reproductive health information to young people. This is often due to their own discomfort about the topic or the false belief that providing the information will encourage sexual activity. Adolescents may also experience resistance or even hostility and bad attitudes from adults when young people effort to gain the reproductive health information and services they need. They therefore may be at an increased risk of sexually transmitted infections (STIs), unintended pregnancy, HIV, and other health consequences. For women aged 15 to 19, complications of pregnancy, childbirth, and serious abortion are the major causes of death.

Methodology

A descriptive analytic study was conducted to assess the level of knowledge about reproductive health among 287 school females students in the age (14-23) years from six secondary schools in Al-Zubair district in Basra city, the data was collected by direct interview using constructed questionnaire to obtain socio-demographic characteristics and level of knowledge related to reproductive health. The study started from November 2018 to April 2019. Validity of the questionnaire is determined through a panel of (12) experts and the reliability through the pilot study. The data was collected through students self-filling technique by using questionnaire which designed for the purpose of the study, which consist of two main parts (Socio-demographic characteristics, and knowledge of students about reproductive health). Descriptive and inferential statistical analysis were employed for data analysis.

Results and Discussion

The present study showed that the majority of the respondents 237 (82.5%) are at age group (14-18years), and (92%) of them live in urban area. The majority of participants (62.5%) reported that the major source of information from browsing internet, these results was in disagreement with the results of a study done by Mattebo, Elfstrand, Karlsson, and Erlandsson, (2015) who stated that 78% of participants were receive information from their friends. The findings of this study showed that the participants have moderate knowledge about menstruation (menstruation means, normal cycle length, causes of menstruation, and source of menstrual bleeding). This result is inconsistent with Fehintola et al.,(2017) who stated that more than half of participants have good knowledge about menstruation.

The study findings revealed that the students have moderate knowledge about infertility (Alcohol can predispose to infertility, it is easy for a woman to conceive after 40years, Smoking can predispose to infertility, etc), consistent with Adesiyun et al., (2014) who stated that the knowledge of participants regarding infertility were moderate. The possible explanation for these could be that students need more assistance in this subject. Regarding sexually transmitted diseases, the participants have poor information regarding STDS (Sexually transmitted diseases can be transmitted by Exposure to cough and sneeze from infected persons, Transfusion of blood from one person to another, Unprotected sexual intercourse, etc). This result is consistent with Ali, (2013) who stated that more than a half of adolescent girls had poor awareness regarding (AIDS). The participants reported that they have moderate knowledge about prevention methods (Use of condom during sexual intercourse protect against sexual transmitted diseases, Don’t share with others sharp or engraving tools, Having a single faithful partner). This is inconsistent with Nwatu, Young, Adikaibe, Okafor, and Onwuekwe, (2017) who stated that knowledge of appropriate preventive measures and practices for STIs and HIV, more than a quarter of the students were not aware that having a single faithful partner was an effective method of prevention while only three quarters of have good knowledge of all preventive measures assessed. This results show that the participants have moderate knowledge about signs of maturity (Hair growth, Breasts enlarge in puberty, Hips enlargement in puberty, etc). This findings consistent with petter, (2013) who stated that Female students were more likely to have moderate knowledge regarding the physical changes of girls. This proves that the girls have aware about physical changes during puberty. The study revealed that the girls have moderate knowledge about premarital counselling (Thalassemia test, Screening for Hepatitis type B, Detection for hypertension, etc). This result inconsistent with kmail, (2011) who stated that the participants have good knowledge about premarital screening. This because to educational lessons that studied for adolescent in their schools. The study conducted moderate knowledge about preconception counselling of the participants (avoiding tobacco and other drugs, seeking further information about pregnancy and care of the children, Life styles change (healthy weight), etc). This is inconsistent with Nascimento, Borges, Fujimori et al.,(2015) who stated that there
was a small proportion of adolescents who have some preconception information. The researcher proves that the study done of unmarried adolescent, on another hand may didn’t hear about this items, so they haven’t enough of information about this mater.

Regarding the conditions of pregnancy the participants reported moderate knowledge about this topic (Hormone necessary for the occurrence and continuation of pregnancy is testosterone, The pregnancy with age more than 35 years occur without complication, There are no health contraindications for anemic woman to become pregnant,,etc). This result is inconsistent with that Basyouni, and Aly, (2015) who showed that the participants have little knowledge about this subject. The researcher believes that health education topics didn’t included within the curriculum of adolescent students. The study showed that the participants reported moderate knowledge regarding this item, this finding is inconsistent with Basyouni, and Aly, (2015) who stated that the participants have inadequate knowledge about this item. This proves that the adolescent didn’t visit the antenatal care because they are unmarred and ignore their family the necessity of the antenatal care. Concerning the tetanus vaccine the students showed that they have moderate knowledge about this vaccine (People who are not completely immunized and have wounds should receive a tetanus immunization,,etc). This result of the study disagreement with Orimadegun, et al., (2014) who showed that Almost two- thirds (64.7%) of the respondents had poor knowledge about tetanus vaccine.

Table 1: Assessment of student’s knowledge about Reproductive Health

<table>
<thead>
<tr>
<th>No.</th>
<th>Items</th>
<th>Assessment knowledge</th>
<th>M.</th>
<th>S.D.</th>
<th>Ass.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Student’s knowledge about Menstruation</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Menstruation is a pathological process</td>
<td>0.91 0.96</td>
<td>M</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Normal cycle length &gt; 35 days</td>
<td>1.13 0.96</td>
<td>M</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Causes of menstruation are hormones</td>
<td>0.98 0.70</td>
<td>M</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Source of menstrual bleeding is vagina</td>
<td>0.96 0.85</td>
<td>M</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total mean</td>
<td>0.9 M</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Student’s knowledge about Infertility</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Alcohol can predispose to infertility</td>
<td>0.72 0.79</td>
<td>M</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Is easy for a woman to conceive after 40 years</td>
<td>0.72 0.81</td>
<td>M</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Smoking can predispose to infertility</td>
<td>0.59 0.75</td>
<td>P</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>Sexually transmitted infection can cause infertility</td>
<td>0.89 0.84</td>
<td>M</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Being underweight or overweight effect on infertility</td>
<td>0.66 0.74</td>
<td>P</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Infertility can only occur after 40 years of age in female</td>
<td>0.59 0.70</td>
<td>P</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total mean</td>
<td>0.7 M</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Student’s knowledge about Sexually Transmitted Diseases</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Sexually transmitted diseases can be transmitted by Exposure to cough and sneeze from infected persons</td>
<td>0.42 0.61</td>
<td>P</td>
<td></td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Transfusion of blood from one person to another</td>
<td>0.50 0.69</td>
<td>P</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Unprotected sexual intercourse</td>
<td>0.64 0.64</td>
<td>P</td>
<td></td>
<td></td>
</tr>
<tr>
<td>14</td>
<td>Sharing the same plate with infected person may have effect</td>
<td>0.77 0.63</td>
<td>M</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>From needles and syringes</td>
<td>0.76 0.74</td>
<td>M</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Conted…

16. Transfer from infected mother to her fetus 0.81 0.70 M
17. One types of STD is syphilis 0.90 0.75 M

Total mean 0.68 P

Student’s knowledge about Preventive Methods from Sexual Transmitted Diseases
18. Use of condom during sexual intercourse protect against sexual transmitted diseases 1.00 0.06 M
19. Don’t share with others sharp or engraving tools 0.77 0.71 M
20. Having a single faithful partner 0.78 0.72 M

Total mean 0.85 M

Student’s knowledge about Signs of Puberty
21. Hair growth 0.76 0.64 M
22. Breasts enlarge in puberty 0.77 0.63 M
23. Hips enlargement in puberty 0.95 0.60 M
24. Start of menstrual cycle 0.87 0.60 M
25. Increase secretion of sweat glands and fat accumulation in certain areas of the body 0.94 0.58 M

Total mean 0.86 M

Table 2: Summary of total mean of the Students knowledge regarding Reproductive Health

<table>
<thead>
<tr>
<th>No.</th>
<th>Domains of knowledge</th>
<th>M</th>
<th>SD</th>
<th>Ass.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Student’s knowledge about Menstruation</td>
<td>0.9</td>
<td></td>
<td>M</td>
</tr>
<tr>
<td>2</td>
<td>Student’s knowledge about Infertility</td>
<td>0.7</td>
<td></td>
<td>M</td>
</tr>
<tr>
<td>3</td>
<td>Student’s knowledge about Sexually Transmitted Diseases</td>
<td>0.68</td>
<td></td>
<td>P</td>
</tr>
<tr>
<td>4</td>
<td>Student’s knowledge about Preventive Methods from Sexual Transmitted Diseases</td>
<td>0.85</td>
<td></td>
<td>M</td>
</tr>
<tr>
<td>5</td>
<td>Student’s knowledge about Signs of Puberty</td>
<td>0.86</td>
<td></td>
<td>M</td>
</tr>
<tr>
<td>6</td>
<td>Student’s knowledge about premarital Counselling</td>
<td>0.83</td>
<td></td>
<td>M</td>
</tr>
<tr>
<td>7</td>
<td>Student’s knowledge about preconception Counselling</td>
<td>0.81</td>
<td></td>
<td>M</td>
</tr>
<tr>
<td>8</td>
<td>Student’s knowledge about Conditions of pregnancy</td>
<td>0.71</td>
<td></td>
<td>M</td>
</tr>
<tr>
<td>9</td>
<td>Student’s knowledge about Ingredients of healthy pregnancy</td>
<td>0.87</td>
<td></td>
<td>M</td>
</tr>
<tr>
<td>10</td>
<td>Student’s knowledge about the role of primary health care center in pregnant health</td>
<td>0.9</td>
<td></td>
<td>M</td>
</tr>
<tr>
<td>11</td>
<td>Student’s knowledge about Tetanus vaccine</td>
<td>0.8</td>
<td></td>
<td>M</td>
</tr>
<tr>
<td>12</td>
<td>Student’s knowledge about Dysmenorrhea (pain during menstrual cycle)</td>
<td>0.8</td>
<td></td>
<td>M</td>
</tr>
<tr>
<td>13</td>
<td>Student’s knowledge about Breast Feeding</td>
<td>0.9</td>
<td></td>
<td>M</td>
</tr>
</tbody>
</table>

Table 3: Association between student Knowledge and their age, number of brothers, frequency of student among their brother, living, and external reading

<table>
<thead>
<tr>
<th>Variables</th>
<th>Sum of Squares</th>
<th>df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig. P≤0.05</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Between Groups</td>
<td>8.417</td>
<td>57</td>
<td>.148</td>
<td>1.009</td>
<td>.467 NS</td>
</tr>
<tr>
<td>Within Groups</td>
<td>33.520</td>
<td>229</td>
<td>.148</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>41.937</td>
<td>286</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Number of brothers</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Between Groups</td>
<td>19.922</td>
<td>57</td>
<td>.350</td>
<td>.996</td>
<td></td>
</tr>
<tr>
<td>Within Groups</td>
<td>80.356</td>
<td>229</td>
<td>.351</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>100.279</td>
<td>286</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Conted…

<table>
<thead>
<tr>
<th>Frequency of student among brother</th>
<th>Between Groups</th>
<th>20.738</th>
<th>57</th>
<th>.364</th>
<th>1.430</th>
<th>.036 S.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Within Groups</td>
<td>58.280</td>
<td>229</td>
<td>.254</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>79.017</td>
<td>286</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Living</td>
<td>Between Groups</td>
<td>.139</td>
<td>57</td>
<td>.002</td>
<td>.653</td>
<td>.971 NS</td>
</tr>
<tr>
<td>Within Groups</td>
<td>.857</td>
<td>229</td>
<td>.004</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>.997</td>
<td>286</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>External Information</td>
<td>Between Groups</td>
<td>83.987</td>
<td>57</td>
<td>1.473</td>
<td>1.390</td>
<td>.048 S.</td>
</tr>
<tr>
<td>Within Groups</td>
<td>242.814</td>
<td>229</td>
<td>1.060</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>326.801</td>
<td>286</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 4: Statistical Differences between Student Knowledge and their residency, father works, family income, attainment, and external information

<table>
<thead>
<tr>
<th>Variables</th>
<th>Mean</th>
<th>N</th>
<th>SD</th>
<th>t. test</th>
<th>df</th>
<th>Sig. P≤0.05</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Residency</td>
<td>48.4843</td>
<td>287</td>
<td>13.03675</td>
<td>61.661</td>
<td>286</td>
<td>.019 HS.</td>
</tr>
<tr>
<td>knowledge</td>
<td>1.0035</td>
<td>287</td>
<td>.05903</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 Father works</td>
<td>1.1429</td>
<td>287</td>
<td>.49875</td>
<td>-61.321</td>
<td>286</td>
<td>.269 NS</td>
</tr>
<tr>
<td>knowledge</td>
<td>48.4843</td>
<td>287</td>
<td>13.03675</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3 Family income</td>
<td>48.4843</td>
<td>287</td>
<td>13.03675</td>
<td>57.603</td>
<td>286</td>
<td>.899 NS</td>
</tr>
<tr>
<td>knowledge</td>
<td>4.0418</td>
<td>287</td>
<td>1.04363</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 attainment</td>
<td>2.3589</td>
<td>287</td>
<td>1.24321</td>
<td>-59.732</td>
<td>286</td>
<td>.850 NS</td>
</tr>
<tr>
<td>knowledge</td>
<td>48.4843</td>
<td>287</td>
<td>13.03675</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Conclusion

The present study concluded that: Student knowledge toward all domain of reproductive health were moderate level and poor level of knowledge about sexual transmitted diseases.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the college of nursing, university of Basra, Iraq and all experiments were carried out in accordance with approved guidelines.

REFERENCES


The Impact of the Pairs Check Strategy on Achieving Fourth Grade Students to Develop the Habits of Mind for Students

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ABSTRACT

The purpose of the research is to identify the impact of the Pairs Check strategy in the achievement of students in the fourth grade in physics. The researcher adopted the empirical research method as a methodology for conducting the current research. It includes an independent variable (Pairs Check) and the usual method (and a dependent variable) The results of the study were calculated according to the Pairs Check strategy and the average scores of the students of the control group who study according to the usual method in the test. In addition, the researcher prepared an achievement test consisting of (50) paragraphs according to the behavioral objectives set according to the relative importance of the content. The researcher investigated the psychometric characteristics of the test after conducting the experiment on the research sample in the academic year (2018-2019), which lasted for 8 weeks. Finally, the experimental test was applied to the two groups. Which is examined according to the peer examination strategy (Pairs Check) on the control group that was studied in the normal way of the academic achievement variable.

Keywords: Pairs Checking Strategy, Achievement, fourth grade students, physics, electromagnetic waves, brain.

Introduction

According to the philosophy of education in society, the world has turned to modern education by providing a modern environment to build and shape the personality of the individual in the society and make their development integrated and balanced physically, psychologically and mentally through the acquisition of good social qualities and it is through the school which is the tool of education to achieve its desired goals. The specialists in scientific education emphasize that teaching in general and teaching physics in particular not only convey information to the learner, it is a process that helps the learner build their knowledge and increase their understanding of the world around them and help their growth (physical, mental and skilled) to integrate their personalities in various aspects. Abees, (2018) says that scientific education emphasizes the creation of a conscious individual capable of coping with cognitive and technological development and coping with life and its future, economic and social challenges. Scientific education is an ongoing process. The basic task is from the perspective of experts and specialists in scientific education, They think in a critical scientific way, especially in physics. Physics is the branch of knowledge that gives organized answers to all the questions that are in our minds about nature. These answers depend on the scientific method based on experimentation and logic that explain the phenomena according to the scientific theories that have proven to be applied in the field. Some of them are based on mathematical interpretation through laws and relationships. Concerns about the phenomena of cosmic and material that most of the issues depend on the conclusions as in the physical experiments of this is a physics quantitative science describes all the phenomena in terms of a few relationships and be measurable, and characterized by a high degree of general and derived from a large number of For phenomena called laws of
According to Abd Omran, (2018) The scientific breakthrough in physics began at the dawn of the twentieth century. It was necessary to pause to consider how to teach this science at different levels of study and to allow the learner to understand and understand physical concepts. Physics is not just a branch of science. Natural, but the origin of other sciences, it became clear to the learner that if he wanted to understand the other basic sciences, it is necessary to absorb more of the concepts of physics that involve the composition of the rest of science and linking physics to daily life and increase the physical culture of the learner. Badawi (2010) says that structural theory is one of the most active theories that support active learning because it depends on the activity of the learner and revolves around it. The learner learns the importance of thinking and allocates sufficient time to it, and linking new ideas with his daily life and also related to previous topics, and also linking ideas in the article with ideas of other materials. The application of this method requires that students be trained in the practice and modeling provided by the teacher in front of students and requires the identification of problems or issues that are intended to train students to solve them from the teacher and write them in working papers distributed among couples and each student to prepare paper and pencil to write the solution or training and recording notes. And train students to give feedback and give praise to the difference between giving an answer to the question and to train others to solve and teach them how to give others time to think about the solution or answer.

**Methodology**

The researcher adopted the experimental approach as a methodology for carrying out this research, which includes an independent variable (Pairs Check, and the usual method). The researcher used experimental design with partial control of the experimental and control groups after the equivalence between them. This method is best suited to achieve the research objectives.

**Search Community and Design:** The current research community included students of the fourth grade in the government day schools of the Directorate General for the Education of Rusafa II in Baghdad - a center for the academic year (2018-2019), which has a population of not less than two divisions. The sample of the research chose the researcher (Nazareth Preparatory for Girls) (B), the researcher chose the (B) method of random drawing (the drawing method) to represent the experimental group and the number of female students (35) students who will study according to (Pairs Checking Strategy) and in the same way chosen to represent the control group and the number of female students (35) students who will study according to (the normal method).

**My Search Group Parity:** In order for the results to be more accurate, the difference between the experimental and control groups should be equal to the independent variable. The researcher must achieve the equivalence between them to exclude all the variables that affect the results of the experiment. The variables are (age calculated by months, first grade, IQ test). The equivalence between the two research groups in the variables above. The results showed in Table (1).

<table>
<thead>
<tr>
<th>Variable</th>
<th>The group</th>
<th>Sample size</th>
<th>SMA</th>
<th>standard deviation</th>
<th>The degree of freedom</th>
<th>T value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age calculated</td>
<td>Experimental</td>
<td>35</td>
<td>204,6</td>
<td>8,06</td>
<td>68</td>
<td>0,563</td>
</tr>
<tr>
<td>in months</td>
<td>Control</td>
<td>35</td>
<td>205,66</td>
<td>7,63</td>
<td>0,304</td>
<td>2,000</td>
</tr>
<tr>
<td>First course</td>
<td>Experimental</td>
<td>35</td>
<td>61,57</td>
<td>13,3</td>
<td>60,63</td>
<td>12,67</td>
</tr>
<tr>
<td></td>
<td>Control</td>
<td>35</td>
<td>60,63</td>
<td></td>
<td>0,287</td>
<td></td>
</tr>
<tr>
<td>IQ test</td>
<td>Experimental</td>
<td>35</td>
<td>25,11</td>
<td>8,99</td>
<td>24,54</td>
<td>7,61</td>
</tr>
<tr>
<td></td>
<td>Control</td>
<td>35</td>
<td>24,54</td>
<td></td>
<td>0,61</td>
<td></td>
</tr>
</tbody>
</table>

**Search Tools:** The research material is one of the most important things that the researcher does for the purpose of conducting the research. These requirements are as follows: (The scientific material (content)): The scientific material that the researcher has been teaching was determined for the students of the experimental and control groups during the period of the experiment (second semester) (2018-2019). The scientific article included the last five chapters of the book of physics for the fourth grade scientific, the formulation of behavioral goals: The researcher adopted the classification of (Bloom) of the field of knowledge, which includes six main levels (recall, understanding, application, analysis, synthesis, evaluation) Behavioral objectives.
based on the general objectives, the scientific subject (content) covered by the experiment, the teaching plans: The researcher prepared a set of teaching plans for the experimental and control groups in light of the educational content of the five chapters (fifth, sixth, seventh, eighth and ninth) of the physics book to be taught to fourth graders (2018-2019), and the number of (16) teaching plan for the experimental group, which is taught according to the strategy of peer examination (Pairs Check) and similar to the control group, which is taught according to the normal method.

Search Tool: The steps of the research tool (the collection test) are:

Determining the purpose of the achievement test: The purpose of the preparation of the achievement test to measure the achievement of students in the fourth grade in physics for the second semester in the academic year (2018-2019). Therefore, the researcher prepared an achievement test for the subject according to the behavioral objectives and appropriate level. The research sample

Determining the purpose of the test: The purpose of preparing the test is to measure the achievement of students in the fourth grade scientific (research sample) in the last five chapters (fifth, sixth, seventh, eighth, ninth) of the book physics after teaching them.

Determination of the test paragraphs: The researcher prepared a specification table according to the basic steps, and determined the relative importance of the five chapters (light V, VI (reflection and refraction of light), VII (mirrors), VIII (thin lenses) The researcher determined the relative weights of each level of the cognitive field in the light of the number of pages of the chapters of the book. After defining the test paragraphs with (50) paragraphs, the number of questions per cell was determined in the specification table.

Preparation of the test paragraphs: In the light of the specification table, the researcher prepared (50) objective test paragraphs of multiple choice type with four alternatives to measure the level of knowledge, understanding, application, analysis, Reflection and refraction of light, mirrors, precision lenses, static electricity).

Formulation of the test instructions: The researcher prepared the instructions and instructions for the collection test, including how to answer (selecting one correct alternative to the paragraph, answering all paragraphs, the time to answer, writing the triple name and the row and the division in the field assigned to it).

Correcting the test answers: After determining the type of test and formulating its paragraphs, the researcher determined a standard for correcting the answers. The researcher put one score for each correct test paragraph and 0 for the wrong answer and the left paragraph that the students did not answer. Is (50) degrees and the minimum grade (zero).

The validity of the test: The researcher confirmed the truthfulness of the test and the validity of the content. The results showed that the apparent honesty was agreed upon by (80%) by the specialists and arbitrators. As for the validity of the content, the results showed that all the clauses of the achievement test are statistically significant. Honestly in measuring the comprehension and comprehension of fourth graders in physics.

The pilot application of the assessment test

The first test application: The achievement test: To verify the clarity of the test subjects, instructions and answers and to determine the time required for the test, the test was carried out on a sample of 50 female students from the fourth grade without a research sample to determine the time taken to answer. (50) minutes by recording the exit time for each student, and by calculating the mean of the time needed to answer all the test paragraphs.

The second survey application of the test of achievement: The test was applied to a sample of (100) students in the fourth grade of scientific non-research sample, the purpose of which is to analyze the items of the statistical achievement test, namely the difficulty of paragraph, discrimination of the paragraph and the effectiveness of the wrong alternatives.

Statistical analysis of the test scores: The achievement test was analyzed as follows:

Coefficient of difficulty of paragraph: The performance test was found to have a difficulty coefficient of (0.31-0.74). Therefore, all the test scores are good and difficult.

Parameter discrimination coefficient: The distinguishing features of the items are: (0.30-0.70) and above, and the difference between the test scores of the test scores (0.20 - 0.80). Thus, the test scores are considered to have a good and appropriate discrimination coefficient.
The effectiveness of the wrong alternatives: The researcher conducted a statistical analysis (highest 27% and lowest 27%) to find the effectiveness of the wrong alternatives ranging from (-0.11) - (-0.33). This indicates that the alternatives of the test scores are all effective, occasion.

Results and Discussion

The students of the experimental group who studied according to the Pairs Check strategy exceeded the students of the control group who studied according to the usual method in the achievement test. This study was unique in this study as the first study on the strategy of peer examination in the achievement of fourth grade students in Physics, as in Table (2). There is a statistically significant difference at the level of significance (0.5) between the average score of the students of the experimental group who study according to the Pairs Check strategy and the average score of the control group students who study according to the usual method in the physics collection test. The researcher found that the level of students in the fourth grade of science is low in physics and touched this decline through the degrees of previous years in physics so the researcher was surprised to experiment with a new strategy of active learning strategies, namely the strategy of peer examination (Pairs Check), the researcher noted that the average grades of female students The experimental group is 36.51 and the difference is 33.52. The average score of the students in the control group is 28.97 and the difference is 53.00. The calculated value of T (4.796) is greater than the numerical value of (2.000), And therefore the difference between the two groups is statistically significant at the level of (0.05) and the degree of freedom (68), and Ali E, the students of the experimental group may outperform the students of the control group in the collection variable.

Table 2: Arithmetical mean, deviation, variance, T value (calculated and tabular) and statistical significance of the scores of the two sets of research in the final achievement test

<table>
<thead>
<tr>
<th>Statistics</th>
<th>Sample size</th>
<th>SMA</th>
<th>standard deviation</th>
<th>variance</th>
<th>The degree of freedom</th>
<th>T value</th>
<th>Statistical significance (0.05)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experimental</td>
<td>35</td>
<td>36.51</td>
<td>5.79</td>
<td>33.52</td>
<td>68</td>
<td>4.896</td>
<td>0.05</td>
</tr>
<tr>
<td>Control</td>
<td>35</td>
<td>28.97</td>
<td>7.28</td>
<td>53.00</td>
<td></td>
<td>2000</td>
<td></td>
</tr>
</tbody>
</table>

Conclusion

Teaching fourth grade students according to the Pairs Check strategy has had a positive effect on raising their academic achievement in physics and increasing their understanding of information, facts and knowledge. Teaching according to the Pairs Check strategy has greatly helped raise students’ ability to organize information and relationships that can be used to solve the daily problems they face. Teaching according to the peer examination strategy (Pairs Check) has made the student the focus of the educational process, by activating its role in the classroom participation in the educational situation and this in turn increases their self-confidence and encourage them to persevere to raise their level of science.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Faculty of Basic Education, University of Babylon, Hilla, Iraq and all experiments were carried out in accordance with approved guidelines.

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Effectiveness of Training Program of School-Age Students about First Aid by Videos Techniques on their Safety Practices in Al- Ashar District Schools at Basra City

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ABSTRACT

This quasi-experimental study aims to identify the students’ knowledge about first-aid (Epistaxis, Epilepsy, Fracture, and Wounds), Evaluates the effectiveness of training program of school age students about first aid by videos on the study group, and Find out the relationships between the effectiveness of the training program of school age students about first aid and their socio- demographic characteristics (age, gender, parents’ education, parents’ occupation, and family’ socioeconomic status). The study was conducted at primary schools in Al-Ashar District at Basra City for the period from October 7th, 2018 to April 16th, 2019. The study included a probability (simple random) sample of 160 students who were randomly select into study and control groups; 80 students for each group. The results of the study displayed that there were statistically significant differences in students’ practices related to first-aid (Epistaxis, Epilepsy, Fracture, and wounds) after the administration of the video-assisted training program. The study concluded that the video-assisted training program positively affected students’ practices related to first-aid of epistaxis, epilepsy, fractures, and wounds. Furthermore, parents’ level of education has an effect in determining students’ overall practices related to first-aid.

Keywords: Effectiveness, Training Program, First Aid, Videos Techniques, Safety Practices.

Introduction

First aid is applied to injure or patients in any health-threatening environment to save life, prevent deterioration of the condition or contribute the treatment process prior to the availability of specialized medical care. First aid may refers to evaluation and attacks that may be carried out by a bystander (or victims) or without them 1,2. Thus, early treatment for such emergencies reduces morbidity and mortality among school-age children 3-5. A school is where children spend most of their time, learning new things and promoting themselves. Apart from their studies, they participated in many extracurricular activities which aimed at their physical and mental development in a healthy manner. Most common activities involving children are cycling, swimming and playing. However, during these activities children are more likely to be physically injured 6,7. From an active perspective, schools have individuals and facilities for first aid education facilities and because they have the largest number of students, there are places where the impact of first aid education can be maximized. Thus, first aid education is a measure to enhance understanding, abilities, knowledge about jobs, and attitudes about safety that can occur in the daily life of both individuals and groups. Thus, teaching first aid is used as the most effective way to maintain health and life. It is compulsory for anyone to learn first aid as preventive measure 8. However, to provide first aid correctly, the service provider should have some basic knowledge and experience to reduce the damage and save life. Therefore it is important that everyone has some basic knowledge about first aid to save the injured person until medical advice is provided 9. First aider is defined as someone who has been trained in first aid. He is the first person to provide care as a caregiver to provide first aid measures.
He must practice the perception of what to do and what not to do. He should realize that his knowledge and skills in first aid can reduce future injury and disability. The importance of first aid training in the early stages of their careers is now being implemented throughout the world. As persons have the ability to change the community’s health scenario if they are properly prepared and educated for a healthy living. WHO estimates, nearly 9,50,000 children die in the world due to an injury each year. However a recent national review on burden of injuries in India revealed that, nearly 8.2% of death and 20-25% of hospitalization occur among children based on few hospitals and population based studies. In the same year there were deaths among 1,133 children in Karnataka. A one year data from Bengaluru on the injury surveillance programme showed that 5,505 children brought to hospitals with an injury and 209 children below the age of 18 years died due to an injury.

Methodology

Study Design: A quasi-experimental design was used to guide this study. The study was conducted at primary schools in Al-Ashar District at Basra City, for the period from October 7th, 2018 to April 16th, 2019.

Study Instrument: To evaluate the effectiveness of the training program on students’ knowledge about first-aid at primary schools in Al-Ashar District at Basra City, the researcher constructed a questionnaire format in order to achieve the aims of the study after demonstration of the videos film about steps of first-aid.

Part I: This part content socio-demographic and personal characteristics items which include (age, gender, grade, parents’ education, residency, and students’ receiving of any first-aid training).

Part II: This part contains students’ practices questions related to first-aid which includes four sections (Epistaxis, Epilepsy, Fracture, Wounds).

Data Collection the Method: The study sample was randomly and equally selected from each (fifth and sixth grades) primary school students. The simple random sample method was used to recruit study subjects. The names of all students were written in identical pieces of paper. These pieces were stirred well and let one of the students drawn one piece. A probability simple random sampling method was used for selecting the study sample. The participants were randomly assigned to either the control group or the study group. Distributing questionnaires in person allow the researcher to explain the instructions before the participants start answering the question. The pre - test was given to participants for complete study questionnaire (self-administration), to assess their knowledge toward first aid.

Statistical Analysis: Data were analyzed by using the statistical package for social science (SPSS) version 24, for windows (Chicago, IL).

Results and Discussion

The age mean for students in the study group is 11.38 ± .86; more than two-fifth age 12-years-old (41.25%), followed by those who age 11-years-old (36.25%). For the control group, the age mean is 11.56 ± .79; less than a half age 12-years-old (45.0%), followed by those who age 11-years-old (38.75%). Concerning students’ gender and grade, students are equally distributed (50.0%) for each group. Regarding father’s level of education, more than a third of students’ fathers in the study group hold a bachelor’s degree (35.0%), followed by those who hold a diploma (22.5%). For the control group, more than a quarter reported that they hold a bachelor’s degree (27.5%), followed by those who hold a diploma degree (26.25%). With respect to mother’s level of education, more than a third of students’ mothers in the study group hold a bachelor’s degree (35.0%), followed by those who hold a diploma (21.25%). For the control group, less than a third hold a bachelor’s degree (32.5%), followed by those who hold a diploma degree (23.75%). Concerning the residency, all students in both groups reported that they live in urban areas (100.0%) for each group. Lastly, all students in both groups reported that they never received any training about first-aid (100.0%) for each group. There is a statistically significant differences in students’ practices related to the first-aid of epistaxis for the study group (p-value = .000). For the control group, there is no statistically significant difference in students’ practices related to the first-aid of epistaxis. There is a statistically significant differences in students’ practices related to the first-aid of epilepsy for the study group (p-value = .000). For the control group, there is no statistically significant difference in students’ practices related to first-aid of epilepsy. There is a statistically significant differences in students’ practices related to the first-aid of fractures for the study group (p-value = .000).
For the control group, there is no statistically significant difference in students’ practices related to the first-aid of fractures. There is a statistically significant difference in students’ practices related to the first-aid of wounds for the study group (p-value = .000). For the control group, there is a statistically significant difference in students’ practices related to first-aid of wounds (p-value = .000). Health education programs can be implemented in schools to prevent health-related problems consequently contributing to youngsters’ and community’s wellness Alexandropoulou in (2013). There was a noticeable improvement in level and first aid management skills of primary school students who received video-assisted teaching method concerning practices related to first aid of epistaxis with a statistically significant difference. This finding indicates the positive influence of the video-assisted teaching method in improving students’ practices related to first-aid of epistaxis. Also this finding is supported by Bandyopadhyay and others (2017) who reported that there was statistically significant increase in students’ knowledge on the first-aid management of epistaxis between pre-and-post-intervention. There was a noticeable improvement in students’ practices related to first aid epilepsy. This finding indicates the positive influence of the video-assisted teaching method in improving students’ practices related to the first-aid of epilepsy with a statistically significant difference. This finding is consistent with that obtained by Elewa and Saad (2018) who concluded that students’ knowledge and practices related to the first aid of epilepsy has improved after the administration of child-to-child health approach. There was a noticeable improvement in students’ practices related to the first aid of fractures. This finding indicates the positive influence of the video-assisted teaching method in improving students’ practices related to the first-aid of fracture with statistically significant difference. Consistently, this present study is supported by Bandyopadhyay and others (2017) who reported that there was statistically significant increase in students’ knowledge in the first-aid management of fractures between pre-and-post-intervention. There was a remarkable improvement in students’ practices concerning first aid of wounds. This finding indicates the positive influence of the video-assisted teaching method in improving students’ practices related to first-aid of wounds with a statistically significant difference. This finding of present study are consistent with that of Mohan and Chandrakala (2017) who reported that there was a statistically significant increase in students’ knowledge about the first-aid management of wounds.

Table 1: Difference in students’ practices related to the first-aid of epistaxis

<table>
<thead>
<tr>
<th></th>
<th>Paired Samples Test</th>
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<tbody>
<tr>
<td></td>
<td>Paired Differences</td>
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<tr>
<td></td>
<td>Mean</td>
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<tr>
<td>Epistaxis</td>
<td></td>
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<tr>
<td>Study Pretest – Study Posttest</td>
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<tr>
<td>Control Pretest – Control Posttest</td>
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Table 2: Difference in students’ practices related to the first-aid of epilepsy

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<tr>
<td></td>
<td>Mean</td>
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<td>Epilepsy</td>
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<td>Control Pretest – Control Posttest</td>
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Table 3: Difference in students’ practices related to the first-aid of fractures

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<tr>
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<th>Df</th>
<th>Sig. (2-tailed)</th>
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</thead>
<tbody>
<tr>
<td></td>
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<td></td>
<td>Mean</td>
<td>Std. Deviation</td>
<td></td>
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<tr>
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<tr>
<td>Study Posttest</td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Control Pretest –</td>
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<td>-.28573</td>
<td>.296</td>
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<tr>
<td>Control Posttest</td>
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Table 4: Difference in students’ practices related to the first-aid of wounds

<table>
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<th>Paired Differences</th>
<th>T</th>
<th>Df</th>
<th>Sig. (2-tailed)</th>
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<td>Std. Deviation</td>
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<td>Study Pretest –</td>
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<td>Control Pretest –</td>
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<td>Control Posttest</td>
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Conclusions

The video-assisted teaching method has a positive effect in improving students’ practices related to first-aid of epistaxis, epilepsy, fractures, and wounds. Parents’ level of education has an effect in determining students’ overall practices related to first-aid and students’ age, gender, grade, and residency have no influence on students’ overall practices related to first-aid.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the College of Nursing/Basra University/Iraq and all experiments were carried out in accordance with approved guidelines.

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Health Nutrition and its Relation to the Mental Skills of Primary School Students in Science

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ABSTRACT

The present study aimed to measure the correlation between healthy nutrition and mental skills among primary school students in science. The sample consisted of (60) primary school girls in two schools and was chosen in a deliberate way to achieve the study objectives. The researcher prepared a questionnaire for health nutrition (44), and a test of the basic mental skills that fit the mental development of this stage, which consisted of (8) mental skills, where the number of three paragraphs about each skill and after ascertaining the indications of honesty and consistency, The analysis of the correlation coefficients revealed that there is a strong positive relationship between the healthy food that the student is taking and the raising of her mental skills. In light of the researcher’s findings, she recommends more studies on healthy food and its relation to other variables such as concentration, intelligence and academic achievement. And their mental abilities.

Keywords: Health Nutrition, Mental Skills, Elementary School Pupils

Introduction

The current research aims to improve the nutritional status of girls by providing food that can avoid the shortage of food provided to children in their homes and increase their intellectual activity as children who receive good nutrition are able to perform better than students who do not get nutrition and therefore are vulnerable to diseases. As the school cannot satisfy the needs of food in the home environment according to changing lifestyle and to instill proper eating habits and to familiarize them with the diversification of food and accept all varieties of food and develop a spirit of cooperation and collective participation, including through inspiration in the provision of food and create the table and create a diet pattern is true and good and prevent leakage in schools. And encourage parents to send their sons and the success of compulsory education, as well as the transfer of the right habits to the family atmosphere which the child will learn in school and thus Effect in society in general. The primary school age is a time of concern not only in terms of pedagogy and culture, but also nutritionally and its impact on the pupil’s body to grow healthy. If we prepare the right food for our students and our students, we will see the benefits of this in the future through a strong generation Of students with healthy and healthy bodies for the other stages of study in addition to organizing the life of the student in the primary scientific, educational, intellectual, social and health and facilitate the growth of healthy development. It is therefore necessary to provide a meal for primary school pupils which must contain important elements for the child and to help raise his or her nutritional level. Food, whether liquid or solid, the body after absorption from the intestine can be used in the generation of thermal energy and the growth or construction of tissues of the body and compensate for the loss of it and the preservation of the body and prevention of diseases. There are also dietary habits followed in the choice of food and related to the ways of preparation, cooking, presentation, eating and keeping all these habits in general formed from the age of the student, the family is the first source and responsible for raising the child and the definition of habits and practices of food and thus shaping the child’s social trends associated with food to agree then with Food and social literature prevailing in the community or food exchange

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DOI Number: 10.5958/0976-5506.2019.01448.7
and promote and develop these food habits Photos of other social activities available in the environment such as school and public holidays and religious events and other social events Rodeo 4. In many countries, the school has become the primary institution responsible for preparing children to live in good health. The relationship between child health and education is close and reciprocal to teach children the right skills and behavior and to become useful factors for promoting community health. The employment of science processes in the science lesson transforms it from mere boring to creative intellectual processes that helps the learner to observe and think about their answers to the various questions and propose a design for experiments and the ability to interpret, infer and generalize. The earliest attempts to define the concept of science operations began relatively recently in the writings of Dersel in 1949. These writings included what is called scientific thinking as an important component of the objectives measured by a comprehensive examination in biological sciences. The ability of the learner to be: The Biological Science Project (1960) defined the processes of science (mental skills) as “the mental processes on which a person relies on organizing observations, collecting data and building relationships, and seeks to interpret or explain a mental event. This mental event represents the” problem “In science because scientific problems are sensed by man and determined by the work of his senses and thought, and there is no independent of him in nature. Scientific studies have shown the importance of breakfast for students. It comes after a period of sleep of up to eight hours, during which time it is not possible to eat any type of food. Therefore, the importance of breakfast in the work of the child’s devices has been shown to be effective. Necessary. Glucose, for example, is the main fuel for brain cell energy, and brain work is affected by the concentration of sugar glucose in blood and this is affected by the concentration of sugar glucose blood, which means low concentration of blood leads to fatigue and fatigue, so maintain a good breakfast meal and balanced nutrients at the beginning of the day To fill the brain’s need for glucose to perform the brain the best performance it needs a continuous supply of glucose because the brain cannot store glucose Unlike the muscle that can store energy in the form of Claykogen, after (9 hours) of non-eating student is considered to be fasting at The glucose is at its lowest level and the need to increase its concentration in the blood. Since the brain is in continuous working state, the brain is in a continuous state of glucose. If the amount of glucose is insufficient in the blood, the brain cannot perform what is asked to the fullest, And here comes the importance of breakfast and its role in the renewal of the level of blood glucose after the fasting period associated with sleep breakfast improves the mental and physical performance of the student as well as reduce the tensions and anxiety and improve the turnout of the child to the school and is the beginning of the right start for a busy day of work and work, Those who eat a good breakfast with a high nutritional value are more active at work and study. Those who accept breakfast with appetites who have a sound sleep and enough hours to be promoted early so that they have time to eat a meal Some of the students exercise a certain diet. They do not eat breakfast in order to lose weight. When food is needed, they try to eat some sweets and chocolate. As a result, they eat more energy than they do. The food is useful, the breakfast is different, so it is light and heavy. But if it is heavy, it gives a feeling of laziness and inactivity because the body in this case takes longer to digest food. Through a number of studies conducted at various age stages to demonstrate the mental capacity of children before and after school age, one of the teachers at King Saud University found that pre-school children were smarter than their American counterparts based on the exact criteria they were in. That their mental abilities decreased and recorded a significant difference from their American peers and one of the most important reasons is the health and nutritional status of these children (and that malnutrition is basically a bad food and not only about inadequate food, but also when food is surplus, On the other hand, the response of the body to a wide range of diseases may be infectious, which leads to poor absorption of nutrients or inability to use these nutrients properly to maintain health. Excessive intake of nutrients, energy and nutrients with essential vitamins and minerals. Another concept of malnutrition is that food may be adequate enough to meet energy needs, but at the same time be weak in providing protein, vitamins and minerals in quantities that provide natural health, growth and vitality. The lack of nutrition is an expression used to describe the continued inability to obtain enough food to meet the needs of the body of energy. The health of the crown on the heads of healthy people, but patients and the Prophet Muhammad (PBUH), recommended us to take care and care for health, and urged us to take advantage of the days when
the human is recovering He said (r) recommend us to take care and care for health, and urged us to take care to take advantage of the days when a person is well, he said (r) take five, five were said, including your health before your illness. Children suffering from developmental delays due to malnutrition and infectious diseases are very vulnerable to the decline of their cognitive abilities at a time when malnutrition has a negative impact on the performance of primary school pupils. The number of students enrolled in the first stage of the study, the number of students who are absent from school, Early study and poor performance in the classroom and thus shows the role of nutrition in the health of the individual is a key factor in school entry and continued participation and attendance. And that the symptoms of malnutrition is pale color with the emergence of abnormal growth in the joints of the hands and legs and in some cases twisted by vitamin D deficiency, which leads to rickets, while vitamin A deficiency leads to impaired vision (1). Iron deficiency leads to anemia,

Food Anemia: A condition that is caused by the lack of hemochlorobinemia, which leads to a decrease in the amount of oxygen, which is the important component and helper of the cells to carry out operations, that food anemia is caused by iron deficiency usually leads to the production of small red blood cells and lack of hemoglobin and the proportion of hemoglobin Less than 11 g/dl for children under 5 years of age. The human body contains about 3.8 grams of iron and 2.3 grams of females. The most iron-absorbing areas in the human body are the last part of the decimal female and the beginning of the small intestine. Anemia is common among primary school children due to unbalanced eating and low iron content. For many reasons, iron deficiency foods are poor due to poverty and ignorance, such as eating habits, digestive diseases, etc., and the increased need for one or more nutrients Hematopoietic iron, protein, folic acid, vitamin B12. In addition to increased amounts of iron because of rapid growth processes as occurs in children and teenage girls

Food anemia may affect the child’s lack of ability to learn, the ability to attain education and stuttering scholastic performance, and directly affect physical growth. This is why nutritionists recommend teaching primary school children healthy eating habits and behaviors such as washing hands and eating foods with high nutritional value, and reduce the consumption of gypsum, chocolate and soft drinks after or before meals.

Methodology

Research Methodology: The researcher adopted descriptive research methodology for its suitability with the current research objective and problem, where he mentioned (Obaidat et al., 1996) that the descriptive approach depends on the study of reality and the phenomenon as it exists in reality and is concerned as a precise description and expresses it quantitatively or qualitatively. Dawood and Anwar (1990) add that the descriptive approach does not depend on the limits of the phenomenon that is the subject of the study, but rather on analysis, interpretation, comparison and evaluation to reach meaningful generalizations that increase information about the phenomenon.

Research Community: The research community included primary school pupils (fifth primary) for two schools of the day schools of the Directorate General of Education in Babil Governorate - Center for the academic year 2018 - 2019 The sample of the researcher chose the female sex division of the fifth stage of primary

Search Tools:

Firstly:

A. Health nutrition questionnaire for girls: The researcher prepared a questionnaire on healthy nutrition after reviewing the literature related to health nutrition in order to obtain data on evaluating the health nutrition of the sample. The questionnaire included data on healthy nutrition. The questionnaire consisted of 44 words. The questionnaire was presented to a group of experts And most of them doctors nutritionists, to express their views in terms of clarity and lack of suitability to the nature and sample of the study and after obtaining the views of the arbitrators, the researcher reviewed the questionnaire and make a number of amendments and additions that they proposed.

B. The validity of the health nutrition questionnaire: The researcher chose the sincerity of the arbitrators to ascertain the veracity of the scale, as they numbered ten (10) arbitrators, all doctors with experience and specialization. The arbitrators referred to the amendment of some paragraphs, and the final form of the questionnaire has become (44) paragraphs.
Second:

The test of mental skills: After reviewing the literature related to mental skills, the researcher designed this tool, drawing on some of the previous studies, the researcher presented a group of mental skills to a group of experienced and specialized arbitrators to express their views in determining the mental skills that fit the stage and mental development of students in the fifth grade primary. According to the opinion of the arbitrators has been identified eight mental skills and the test of (25) paragraph of the type of pans, each skill three paragraphs.

Results and Discussion

The results indicated that there was an inverse correlation between the nutritional imbalance of the students and the level of their mental skills. The value of R = -0.65 was statistically significant, i.e., the higher the malnutrition, the lower the mental skills. The malnourished student is the student who does not receive On the balanced food between the food components necessary for the safety of growth and physical and mental health, regardless of the economic level of the family, the researcher noted through the field study that there are families financially comfortable but do not provide their children with the necessary nutrients for their age, And poor nutrition education. This is confirmed by the predicted proportions, so that the malnourished students do not have a low or very low cognitive achievement at a rate of 68.46% while those who receive a balanced diet with excellent mental abilities are estimated at 74.71 These results indicate the extent to which malnutrition is related to mental skills because malnutrition affects children's intelligence and mental abilities. This is confirmed by the study by Sarah Al-Sibai and Sana Abdel-Aziz. If the student obtains an integrated diet of both quality and quantity, Knowledge, science and good education.

Conclusion

Lack of schools to health schools because there is no cooperation between health authorities and schools. There are many studies and medical research that indicate the danger of fast food as well as the maintenance of balanced nutrition and diverse. Students have bad habits, including not eating breakfast and eating too much junk food. Most of the sample is completely agree that the lack of love of the school and the delay of the school sense or realistic is due to the health and nutrition status, which push the student to focus and thinking because of eating nutritious diets are not useful.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the University of Babylon, College of Basic Education, Babylon, Iraq and all experiments were carried out in accordance with approved guidelines.

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Medicinal Applications of Organotin (IV) Complexes and Its Important Place as Effective Antitumor Agents

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ABSTRACT

Organotin complexes are known for their outstanding structural diversity and applications. Organotin carboxylates form an important class of organotin compounds. The structural diversity of these compounds emanates from several features including flexibility in coordination geometries, coordination numbers, and versatility of the ligands to engage in different modes of chelation from monodentate to bidentate. Triorganotin(IV) complexes with various ligands mostly demonstrate tetrahedral or trigonal bipyramidal symmetry with some distortions, while diorganotin(IV) complexes have variation of geometries and coordination numbers.

Keywords: Organotin(IV), Carboxylates, Coordinate, Ligands, Triorganotin(IV), diorganotin(IV).

Introduction

Organotin compounds (OTs) are defined as those that contain at least one carbon-tin covalent bond, the carbon atom being part of an organic group. The compounds contain tetravalent tin centers and are classified as mono-, di-, tri- and tetra-organotin (IV) s, depending on the number of alkyl (R) or aryl (Ar) moieties. The anion is usually a chloride, fluoride, oxide, hydroxide, a carboxylate or thiolate ¹. Tin has 5s²; 5p² electronic configuration in its valence shell and therefore, two oxidation states i.e., +2 and +4 (due to ‘inert s-pair effect’) are possible. The ground state for tin is a 3P state, derived from s²p² configuration. In this state, there are only two unpaired electrons and a covalence of two would be expected. But the tetra-covalent state occurs much more frequently than the divalent state. The four-covalent state is derived from the sp³, 5S state of the tin, which is not the ground state but the first excited state ². The electronegativity of tin change with its oxidation number. Tin(II) compounds are generally more ionic than tin(IV) compounds ³. The structural chemistry of tin(IV) compounds reflects the relative simplicity of the electronic configuration in this oxidation state and is dominated by regular bond arrangements: tetrahedral, trigonal bipyramidal and octahedral depending on the coordination number⁴. Tin(IV) is remarkable in its capacity to expand its coordination number from four (which is found in most simple organotin compounds like the simple tetra alkyls and tetra aryls) to five, six or seven. In organotin derivatives of the type RnSnX₄-n (n = 1 to 3), where X is an electronegative group (e.g. halide or carboxylate etc.), the compounds R₃SnX usually yield five-coordinate complexes R₃SnXL which are approximately trigonal bipyramidal, and the compounds R₂SnX₂ and RSnX₃ usually form six-coordinate complexes R₂SnX₂L₂ and RSnX₃L₂ which are approximately octahedral ⁵. The chemistry of organotin has a long history that started since 1849, when Frankland isolated a specimen of diethyltin diiodide ⁶. In 1852, Lowich reported on the reaction of alkyl halides with a tin-sodium alloy giving alkyltin compounds ⁷. The basic studies in the field of organotin compounds have been developed due to the success of a large number of modern techniques applied to the organotin compounds. Investigations can be performed by the general techniques such as UV ⁸, IR ⁹ ¹H-NMR ¹⁰, ¹³C-NMR ¹¹, Mass Spectroscopy ¹² and also by the specialized techniques of ¹¹⁹Sn Mossbauer

DOI Number: 10.5958/0976-5506.2019.01449.9
spectroscopy 13 and 119Sn NMR spectrometry 14. Because of diverse applications in industry and in basic research, the chemistry of organotin compounds has gained considerable importance 15.

**Organotin(IV) Carboxylates:** This class of compounds comprises organotins containing (Sn–O) bonds formed through COO group. The compounds containing (OCOR) groups bonded to tin are defined as organotin esters which may be either monomeric or polymeric and of three general types, viz. $R_3SnOCOR^*$, $R_2Sn(OCOR^*)_2$ and $RSn(OCOR^*)$, where $R$ and $R^*$ may be same or different groups. Organotin(IV) carboxylates are widely studied organotin compounds due to their structural diversity and pharmaceutical applications, especially with reference to their antitumour activity 16. These compounds also exhibit a number of interesting structural features because of the tendency of the anionic group to coordinate inter or intra-molecularly 17. Therefore, organotin carboxylates have been studied extensively. Based on the available crystal structures, organotin(IV) carboxylates can generally be categorized into the following four classes:

1. Triorganotin(IV) carboxylates
2. Diorganotin(IV) dicarboxylates
3. Monoorganotin tricarboxylates
4. Chlorodiorganotin(IV) carboxylates

Carboxylates in the solid state show four types of structures. The structure of $R_3SnOCOR$ depends upon the size of R attached to tin, tetrahedral geometry this structure has a four-coordinate distorted tetrahedral tin as in figure 1 type (1) Trigonal bipyramidal geometry, type (2) contains a five coordinate tin with a bidentate carboxylate 18,19. Linear polymeric geometry type (3) compounds exhibit polymeric trans-$R_2SnO_2$ structural motif, in which adjacent SnR₃ moieties are bridged by a single bidentate carboxylate. Polymeric triorganotin(IV) carboxylates, type (4) has a macrocyclic tetramer, which contains four units of five-coordinate tin with bidentate carboxylate moieties. Diorganotin dicarboxylates adopt a variety of structural modes (figure 2) depending on the nature of organic substituents at the tin and/or carboxylate octahedral geometry and monomeric structure. Two longer and two shorter tin-oxygen bonds form the tetrahedron figure 2 type (1) 20-24. Trigonal bipyramidal geometry has distorted trigonal bipyramidal geometry. This is due to extensive crowding by the bulky anthracene groups, preventing the carboxylates to make a coordinate bond intra- or inter-molecularly with tin. Many organotin(IV) carboxylate complexes have been synthesized and studied with different applications. Spectroscopic studies showed that the coordination took place via oxygen atoms from the carboxylate anions and tin atom of di (or, and) tri organotin compounds. The difference of these complexes was in the ligands 25-28.

![Figure 1: Four structural classes for compounds of the type $R_3SnOCOR$](image)
Figure 2: Two major structure classes of diorganotin(IV) compounds

Scheme 1: Fragmentation pattern of triorganotin(IV) carboxylates

Scheme 2: Fragmentation pattern of diorganotin(IV) carboxylates
Physicochemical Properties of Organotin Carboxylates: Many of the carboxylates have low melting points which indicate that these are covalent compounds. The carboxylates with small organic groups are more soluble in alcohol, ether etc. than in water because the Sn-O bond is essentially covalent. The solubility of triorganotin carboxylates is low in common organic solvents because of their polymeric associated structure. The Sn-C bond is covalent in nature due to small electronegativity difference between Sn and C. However, Sn-C bond can readily participate in ionic reactions through polarization, where the carbon atom acts as a nucleophile and the tin atom as an electrophilic center. On the other hand, the bonds between tin and heteroatoms (Sn-x, where x = O, N, halogen, etc.) are thermodynamically stable but are chemically highly labile and readily participate in substitution reactions. The large size of the tin atom (covalent radius 1.4 Å), the greater polarisability of the Sn-X bond relative to that of C-X bond and the possible participation of the tin 3d orbitals are more important for determining their structures in the solid state than at carbon.

Spectroscopic Studies of Organotin Carboxylates: Structural aspects of organotin(IV) carboxylates have received a lot of attention. For determination of structural features of organotin carboxylates in solutions their 1H, 13C, and 119Sn NMR have been performed in appropriate solvents. On the other hand, structures in the solid state are usually predicted using infrared data.

1. Infrared Spectra: Solid-state FT-IR spectra were recorded in the spectral range of 4000-400 cm⁻¹ and important ν_{asym}(COO), ν_{sym}(COO), ν_{asym}(Sn-C), ν_{sym}(Sn-C), μ(Sn-O) vibrational frequencies were observed in this region. The IR stretching frequency of carboxylate groups are very important for determining their structures viz., when there are interactions between the carbonyl oxygen atoms of the carboxylate groups and the tin atom. The carboxylates generally have two strongly coupled C=O bonds with band strengths intermediate between C=O and C-O. These give a strong asymmetric stretching band near 1545-1598 cm⁻¹ and a weaker symmetrical stretching band near 1400 cm⁻¹. The Δυ values [Δυ = ν_{asym}(COO)-ν_{sym}(COO)] were used to predict the mode of tin carboxylate interaction. The differences [Δυ] between ν_{asym}(COO) and ν_{sym}(COO) are more than 200 cm⁻¹, indicating the covalent nature of the metal- oxygen bond and unidentate coordination of the carboxylic groups bonding to the metal must therefore be assumed. The bridging carboxylate of organotin compound is observed when the difference [Δυ] is less than 200 cm⁻¹. The presence of ν(Sn–O) in the range of 520-400 cm⁻¹ indicates deprotonation of the carboxylic acid group and consequent coordination of the carboxylate group with tin metal. The IR spectra of triorganotin (IV) compounds, Ph₃MeSnL, Me₂SnL, Ph₂EtSnL and PhMe₂SnL (L=AC) have been studied by Amini et al. The ν_{asym}(COO) and ν_{sym}(COO) modes of these complexes appear at 1579, 1385; 1549, 1392; 1568, 1378; 1546, 1389 cm⁻¹ respectively. On the other hand, in the IR spectra of triorganotin (IV) complex of general formula Ph₃SnL (L= AC, TPMG and MIG) the ν_{asym} mode was observed at 1620-1600 cm⁻¹ and the value of Δυ exceeds 230 cm⁻¹; this clearly show that these complexes adopt the monodentate carboxylate structure, but for other complexes of Ph₃SnL (L= α-ph-MDC, DMAN [38], DEPAB, the carboxylate groups are bidentate, (υ_{asym}(COO) = 1610-1580 cm⁻¹; Δυ < 200 cm⁻¹). In the triorganotin carboxylates, R₂SnL (R= Me, n-Bu, Ph, L= BM), the ν_{asym}(COO) stretching has been assigned in the range between 1625-1590 cm⁻¹ and the magnitude of ν_{asym}(COO)- ν_{sym}(COO) (Δυ) separation is 200 cm⁻¹, indicating monodentate carboxylate group. While for Bz₂SnL Δυ is 195 cm⁻¹, is on the broader line of monodentate and bidentate carboxylates; therefore, one can conclude a four- or six-coordinated tin for this complex but a four coordinated tin is observed due to the presence of bulky benzyl group. Carboxylate groups in the diorganotin (IV) derivatives adopt a bridged structure in the solid state unless the organic substituents in tin are bulky or unless the carboxylate group is branched at the α-carbon. The IR spectra of diorganotin (IV) complexes of general formula R₂SnL₂ (R= Me, Et, Pr, n-Bu, Ph, Bz, L= MIB) have been studied by Khan et al. 31.

2. Nuclear (1H, 13C and 119Sn) Magnetic Resonance Spectral Studies: The value of 70-71 Hz measured in DMSO-d₆ solutions is in the range for five coordinate compounds, due to adduct formation with the donor solvent. In 1H NMR spectra of organotin(IV) carboxylates,
a signal between 10.00-13.00 ppm due to the CO(OH) resonance of the ligand is absent, which suggests the replacement of the carboxylic proton by the organotin(IV) moiety. The protons of n-butyltin(IV) and triphenyltin(IV) complexes mostly show a complex pattern in the region of 1.30-1.66 ppm and 7.25-7.71 ppm. Although the complex motif of ¹H-NMR spectra of di- and tri-n-butyltin(IV) derivatives, a clear triplet due to terminal methyl group appears in the range of 0.84-0.95 ppm. The values of the coupling constant ³J[¹H-¹H] of 8.83-9.15 Hz for -CH=CH-protons in the dibenzyl and trimethyltin (IV) derivative of 4-bromomaleamic acid, indicate the cis-configuration.

Mass Spectral Studies: The major fragmentation in the organotin(IV) derivatives is observed due to the loss of the ligand moiety from the tin derivatives. Successive fragmentation is observed by the loss of R groups (Me, Ph, Bu, Bz) until the Sn⁺ ion is obtained. In an alternative route, R groups are eliminated first and in the next step one molecule of CO₂ is evolved from the ligand moiety attached to the tin atom. In the successive steps the remaining substituents are evolved from the tin atom (Schemes 1 and 2).

Conclusion

Three main factors have been found to play an important role in determining the relationship between structure and activity for organotin(IV) derivatives (L)₉₂SnX₄₋ are: the nature of the organic group R; the nature of halide or pseudohalide X; the nature of donor ligand. The spectral data suggest that the ligand acts in a bidentate manner, coordinating through the oxygen atoms. These spectroscopic techniques exposed a distorted tetrahedral geometry in the solution state for the triorganotins, while a mean coordination number between five to six for the di-organotin(IV) dicarboxylates. In the solid phase, the tri-organotins were essentially trigonal bipyramidal polymeric while the di-organotins were octahedral. Investigations on organotin(IV) complexes have received considerable attention due to their non-biological and biological applications. Organotins are also finding important place as effective antitumor agents.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Department of Chemistry, College of Science, Babylon University, Iraq and all experiments were carried out in accordance with approved guidelines.

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The Impact of Daniel Model on the Fifth Grade Students for Development the Skills of Students’ Science

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ABSTRACT

This study was conducted in Iraq Babylon province/University of Babylon/Faculty of Basic Education, the purpose of the study is known as “the impact of the model Daniel Neil in the collection of history in the fifth grade literary students.” The current study community was the preparatory school for boys in the center of Babylon governorate. The sample was the Thawra high school for boys. The fifth grade was chosen by two groups (A and B), one was experimental and the other was an officer with 54 students. The researcher has equaled the previous collection variables, the parents’ achievement and the age of the time calculated in months. The researcher applied the research experience in the first semester of the academic year 2018-2019. The results showed that the experimental group exceeded the control group. The researcher came out with a set of conclusions, recommendations, and proposals.

Keywords: Daniel Neil Model, Collection, History, Fifth Literature, Methods of Teaching History

Introduction

The subject of history as a subject has faced a number of problems that contributed to its nature and its applications in highlighting it, including that it is wide, and its many branches and subjects. Therefore, the teachers use this article to memorize the students about the facts and historical information; and not to take care of whether the student realized what was presented in the article 1. Social materials are about a year old, and history in particular faces multidimensional problems that have emerged in a rapidly changing world, requiring teachers to abandon their traditional roles to new roles 2. The problem lies in the reality that embodies an unpleasant picture showing the low student achievement in that article 3. Social problems in general means talking about the weakness of achievement in the subject of history in particular. Students do not accept that article because they consider it useless, so weakness is inevitable 4. The reality of teaching history depends on filling the students’ minds with information without understanding and understanding. Moreover, the teaching is based on teaching the teacher a set of facts, events, and dates in the textbooks, and teaching and memorizing them from the students while calling for contemporary educational trends to use the teaching methods Actors 5. It is no longer acceptable to stick to traditional methods because they are no longer sufficient to meet the requirements of the educational and educational process. It is important to be familiar with all that is new in teaching, especially in light of the fact that the world today is witnessing qualitative and quantitative leaps in all areas of life, and that maintaining traditional methods of teaching will inevitably increase the gap between us and the countries of the developed world. Hence the current search problem with the question: Does the teaching of the Daniel model have an effect on the achievement of fifth graders in history? Perhaps this model contributes to addressing or minimizing some aspects of the problem?

In view of the above, the importance of the current study is reflected in:

1. The use of the Daniel model may contribute to raising students’ achievement in history, and to achieving a positive learner in the educational process by actively participating in them and increasing their motivation towards learning.

2. The importance of introducing a number of contemporary models active in the stage because
the students reached an age whose mental abilities and motivation are more mature and renewed.

3. The researcher hopes that the relevant parties will benefit from the educational process from the results of this research in the methods of teaching social sciences in general and history in particular.

**The Daniel Model:** This model was invented by Daniel in 1987, and it has been used in the crystallization of this model of ideas in the learning cycle and concept maps, where direct education focuses on the teacher’s interest. On the outcomes of learning to his students and the teacher to talk about the subject of the lesson, such as basic information to benefit students and cannot reach it in another way and raise the interest of students and their motivation to learn and master the facts and rules and procedures necessary for subsequent learning and the prelude to the activity is taught indirectly, Scientific, and explain to them how to do the required work and how to operate and install the devices and draw conclusions and scientific experiences and activities in the manner of other teaching methods. Based on some constructional ideas derived from the learning cycle, Daniel and his colleagues designed this model, one of which is to discover the concept, in which the teacher gives the students appropriate materials, questions or images and instructions to collect data by means of direct sensory experiences related to the concept. At this stage, the teacher encourages his students to interact in a cooperative way to formulate interpretations and give predictions, and this phase corresponds to representation in the formation of knowledge at Piaget. The model designer has benefited from the practical development of Ozbel’s theory of meaningful learning, which is called the advanced organizations, which are excellent in their voice. They are preliminary introductions at the level of generality, abstraction, and comprehensiveness of the educational material, provided with the beginning of the new learning to provide the intellectual foundations through which the new material relates to previous experiences.

**The Characteristics of the Daniel cognitive Education Model:**

Daniel’s model achieves many goals, including:

1. It helps to develop the skills of students’ science processes such as observation, interpretation, prediction and control of variables. This is because the model is based on the survey.

2. Give students the opportunity to participate in scientific activities in the exploration phase.

3. Students develop logical-mathematical intelligence through the use of science processes such as classification and linguistic intelligence ethnically, reading and writing activities and talk about results and intelligence, social through the interaction of students with each other.

4. The model is a thrill, attracting attention and inspiring students to learn.

5. The model is to purchase, interpret and discuss through groups with each other, between them and the teacher.

6. The model provides students with various means of assessment.

7. The model allows the use of many activities, methods and experiments that help students learn.

**The levels of Daniel’s Model:**

Daniel El cognitive model includes the following levels:

1. **Direct education:** At this level, the teacher begins by giving a general overview of the lesson’s objectives and activities and providing simple subheadings about the content of the new lesson. The purpose of this lesson is to focus students’ attention.

2. **Review:** At this level discuss the previous lessons associated with the new lesson in order to prepare the minds of students to accommodate the Updates in the current lesson.

3. **Review:** At this level, a general and preliminary review of the new information or problem to be studied, and stimulate students’ ideas through the work of cognitive schemes existing learner related to understanding the phenomenon, and you mentally re-form these plans to modify or use new schemes.

4. The student can conduct the experiment in a practical and practical manner by raising questions, giving hints and helping to help students reach the desired goal and implement it in practice to preserve the safety of the students.

5. **Expression and Expression:** Students at this level deal with the materials, equipment and
equipment necessary to convey the results of their activities in tables, drawings and paintings. The purpose of this is to familiarize them with the results they have achieved.

Methodology

The researcher has used the experimental method in this study, and experimental design has chosen a partial tuning of the two groups equaled (experimental and control) to measure achievement.

Study Sample and Population: The current study community is determined by the fifth grade students in secondary and middle schools (morning study) in the center of Babylon province in the district of the center for the academic year (2018-2019). The researcher randomly selected (by lot) the junior high school among the schools, (B) as a pilot group and a (a) as a control group. After excluding students who failed the previous year, the number of students in the two groups was (54) students (26) students for the experimental group and 28 students for the control group. (Age, intelligence, achievement) For the former, the academic achievement of the parents) and there were no differences between the two groups in these variables.

Procedures: In the first four chapters of the book, the scientific material had identified in the modern and contemporary history of Europe for the fifth grade. 116 behavioral goals were formulated according to the six levels of Bloom’s cognitive classification. The researcher prepared 20 study plans for both groups, and a model of behavioral plans and objectives was presented to a group of arbitrators in education and the methods of teaching history to determine their suitability for the purpose for which they were set up and to view of what the arbitrators showed, some modifications were made.

Instrument: The researcher prepared a tool to measure the achievement of the independent variable (Daniel model) in this variable. Here is an explanation of the procedures used in building the tool:

First: making achievement test: The researcher determined the aim of the test to measure the achievement of the students of the study groups in the history of modern and contemporary Europe for the first four chapters. They also prepared the test map and the six levels of Bloom’s cognitive classification. Therefore, the study identified (50) the results of the test were reviewed by the arbitrators in order to express their opinion on the validity of the test paragraphs. Some of them were amended in light of their opinions. The paragraphs that obtained the percentage of agreement (80%) were retained. And more, as has been verified honesty construction specifications table numbers. The pilot test was conducted on a sample of (36 students) of the fifth grade students in (preparatory Jihad for boys) on 10/12/2018. It was found that the test instructions and paragraphs were mostly clear and understood by all students The survey was conducted on a random sample of (115 students) randomly selected from fifth grade students in Al Fayhaha Preparatory School for Boys and Imam Ali Secondary School for Boys on Monday, (17/12/2018) and supervised the researcher himself to the application, after the calculation of the time taken to complete the answer was (41) minutes, and after correcting the answers, the grades were ranked in descending order and 27% of the answers and (27%) of the answers were obtained. As follows:

A. Difficulty coefficient of the paragraphs: When calculating the difficulty factor for each of the test paragraphs, it was found to range from 0.28 to 0.71. All the test subjects were moderately difficult and thus all were acceptable. Bloom believes that the test is good and valid for application If the coefficient of difficulty of its paragraphs between (0.20 - 0.80).

B. Coefficient of discrimination of paragraphs: When calculating the coefficient of discrimination for each of the paragraphs of the test found between (0.33 - 0.67), where Ebel that the paragraphs of the test is good if the strength of discrimination (30, 0) All test paragraphs are good.

C. The effectiveness of the wrong alternatives: The alternative is more effective the greater the value in the negative and after the researcher conducted the statistical operations necessary to know the effectiveness of the wrong alternatives for the paragraphs of the test collection found good alternatives.

Stability of the test: In order to verify the stability of the test, the researcher used the method (Cronbach’s Alpha) reached (0.85) and is a very good stability index.

The collection test is ready to be applied to the research sample, consisting of (50) objective test paragraphs with four correct alternatives, and the highest score for the test (50) and the lowest score is (zero).
Application of the Experiment: The researcher began applying the experiment from the beginning of the academic year (2018-2019) to the members of the research groups in the teaching of three classes per week according to the plans prepared for each group, as the teaching continued until Thursday, 27/12/2018.

Statistical Methods: The researcher used the statistical record for social sciences (24-Spss) and Microsoft Excel in arithmetic: standard mean, standard deviation, t-test, square, and coefficient of difficulty for test paragraphs, coefficient of discrimination.

Results and Discussion

Results for the first zero hypothesis states that (There was no statistically significant difference (0.05) between the average achievement of the experimental group studying the date material using the Daniel model and the average achievement of the control group students who study the same material in the normal way, To verify the validity of this hypothesis, the mean, standard deviation and T value of the scores of the two groups were calculated in the collection test, as shown in the table 2. As shown in the above table, the mean for the experimental group is 42.2. The mean of the students in the control group is 33.8. The calculated T value is 8.214, which is greater than the numerical value of (2.02) (0, 05). This means that there are statistically significant differences in favor of the experimental group in the achievement test, thus rejecting the null hypothesis, and accepting the alternative that confirms a statistically significant difference at the level of (0.05) They study the Daniel model and the average scores of the control group students who are They studied the usual way of collecting.

Table 1: Experimental design of the two research groups

<table>
<thead>
<tr>
<th>Group</th>
<th>Satirical Equivalence</th>
<th>Independent Variable</th>
<th>Instrument</th>
<th>Dependent Variable</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experimental</td>
<td>1. Age</td>
<td>The Daniel model</td>
<td>Achievement test</td>
<td>Achievement test</td>
</tr>
<tr>
<td></td>
<td>2. Intelligence</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Control</td>
<td>1. Pervious information</td>
<td>Conventional method</td>
<td>The book of history</td>
<td></td>
</tr>
<tr>
<td></td>
<td>2. Pervious Achievement</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 2: Shows the difference between the average scores of the students of the two groups in the achievement test and (T- test) for two independent sample

<table>
<thead>
<tr>
<th>Group</th>
<th>Sample size</th>
<th>SMA</th>
<th>Standard deviation</th>
<th>The degree of freedom</th>
<th>T value</th>
<th>Statistical significance at Level (0.05)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experimental</td>
<td>25</td>
<td>42.2</td>
<td>3.6</td>
<td>52</td>
<td>8.214</td>
<td>2.02 value</td>
</tr>
<tr>
<td>Control</td>
<td>25</td>
<td>33.8</td>
<td>3.2</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Conclusion

Through the present study results, the researcher concludes the following: Daniel’s model has a positive impact on student achievement through interaction between students and teachers. The Daniel model helped to preserve the subject of the fifth grade students in the history material through the grades obtained by the students. The Daniel model has an impact on the thinking of the fifth graders in history.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Babylon University College of Basic Education, Iraq and all experiments were carried out in accordance with approved guidelines.

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The Impact of the Content of the Science for the First Stage for Development of the Curriculum and its Effects on the Mental and Emotional Aspects of the Students

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ABSTRACT

The paper aimed to analyze the content of the science book for the first stage of middle school based on standards of (STEAM). In order to achieve this objective, The researcher reviewed the studies that dealt with STEAM standards and prepared a list of STEAM standards, consisting of (5) fields and (50) standards, and presented them to a group of experts and specialists in teaching science and quality of education to express their opinions and observations. Consequently, the elements on the STEAM Standards List have been modified slightly. The analytical descriptive approach was used as a tool to analyze the content of the science book in light of STEAM standards. The study achieved the achievement of the STEAM standards in the content of the science book for the first middle in a very low percentage which was almost negligible. Results indicate that the STEAM standards should be included in the content of the first-middle science book for its integration of science, design, innovation, ability to work, and the generation of a generation capable of choosing the job that suits it in the future. STEAM provides meaningful learning experiences by linking education With daily life and the development of skills Meh labor market, such as the skill of problem-solving and critical thinking.

Keywords: Content Analysis- Science Book- STEAM standards- first stage of middle school.

Introduction

The problem of research can be shaped by the following question: What is the availability of STEAM standards in the science book for the first middle of middle school? Currently, human communities are in the orbit of change and development that is required by the most needs and information in this century of technology 1. information technology itself is not a goal at all, rather it is a means to deliver knowledge and to achieve the aims expected from education2. One of the main desired goals of education is to provide learners with a set of required scientific experiences in order for them to keep pace with modern knowledge and technologies. Among important goals of teaching science classes are to develop the capacity of learners to face problems and create creative attitudes to encourage their curiosities; increase learners’ ability to process and interpret information; improve their ability to review and evaluate different possible solutions; and apply scientific methods related to real life situations3. Education is one of those aspects and it plays a major role in societies and nations. It is the foundation of its development, its main viability, continuity and the wave of environmental challenges4. Scientific education emphasizes creating a conscious person who has the ability to face this knowledge and technological development, the future challenges, economic, social, scientific culture and able to keep up the modern life5. The textbook is one of the main elements of the educational system. And an important means to achieve its objectives, including the provision of scientific material and various educational experiences depend on the teacher and the learner within and outside the classroom and reflects the vision of the national educational curricula and educational
The book of science is an important part of the curriculum, used by the teacher and can not imagine any school without it, where the book of science the attention of those involved in the educational process, and is an analysis and evaluation. The book of science is important when applying the curriculum. The book is considered the essence of the educational process that facilitates the teacher and student the process of education and learning is an educational tool rich in information and facts, concepts and principles that help the success of education and learning in different stages of study. So educational studies have shown the need to reconsider the development of the curriculum and its effects on the mental and emotional aspects of the students, which requires re-formed or modified and balanced curricula and systems have proven their progress and success.

The definition of content analysis is one of the scientific research tools, one of the descriptive research curricula, that aims at knowing the communication characteristic or school books. It also describes these characteristics using quantitative symbols plus using any data obtained from different tools to fulfill the requested development. Analyzing the content of the textbook is one of the most important branches of analytical research to determine the relevance of the content of the book to the curriculum document and to explore the strengths and weaknesses of the textbooks for the purpose of improving them.

Learners today are driven and dictated by technology in their daily lives so firmly gripping the same old traditional teaching is not enough anymore, for we need to integrate technology and innovation into our teaching. Content analysis is a set of procedures and techniques designed to interpret and classify a textbook, including text, graphics, images and ideas contained in a book or curriculum. The integration of Science, Technology, Engineering, Arts and Mathematics (STEAM) and the linking of science to life is essential for the development of 21st century skills, so it is necessary to analyze the content of the science book for the first middle school and indicate the extent to which these standards need to add STEAM to the content of the books because it stimulates learning by making it more exciting; develop creative thinking and problem-solving skills; and makes the student the focus of the learning process and responsible for learning. A contextual approach in which themes are coordinated in support of each other in the context of which they are Science, technology, engineering, mathematics, and a wide range of arts. In fact, science and technology are understood as the basis for what the world must go through, analyzed and developed through engineering and the arts. Everything is based on the elements of mathematics, innovative art and design practices that play a key role in improving teaching, learning and research in science, technology, engineering and mathematics, and was also known as "integrating art and artistic design with science and technology and India Mathematics and mathematics through the educational ladder (kindergartens - the third secondary). The integration of the arts helps students to promote literary and aesthetic development as well as improving and understanding the competencies of mathematics and hopes for the concepts and facts of science and the renewal of the skills of the logic of monetary response. In a paper written by STEAM, Georgette Yekman describes science and technology as being interpreted through engineering and the arts, all based on mathematics. There are previous studies with the same research variable (STEAM Standards): the study of Choi (2015) A Case Study of the Application of Science Teachers in the Secondary Stage of the Integrative Approach (STEAM) in their Teaching. Topsakal (2017) Knowledge of students’ views on STEAM activities.

Methodology

The researcher used the descriptive approach (the method of content analysis) as the appropriate method for the purpose of research aimed at analyzing the content of the analysis of the content of the book of science for the first stage of middle school based on STEAM standards, the basic research sample subjects science book in the first grade intermediate taught in the year (2018 − 2019), and for the purpose of achieving the goal of the research used the researcher method of analysis of content, and requires the conduct of this research prepare a tool against which the analysis of the content of science books in the first row the average and must include the tool criteria for the basis of analysis. The researcher steps next to build this tool To turn standards (STEAM) and the use of the opinions of experts and specialists in the field of psychology and teaching methods. In light of this, the researcher has formulated a set of criteria in the initial formulation numbered (50) standard within (5) areas. The rules and foundations adopted by the researcher in the analysis are to read each subject of the science book for the first grade intermediate in order to control the analysis. The subject, which contains many
conclusions or many of the objectives of the researcher each one of the ideas within the main subject and gives it a repeat if the idea expresses standard. Balancing each subject to the criteria adopted by the researcher in the search tool. The results of the analysis were analyzed in the analysis table by giving the (x) sign for each subject within the classification in the analysis table, ie, the availability of the standards in the subject and giving the sign (-) Indicate that there is no standard in the subject. Transform qualitative responses into a quantitative image to facilitate statistical processing (such as calculation of frequency and percentage repetition). The statistical methods used in the research are the Cooper equation to calculate the proportions of the female analysis and find ratios in the research sample through the calculation of frequencies and the percentage of each standard.

Results and Discussion

The results showed that the field of science obtained (25) repetitions and (29.76%) percentage recurrence, while the field of technology obtained (1) recurrence and (1.19%) percentage recurrence, (19%) and (22.61%). The field of mathematics received (12) repetitions and (14.28%).

Conclusion

The first field (science) and the third field (engineering) were included in the science book for the first-grade intermediate received the highest percentage. STEAM scores were low in the science book for the first grade due to the lack of interest of the authors to include them.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Department of Graduate Studies Methods of Teaching General Sciences, Faculty of Basic Education, University of Babylon, Iraq and all experiments were carried out in accordance with approved guidelines.

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The Impact of Using Chunking Technique on Developing Reading Skill and Perception of Intermediate School Students

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ABSTRACT

Teaching reading skill to the students is very difficult thing. The difficulties might come from the teachers who are not creative to simulate in teaching reading, lack of using affective strategies to attract students’ attention to the lesson and keep using traditional ways of teaching. Other difficulties came up from the students who did not interest to read a long passage, lack of vocabulary, and understanding the meaning of what they have read. Students who learn English as foreign language face difficulties in reading long stories, texts and paragraphs. The presented study aims at investigating effects of using chunking technique on developing English language reading skill of Iraqi EFL students. The study uses quantitative research method. The samples of the study were randomly selected from the second intermediate school students. The study adopted a pretest treatment- post-test design. Through the results of the study, the first hypothesis was accepted and was concluded that chunking technique was better than the recommended teaching in both the overall achievement and reading comprehension items.

Keywords: Chunking, Technique, Reading Skill, Perception

Introduction

In education, Reading is considered to be a mental process and cognitive ability which a person is able to use when interacting with the written text. Many scholars and scientists of language have confirmed the important of reading like Davies (1968) who states that reading skills involve: identifying word meaning, drawing inferences, identifying writer’s technique, recognizing mood of passage, finding answers to questions. Further more, reading skill should not be separated from other skills. This means that everything that people talk or write is all about things that they have read. Reading relates to reading comprehension. Students when they are reading, they think by comprehending all the words, phrases, sentences, and paragraphs in order to get the meaning of the texts as a whole 1. To make teaching language more effective, the researcher uses certain strategy which is called Chunking strategy, it means : the gathering of words in a sentence into short important expressions (for the most part three to five words). This procedure contemplates word-by-word perusing, which can cause necessity of perception, since understudies omit the sentence introduction before they get to the end (Casteel, 1988). Chunking strategy is a chunking is a process by which individual pieces of an information set are broken down and then grouped together. A chunk is a collection of basic familiar units that have been grouped together and stored in a person’s memory. These chunks are able to be retrieved more easily due to their coherent familiarity3. The present study aims at :Investigating the effect of chunking strategy of Iraqi EFL Intermediate Students’ reading skill. That there is no statistically significant differences between the mean scores of the experimental group which is taught by using chunking strategy and the control group which is taught according to the conventional way. Reading is also defined by Rumptz (2003) who says “Reading is a complex process. It involves visual action in analyzing printed letters, and then identifying these letters as the components of words, until reaching the interpretation of the meaning of these words”. Bernhard et al. (2000:6), has stated that reading is about understanding written text. It is a complex activity in which it involves both perception and thought. Moore, et al. (1980: 8 ) also state...
that: “Reading is an active process, not a passive process. It involves interpreting passages, not just receiving a message. A reader interprets a passage by: understanding a writer’s implications, making inferences, realizing not only what information is given but also what information is not given, evaluating the passage”. While, Goodmann (1988) defined Reading as the operation which demands readers to explain the graphic signs, to delineate reading in a variety of ways, i.e. matching sounds to letters. In this sense, reading is as a cognitive process which could make readers provoke meaning from text. From all these definitions above, it is found that reading is an active process to get meaning of current information by connecting readers’ background knowledge to the information that is found in the written text. Reading skill is a cognitive ability when a person has the ability to interact with the written text. According to Davies (1968) reading skills involve: drawing inferences, identifying writer’s technique, identifying word meaning, recognizing mood of passage, finding answers to questions. It also include: recognizing the script of language; communicative value of sentences, deducing the meaning, use of unfamiliar lexical items; recognizing explicitly and non-explicitly stated information, conceptual meaning, relations within the sentences and between parts of text through lexical cohesion devices; perceiving indicators and main point of information in discourse; identifying main idea from supporting detail; selective summary of relevant points from the text. Munby (1978), Lanzer, Waite and Dolan (1979) classify reading skills as: word meaning in context, literal comprehension, drawing inferences, interpretation of metaphor, finding main ideas, forming judgments. chunking is a term in which it refers to the process of taking private section of information (chunks) and gathering them into larger units. By doing this, a reader can promote the quantities of information he can remember.

According to Casteel (1988) chunking is the gathering of words in a sentence in a certain text to put it into short meaningful phrases (usually three to five words). This process helps in preventing word-by-word reading, which can bring about lack of comprehension, since students overlook the beginning of a paragraph before they gain the end. Smith (1982) asserted that chunking refers to the largest meaningful sets of units in which it can be stored in short-term memory. Many studies point out that the presentation of “chunked” material can be separated into meaningful related sets of words which promotes the comprehension of some readers, who can be classified as poor or low-ability readers (Casteel, 1989), the term “chunking” as a fundamental learning strategy is used to portray a wide diversity of learning techniques that cover the organization of study time as well as a diversity of memory tools.

**Procedures and Methodology:** The following statistical procedures which followed by the researcher in order to reach the aim of the study and prove its hypothesis. The following procedures are:

1. Selecting the experimental design.
2. Selecting the population and sample and Equalizing the sample.
3. Controlling extraneous factors.
4. Applying the experiment.
5. Designing and administering tests.
6. Analyzing the data statistically.

**Experimental Design:** The experimental design includes one independent variable (chunking technique) and a dependent variable (the test scores), thus the experimental design was adopted on two equivalent groups one experimental and the other is controlled.

**Population:** The population of the presented study is represented by the second-grade intermediate school students in the province of Wasit for the educational year (2018-2019). Al Huda intermediate school lies at the heart of the province was chosen to represent both samples the control and the experimental group which we randomly selected class (A, 37 students) to represent the experimental set that received chunking technique based instruction and class (B, 39 students) to represent the control group which taught by recommended teaching.
Samples Equivalence: The researcher conducted a statistical equivalence between the experimental and control sets in some variables that could affect the results of the experiment. The researcher has chosen the two groups randomly, the students of the research sample from similar social and economic status and study in one school. These variables are: the age measured by months, first course scores, and parents academic achievement (Hammad et al., 2019). The statistical results demonstrated that the two sets were equivalent in all the aforementioned variables.

Extraneous Variables: Despite the fact that the researcher verified the equivalence of the two sets of research in some variables that are believed to affect the course of the experiment, she also tried to avoid the effect of some extraneous variables in the course of the experiment. Some of these variables and how to control them are as follows: Accidents associated with the experiment. There were no accidents during the execution of the experiment. No students left the school or got transported to another one. The sample was chosen intentionally and the two sets were equalized accordingly. The maturity factor: Since the duration of the experiment was unified between the two research groups as well as the age for students in the two groups so all the growth that occurred will be unified between all the students because they are on the same level, so this factor did not have an impact on the research, the impact of experimental procedures: the researcher worked to reduce the impact of experimental procedures that can affect the dependent variable during the course of the experiment (Dehham, 2019).

Preparing the Material: The teaching materials that were used in conducting the experiment were represented by the English for Iraq syllabus and the content that was taught during the second course of the educational year (2018-2019) was set to be from (Unit 6- Unit9). In which the researcher set a number of behavioral objectives to be expected from the test sample, as for the lesson plans the researcher prepared a total of (30) lesson plan for each sample set based on the second intermediate grade book (English for Iraq).

Research Instrument

The Performance Test: It is defined as the assessment of the knowledge of an individual in a particular area content area, skill or accomplishment in a particular curriculum, time frame, and material. They can also help in diagnosing the level of students and what they need to develop and work on (Brown, 2003, Ali et al. 2019).

The performance test was constructed by following these steps:

- The purpose of the test: the desire of constructing the test was to measure students’ reading skill aptitude in the English language by depending on the behavioral objectives specified by the teachers’ guide.
- Determining test items: the test items were determined by the researcher to be 25 test items and prepared a scoring scheme for the test.
- The test was designed by depending on the revised Bloom’s Taxonomy of educational objectives.

Pilot Test: The researcher chose the students of two schools that are located near the main school on which the experiment was conducted. The two schools were Wait Intermediate school and Al-Huda and on (50) student from each school. The test items were statistically analyzed and found that the item difficulty ranged from (0.76- 0.31) by which the test items are considered valid in difficulty. The item discrimination ranged from (0.82-0.33) which is accepted also.

Conducting the Test

The Pre-test Final Administration: Both students of the experimental and control groups were pre-tested on the 20th of February 2019. This pre-test aims at comparing the scores of the students’ achievement in the pre-test with those in the post-test. As a result, the researcher tested and scored the sample of the study.

The Post-test: Students of both groups (the experimental and control ones) were post-tested on the 20th of April 2019. The same pre-test procedures were followed in conducting the post-test, namely scoring scheme, validity, pilot study, item difficulty, item discrimination, and reliability. It is worth mentioning that the post-test also was seen by a jury of fifteen specialists in linguistics and TEFL methodology.

Results and Discussion

The students of the experimental group who studied according to the chunking technique were superior to the students of the control group, who studied according to
the guided method in the performance test, thus rejecting the first null hypothesis and accepting the alternative null hypothesis: (There is a statistically significant difference at the level of (0.7) and the average score of students in the control group who study according to the guided method in the English test). This is consistent with the studies that confirmed the superiority of the experimental group studied according to chunking technique to those of the control group.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the University of Babylon –College of Basic Education, Iraq and all experiments were carried out in accordance with approved guidelines.

REFERENCES
Comprehensive Learning Strategies for the Development of Mind Theory for Deaf Children and Hearing Impaired

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ABSTRACT

Modern studies aim to push children with hearing impairment to integrate into social life and communicate with others. On the other hand, to develop the theory of mind by integrating them with educational systems that ensure their optimal development in order to raise the level of their cognitive intelligence and academic achievement. This study will review the literature of modern strategies for the integration of Hearing impaired and deaf children in the educational process and determine the negative and positive actions of each strategy through a theoretical comparison of the results of each strategy and then propose a set of recommendations to reach a comprehensive strategy focused on the positive points and are trying to eliminate the negative effects of previous strategies in order to make the integration of students with hearing impairment or deaf in the process of comprehensive education to ensure that the development of the theory of mind to them as normal as possible compared to their peers and on the other hand ensure the psychological structure Sound and scientific achievement that qualifies them to integrate into practical life.

Keywords: Theory of Mind, ToM, Hearing impairment, deaf, Comprehensive education, language.

Introduction

There is a consensus in recent studies that exceptional children are part of society and can be integrated into society to be active and interactive actors through the application of appropriate education strategies for each category of children with disabilities. The concept of special education has been found to explain this process and develop it. The condition of hearing impairment or what is commonly called deafness is a condition that indicates the inability to hear normally, which affects the negative impact on the process of pronunciation and learning of language because of the correlation of the development of speech reception and processing information, which led to their inclusion in the curricula of special education. The peculiarity of this category is that they have a good chance of developing their mind theory at a normal rate compared to their normal peers but also have a chance of having a higher rate of evolution than their peers if appropriate strategies are used for their condition. The creation of appropriate learning strategies for this category of children has become the concern of most researchers in this field. During the literary reading of previous scientific research in this area, it was found that there are many strategies proposed for the development of the theory of mind in children with hearing impaired or deaf, but it was noted that these strategies did not produce positive results enough; these strategies have suffered some negative points that may causing the success of the strategy to be reduced. On the other hand, some research compared the development of the theory of mind in children with hearing impaired or deaf with their natural peers without proposing a mechanism to increase the rate of development of the theory of mind in these children. The best definition of mind theory is provided by Peterson & Siegal in 2000, where this concept refers to the ability to attribute mental and mental states such as beliefs, intentions, memories, desires to self and others. In other words. Where the theory of reason is an expression refers to the individual’s ability to visualize and display and determine the causes of mental states. In the full maturity stage of theory of mind, it becomes refer to a special conceptual framework to deal with

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sensory and physical factors such as sensory perception, intentional acts and faith. This framework can be activated very easily. In other words, it can be said that the theory of reason is the reason for conscious and unconscious awareness of human behavior. It represents the set of concepts that people understand the social reality surrounding not only dependence on stimuli but also on reasoning, prediction and explanation. 6

Based on this definition, Sylvia Glenn presented a research study comparing the development of the theory of mind among deaf adolescents with their natural peers. The study confirmed that the deaf community has a less developed theory of mind in the fields of reading and reasoning. The study explained this phenomenon by methodological, linguistic and social factors. Specifically for use with the Deaf group rather than relying on interpreted measures. The study attributed the delay in the development of the mind theory of the deaf to systematic, educational and social factors. In this context, Bertram F. Malle conducted a study on the relationship between language and the development of the mind theory of the deaf. Since the close relationship between language and the theory of mind in the field of development and social behavior in addition to being linked physiologically and ideologically and applied are facts can not be denied but the mechanism of influence on each other is a complex process so the researcher tried to find all possible relationships between them and made a conceptual arguments and an experiment of the mechanism of mutual influence between the development of the theory of mind and language and has concluded to practical procedures for the development of language and the theory of mind for the hearing impaired alike. On the other hand, Gudyanga and his colleagues stressed the danger of excluding deaf students from education and continuous learning and taking measures to ensure that they are fully included in the process of education and training. Where the researchers discussed the problems associated with the inclusion of students with hearing impairment in secondary schools, where the study proved that communication problems are not the only problem suffered by students, but also suffered from students feelings of anger and frustration isolation based on the dictates of the environment, and proved that there is a chance for teachers and Other stakeholders to reflect on school and classroom practices with students with hearing disabilities and adopt effective strategies for their management in comprehensive secondary schools.

The study recommended the following

- Students with hearing impairment served through inclusion with clinical remediation need to take the full curriculum in ordinary classrooms and receive clinical remedial instruction as needed.
- Policies that would guide the inclusion of learners with hearing impairment in secondary schools need to be put in place.
- Further research on the inclusion of students with hearing impairment in secondary schools at a wider scale is recommended.

While Emil Holmer, Mikael Heimann and Mary Rudner presented a research survey of the relationship between the development of the theory of mind and reading in Sweden. The study was conducted according to three tests: the choice of reading and understanding, the Swedish sign language test and the working memory test. The relation between the theory of mind on the one hand and reading and working memory on the other, but there is no connection between the theory of reason and sign language. 8 In a related context, Hülya Çizmeci, Ayça Çiprut, conducted a statistical research study aimed at evaluating the reading and writing of students with hearing impairment and cochlear implantation and comparing these results with their natural counterparts according to the age of cochlear implantation and the duration of this technique In the development of reading and writing skills, where the researcher chose 20 students who implant the cochlea and 20 others have a natural hearing within the ages of 12 to 14 years of statistical specific to conduct the study also relied on the tool to evaluate the written expression and reading inventory to assess the skills of students according to These two factors are The study concluded the importance of early cochlear implantation to the development of reading and writing skills and thus the development of the theory of mind in the upper grades. 9 Depending on the fact that deaf adolescents have similar kinetic skills to their peers except balance. The study by Tan SY Jernice and Karen Nonis compared the total and precise motor skills of 24 adolescents (7 normal and 17 deaf) in a public school and found no significant difference in overall motor skills While deaf group recorded a weakness in sensory integration compared with the hearing group. The study concluded that organized individual sports activities focused on balance development in addition to the usual PE lessons should be organized to improve balance efficiency in order to improve inclusiveness.
Methodology

The practical work of this study begins with an academic study covering all aspects of each of the previous strategies, identifying their basic tools and then determining their strengths and weaknesses to reach the research objectives described above. Strategies studied in the development of the theory of mind and the integration of Hearing impaired and deaf children in the process of education:

**Strategy Achieving Developmental Synchrony in Young Children With Hearing Loss:** Nancy K. Mellon and her colleagues proposed a model of intervention that combines best practices from a range of different disciplines that affect young development outcomes with deafness, as well as specific strategies and methods that help promote the optimal development of these children. The proposed model was based on a shared teaching model between healthy and deaf students, in addition to the social constructivist perspective of education and learning. This strategy is based on a set of core points that must be met: consistent access to a classroom majority of typically developing peers. Small class size and acoustical modifications. Well-trained motivated educators who hold high expectations for students. A co-teaching model that includes a full-time speech language pathologist (SLP) in the classroom. Transdisciplinary support teams, including occupational therapists, psychologists, and an audiologist, who can support teachers and children. A play-based, developmentally appropriate approach in the classroom. The use of thematic curriculum to promote vocabulary and language development. A focus on social emotional learning. Support for sensory–motor development. Language and literacy programs beginning at 18 months. The study concluded that this method is suitable for some children only, as children with hearing impairment who are amplified correctly and can reach all sounds of speech have given positive results, while this strategy has shown negative results on the psychological and cognitive level. For the rest of the children. On the other hand this strategy may cause psychological damage on children with hearing impairment or deaf, because of the lack of observance of psychological supervision during the application of the algorithm.

**Teacher-based strategy:** This strategy is based on the preparation of comprehensive classroom teachers capable of dealing with hearing impaired children. In this context, Santhi S Prakash also presented a study aimed at including students with disabilities in the classroom. This concept has both positive and cognitive advantages, as it provides a real opportunity for social interaction and interaction.

Which is based on three domains:

1. **First Domain:** Effective strategies to meet the needs of all students
   - Remedial classes are needed in regular schools for children with disability.
   - Maximum class size should be lowered when including students with disabilities.

2. **Second Domain:** Support educational change in the region
   - Achieve cooperation and planning between staff and teachers to develop teaching methods
   - Provide input to the program for students with disabilities who have been placed in the classroom

3. **Third Domain:** Inclusive education
   - Placement of a student with a disability in a regular classroom is not disruptive to students without disability.
   - Students should be served in regular classes regardless of disability.

This strategy was tested by a study conducted by a researcher in Andhra Pradesh, India to measure and compare the position of teachers of inclusion of children with hearing impairment in children in the classroom. For this reason, the researcher adopted the 1995 Giles and Tanner questionnaire. This questionnaire was applied to 100 teachers from various government and non-governmental schools in two districts of Andhra Pradesh, taking into account cultural and geographical differences. The study concluded that intervention was
needed to promote positive attitudes among teachers to implement universal education. On the other hand, this experiment had negative effects on the formulation of consensus and policies for children with hearing impairment.

**Strategy to depend on the integration of modern technology the process of education:** In this area the ICT become part of the education of what its importance in the field of promoting participate in educational activities for students with special needs Consequently feet helene lidström and helena hemmingsson study aims to explore the elements of information technology and communication and how to use this technology by children with disabilities physically add to determine the benefits of the use of information technology and communication in school activities terms of use researchers way to find the systematic within a period of 2000 2012 and heuristics to get to the objectives of the search. Where concluded that this technology was useful in the development of writing and dictation add to communicate and on the other hand, the dogs benefit from this technology, regardless of type. As a result of this study, we present a set of recommendations that should be considered and expected to yield effective results in this area: Children with hearing loss are identified and referred for assessment as early as possible to enable the best possible language, communication, and achievement outcomes. Children with hearing loss should be categorized according to the degree of deafness and the theory of reason Combining each class into the classroom based on the previous classification and not age Design approaches educational suitable for each category includes the mass suitable for ensuring education suitable for both children and healthy and with the vulnerability of hearing. Training cadre teaching able to handle cases located within the class. Use of information technology and communication through classes to explain the lessons. Ensure a social environment and psychological sound for students in the classroom. Emphasis on the principle of cooperation between teaching staff and parents

**Conclusion**

The scientific development and the knowledge explosion that the world is witnessing every year has become the hallmark of this era in various fields, especially in the field of strategies and methods of teaching for people with special needs, in order to improve and develop the process of learning, education and education is an effective means to achieve the strategic goals of the society for all its categories due to its importance in adaptation And interaction with the local environment, and this will create the appropriate conditions for the formation of citizens and prepare them capable of strengthening the community and adapting them to changes in the environment and society. Early intervention in hearing loss cases yields significant gains in speech, language, and literacy skills. In many cases, however, children continue to exhibit cognitive, behavioral and motor cognitive disorders. As a result, an appropriate educational and pedagogical environment is needed to foster skills growth across multiple dimensions. During these papers, a series of strategies for the development of the theory of mind in children with hearing impairment or deafness were reviewed through the comprehensive classes.

**Financial Disclosure:** There is no financial disclosure.

**Conflict of Interest:** None to declare.

**Ethical Clearance:** All experimental protocols were approved under the University of Babylon, College of Basic Education - Department of Special Education, Babylon, Iraq and all experiments were carried out in accordance with approved guidelines.

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Scolicidal Effect of Ethanolic Extract for *Cydonia oblonga* Seeds in the Viability of the Protoscolices of the *Echinococcus granulosus* Parasite *In Vitro*

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ABSTRACT

The current study was conducted for the period from 1/10/2018 to 1/3/2019 in the Department of Biology - Faculty of Education for Girls - University of Kufa, which aims to study the effectiveness of the ethanol extract of *Cydonia oblonga* seeds in the viability of the protoscolices of the *Echinococcus granulosus* *In vitro*. The results showed that the ethanolic extract of the *C. oblonga* seeds had a significant effect on the destruction of the protoscolices. The mortality rate was 42.4% and 68.4% after 30 and 120 minutes respectively when exposed to 4 mg/ml, while the mortality rate was 68.9% and 98.1% after 30 and 120 minutes respectively at 16 mg/ml. Statistical analysis showed significant differences between the treatments at the probability level of 0.05. In the calculation of the concentration necessary for the destruction of 50% (LC50) of the protoscolices, it was 6.5 and 3.9 mg/ml after 30 and 120 minutes of the exposure to the extract respectively and when calculating the time required to destroy 50% (LT50) of the protoscolices, it was 39 and 27.40 minutes at the exposure to concentrations 4 and 16 mg/ml of the extract, respectively.

Keywords: Protoscolices, Echinococcus granulosus, Cydonia oblonga

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Introduction

Hydatid disease is a common disease worldwide, a common disease of humans and animals (Cyclo-Zoonotic disease)¹. The genus *Echinococcus* has two types, the most important of which are the most important medical and the most common are *E. granulosus*. Its larval development is called the unilocular hydatid cyst and the *E.multilocularis*, the cause of alveolar echinococcosis ²⁻⁴. The parasites belonging to the genus of *Echinococcus* require two hosts to complete their life cycle. The first host includes carnivorous animals and represents the definitive host. The second host is Herbivorous and represents the intermediate host. The human is an accidental host or aberrant, and does not contribute to the perpetuation of the life cycle ⁵. The disease develops in most parts of the body ⁶. The parasite is able to reach any organ in the human body when the eggs are accidentally ingested and developed into hydatid cysts, mainly the liver and lungs ⁷ this is called primary hydatid disease. A rupture of the cyst or drainage of hydatid fluid during surgery or bruising can lead to the spread of Protoscolices and thus lead to the formation of secondary hydatid cysts in other parts of the body ⁸⁻⁹. Surgery is the best option for treating human hydatidosis. Surgical operations may be accompanied by a secondary infection that results from the spills of protoscolices into the peritoneal cavity. Many chemical agents have been used as anti-protoscolices to discourage cyst contents, but most are associated with adverse side effects. Some studies have suggested that traditional plants had an effective effect in the prevention of post-surgical secondary infection ¹⁰. *Cydonia oblonga* is a member of the Rosaceae family, traditionally, *C. oblonga* is used as an anti-diarrheal agent, tonic for the stomach, healing of ulcer, anti-inflammatory, anti-emetic and astringent and the fruit is suitable for uterine bleeding and hemorrhoids ¹¹. The results of the chemical analysis showed that the alcoholic extract of *C. oblonga* seeds contain tannins, glycosides and Phenolic compounds and the seed extract are effective against *Staphylococcus aureus* ¹². Since there

DOI Number: 10.5958/0976-5506.2019.01454.2
are no studies on the effects of *C. oblonga* seeds on the viability of the *E. granulosus* protoscolices, therefore, this study was proposed to evaluate the effectiveness of ethanolic extract of *C. oblonga* seeds in the viability of the protoscolices of the *E. granulosus In vitro.*

**Materials and Method**

The current study was conducted for the period from 1/10/2018 to 1/3/2019 in the Department of Biology - Faculty of Education for Girls - University of Kufa, where the seeds of *C. oblonga* were obtained from the local markets of Najaf province, and was crushed by the electric grinder for the purpose of obtaining powder, (50) gm powder were mixed with 200 ml of 96% ethyl alcohol (volume/volume) in a glass flask with capacity of (400) ml then covered and left the flask at lab temperature in a dark place for 72 hours with stirring using Shaker to ensure that the substance is exposed to alcohol. The samples were filtered by filtration papers and the extract was then dried by the rotary evaporator at a temperature of 40 ° C. The dry extract was then stored in a sterile container at a temperature of 4 ° C until use 14. Samples of infected sheep liver, (Image 1) were collected from the Najaf province massacre and placed in clean containers and transferred to the laboratory in the Department of Biology - College of Education for Girls - University of Kufa, and the processing of the preparation and counting in a period not exceeding two hours, where sterilized the outer surface of the cysts by 70% ethyl alcohol, pulling about 75% of the hydatid fluid and placed in a sterile glass container. Then remove the germinal layer. (Picture 2) is placed in a sterile glass dish and washed with sterile saline solution 0.9% for three times. Use the centrifuge at 3000 rpm for 3 minutes to precipitate the protoscolices in the hydatid fluid and the solution of the wash of the germinated layer, where the leachate was neglected and the precipitation containing the protoscolices was suspended by 0.9% saline solution. The protoscolices were calculated using the fixed size transfer method by micro pipette, where the total number of protoscolices in the volume of (10) μl of the suspension was calculated using the compound microscope under (20x). The average number of three replicates was calculated by calculating the total number of protoscolices. The viability of the protoscolices was examined using 0.01% eosin stain, where equal amounts of protoscolices suspension were mixed with the eosin stain, and examined under the microscope (20x) and a manual counter was used., 200 protoscolices were counted as living and dead, where the living protoscolices appear in a greenish color, while the dead protoscolices appear red. Prepare a stock solution for the extract by dissolving 2 g of dry extract in 100 ml of the 0.9% physiological solution. Then prepare the concentrations 4, 8 and 16 mg/ml for the extract and store at a temperature of 4 ° C until use in vitro tests. The suspension were well shaken for regular distribution of protoscolices in the suspension The total number of protoscolices was calculated in 1 milliliter of suspension using the fixed-size transfer method, 12 test tube with tight lid, three tubes for each concentration and control, and then transferred 1 ml of the protoscolices suspension containing approximately 2000 ± 20, and the tubes containing the protoscolices were treated with concentrations of 4, 8 and 16 mg/ml for the extract. The control tubes were treated with 0.9% saline solution. The viability of the protoscolices was examined using 0.01% eosin stain at intervals of 120,60,30 minutes after treatment. 200 living and dead protoscolices were counted, where the living protoscolices appear in the greenish color, while the dead protoscolices appear red.

**Statistical Analysis:** The results were statistically analyzed using the ANOVA table and the least significant difference (L.S.D.) was used to diagnose statistical differences between treatments (Daniel, 1988). The method of the lower squares of the deviation of values was applied to calculate the concentration and time required to destroy 50% of the protoscolices of which a correlation coefficient was calculated Finney, (1977).

**Results and Discussion**

The results of the current study showed that the ethanolic extract of the *C. oblonga* seeds had a significant effect on the destruction of the protoscolices. The percentage of mortality increased with the increased the concentration and exposure time to extract. The mortality rate was 42.4% and 68.4% after 30 and 120 minutes respectively when exposed to 4 mg/ml, while the mortality rate was 68.9% and 98.1% after 30 and 120 minutes respectively at 16 mg/ml. Statistical analysis showed significant differences between the treatments at the probability level of 0.05 as in table (1). In the calculation of the concentration necessary for the destruction of 50% (LC50) of the protoscolices, as in table (2), it was 6.5 and 3.9 mg/ml after 30 and 120 minutes of the exposure to the extract respectively and when calculating the time required to destroy 50% (LT50) of the protoscolices, as in table (3), it was 39 and 27.40 minutes at the exposure to concentrations 4 and 16 mg/ml of the extract, respectively, and statistical analysis showed the existence of a positive correlation
between the concentration and the time and the percentage of mortality of the protoscolices at the level of probability 0.05. Most studies have focused on the efficacy of *C. oblonga* seeds extracts against bacterial microorganisms. Alizadeh *et al.* (2013) studied the effect of ethanolic, acetonic and aqueous extracts of *C. oblonga* seeds in some intestinal bacterial isolates in vitro and in vivo. Ethanol extract was found to be the most effective in inhibiting the growth of *Escherichia coli*, while the aqueous extract was effective in inhibiting the growth of *E. aerogenes* bacteria, and concluded that the extract of the *C. oblonga* very effective in controlling intestinal bacterial infections. Kadhum *et al.* (2017) tested the effect of the aqueous extract of the *C. oblonga* seeds in some positive and gram negative bacterial isolates. The most sensitive bacterial isolates were *Staphylococcus saprophyticus*, while the lowest sensitive bacterial isolates were *Pseudomonas aeroginosa* and *Pseudomonas fluroscences*.

Table 1: The effect of ethanolic extract of *C. oblonga* seeds in the protoscolices of *E. granulosus* parasite

<table>
<thead>
<tr>
<th>Concentration (mg/ml)</th>
<th>Mortality percentage of the protoscolices in the time periods (minute)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>30</td>
</tr>
<tr>
<td>Control</td>
<td>0a</td>
</tr>
<tr>
<td>4</td>
<td>42.4b</td>
</tr>
<tr>
<td>8</td>
<td>66.7c</td>
</tr>
<tr>
<td>16</td>
<td>68.9c</td>
</tr>
<tr>
<td>L.S.D at the level 0.05</td>
<td>6.5</td>
</tr>
</tbody>
</table>

Table 2: LC50 of the protoscolices for *E. granulosus* parasite

<table>
<thead>
<tr>
<th>Time (minute)</th>
<th>LC50 (mg/ml)</th>
<th>Correlation coefficient (r*)</th>
</tr>
</thead>
<tbody>
<tr>
<td>30</td>
<td>6.5</td>
<td>0.840</td>
</tr>
<tr>
<td>60</td>
<td>5.01</td>
<td>0.920</td>
</tr>
<tr>
<td>120</td>
<td>3.9</td>
<td>0.960</td>
</tr>
</tbody>
</table>

Table 3: LT50 of the protoscolices for *E. granulosus* parasite

<table>
<thead>
<tr>
<th>Concentration (mg/ml)</th>
<th>LT50 (minute)</th>
<th>Correlation coefficient (r*)</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>39</td>
<td>0.980</td>
</tr>
<tr>
<td>8</td>
<td>32</td>
<td>0.890</td>
</tr>
<tr>
<td>16</td>
<td>27.40</td>
<td>0.980</td>
</tr>
</tbody>
</table>
Conclusion

The conclusion from the present study that the seeds of the *C. oblonga* as natural substances are effective in the destruction of the protoscolices of the *E. granulosus* and can be used as scolicidal agent before surgical operations to remove the hydatid cysts.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Faculty of Education for Girls-University of Kufa-Iraq and all experiments were carried out in accordance with approved guidelines.

REFERENCES


The Association between Abnormal Body Mass Index and First Trimester Spontaneous Abortion in Iraqi Women: Case Control Study

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ABSTRACT

The lack of consensus regarding the effect of pre-pregnancy BMI on pregnancy outcome and in particular on the risk of early miscarriage, and the rarity of Iraqi literatures dealing with this subject, justified the planning and the conduction of this study on a sample of Iraqi pregnancy ladies that unfortunately developed spontaneous abortion in the Mid-Euphrates region of Iraq. Aim of the study: To evaluate the correlation between pre-pregnancy BMI and risk of spontaneous abortion. The study was conducted at the Department of Obstetrics and Gynecology in Al-Diwaniyah maternity and Child Hospital in AL-Diwaniyah Province, Mid-Euphrates region of Iraq. The study was started at January 2018 and ended at March 2019. BMI measurements of two groups of women, the first group included women with early spontaneous abortion and the second group included women with uneventful term or near term pregnancy, were obtained and contrasted. There was no significant difference in mean BMI between study and control groups, 24.60 ± 4.57 kg/m² versus 23.55 ± 3.50 kg/m², respectively (P = 0.195). However, the incidence rates of underweight and overweight were significantly higher in study than in control groups, 10% versus 1.7% and 40% versus 23.3%, respectively (P <0.05).

Keywords: abnormal body mass index, first trimester spontaneous abortion

Introduction

The common goal for every couple when get married is to have a baby; however, a significant proportion of couples in our community and worldwide will either fail to have pregnancy “the problem of infertility” or will lose their baby unexpectedly early during pregnancy “the problem of miscarriage”¹-³. The debate about the exact nomenclature that should be applied to the loss of pregnancy product is well recognized issue in obstetric literatures⁴. However, there is some common consensus about considering miscarriage event that occurs within 20 weeks gestation as spontaneous abortion provided that pregnancy loss has occurred accidentally without medical or non medical intervention⁵,⁶. Early pregnancy spontaneous abortion is seen in up to 15% of clinically documented pregnancies⁵,⁶. This relatively high incidence rate justifies the huge amount of literatures dealing with identification of risk factors associating spontaneous abortion and searching for ways to avoid this catastrophic pregnancy event⁷-¹¹. The list of factors that have been recognized to accompany spontaneous abortion is long; nevertheless, embryonic chromosomal abnormalities and hormonal factors are the principal blamed factors; even though, a number of environmental factors and demographic characteristics have been linked to spontaneous abortion⁷-¹¹. Abnormalities related to mother weight in the form of overweight or underweight have been blamed as risk factors for spontaneous abortion. Overweight weight and obesity, based on pre-pregnancy body mass index (BMI) records have been shown to increase the risk of spontaneous abortion in a number of case control studies¹²,¹³. However, there are some studies that have denied such an association¹⁴,¹⁵. On the other hand, underweight has been shown to increase
the susceptibility of pregnant ladies to lose their babies early in pregnancy. Again, there are reports that rejected the association between women underweight and risk of spontaneous abortion. The lack of consensus regarding the effect of pre-pregnancy BMI on pregnancy outcome and in particular on the risk of early miscarriage, and the rarity of Iraqi literatures dealing with this subject, justified the planning and the conduction of this study on a sample of Iraqi pregnancy ladies that unfortunately developed spontaneous abortion in the Mid-Euphrates region of Iraq.

Methodology

The current study has been designed to be a cross sectional one including 40 women who have experienced spontaneous miscarriage during the first trimester, that is during the first 13 weeks of gestation. This group included 30 women. The second group included 60 pregnant ladies with uneventful pregnancy that is at or near full term. The latter group served as control group. Information regarding age, parity, previous abortion, occupation and residency has been obtained from all participants. In addition, height and pre-pregnancy weight of each women was obtained in order to calculated pre-pregnancy body mass index (BMI) according to the formula: BMI = weight (kg)/(height in meters)$^2$. Women were later classified into three groups: those with BMI $<$ 18.5 kg/m$^2$ were considered underweight, women with BMI between 18.5 and 24.9 kg/m$^2$ were considered of normal weight and women with BMI $>$ 24.9 kg/m$^2$ were considered overweight.

The study was conducted at the Department of Obstetrics and Gynecology in Al-Diwaniyah maternity and Child Hospital in AL-Diwaniyah Province, Mid-Euphrates region of Iraq. The study was started at January 2018 and ended at March 2019. The study was approved by the institutional ethical approval committee and verbal consent was obtained from all women subjected to the current study following full illustration of the purpose and methodology of the current study. Data were then transferred into an SPSS (version 23) spread sheet for statistical analysis. Microsoft Office Excel 2010 was also used for this purpose. Numeric variables were expressed as mean, standard deviation and range, whereas, categorical variables were expressed as number and percentage. Association between categorical variables was evaluated using Chi-square test or Fischer exact test. Difference in mean between two groups was evaluated using independent samples t-test.

Results and Discussion

Demographic characteristics of the study group (women with spontaneous first trimester abortion) and control group (women with term and near term uneventful pregnancy) are shown in table 1. There was no significant difference in mean age between study and control groups ($P = 0.512$). Distribution of women according to parity, as nulliparous, low multaparous and grand multaparous, exhibited insignificant difference ($P = 0.100$). In addition, the distribution of women according to residency and occupation showed insignificant difference between both groups ($P > 0.05$). The association between body mass index (BMI) and spontaneous abortion was demonstrated in table 2. Indeed, there was no significant difference in mean BMI between study and control groups, $24.60 \pm 4.57$ kg/m$^2$ versus $23.55 \pm 3.50$ kg/m$^2$, respectively ($P = 0.195$). However, the incidence rates of underweight and overweight were significantly higher in study than in control groups, 10% versus 1.7% and 40% versus 23.3%, respectively ($P < 0.05$). On the other hand, presence of previous abortion was significantly higher in study group when compared to control groups, 90% versus 36.7% ($P < 0.001$). Moreover, recurrent abortion ($\geq 3$ previous abortions) was significantly more frequent in study than in control group. In addition, there was no significant correlation between number of previous abortions and recent pre-pregnancy BMI ($P > 0.05$), figure 1. The problem of recurrent miscarriage is common in our community and identification of risk factors associating this problem may help limiting its frequency in the population. The current study has shown two important risk factors associating early spontaneous abortion and these were abnormal BMI, whether low or high and previous history of abortions and in particular recurrent abortion. One may argue that one of the risk factors, BMI or previous recurrent abortions, is a confounder so that the same patient with abnormal recent BMI is liable for having previous recurrent abortions; however, we were able to prove the lack of statistical correlation between those two factors. Therefore, the most likely explanation for higher rate of recent abortion in patients with history of recurrent abortion is embryonic chromosomal abnormalities; however, this explanation, in our opinion, is sufficient to be applied partially and that abnormal BMI index is an independent risk factor for spontaneous early abortion in the current study at least in a significant proportion cases. A number of studies have investigated the correlation between abnormal body mass index and the risk of spontaneous abortion. In a large cohort
Chinese study that included 536,098 pregnant ladies, it was found that both obesity and underweight were significantly associated with spontaneous abortion. These findings support the findings of the current study. In another cohort study, carried out in Denmark and included 23,821, underweight was shown to be a significant risk factor for spontaneous abortion. We agree with the later Danish study that underweight is a risk factor for spontaneous miscarriage. It was also shown, by previous studies, that obesity is an independent risk factor for spontaneous abortion, in accordance with the findings of the current study. However, some authors have denied the existence of significant impact of maternal BMI on the incidence rate of spontaneous abortions. The epidemiologic observation that obesity increases the risk of spontaneous abortion, as demonstrated by the current and some previous studies, may be explained by low level of estradiol in obese women or by low concentration of sex hormone binding globulin. Another suggested mechanism that increases the rate of spontaneous abortion in obese women is the higher level of circulating pro-inflammatory cytokines. Underweight women are more prone to nutritional deficiencies that may adversely affect fetal growth and development and may increases maternal susceptibility to infection because of less optimum immune responses. On the other hand, underdeveloped placenta with small volume and surface area in underweight women may lead to placental insufficiency. Indeed, we believe that more research work, both clinical and experimental, is needed to prove these suggestions; but for the time being, it is essential to inform women to have optimum pre-pregnancy BMI before planning to get pregnant because of the significant risk of having spontaneous abortion in women with both lower and higher than normal BMI.

Table 1: Demographic characteristics of control and study groups

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Study group n = 40</th>
<th>Control group n = 60</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean ± SD</td>
<td>30.05 ± 6.04</td>
<td>28.73 ± 2.58</td>
<td>0.521 †</td>
</tr>
<tr>
<td>Range</td>
<td>19 - 41</td>
<td>23 - 33.2</td>
<td>NS</td>
</tr>
<tr>
<td>Parity</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nulliparous</td>
<td>12 (30.0 %)</td>
<td>8 (13.3 %)</td>
<td>0.100 ¥</td>
</tr>
<tr>
<td>Low multiparous</td>
<td>22 (55.0 %)</td>
<td>44 (73.3 %)</td>
<td>NS</td>
</tr>
<tr>
<td>Grand multiparous</td>
<td>6 (15.0 %)</td>
<td>8 (13.3 %)</td>
<td></td>
</tr>
</tbody>
</table>

Conted...

Table 2: BMI mean and categorization in control and study group

<table>
<thead>
<tr>
<th>BMI</th>
<th>Study group n = 40</th>
<th>Control group n = 60</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean ± SD</td>
<td>24.60 ± 4.57</td>
<td>23.55 ± 3.50</td>
<td>0.195 †</td>
</tr>
<tr>
<td>Range</td>
<td>18.00 - 33.20</td>
<td>18.40 - 36.10</td>
<td>NS</td>
</tr>
<tr>
<td>Normal (18.5 - 24.9) kg/m2</td>
<td>20 (50.0 %)</td>
<td>45 (75.0 %)</td>
<td>Reference</td>
</tr>
<tr>
<td>Underweight (&lt;18.5 kg/2)</td>
<td>4 (10.0 %)</td>
<td>1 (1.7 %)</td>
<td>0.044 €</td>
</tr>
<tr>
<td>Overweight (&gt;24.9 kg/m2)</td>
<td>16 (40.0 %)</td>
<td>14 (23.3 %)</td>
<td>0.035 ¥</td>
</tr>
</tbody>
</table>

Table 3: Previous history of abortion in control and study groups

<table>
<thead>
<tr>
<th>Previous history of abortion</th>
<th>Study group n = 40</th>
<th>Control group n = 60</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Positive</td>
<td>36 (90.0 %)</td>
<td>22 (36.7 %)</td>
<td>&lt; 0.001 ¥ HS</td>
</tr>
<tr>
<td>Negative</td>
<td>4 (10.0 %)</td>
<td>38 (63.3 %)</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>8 (20.0 %)</td>
<td>8 (13.3 %)</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>8 (20.0 %)</td>
<td>12 (20.0 %)</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>12 (30.0 %)</td>
<td>0 (0.0 %)</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>6 (15.0 %)</td>
<td>2 (3.3 %)</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>2 (5.0 %)</td>
<td>0 (0.0 %)</td>
<td></td>
</tr>
</tbody>
</table>

n: number of cases; SD: standard deviation; †: independent samples t-test; €: Fischer exact test; ¥: chi-square test; NS: not significant at P ≤ 0.05; S: significant at P ≤ 0.05
Conclusion

Both underweight and overweight pregnant ladies are at high risk of developing first trimester spontaneous abortion.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Gynecology specialist/Al-Diwaniyah child and maternity hospital/Department of Obstetrics and gynecology/Al-Diwania/Iraq and all experiments were carried out in accordance with approved guidelines.

REFERENCES


The Effect of the Strategy (Mental and Informational) on the Ability of Pupils in the Fifth Grade in Primary School in Reading Material

Ameerah Ghanim Akkar Al-Delfi, Aref Hatem Hadi al-Jubouri, Saad Hassan Alawi

1University of Babylon, College of Basic Education, Iraq

ABSTRACT

The research aims at identifying the effect of strategy (mental and informational) in the language ability of pupils in the fifth grade primary school in reading material, the researcher adopted the method of experimental research as a methodology for conducting research which includes an independent variable (mental and informational strategy, the usual method) and a dependent variable (linguistic ability), where the researcher adopted experimental design with partial settings to adjust the search variables, and before applying the experiment the researcher conducted equivalence between the two research groups for the purpose of obtaining accurate results and objective in the following variables (half-year grades, the chronological age is calculated in months, parents’ achievement), the completion of the application of the experiment, the researcher applied its research tool to the two groups of research, after correcting the answers of the students, the researcher obtained data for the two research groups, the data were statistically treated by t-test of two independent samples, the results showed the superiority of the experimental group, which was studied according to a mental and informational strategy for the control group, which was studied in the usual way in the linguistic ability variable.

Keywords: Strategy, Mental, Pupils, fifth grade, Strategy (mental and informational), language ability, elementary schoolgirls, reading

Introduction

The present era has witnessed a great development in all aspects of life and this development has been reflected in the field of education and teaching methods and reflected in the light of the need to train the teacher to acquire modern teaching skills may facilitate the process of learning and education, supporting its job: as guide and facilitator, inspired by modern methods unconventional; this type of program requires distinct planning according to modern strategies which proved to be effective in the learning environment. In recent years, there have been several educational theories based on a number of methods strategies used in teaching, these constructivism theories call for the learner to build his own knowledge through his direct interaction with educational attitudes and with new knowledge, and links them with previous knowledge in the light of the guidance of the teacher, structural theory is a contemporary educational trend that has been widely sought and an increasing interest in contemporary educational and teaching thought, because of its great impact on the same learner, structuralism has shifted attention from external factors to internal factors, i.e., what is going on inside the learner’s mind like: His previous information, his motivation, and his patterns of thinking and all that makes learning based on a deep understanding of meaning. Education seeks to build the learner to know him through a cooperative society, and thus benefit the learner from his peers during work and signals and assistance provided by the teacher. This is also consistent with Scaffolding’s goal of learning to connect to a possible or adjacent growth zone, which Vygotsky defines as the distance between the possible level to solve problems when assistance or support is available through cooperation between students themselves. The traditional education was seen as a learner as an empty vessel and

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learner and it is a negative future of knowledge dictated by the then changed education and became a learner with positive images. The modern education concerned the learner, making it its material, and its role was not limited to the transfer of knowledge, but rather aimed at teaching individuals how to think and how to learn. Education is one of those aspects and has a great role in societies and nations. It is the foundation of its development, its well-being and its main drivers of survival and sustainability. In the wave of environmental challenges, it plays a large role in the lives of both developed and developing peoples. Some teachers may neglect reading and consider it as time to rest of the trouble of the rest lessons whereas he orders his students to take out the book and read the subject boring sequence read until the lesson ends, the meanings of some of the words may not be mentioned, and the speed of reading whether time constraints or other, the main cause of the error, and the header does not benefit anything because he cannot follow up with the reader and does not come to him understanding what he hears, the length of the sentence affects the understanding, because the long sentence is more difficult than the short sentence, as well as the difficulty of vocabulary. Or uncommon is more difficult than a sentence that does not contain such vocabulary. Therefore, the researchers have been interested in the development of implementation strategies followed by the teacher in the classroom going according to the theories (constructivist knowledge) which emphasizes on making the student the axis of the learning process without ignoring the role of the teacher, as a key to the success of the educational process, therefore, the educational system becomes more positive when it focuses on a range of modern strategies such as self-learning strategy and problem-solving strategy, and mental maps, selective learning, exploratory learning, cooperative learning strategies, the cluster strategy is one of cooperative learning strategies, it emphasizes a special structure designed to influence student interaction and aims to improve the mastery of educational outcomes through student traps in reviewing the material covered for the lesson and understanding the content of the lesson, it is a sophisticated structure that students have to help each other in small blocs, students seek to achieve a meaningful outcome for themselves and for all members of the community, students feel that each of them has a certain responsibility each of them has a specific role to play in order to integrate the work of the whole group, so they are responsible for teaching each other as an alternative to traditional structures such as lifting hands and then assigning a teacher to answer the questions raised. This strategy is easy to apply as it relates to the student’s self-potential and development, and is based on evaluating the findings of the clusters of responses.

Methodology

It includes a description of the procedures that were carried out to achieve the research objectives, starting with research methodology and experimental design, defining the research community and its design, the equivalence of the research groups (control and experimentation), preparation of the research requirements and tools, experimental design: It includes one independent variable (mental and informational strategy) and a dependent variable (linguistic ability).

The research community and its model: The current research community consists of the fifth primary school of female pupils in elementary schools affiliated to Babylon Directorate of Education in the academic year (2019-2018) which falls within the Musayyib District, after the researcher identified the school in which it is applied, school (Hittin) visited by the researcher carried official letter of Babylon Directorate of Education, I found it included two divisions, and in a random drag mode she chose Division (B ), to represent the experimental group, and Division (A) to represent the control group, The number of students in the two research groups was (66), and after the exclusion of the failed (5) students from the two groups, whereas reached (34) in the experimental group and (32) in the control group.

Equivalence of research groups: The researcher conducted a statistical equivalence between the experimental groups and control in some variables that affect the results of the experiment, although the researcher chose the two groups in random drawing mode, although the students of the research sample are from a social center economically very similar and studying in one school, and of the same sex, but it was keen to make equivalence of the following variables (The chronological age calculated in months, the educational attainment of parents, classes in the first semester in the Arabic language for the academic year (2010-2019 ), the results of the parity of the two groups of research, that the two research groups are equivalent to the variables mentioned above. Table 1.
### Table 1: The results of the parity of the two groups of research

<table>
<thead>
<tr>
<th>Groups</th>
<th>No. of individuals</th>
<th>SMA</th>
<th>Standard deviation</th>
<th>The degree of freedom</th>
<th>Value T</th>
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<td>Experimental</td>
<td>34</td>
<td>131.15</td>
<td>6.458</td>
<td>64</td>
<td>2.255</td>
<td>2.000</td>
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<tr>
<td>Control</td>
<td>32</td>
<td>136.25</td>
<td>11.601</td>
<td>32</td>
<td>0.05 Not significant</td>
<td></td>
</tr>
</tbody>
</table>

**Adjust Variables:** Although the researcher verifies the equivalence of the two research groups in some variables that you think affect the course of the experiment, However, it tried to avoid the effect of some extraneous variables in the course of the experiment, here are some of these variables and how to adjust them: (Accidents associated with the experience: The experience in the search has not been subjected to any emergency or accident that hinders its progress, experimental extermination: There was no interruption or transfer of any pupil or pupil during the experiment, Sample Selection: The two groups were randomly selected The equivalence of the two groups, maturity factor:

The effect of the experimental procedures is as follows: The researcher’s work was to limit the effect of experimental measures that could be applied to the experimental procedures. Affect the dependent variable during the course of the experiment).

**Preparation of the research requirements:** The research requirements are the basic elements on which the research is carried out, according to which the research procedures are carried out. These requirements are as follows: (The scientific material is the scientific material that the researcher is teaching to the students of the two research groups during the period of the experiment of the academic year (2019-2018) included the topics of the second chapter of the book of Arabic reading, formulation of behavioral goals: The researcher formulated (80) behavioral goals based on the general goals and the content of the material covered by the experiment, according to Bloom’s classification the field of knowledge is distributed between the number of plans (16) plans and presented the researcher a sample of them to a group of experts in the methods of teaching Arabic language to express their views on the integrity of its formulation after taking their observations, it became its final image and its application.

**Search Tool**

**Language ability test:** The test is a structured procedure to measure the changes that occurred in the students after passing through specific learning experiences (Katami, and others, 2003: 271).

**The purpose of the test determine:** The purpose of the test is to measure the understanding of primary school students in the reading, in accordance with the behavioral goals that were formulated from the scientific material. determination of the objectives of the test: After the purpose of the test was determined for the language ability, the objectives of the test are determined to determine the extent of their achievement and the researcher formulated a number of behavioral goals.

**Determination of the test paragraphs:** The researcher determined the number of paragraphs consisting of the linguistic ability test, the number of paragraphs of the test (24) paragraph.

**The test instructions:** Specific instructions and instructions are written on how to answer (selecting one correct alternative to the paragraph, answering all paragraphs, answer time, typing the triple name, row and division in the assigned space).

**Correcting the test answers:** After the test paragraphs were drafted and the test type was selected, a standard was developed to correct the answers. One score for each correct test paragraph for questions first, second, third, eight for the fourth question and zero for the wrong answer and the left-item that the student didn’t answered, the paragraph to which more than one choice was made. Thus, the final upper level of the reading comprehension test is (30) degrees and the minimum grade (zero).

**The validity of the test:** The authenticity of the test was verified and the validity of the content was confirmed. The results showed that the virtual honesty obtained 80% by the referees and specialists. As for the validity of the content, the results showed that all paragraphs of the reading comprehension test were statistically significant.

- Understand and absorb students.

The test was carried out in the first phase of the survey on a group of students from the non-research sample. The number of students was 30 students. The purpose of the test was to know the clarity of the instructions and the test instructions, the comprehension...
and clarity of the test paragraphs for the students and the calculation of the time period of the test. The time of departure for each student and the calculation of the arithmetic mean of time showed that the time needed to answer all the test paragraphs was (40) minutes.

The Statistical application: The test was applied to a sample of (100) students from a non-research sample. The purpose of the test is to analyze the test paragraphs statistically, the difficulty of the paragraph, distinguishing the paragraph, the effectiveness of the incorrect alternatives.

The statistical analysis of the test paragraphs: The test paragraphs were analyzed as follows:

The level of difficulty of paragraph: By conducting the statistical analysis of the test paragraphs, the researcher found that the coefficient of difficulty of paragraphs is limited to (0.32-0.62) and thus the test paragraphs are all good and their difficulty is appropriate.

Level of distinguish Paragraph: It was found that the test paragraphs ranged from (0.37 to 0.77).

The effectiveness of the right alternatives: After calculating the effectiveness of each wrong alternative and each experimental paragraph of the test paragraphs using the equation of effectiveness of the alternatives, it was found that he brought the largest number of students in the lower group compared to the students of the upper group. The values of the wrong alternatives ranged from (0, -37, -11, 0), and accordingly the researcher kept the alternatives unchanged.

The test Stability: The test is the one that gives results if applied more than once in similar circumstances, to calculate the stability of the test, the researcher used the half-Test, It is not characterized by its economy in the time required to apply the test, It is applied in one go, avoiding the experience of students as in the method of retesting, and the researcher adopted the scores of the members of the statistical analysis sample, the test sections were divided into two halves, the first half included individual scores, the second half is the degree of conjugal vertebrae and the Pearson correlation coefficient being the most common and commonly used correlation coefficient in this field.

The research tool implementation: Experimental research groups reported and the officer to the date of application of the language ability test a week before it was carried out and applied after completing the teaching of the specific material for the two sets of simultaneous research, the researcher supervised the application of the test.

The statistical Methods: The researcher used the T-test equation for two independent samples to make the equivalence between the experimental and control groups in the following variables (the age of time calculated in months, the educational achievement of the parents, the first grade of the students).

The results: The students of the experimental group who studied according to a mental and information strategy were superior to the students of the control group who studied according to the usual method of testing the language ability.

Conclusion

Based on the research findings, the researcher reached the following conclusions: Employing a mental and informational strategy in primary education stimulates the learner’s desire and motivates them to learn, and increases the integration of learners in learning without asking questions and recording them, listening to good and exchanging roles, adding to the learning fun and joy, and has an active role in creating an active teaching environment through participations educated and encouraged them to work themselves.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the University of Babylon – college of Basic Education, Iraq and all experiments were carried out in accordance with approved guidelines.

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An Evidence for Ability of Malassezia Species to Experimentally Induce Pityriasis Versicolor in Various Skin Layers by Using Periodic Schiff Stain (PAS)

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ABSTRACT

The fungal agents were visualized in skin sections stained with Periodic Schiff Stain (PAS), fungal spores and hyphae were attached and colonized in the stratum corneum of most of skin sections from infected rat skin with Malassezia species spores isolated from patients, spores well organized, morphologically identified and this method very suitable for diagnosis of Malassezia species from other pathogenic yeasts, the present results showed Malassezia species yeasts that penetrated the corneum layer formed sometimes sheet or aggregation on epidermis surface with cellular debris. Moreover the spores budding noticed, the hyphae showed filamentous with pink color.

Keywords: Malassezia, pityriasis versicolor, Periodic Schiff Stain (PAS)

Introduction

Malassezia are part of the microbiota (microorganisms found on normal skin), that are colonizing the human skin as normal flora which can affect and change their saprophytic state, enabling them to invade and penetrate the stratum corneum layer of the skin and behave as pathogens under certain condition, e.g. a hot climate, perspiration a lot, and a weakened immune system ¹. Now a days, it is very well documented that the colonization of skin by Malassezia spp. can cause various type of skin diseases, e.g. pityriasis versicolor, Malassezia (Pityrosporum) folliculitis, seborrheic dermatitis, dandruff, steroid acne, atopic dermatitis and psoriasis ²,³. The appearance of round to ovoid yeast cells with characteristic short filaments in scales was considered in past to be one of the most diagnostic findings in direct microscopy, in addition to that a slight inflammatory changes in cornified layer of affected area of the skin with no or very weak cellular and humoral immune responses had been demonstrated ⁴. Pityriasis versicolor is a superficial chronically recurring fungal infection of the stratum corneum layer of human skin, characterized by scaly, dyspigmented irregular macules most often occurring on the trunk and extremities. Malassezia yeasts reside mainly in the stratum corneum, though some authors suspect their presence in the hair follicles which could act as a reservoir and thus accounts for the recurrence of PV after treatment ⁵. Microscopy of the PV scales adds a distinguishing feature to its diagnosis and helps differentiate it from the various skin disorders that may have similar clinical features to PV. The study was aimed to evaluate the pathogenicity and histopathological changes of laboratory animal (rat) as experimental model infected with Malassezia species used Periodic Schiff Stain (PAS) as specific stain for yeasts spores and hyphae diagnosis.

Materials and Method

Sample Collections: Ninety five samples were collected from patients with pityriasis versicolor in the form of skin scrapings took by sterile surgical blade, then transported in sterile containers and processed at the
Mycology section of the Department of Microbiology. Direct and indirect methods were applied for diagnosis.

**In Vivo study:** The in vivo study was found necessary and useful to prove the germ theory and to document any suggestions that interest in relation between pityriasis versicolor and their possible yeast causative agents. We proposed these investigation to get these proven, as well as to identify the possibility of experimentally induce of pityriasis versicolor (human being origin) in animal model, and to determine the similarity between human PV and rat PV.

The laboratory animals was the white rat (*Rattus norvegicus*), (20) rats aged between one to two months, weighted 150-200 gm grew under standard conditions were used.

All rats were divided into groups (6 rats for each group except 2 rats for control) as the follow:

1. Infected by Intradermal injection.
2. Infected by Spot technique (kept infectious agents on externally determinant area).
3. Infected by Prick technique (scratching) (streaking the epidermal layers).
4. Control group without any infections, injected by normal saline (0.85% NaCl).

All above mentioned groups infected with 1ml of *Malassezia furfur* suspension (10^8 - 10^9 cells) of overnight culture.

The pathogenicity and clinical complications of the rat skin were observed after two weeks.

**Histopathological Study:** An experimental rat and control were examined histopathologically by taken an oval shaped, 10mm diameter of the skin. Fixed in 10% formalin, 6mm sections stained by PAS (periodic acid Schiff’s) stain to reveal the histopathological changes.

**Results and Discussion**

In some skin sections, the yeast spores that appeared at the surface layer of epidermis have rounded or oval shape, pink color, budding sprouting up from one side of the original through a collarette (Fig 1,2). Sections stained with PAS related to rats skin infected intradermally with *Malassezia* species showed heavy deposition of yeast spores appeared globose to elliptical in shape, budding gave rise to a large collarette from which younger buds emerge, the yeast and hyphal elements can be observed, inflammation signs accompanied with large number of inflammatory cells (Pic3). The histological examination of skin biopsy from infected rats with *Malassezia* species showed moderate to large numbers of yeast in the corneum layer with epidermal hyperplasia, keratosis and dermatitis, the inflammation associated with number of inflammatory cells infiltration and obvious around the hair follicles (Fig 4,5). The present result was confirmed by microscopic examination the variability in keratin deposition pattern and highly keratinocytes proliferation, this may regarded to the adherence of fungus spores with these cells directly and the finding agreed with studies revealed to the alteration of the keratin deposition and to a grave changes of their cornified envelope. The scratching and maceration incision in the rat skin was suitable to establish the infection, this may be due to wide regions which offer more appropriate area for fungus to entry and growth that appeared more suitable than the spot skin, this result is agreed with Kaya, *et al.*, (2009) who found that the maceration and scratching methods offered more entry points that originating from the infundibulum follicular epithelium, various patterns of hair involvement can develop depending on the fungus species. Pictures showed aggregation of large number of *Malassezia furfur* spores within the stratum corneum, around hair root and dermis layer, due to the suitable environment (body temperature that is suitable for *M.furfur* spores and hyphae which can be grown in 37°C, matrix of the connective tissue which prevent growth and diffusion of these fungi, these findings also reported that the matrix of connective tissue play an important role in pathogenesis, by protecting the yeast spores from destruction, through preventing their spread or inactivation by direct binding, low PH and high concentration of metallic ions (Harada, *et al.*, 2015). Findings reported inflammatory cells infiltration in the most sections stained with (PAS) stain, this suggested that *M.furfur* excited immunological effect and play an important role in the pathogenesis, this findings were agreed with other studies proved the same results.  

Our results showed that the infection extend to the hair follicles and adjacent sebaceous glands, this may be considered that *M.furfur* was lipophilic yeast and implicated in the pathogenesis of seborrhiec dermatitis and *Malassezia* folliculitis. Histology of skin biopsy from PV patients can be accessed via the Hematoxylineosin stain or the PAS stain.
Figure 1: Infected rat skin with *Malassezia* furfur showed large number of spores( ) some that attached on surface corneum, others reached to the dermis and hyphae formed. PAS (10X)

Figure 2: Infected rat skin with *Malassezia* furfur showed aggregation of spores on the surface layer of the epidermis, hyperkeratosis, vacuolated keratinocytes. PAS (10X)

Figure 3: Infected rat skin with *Malassezia* furfur showed large number of hyphae as segmented filaments, stained pink, embedded within amorphous substance. PAS (40X)

Figure 4: Infected rat skin with *Malassezia* furfur showed number of yeast spores stained pink, near the hair follicle within flamed dermatitis. PAS (40X)

Figure 5: Infected rat skin with *Malassezia* furfur showed number of yeast spores embedded within the keratin, hyperkeratosis, epidermis hyperplasia and dermatitis. PAS(10x)

**Conclusion**

The present results showed *Malassezia* species yeasts that penetrated the corneum layer formed sometimes sheet or aggregation on epidermis surface with cellular debris. Moreover the spores budding noticed, the hyphae showed filamentous with pink color.

**Financial Disclosure:** There is no financial disclosure.

**Conflict of Interest:** None to declare.

**Ethical Clearance:** All experimental protocols were approved under the Department of Microbiology, Collage of Medicine, University of Basrah, Basrah, IRAQ and all experiments were carried out in accordance with approved guidelines.
REFERENCES


Citric Acid Production Using Wheat Bran by *Aspergillus niger*

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**ABSTRACT**

This study aimed to obtain a local isolation of *Aspergillus niger* and then studied its ability to produce citric acid from raw materials available locally using solid state fermentation. Six local isolates were collected from different sources including some samples of the damaged fruits such as grapefruit, oranges and sindi. Wheat bran was used as a raw material or as culture medium for the production of citric acid from the collected isolates. The conditions for citric acid production were determined by humidity percentage of 1:1 (water: culture medium), temperature of 28 °C, pH 4 and inoculum dose with $5 \times 10^6$ spore/ml and for 3 days of incubation. The orange was the best model for citric acid production with a concentration of 12.8 mg/ml. In this study the citric acid was diagnosed by using High Performance Liquid Chromatography (HPLC) technique, and it was found that the concentration of citric acid after three days of incubation was 3.662 mg/ml

**Keywords:** citric acid, *Aspergillus niger*

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**Introduction**

Citric acid is one of the most common acids in the nature. It is found mainly in the group of citrus fruits such as orange, lemon, grapefruit, mandarin, etc., as well as in other fruits but with various quantities. The production of citric acid theory using fermentation method in microorganisms belongs to German botanist Wehmer in 1893, when it was discovered that certain types of fungi including *Penicillium* had the ability to biosynthesis of citric acid as a metabolic product after growth of microorganism on sugars-rich solutions. The establishment of the first commercially factory to produce citric acid was designed by Currie and Thom in 1923 using superficial fermentation. Citric acid is consumed in the production of food in large quantities about 70% of its total production. FAO/WHO Expert Committee on Food Additives is classified citric acid generally as a safe recognized substance followed by the pharmaceutical industry, which consumes approximately 12% of citric acid, and the rest of it is found in other applications or industries such as the manufacture of plastics and animal feed. Citric acid has several and different uses especially in 65% - 70% of the food industries. Production of citric acid was carried out by several physical and chemical methods. However, such conventional methods are found to be an expensive, complex and not eco-friendly. The variation of citric acid uses is due to several properties including good taste, high solubility in water, regulation of pH, and its ability to connect the metals with claw property. Citric acid used as antioxidant and as food preservative as well as used in the pharmaceutical and cosmetic industries. Many residues are used to produce citric acid, such as corn cob banana peel, Apple Pomace and Corn Steep Liquor cotton wastes, kiwi pulp, date pulp, apples and solid wastes, orang pulp residues, Pineapple residues, wheat bran and soybeans, fresh kumara (*Ipomoea batatas*), potato (*Solanum tuberosum*) and taro (*Colacasia esculenta*). Citric acid occupies a key position in the global market due to their heavy usage in many industries.

**Materials and Method**

**Isolation sources:** A group of damaged fruits such as orange, grapefruit and sindi.
Culture media and stains: Potato Dextrose Agar (PDA) was prepared according to manufacture instructions (OXOID Company) by dissolving 39 g of the medium in the distilled water. The medium sterilized for 15 minutes and pressure 121 pound/inch\(^2\). The culture medium also was used in the purification of isolates and in the study of the fungi characteristics and the nature of their growth. All fungal isolates are then preserved on PDA slants under refrigeration (4˚C). The isolates may also be stored in glycerol solution (30% V/V) at -76˚C.

The screening medium: The screening medium was placed on Czapek-Dox Agar by dissolving the components listed below in one liter of the distilled water with sucrose with 30 g/L of distilled water. The components are: KCl 0.5 g, K\(_2\)HPO\(_4\) 1.0 g, MgSO\(_4\) 0.5 g, NaNO\(_3\) 3 g, Fe\(_2\) (SO\(_4\))\(_3\) 0.01 g, Agar 13 g. pH of the medium was adjusted to 6.

Methyl Red reagent: This reagent was prepared by dissolving 0.1 of methyl red powder in 300 mil of ethanol (95%) and distilled water was added up to final volume 500 ml Mohammed,(2015) and pH adjusted to 6 using HCl solution (0.1 M).

Isolation and screening: This study used a number of local isolates that their characteristics in the culture media are similar to fungus of *Aspergillus*; all isolated were collected from damaged fruits. The screening process included the sterilization of sieving medium and then methyl red was added with (1-4) drops for each 10 ml of the medium. The medium was inoculated with active isolates of fungi and incubate at 28 °C for six days, and the diameter of growth zone (cm) of citric acid was recorded after 3, 4, 5 and 6 days of incubation. The diameters of growth zone were as initial indication of the ability of the isolates in the production of citric acid.

Diagnosis the efficient isolate at the level of genus and species: The classification keys were depending on to diagnose the efficient isolate in the production of citric acid which is called N1. code N1. The diagnostic tests included morphological characteristics of the isolate that cultures on Czapek Yeast Extract Agar (CYA) medium at 28° C for 6 days; after that the growth and separation of isolate on culture media was evaluated. Then, some samples were tested under microscope using lactophenol blue solution to detect the conidial heads, mycelium, Conidia and Vesicle, and compare all the information them with the available taxonomic information in a number of scientific references and with the assistance of specialized researchers.

The production of citric acid: The solid state fermentation method was used; this method included moisten 10 g of raw material, which is wheat bran, with ratio of 1: 1 (water: medium of production) and pH=4, then all the suspension sterilized and inoculated with 1 ml of 5 \(\times\) 10\(^6\) spore in a 250 ml conical flask. All the flasks were incubated at 28° C for 3 days. Citric acid extracted from the fermentation medium with 50 ml of distilled water, and filtered using Whatman No.1 filter paper, and then filtered solution was centrifuged at 7000 rpm for 15 minutes and then pH and volume using the methods listed below.

Determination Methods:

**pH Estimation:** pH-meter was used after adjusting the device using two types buffer, one with pH=4 and the other with pH=7.

**Determination of total acidity:** The total acidity was estimated according to Pearson, (1973) method; total acidity was estimated by adding 10 ml with sodium hydroxide (NaOH 0.1 M) using phenolphthalein reagent. The concentration of acidity was calculated according to the following equation:

\[
\text{The percentage of citric acid (\%)} = \left[\frac{\text{volume of alkaloid consumed} \times \text{normality of alkaloid} \times \text{equivalent weight of citric acid}}{\text{volume of acid} \times 1000}\right] \times 100
\]

**Determination of citric acid using HPLC technique:** The produced citric acid from *Aspergillus niger* N1 was estimated in the sample using High Performance Liquid Chromatography (HPLC) technique, and according to the conditions of using the device of the laboratories of the Ministry of Science and Technology using a standard sample. A 20μl was injected into the device to identify the citric acid during the time of detention. The quantity of produced acid in the sample was calculated using the following equation:

\[
\text{Concentration of the sample} = \left(\frac{\text{sample area}}{\text{standard sample area}}\right) \times \text{concentration of standard sample} \times \text{dilution factor}
\]

Results and Discussion

In this study, six isolates were selected from samples of fungi that isolated from damaged fruits on PDA
medium. Isolates were purified from the PDA medium and the screened to detect their ability to produce citric acid, by culturing it on Czapek-Dox Agar culture media that containing sucrose, a source of carbon, and methylene red reagent; all isolates were incubated at 28°C for 6 days. The changing of culture medium color from yellow to red ad indicator to production of citric acid due changing of pH. The efficiency of isolates in citric acid production was compared by calculating the ratio between the diameter of the colored zone to the diameter of the growth zone during 3, 4 and 6 days of culturing (Table 1). Three isolates out of 6 were characterized by a high production rate, so that screening was repeated. The most efficient isolate was selected after testing in the first and second stages of screening. This isolated called N1 (Table 2), this isolate characterized with high efficiency to produce the citric acid that detected from the ratio of diameter of produced acid to the diameter of growth zone after 1, 3 and 5 days. Thus, citric acid concentration was estimated according to the total acidity method, and the concentration was 12.8 mg/ml; the citric acid also measured using pH meter and was 2.9, and thus isolate obtained from the damaged orange was found to have a higher efficiency in citric acid production than that isolated from sindi and grapefruit samples. This difference is due the variation in the isolates efficiency to metabolite the carbon source or sugar in the culture medium which in turn leads to produce different concentration of citric acid.

Table 1: The first stage of screening process to determine the ability of isolates in the production of citric acid on Czapek Dox agar medium that containing sucrose and red methyl by indicating the diameter of growth zone of citric acid

<table>
<thead>
<tr>
<th>Isolates</th>
<th>Isolation sources</th>
<th>Diameter of formation acid/diameter of growth(cm) for different periods of incubation</th>
</tr>
</thead>
<tbody>
<tr>
<td>N1</td>
<td>orange</td>
<td>7.4 5.8 5.2</td>
</tr>
<tr>
<td>N2</td>
<td>orange</td>
<td>7.2 5.6 5.1</td>
</tr>
<tr>
<td>N3</td>
<td>grapefruit</td>
<td>6.0 6.6 7.2</td>
</tr>
<tr>
<td>N4</td>
<td>grapefruit</td>
<td>6.2 6.8 7.2</td>
</tr>
<tr>
<td>N5</td>
<td>sindi</td>
<td>4.5 4.8 5.2</td>
</tr>
<tr>
<td>N6</td>
<td>sindi</td>
<td>4.2 4.6 5.2</td>
</tr>
</tbody>
</table>

Table 2: The second stage of screening process to determine the ability of isolates in the production of citric acid on Czapek Dox agar medium that containing sucrose and red methyl by indicating the diameter of growth zone of citric acid

<table>
<thead>
<tr>
<th>Isolates</th>
<th>Isolation sources</th>
<th>Diameter of formation acid/diameter of growth(cm) for different periods of incubation</th>
</tr>
</thead>
<tbody>
<tr>
<td>N1</td>
<td>orange</td>
<td>6.8 5.8 4.1</td>
</tr>
<tr>
<td>N4</td>
<td>grapefruit</td>
<td>5.8 4.5 4.1</td>
</tr>
<tr>
<td>N5</td>
<td>sindi</td>
<td>3.9 3.1 3.1</td>
</tr>
</tbody>
</table>

Diagnosis genus and species of N1 isolate: This study determined the morphological characteristics of the efficient isolate in citric acid production to detect genus and species of this isolate according to the taxonomic keys of 24 in addition to the help of specialized researchers. It is observed that isolate formed black colonies filled with conidial heads and grows rapidly on Czapek Yeast Extract Agar. The growth intensity was exceeded on the culture media margin after 6 days of incubation at 28°C its spores are characterized with dark black color. The isolate was examined under the light microscope using lactophenol blue; it was found that the conidial stalks were non-branched or divided (Fig. 1).
Determination of citric acid using HPLC technique:
Citric acid was determined in the sample using standard solutions in HPLC device, and the conditions of the device were described in Table (3). As shown in Figure (2), the peak of the standard citric acid solution appears in the detention time of 2.963 minute and the area was 54.7468% of the total area of the various peaks of standard solution that injected 20 μl of it into the device. While the detention time of the produced citric acid sample was identical to that time of standard citric acid, the detention time was 2.978 min (Figure 3) and the area was 20.0537% of the total area, and the concentration of citric acid was 3.662 mg/ml. This value is lower than those estimated in titration method, and this is due the presence of other compounds were associated with the production of citric acid with a quantity is equivalent to the concentration of citric acid and did not recognized. These compounds may be the organic acids of grape cycle, which may interact with citric acid during determination. Thus, based on the results of citric acid estimation using HPLC technique, it many concluded that the actual production of citric acid from the studied isolate was 3.662 mg/ml but not those calculated on the basis of the titration method which the concentration was 12.8 mg/ml.

Figure 2: curve of standard citric acid by HPLC

Figure 3: curve of citric acid in a sample after 3 days by HPLC

Conclusion

This study confirmed that isolate N1 isolate, which isolated from various sources, was with high susceptibility to produce citric acid. Isolate N1 was detected according to the morphological characteristics on the culture medium, and it was proved is belong to Aspergillus niger. Additionally, the titration method for estimating the produced citric acid did not consistent with HPLC technique, while the latest give an indication of productivity of acid at a lower value than the first method.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Department of Biology, College of Education for pure science Ibn-Al Haitham, University of Baghdad, Iraq and all experiments were carried out in accordance with approved guidelines.

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Effect of *Olea europea* L Extraction and TiO$_2$ Nanoparticles against *Pseudomonas aeruginosa*

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**ABSTRACT**

The effect of TiO$_2$ nanoparticles on *Pseudomonas aeruginosa* was determined and the results observed that this compound had inhibitory effect on the isolate (1) of bacteria but not with isolates (2,3). Moreover the effect of *Olea europea* leaves extract on *Pseudomonas aeruginosa* was studied, the results of this study showed that there was inhibitory effect of olive leaves extract against the three isolates of the studies bacteria (1,2 and 3) with different rates of inhibitory zone. When TiO$_2$ nanoparticles mixed with olive leaves extract the results were higher in effect and the mixture showed a synergistic action against the three isolates of *Pseudomonas aeruginosa*. The detection results of the active compounds revealed that the hot crude alcoholic extract of olive leaves contained flavones, tannins, alkaloids, phenols, glycosides, fatty acids, steroids and terpins. The X-Ray Diffraction Analysis (XRD) of TiO$_2$ was performed also for TiO$_2$ solution, and the results showed that the average size of each molecule of TiO$_2$ nanoparticles was (15.96nm).

**Keywords:** *Olea europea, TiO$_2$ nanoparticles, Pseudomonas aeruginosa.*

**Introduction**

In the recent days the herbal and medicinal plants have been assumed greater important due to the considerable role that they propose in formulating new antibiotics ¹, so the ever increasing resistant of pathogens towards antibiotics has caused serious health problems ² that caused increasing interest in antimicrobial effects of plants extracts ³. Olive tree is one of the medicinal plants that it uses in alternative medicine for thousands of years, Olive plant belongs to *Olea europeae* L. is typical Mediterranean species where more than 95% of the world total production is localized ⁵. And it has been an important source of medicine and nutrition ⁵. The leaves of olive plant contain some active compounds include saponine, steroid, and flavonoids to express the desired properties ⁶. So Olive plant may have antibacterial activities because it contains many potential bioactive substances ⁷. In addition there is more interest in nanomaterials according to the ability of antimicrobial effects ⁹. So in the recent years the nanoparticles become attractive as anew antibiotic against infectious diseases, depending on their interesting features which makes them worthwhile in pharmaceutical and biological applications ¹⁰-¹². That means nanoparticles have unique physical and chemical properties, TiO$_2$ one of this materials that used in last decades because it is cheap, non-toxic and easy in production ¹³. As well as the possibility of NPs permeation inside the bacteria cell membrane due to their potential toxicity mechanism such as endocytosis, diffusion and channel implication so NPs have been used to be an antibacterial agent against microorganisms such as bacteria ¹⁴,¹⁵. The activity of TiO$_2$ nanoparticles (1-100) nm diameter have become interesting to investigators because of special features as shape, structure and size of TiO$_2$ nanoparticles, surface stability, the transferences between different phases of TiO$_2$ NPS under stress and heat. Nanoparticles of TiO$_2$ known as glamour of the recent medicine due to its antimicrobial effects to different diseases - causing organisms ¹⁶. The photo catalytic agent TiO$_2$ has been used widely for inhibit various groups of microorganisms such as fungus, viruses and bacteria because it has broad antibacterial activity, high photo reactivity, optical competency and chemical stability ¹⁷,¹⁸ and that results...
to apply this materials in purifying air and water from bacteria and another harmful organic materials also in cleaning and sterilization for places such as clinical centers\textsuperscript{19,20}. So the purpose of this research is to estimate the antibacterial activity of some substances like medicinal plants and nanoparticles of metal oxide which have a good activity against infectious and pathogenic bacteria without side effects.

Materials and Method

Microorganism: \textit{Pseudomonas aeruginosa} isolate was obtained from the laboratory of molecular microbiology at college of education for pure science Ibn-Al haitham for microbiology and molecular laboratory for high Graduate Studies.

Sample Collection: Olive leaves were collected from olive trees in Baghdad. The leaves were washed under sterile distilled water (SDW) to remove impurities such as dust. Blotted with paper towels then dried in open air. Once completely dried there were ground to powder.

Preparation of olive leaves extract: The dried leaves were ground in blender to form powder. Thereafter (20) gm. of the powder were dissolved in (150) ml absolute ethanol and allowed to extract in (soxhlet apparatus) for three hours then the extract was dried at (50-60)° C. The dried extract was collected in sterile tubes until use.\textsuperscript{21}

Analysis of active compounds: The methods that were employed to analysis the active compounds in olive leaves extract: alkaloids with\textsuperscript{22}, flavonoids with\textsuperscript{23}, tannins with\textsuperscript{24}, glycosides and polyphenols with\textsuperscript{23}, fatty acids with\textsuperscript{25}, Terpenes and steroids with\textsuperscript{26}.

Preparation of olive leaves extract concentrations: Stock solution was prepared from the ethanolic extract of olive leaves by transfer (1) gm. of dried extract into volumetric flask (100) ml, the volume was completed with sterile distilled water then it was filtered with Millipore filter (0.22) \mu g\textsuperscript{27}.

Preparation of nanoparticle solution: Nanoparticles was suspended in distilled water by using ultrasound for (15) minutes, the concentration that prepared was (1) gm./100ml.\textsuperscript{28}

Preparation of nanoparticles solution combined with olive leaves extract:

(1) ml of nanoparticles was suspended with the hot ethanolic extract of olive leaves (1)ml at concentration 1gm/100ml by ultrasound for 15 minutes.\textsuperscript{29}

Antibacterial activity: Well diffusion method was employed to determine the antimicrobial activity of TiO\textsubscript{2} nanoparticles and the ethanolic extract of olive leaves each one itself and when they were combined together.\textsuperscript{30}

X-Ray Diffraction (XRD) Analysis: Titanium dioxide powder was used to determine (X-ray diffraction) Shimadzu XRD-6000), the analysis was done in the service The Central Laboratory of college of Education for Pure Science (Ibn Al-Haitham)/University of Baghdad.

Results and Discussion

Titanium oxide TiO\textsubscript{2} nanoparticles were tested for their antibacterial efficacy against three isolates of \textit{Pseudomonas aeruginosa}, Titanium dioxide nanoparticles (1- 100) nm in diameter have become a quintessential materials due to their optical competency, dielectrical, photo-catalytic characteristics from size quantization.\textsuperscript{28} The results showed that TiO\textsubscript{2} nanoparticles had a relatively low inhibitory effect against \textit{Pseudomonas aeruginosa} for isolates (1,2,3) (Table 1), where isolate (1) was affected by these nanoparticles with high efficiency while isolates (2,3) did not actually inhibited in the presence of TiO\textsubscript{2} many recent and previous research have been indicated the ability of nanoparticles of TiO\textsubscript{2} to inhibit certain species of bacteria. Current results of antibacterial effect of titanium oxide nanoparticles were compatible with previous studies reporting that NPs possessed good antibacterial activity against pathogenic bacteria such as \textit{Klebsiella aerogenes} and \textit{staphylococcus aureus} \textsuperscript{31}, another study mentioned that concentration 100\mu/ml of nanoparticles suspension had inhibition effect against \textit{Bacillus subtilis}, \textit{Pseudomonas aeruginosa}, and \textit{Escherichia coli} \textsuperscript{32}. It is recorded that nanoparticles of Titanim dioxide are effective bactericidal agent against both strains of bacteria but the activity against gram negative bacteria was more than in the gram positive bacteria.\textsuperscript{33} Many studies refer to that the bacterial cell carries negative charges where the metal oxide carry the positive charge so there is an attractive between the metal oxide and the bacterial cell and these leads to oxidation so the bacterial cell will die finally.\textsuperscript{34} and we can say that nanoparticles can deactivate DNA and the enzymes of bacterial cell by coordination to electron-donating groups like Thiols, Amides, Carbohydrates, Indoles, Hydroxyls and etc. So that leads to make pits in the cell wall of bacteria and causes to increased permeability and cell death, surface modification intrinsic properties, composition, and the cell surface characteristics of microorganisms could be another reason.\textsuperscript{35} Interestingly, the results showed the antibacterial activity of hot alcoholic leaves extract
of *Olea europea* and indicated that olive leaf extract presented abroad – spectrum antibacterial activity against the three isolates of *Pseudomonas aeruginosa* (Table 1), many researches emphases the great role of olive leaves as a medical plant against the pathogenic bacteria. 36 studied the effect of aqueous extract of olive leaves with concentration of 0.6 % (w/v) and he found that the extract killed *Escherichia coli*, *Pseudomonas aeruginosa*, *Staphylococcus aureus* and *klebsiella pneumonia* in three exposure 37 found that methanol extracts of arugula seeds and olive leaves gave posetive antibacterial effect with average inhibition zone between 3-8 mm. Olive leaves (*olea europea*) have been used for pharmaceutical purposes since ancient times and the studies have proposed that olive leaves extracts have antimicrobial activities 38, so olive plant may be useful as an antibiotic against the opportunistic infectious diseases 39, especially against *Pseudomonas* and *Klebsiella*, so both of bacteria pose a high resistance problem 40. The results also showed a synergistic activity of olive leaf extract and TiO2 mixture against the studied bacteria and for three isolates. Many studies pointed the high inhibitory activity of nanoparticles and plant extracts in the case of mixing them together in comparison to their effectiveness if they were used alone, this in agreement with results of 41 that find increase in the size of inhibition zones, they reach to (19-21)mm in case of use ELE-Ag nanoparticles combination as compared to (8-10) mm with extract alone. as well as there is a significant inhibition effect of biofilm formed by *Pseudomonas aeruginosa* and *Staphylococcus cereus* with mix of Eucalyptus extract and nanoparticles of silver, while there is no with Eucalyptus extract alone. The detection results of the active compounds revealed that the hot crude alcoholic extract of olive leaves contained flavones, tannins, alkaloids, phenols, glycosides, fatty acids, steroids and terpins (Table 2) the reports describing antimicrobial features of phenolic compounds in olive products refer to compounds obtained from olive plant particularly hydroxyrosol and oleuropin. phytochemical screening of many extracts of (*olea europea*)leaves showed the presence of steroids, saponins, flavonoids, terpins and sterols, and these compounds were many previously studies reported to exist in olive leaves, these compounds are responsible for antimicrobial properties. X-Ray Diffraction analysis was performed for TiO2 (Fig 2) and the diffraction peaks were indicated to the small size of the crystals. Scherrer equation was used to calculate the average size of the nanoparticles for TiO2 as well as the capacity of nanoparticles

\[ D = \frac{K\lambda}{\beta\cos\theta} \]

- **D** = size of particles
- **K** = Scherer constant (1-0.9)
- **\( \lambda \)** = the wave length of x-ray (A1.5418)
- **\( \cos \theta \)** = Bragg angle

Based on the above equation, the results found that the average size of nanoparticles of TiO2 was (15.96) nanometer. Observation where found that the size of TiO2 nanoparticles was (22) nanometer according to Scherer equation.

**Table 1: Inhibition zone of Titanium oxide TiO2 nanoparticles and Olea europea extracts alone and combination of Pseudomonas aeruginosa isolates**

<table>
<thead>
<tr>
<th>isolates</th>
<th>Inhibition zone (mm)</th>
<th>Nanoparticle TiO2</th>
<th>Olea europea extracts</th>
<th><em>Combination</em></th>
<th><strong>Control</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Pseudomonas aeruginosa</em></td>
<td></td>
<td>-</td>
<td>+</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td><em>Pseudomonas aeruginosa</em></td>
<td></td>
<td>-</td>
<td>+</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td><em>Pseudomonas aeruginosa</em></td>
<td></td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>-</td>
</tr>
</tbody>
</table>

**Table 2: Detection of some active compounds in the hot crude extract of olive leaves (Olea europea)**

<table>
<thead>
<tr>
<th>Active compounds</th>
<th>Hot crude extract of olive leaves (Olea europea)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alkaloids</td>
<td>+ve</td>
</tr>
<tr>
<td>Flavonoids</td>
<td>+ve</td>
</tr>
<tr>
<td>Tannins</td>
<td>+ve</td>
</tr>
<tr>
<td>Glycosides</td>
<td>-ve</td>
</tr>
<tr>
<td>Poly Phenols</td>
<td>+ve</td>
</tr>
<tr>
<td>Fatty acid</td>
<td>+ve</td>
</tr>
<tr>
<td>Terpenst steroid</td>
<td>+ve</td>
</tr>
</tbody>
</table>
Fig. 1: Inhibition zone of the effect of Titanium oxide TiO$_2$ nanoparticles and *Olea europea* extracts alone and combination of the *Pseudomonas aeruginosa* isolates

Fig. 2: Shows the x-ray diffraction patterns of Titanium oxide TiO$_2$ nanoparticles and its nanoparticle measurement

**Conclusion**

The X-Ray Diffraction Analysis (XRD) of TiO$_2$ was performed also for TiO2 solution, and the results showed that the average size of each molecule of TiO2 nanoparticles was (15.96nm).

**Financial Disclosure:** There is no financial disclosure.

**Conflict of Interest:** None to declare.

**Ethical Clearance:** All experimental protocols were approved under the Department of Biology, College of Education for pure science Ibn-Al Haitham, University of Baghdad, Iraq and all experiments were carried out in accordance with approved guidelines.

**REFERENCES**


Evaluation of the Midwives, Practices toward Management and Prevention of Postpartum Hemorrhage at Delivery Rooms in Holly Karbala and Hilla City Hospitals

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¹Maternal and Neonatal Health Nursing, ²Community Health Nursing Department, College of Nursing, University of Babylon, Hilla City, Iraq

ABSTRACT

Globally, there is an estimated of (287,000) maternal deaths. This means, every day, about 830 women deece from preventable causes linked to pregnancy and childbirth. One woman dies every two minutes. About 99% of maternal deaths happen in developing countries, while above half of these deaths were preventable. Postpartum hemorrhage (PPH) is a major cause of maternal mortality and morbidity, especially in developing countries, where most pregnancy-related deaths are connected with hemorrhage. It aimed to assess midwives knowledge regarding management and prevention of PPH. A descriptive study was found to be effective for the present study. In this study the target population was consisted of all midwives working in delivery room in hospital of a Holy Karbala and Hilla city. The sampling technique use in this study was (nonprobability) purposive method of sampling ; sample were consist of 60 midwives working in delivery room in Karbala and Hilla hospitals. The main results of the study reveal that majority of the midwives had fair evaluation according to the mean of scores in most of the items regarding participants’ practices toward management and prevention of postpartum hemorrhage.

Keywords: postpartum hemorrhage, Midwives, practices toward management prevention of PPH.

Introduction

More than half million women around the World die as a result of complications during pregnancy and childbirth. Common of these deaths occur within few hours of delivery and in most cases are due to (PPH). Approximately 24% of maternal death occur through pregnancy, 16% in the period of labor and births and 61% occur during the postpartum period. 45% of death occur within the earliest 24 hours of birth mostly as a cause of PPH. Postpartum hemorrhage is the major cause of maternal morbidity and mortality worldwide with the main incidence in developing countries.¹ According to WHO, (2005) obstetric hemorrhage causes 127,000 deaths worldwide and is the leading cause of maternal mortality. Universally, obstetric hemorrhage remains the most significant cause of maternal mortality. It is expected that PPH is the most common cause of maternal deaths across the world, responsible for more than 25% of deaths annually and is a major cause of several maternal morbidity.² PPH is one of the obstetric emergencies that can be prevented if the correct skills are employed yet it remains the leading cause of maternal mortality globally.³ In 2010 nearly 14 million women suffered from PPH worldwide resulting into 287,000 women dying while pregnant or giving birth. 99% of global maternal deaths occur in developing countries, with the maternal mortality ratio (MMR) of 239 per 100,000 live births, 14 times higher compared to the developed regions (17 maternal deaths per 100,000 live births).⁴ PPH is accounts for approximately one-quarter of all maternal pregnancy-related deaths. Many studies have recommended that several deaths associated with PPH could be prevented with prompt recognition and more timely and forceful treatment. Morbidity from PPH can be severe, with sequelae including organ failure,
shock, edema, compartment syndrome, transfusion complications, thrombosis, acute respiratory distress syndrome, sepsis, anemia, intensive care, and prolonged hospitalization.

Materials and Method

Study Design: A descriptive design study was found to be effective for the present study.

Sample: Sample were consist of 60 midwives working in delivery room in Karbala and Hilla hospitals. The sampling technique use in this study was non probability purposive method of sampling.

Setting: In this study the target population was consisted of all midwives working in delivery room in Maternity Teaching Hospital of a Holy Karbala and Hilla city. This Study is carried out in Holy karbala and Hilla city from December, 5th, 2017 to January, 3rd, 2019.

Instrument: Checklist used by the researcher for three observations for each study sample (midwives). An instrument was constructed through the use of three level type of Likert scale to evaluate the midwives practices toward management and prevention of PPH in delivery room. Each midwife was observed 3 time, (3) times considered as always, (2-1) times considered as sometime, and (zero) as never. The rating score of the observational checklist was (3) for always, (2) for sometime, and (1) for never. Depended on Likert scale, scoring of practice was done as:

- Poor practice (mean of score= 1-1.66).
- Fair practice (mean of score= 1.67-2.33).
- Good practice (mean of score= > 2.33).

The instrument was comprised of (4) categories, each of them included several items.

1. Administration of a uterotonic drug which contain (6) items.
2. Controlled cord traction which contain (12) items.
3. Uterine massage which contain (5) items.
4. Immediate postpartum care which contain (8) items.

Validity: The content validity of the tool was established in consultation with guide of experts from the field of obstetrics and gynecology department of nursing & medicine and other field specialties. Suggestion of the experts were considered for modification and changes which were made accordingly.

Data Collection: The data collection was carried out during the period from March 28th to July 1st, 2018.

Data Analysis: The collected data was analysis by using descriptive statistics (mean, mean percentage, standard deviation) and T-test to find out the association between the demographic variables and the scores of knowledge.

Results and Discussion

Since 2007, the world health organization recommendations need maintained active management of the third stages of labor (AMTSL) as acritical intervention for postpartum hemorrhage prevention. AMTSL has become a central factor of the PPH reduction plans of government around the world. Table 1 of this study demonstrated that more than half of midwives had some times checked and palpated the uterus to ensure no other baby is present. This result disagree with the study done in south of Ethiopia by Zelalem T, et al., 2017 who showed that all of obstetric care provider had given uterotonic drug intramuscularly and only (1.7%) had given intravenously and agree with the study done in Addis Ababa by Andualem & Rahel, 2015, the aimed of their study was to assess factors associated with knowledge, attitude and practice of midwives on active management of third stage of labor and they reported that about (89%) of midwives had awareness on oxytocin intramuscular injection as a first line drug for the management of postpartum hemorrhage.

Table (2) explained how midwives deal with the cord traction, the results showed that there are more than one procedure can be performed. In this instant, high percentage of them never change gloves when cutting the cord, followed by the action of clamping the cord close to the perineum and hold the cord in one hand which they always did that, (58.3%) of the participants always place the palm of the hand on the lower abdominal, just above the pubic bone and finally it was observed that subjects did not put the baby before cord clumping on the mother abdomen. The woman’s life sometimes rely on one moment to be saved with very simple intervention. A study was conducted by Rahel Y, et al., 2014 they
aimed to assess the knowledge, attitude and practice of midwives on active management of third stage of labor. The current study indicated that (61.7%) of midwives always done immediately cord clamping (less than 60 sec) and (51.7%) study participants encourages the mother to push while gently pulling downward on the cord to deliver the placenta, with the strong uterine contraction. Table 3 Majority of the participants in this study prefer to immediately massages the fundus of the uterus until it contracted while high percentage of them never palpate for a contracted uterus every 15 minutes and repeats uterine massage as needed during the first 2 hours. This result agree with the study done in Ethiopia by Rahel Y, et al., 2014 shows that (86%) of the sample immediately massages the uterine fundus and (60.3%) palpates the uterus every 15 minutes. Massaging the uterus should be done only when uterus is not firm, otherwise muscle fatigue and uterine relaxation may occur. Aggressive massage may lead to partial or complete uterine prolapse. Table 3 revealed that more than half of study sample ensure that the uterus does not become relaxed (soft) after stopping uterine massage while (55%) of midwives never instruct the woman on how to massage her uterus. Table 4 the result of the current study shows that all midwives inspect and repairs lacerations or tears and majority of the midwives (78.3%) always repair the episiotomy if one was performed. In a study conducted by Balla B, 2015 in Al-Ribat which aimed to assess the knowledge of midwives toward postpartum hemorrhage the researcher found that almost all the sample (94.8%) inspected the perineum after delivery and repairs laceration or tears. Moreover more than half of midwives never estimate blood loss. The current study results is supported by Faiza A, 2014 who had done a study and reported that (61.7%) of midwives had assessed of blood loss and lochia. Most of the midwives the in present study remove soiled bedding and makes the woman comfortable, explain the procedures and actions to the woman and her family and Continue to provide support and reassurance throughout while, (61.7%) of them never put the baby to the mother’s breast. One of the most important action that the nursing process emphasized is to teach and discuss any procedure will be implemented on the patient. As well as making the mother comfortable. Another issue in the assessment of the hemorrhage when care provider position the baby to the breast of the mother which make

### Table 1: Distribution of demographic characteristics for study sample N = 60

<table>
<thead>
<tr>
<th>Variables</th>
<th>Freq</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>21-29 yrs</td>
<td>24</td>
<td>40.0</td>
</tr>
<tr>
<td>30-38 yrs</td>
<td>10</td>
<td>16.7</td>
</tr>
<tr>
<td>39-47 yrs</td>
<td>18</td>
<td>30.0</td>
</tr>
<tr>
<td>≥ 48 yrs</td>
<td>8</td>
<td>13.3</td>
</tr>
<tr>
<td>Total</td>
<td>60</td>
<td>100%</td>
</tr>
<tr>
<td>Level of Education</td>
<td></td>
<td></td>
</tr>
<tr>
<td>School of Nursing</td>
<td>2</td>
<td>3.3</td>
</tr>
<tr>
<td>Secondary School of Midwifery</td>
<td>39</td>
<td>65.0</td>
</tr>
<tr>
<td>Secondary school of Nursing</td>
<td>7</td>
<td>11.7</td>
</tr>
<tr>
<td>Institute of Nursing</td>
<td>10</td>
<td>16.7</td>
</tr>
<tr>
<td>College of Nursing</td>
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<td>3.3</td>
</tr>
<tr>
<td>Total</td>
<td>60</td>
<td>100%</td>
</tr>
<tr>
<td>Total years of experiences in the delivery rooms</td>
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<td></td>
</tr>
<tr>
<td>1-5yrs</td>
<td>37</td>
<td>61.7</td>
</tr>
<tr>
<td>6-10yrs</td>
<td>15</td>
<td>25.0</td>
</tr>
<tr>
<td>≥11yrs</td>
<td>8</td>
<td>13.3</td>
</tr>
<tr>
<td>Total</td>
<td>60</td>
<td>100%</td>
</tr>
<tr>
<td>No of training course about PPH</td>
<td></td>
<td></td>
</tr>
<tr>
<td>None</td>
<td>15</td>
<td>25.0</td>
</tr>
<tr>
<td>One</td>
<td>17</td>
<td>28.3</td>
</tr>
<tr>
<td>Two</td>
<td>13</td>
<td>21.7</td>
</tr>
<tr>
<td>Three</td>
<td>6</td>
<td>10.0</td>
</tr>
<tr>
<td>Four and more</td>
<td>9</td>
<td>15.0</td>
</tr>
<tr>
<td>Total</td>
<td>60</td>
<td>100%</td>
</tr>
<tr>
<td>Assigned of PPH</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>41</td>
<td>68.3</td>
</tr>
<tr>
<td>No</td>
<td>19</td>
<td>31.7</td>
</tr>
<tr>
<td>Total</td>
<td>60</td>
<td>100%</td>
</tr>
<tr>
<td>No. of managed cases of PPH</td>
<td></td>
<td></td>
</tr>
<tr>
<td>One</td>
<td>13</td>
<td>30.2</td>
</tr>
<tr>
<td>Two</td>
<td>12</td>
<td>27.9</td>
</tr>
<tr>
<td>Three</td>
<td>8</td>
<td>18.6</td>
</tr>
<tr>
<td>Four</td>
<td>2</td>
<td>4.7</td>
</tr>
<tr>
<td>Five</td>
<td>7</td>
<td>16.3</td>
</tr>
<tr>
<td>Six and more</td>
<td>1</td>
<td>2.3</td>
</tr>
</tbody>
</table>
Table 2: Midwives’ practices towards Administration of a Uterotonic Drug

<table>
<thead>
<tr>
<th>Items</th>
<th>Never</th>
<th>Some times</th>
<th>Always</th>
<th>MS</th>
<th>SD</th>
<th>Evaluate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1- Palpates the uterus to make sure no other baby is present.</td>
<td>23 38.3</td>
<td>35 58.3</td>
<td>2 3.3</td>
<td>1.65</td>
<td>0.55</td>
<td>Poor</td>
</tr>
<tr>
<td>2- Administer of oxytocin drug within one Minute</td>
<td>1 1.7</td>
<td>21 35.0</td>
<td>38 63.3</td>
<td>2.62</td>
<td>0.52</td>
<td>Good</td>
</tr>
<tr>
<td>3- Giving oxytocin drug intravenously</td>
<td>22 36.7</td>
<td>33 55.0</td>
<td>5 8.3</td>
<td>1.72</td>
<td>0.61</td>
<td>Fair</td>
</tr>
<tr>
<td>4- Giving oxytocin drug intramuscularly</td>
<td>14 23.3</td>
<td>23 38.3</td>
<td>23 38.3</td>
<td>2.15</td>
<td>0.78</td>
<td>Fair</td>
</tr>
<tr>
<td>5- Administration of oxytocin Immediately after delivery of infant</td>
<td>16 26.7</td>
<td>39 65.0</td>
<td>5 8.3</td>
<td>1.82</td>
<td>0.57</td>
<td>Fair</td>
</tr>
<tr>
<td>6- Administration of oxytocin After delivery of placenta</td>
<td>10 16.7</td>
<td>26 43.3</td>
<td>24 40.0</td>
<td>2.23</td>
<td>0.72</td>
<td>Fair</td>
</tr>
<tr>
<td>Mean</td>
<td>14 23.89</td>
<td>30 49.17</td>
<td>16 26.94</td>
<td>2.01</td>
<td>0.29</td>
<td>Fair</td>
</tr>
</tbody>
</table>

Table 3: Midwives, Practices towards Controlled Cord Traction

<table>
<thead>
<tr>
<th>Items</th>
<th>Never</th>
<th>Some times</th>
<th>Always</th>
<th>MS</th>
<th>SD</th>
<th>Evaluation</th>
</tr>
</thead>
<tbody>
<tr>
<td>1- Put the Baby before cord clumping On the mother abdomen</td>
<td>34 56.7</td>
<td>2 3.3</td>
<td>24 24</td>
<td>1.83</td>
<td>0.98</td>
<td>Fair</td>
</tr>
<tr>
<td>2- Change gloves when cutting the cord</td>
<td>43 71.7</td>
<td>9 15.0</td>
<td>8 13.3</td>
<td>1.42</td>
<td>0.72</td>
<td>Poor</td>
</tr>
<tr>
<td>3- Places the palm of the hand on the lower abdomen just above the woman’s pubic bone</td>
<td>9 15.0</td>
<td>16 26.7</td>
<td>35 58.3</td>
<td>2.43</td>
<td>0.74</td>
<td>Good</td>
</tr>
<tr>
<td>4- Clamps the cord close to the perineum and holds the cord in one hand.</td>
<td>20 33.3</td>
<td>0.0</td>
<td>0.0</td>
<td>40 66.7</td>
<td>2.33</td>
<td>Fair</td>
</tr>
<tr>
<td>5- Places a second clamp on the cord and cuts the cord between the two clamp</td>
<td>20 33.3</td>
<td>0.0</td>
<td>0.0</td>
<td>40 66.7</td>
<td>2.33</td>
<td>Fair</td>
</tr>
<tr>
<td>6- Immediately cord clamping (less than 60 sec)</td>
<td>23 38.3</td>
<td>0.0</td>
<td>0.0</td>
<td>37 61.7</td>
<td>1.77</td>
<td>Fair</td>
</tr>
<tr>
<td>7- Early cord clamping during 1 minute</td>
<td>45 75.0</td>
<td>4 6.7</td>
<td>11 18.3</td>
<td>1.43</td>
<td>0.79</td>
<td>Poor</td>
</tr>
<tr>
<td>8- Late cord clamping during 1-3 minute</td>
<td>36 60.0</td>
<td>17 28.3</td>
<td>7 11.7</td>
<td>1.52</td>
<td>0.70</td>
<td>Poor</td>
</tr>
<tr>
<td>10- Holds the placenta in both hands and Slowly pulls to complete the delivery</td>
<td>5 8.3</td>
<td>22 36.7</td>
<td>33 55.0</td>
<td>2.47</td>
<td>0.65</td>
<td>Good</td>
</tr>
<tr>
<td>11- Wearing sterile gloves and gently examines the upper vagina and cervix</td>
<td>25 41.7</td>
<td>18 30.0</td>
<td>17 28.3</td>
<td>1.87</td>
<td>0.83</td>
<td>Fair</td>
</tr>
<tr>
<td>12- Inspects the placenta to be sure none of it is missing.</td>
<td>16 26.7</td>
<td>25 41.7</td>
<td>19 31.6</td>
<td>2.05</td>
<td>0.77</td>
<td>Fair</td>
</tr>
<tr>
<td>Mean</td>
<td>25 41.67</td>
<td>12 20.0</td>
<td>23 38.33</td>
<td>1.97</td>
<td>0.17</td>
<td>Fair</td>
</tr>
</tbody>
</table>
Table 4: Midwives, practices towards immediate postpartum care

<table>
<thead>
<tr>
<th>Items</th>
<th>Never</th>
<th>Some times</th>
<th>Always</th>
<th>MS</th>
<th>SD</th>
<th>Evaluate</th>
</tr>
</thead>
<tbody>
<tr>
<td>1- Inspect and repairs lacerations or tears</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>60</td>
<td>100.0</td>
<td>3.00</td>
</tr>
<tr>
<td>2- Repair the episiotomy if one was performed</td>
<td>0</td>
<td>0</td>
<td>13</td>
<td>47</td>
<td>78.3</td>
<td>2.78</td>
</tr>
<tr>
<td>3- Estimate blood loss</td>
<td>31</td>
<td>51.7</td>
<td>23</td>
<td>38.3</td>
<td>6</td>
<td>10.0</td>
</tr>
<tr>
<td>4- Check the woman’s BP and pulse every 15 minutes</td>
<td>37</td>
<td>61.7</td>
<td>18</td>
<td>30.0</td>
<td>5</td>
<td>8.3</td>
</tr>
<tr>
<td>5- Remove soiled bedding and makes the woman comfortable</td>
<td>0</td>
<td>0</td>
<td>6</td>
<td>10.0</td>
<td>54</td>
<td>90.0</td>
</tr>
<tr>
<td>6- Explain the procedures and actions to the woman and her family.</td>
<td>15</td>
<td>25.0</td>
<td>31</td>
<td>51.7</td>
<td>14</td>
<td>23.3</td>
</tr>
<tr>
<td>7- Put the baby to the breast</td>
<td>37</td>
<td>61.7</td>
<td>12</td>
<td>20.0</td>
<td>11</td>
<td>18.3</td>
</tr>
<tr>
<td>8- Continue to provide support and reassurance throughout.</td>
<td>3</td>
<td>5.0</td>
<td>33</td>
<td>55.0</td>
<td>24</td>
<td>40.0</td>
</tr>
<tr>
<td>Mean</td>
<td>15</td>
<td>25.00</td>
<td>17</td>
<td>28.33</td>
<td>28</td>
<td>46.67</td>
</tr>
</tbody>
</table>

Table 5: Overall Practices of studied midwives toward management and prevention of postpartum hemorrhage

<table>
<thead>
<tr>
<th>Practice variables</th>
<th>Never</th>
<th>Some times</th>
<th>Always</th>
<th>Chi-Square</th>
<th>P-Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Administration of a uterotonic drug</td>
<td>23.89</td>
<td>49.17</td>
<td>26.94</td>
<td>9.587</td>
<td>0.022*</td>
</tr>
<tr>
<td>controlled cord traction</td>
<td>41.67</td>
<td>20.00</td>
<td>38.33</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Uterine massage</td>
<td>35.00</td>
<td>45.00</td>
<td>20.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Immediate postpartum care</td>
<td>25.00</td>
<td>28.33</td>
<td>46.67</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 6: The relationship between the demographic characteristics and practices of midwives

<table>
<thead>
<tr>
<th>Demographic characteristics</th>
<th>Practice</th>
<th>Correlation</th>
<th>Administration of Uterotonic Drug</th>
<th>Controlled Cord Traction</th>
<th>Uterine Massage</th>
<th>Immediate Postpartum Care</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>R</td>
<td>0.031</td>
<td>0.274*</td>
<td>0.164</td>
<td>0.213</td>
<td></td>
</tr>
<tr>
<td>Education level</td>
<td>R</td>
<td>0.048</td>
<td>0.075</td>
<td>0.020</td>
<td>0.370**</td>
<td></td>
</tr>
<tr>
<td>Total years of experiences in delivery rooms</td>
<td>R</td>
<td>0.304</td>
<td>0.204</td>
<td>0.113</td>
<td>0.239</td>
<td></td>
</tr>
<tr>
<td>No. of trainings course about PPH</td>
<td>R</td>
<td>0.133</td>
<td>0.120</td>
<td>0.282*</td>
<td>0.142</td>
<td></td>
</tr>
<tr>
<td>No of managed cases of PPH</td>
<td>R</td>
<td>0.128</td>
<td>0.094</td>
<td>0.026</td>
<td>0.112</td>
<td></td>
</tr>
</tbody>
</table>

Conclusion

The present study concludes that majority of the midwives had fair evaluation according to the mean of scores in most of the items regarding participants’ practices toward management and prevention of postpartum hemorrhage.
**Financial Disclosure:** There is no financial disclosure.

**Conflict of Interest:** None to declare.

**Ethical Clearance:** All experimental protocols were approved under the Community Health Nursing Department, College Nursing, University of Babylon, Hilla City, Iraq and all experiments were carried out in accordance with approved guidelines.

**REFERENCES**


Evaluation the Effect of Gentamicin on Fertility of Male Rats & Probable Protective Role of Lipoic Acid

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¹Department of Physiology, Biochemistry & Pharmacology, College of Veterinary Medicine, University of Kerbala, Iraq

ABSTRACT

The aim of our research was to investigate the probable preventive effect of lipoic acid in fertility of rats against gentamicin toxicity. Twenty four male rat divided into four groups each group have 6 animals were treated as follows: untreated control animals (group1), treated with lipoic acid 600 mg/kg orally (group 2), treated with gentamicin 80 mg/kg intraperitonialy (group 3) & treated with lipoic acid combination with gentamicin (group 4) all these groups treated for four weeks. The result revealed physiological & histopathological changes in animals treated with gentamicin, there are significant decrease in testosterone & LH levels, also there are significant decrease in sperm count, viability, motility & significant increase in sperm abnormality. On the other hand, lipoic acid when given with gentamicin lead to return all these alteration near closely to the normal states. In conclusion, lipoic acid causes enhancement the alteration induced by gentamicin in male reproductive system of rat.

Keyword: fertility, lipoic acid, gentamicin, testosterone

Introduction

Infertility is an inability to become pregnant after an unprotected year of intercourse ¹. Infertility is experienced by 15 percent of couples. In general, there are anatomical factors for male infertility (e.g. varicoceles, ductal obstructions or ejaculatory disorders) as reported by ²,³. There are few investigations managing the impacts of gentamicin on the regenerative arrangement of guys. It has been accounted for that gentamicin does not aggregate in the testicles because of poor transport over the blood testicles hindrance ⁴, despite the fact that a later report detailed a restraint of the cell division of germ cells & the union of proteins in the testis & the acceptance of cell passing in the testis. Numerous examinations have as of late demonstrated that gentamicin causes oxidative worry in the testis by expanding free extreme arrangement & lipid peroxidation ⁵. Alpha lipoic corrosive (ALA) is a characteristic substance combined by octanoic corrosive & cysteine, which are immediate antecedents of lipoic corrosive, in human & creature bodies in mitochondria. In numerous investigations, ALA has been appeared to battle oxidative worry by free radicals ⁶. ALA has likewise been recognized as a member in the development of other cell cancer prevention agents, for example, nutrient C, nutrient E, & the decrease of glutathione (GSH) in a reusable structure by recovering them ⁶, notwithstanding its job in the searching & end of the extreme impacts of ROS. This experiement has been designed to know the protective effect of lipoic acid against the negative effect of gentamicin on the male rat system.

Materials and Method

Male rats (Rattus Norvegicus) obtained from Faculty of science, University of Kufa were used in the present study. The animals housed in animal’s house in College of Veterinary Medicine/University of Karbala in plastic cages under suitable environment conditions at temperature 23 ± 2 °C from 14/12/2017 to 6/2/2018, food & water were offered daily, they kept for two weeks before experimental beginning for acclimation.
Experimental Design: Twenty-four male rats weighing 200–220 g were used in the present study under suitable environmental conditions at temperature 23 ± 2 °C. Food & water were offered daily, they kept for two weeks before experimental beginning for acclimation then randomly divided into four groups comprising six animals for each group as the following:

Group 1: Rats were given normal saline orally & served as control (C).

Group 2: Animals of this group were given gentamicin (G) intraperitonially at a dose of 80 mg/kg, for four weeks according to 7.

Group 3: Rats were given lipoic acid (LA) orally at a dose of 600 mg/kg BW according to 8 for four weeks.

Group 4: The animals were orally given lipoic acid after administration of gentamicin (A/G) at a dose of 80 mg/kg, for four weeks.

At the end of the experiment, animals were anesthetized by chloroform followed by blood collection to perform hormonal & biochemical assays, then after animals sacrificed, caudal epididymis was isolated for epididymal spermatozoal examination.

Parameters of the Study: In this examination sperm motility, tally, & feasibility were assessed by utilizing customary techniques 9-11. Amount of the motile spermatozoa were determined per the unit of territory & communicated as rate sperm motility. Sperm checks were finished utilizing haemocytometer & outcome were communicated as Mil./ml of suspension. Hormonal test: Estimation of serum testosterone, luteinizing hormone (LH) & Follicle-animating hormone (FSH) levels by adhere to produce directions of pack. All packs utilized for hormone test were (Monobind Inc. lake woodland CA 92630, USA) according to 12. The outcomes were spoken to as mean ± standard blunder. The information were investigated by t test & a likelihood (p≤0.05) was acknowledged as huge (SPSS, 2014)

Results and Discussion

Effect of gentamicin & lipoic acid on some hormone levels:

Effect of gentamicin & lipoic acid on some hormone levels in male rat: The statistical analysis revealed presence significant decrease (p ≤ 0.05) in testosterone level in animal that treated by the gentamicin only & there is no significant change in animals treated with gentamicin & lipoic acid in compare with animals treated with lipoic acid only as well as control. In addition level of LH hormone revealed significant decrease (p ≤ 0.05) in rats which treated with gentamicin only when compare with rats treated with gentamicin & lipoic acid & that treated with lipoic acid only as well as control group. Last column observe no significant change in FSH hormone level between groups, table (1).

Epididymal Sperm Analysis: Table (3) represent values of sperm analysis; first column shows presence significant decrease (p≤ 0.05) in the epididymal sperm count in rats administrated gentamicin in compare to other groups. There was significant decrease (p ≤ 0.05) in the sperm viability in animals giving gentamicin in compare with animals in control, treated with lipoic acid & treated with both lipoic acid & gentamicin respectively. Sperm motility in column three showed presence significant decrease (p ≤ 0.05) at the rats administrated with gentamicin when compare with rats in the other groups. Finally there were significant increase (p ≤0.05) to sperm abnormality in the animals injected intraperitonially with gentamicin in compare to animals in control, giving lipoic acid orally in addition to animals treated with gentamicin & lipoic acid in combination.
In the present examination gentamicin have no noteworthy impact on FSH levels this finding is coordinate with that revealed by 14. What’s more, testosterone, is a hormone delivered by Leydig (interstitial) cells in the testicles manages development & support of optional sex organs 17. The pituitary gonadotropin luteinizing hormone (L H) is the critical trigger of testicular steroid genesis, specifically of testosterone (T) generation, in the Leydig cells present in testicular interstitial tissue. LH & T structure the practical spine of the hypothalamic – pituitary – testicular (HPT) pivot, an administrative circuit where LH invigorates T creation, which equally manages LH discharge by negative input activity 18. In guys, LH invigorates androgen generation by interstitial Leydig cells, despite the fact that FSH targets Sertoli cells in the testicles to control spermatogenesis 19. In worry to testosterone our outcome indicates critical lessening in testosterone levels when administrated gentamicin this finding concur with 20 who detailed that diminished testosterone levels were seen on account of gentamicin organization (20– 24th day) in solid rodents. The diminished serum testosterone in the gentamicin treated rodents might be expected to Leydig cell debilitation brought about by ROS age 21,22. Then again on the grounds that the gentamicin have negative impact on the nerve center pituitary-gonads pivot this lead to diminish the dimension of the testosterone just as luteinizing hormone by decline the GnRH–LH motioning in the testis; which have invigorate the arrangement & emission of testosterone hormone 23,24. In other component demonstrates the job of gentamicin as a cationic component appears to collaborate with the Ca++ authoritative to lipid mono-layers & to bio-membranes 25. Various examinations demonstrate the limit of gentamicin & different aminoglycosides to square different calcium channels 26-28. Calcium assumes a noteworthy job in the excitation-discharge pairing of synapses & hormones 29. It is conceivable that gentamicin squares testosterone blend either meddling with the movement of the relative steroidogenic compounds 30, or restraining testosterone discharge in the blood as it occurs with the acetylcholine discharge, by means of calcium enmity in the aminoglycosides actuated neuromuscular blochade 31-33. The impregnation of gentamicin in testosterone pellet inserts, in people, in spite of the fact that not critical brought about 20% decrease of the testosterone expulsion rate 34. In our investigation we demonstrate that the lipoic corrosive have defensive impact to improve & amiolerate the negative impact of gentamicin on the regenerative tract of male rodent. Concerning male proliferation, a noteworthy number of restorative investigations proposed that LA ensures the testis & its capacities against an expansive range of lethal abuse where oxidative pressure is a piece of the fundamental etiology 35-37. It is trusted that the lipoic corrosive by means of its cell reinforcement property can search a few receptive oxygen animal categories & furthermore restrains the age of hydroxy radicals that assault sulfur-containing cancer prevention agents 6. In addition, lipoic corrosive has capacity to support the dimensions of protein thiols & regulate tissue endogenous cancer prevention agents 6. In view of these phenomenal properties, lipoic corrosive has been appeared to be of enthusiasm as a helpful instrument to secure the male regenerative wellbeing against a scope of testicular toxicants in test creatures, where oxidative pressure is the piece of fundamental etiology 37.

**Conclusion**

Lipoic acid when given with gentamicin lead to return all these alteration near closely to the normal states. In conclusion, lipoic acid causes enhancement the alteration induced by gentamicin in male reproductive system of rat.

**Financial Disclosure:** There is no financial disclosure.

**Conflict of Interest:** None to declare.

**Ethical Clearance:** All experimental protocols were approved under the University of Kerbala/College of Veterinary Medicine/Department of physiology, Biochemistry & Pharmacology, Iraq and all experiments were carried out in accordance with approved guidelines.

**REFERENCES**


Introducing 5P’s Methodology as Healthcare Marketing Plan: Using 5P’s Healthcare Marketing Plan in Diabetic Foot Care Management

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Quality Management, Abu Dhabi, United Arab Emirates

ABSTRACT

This study will focus on introducing 5P’s (Product, Place, Process, Price, and Promotion) methodology as health care marketing study through implementing the lean process in diabetic foot management in outpatient services in a five hundred and fifty six bed, tertiary hospital in the UAE. The Quality specialist applied lean methodology to eliminate unnecessary staff and patient movement. Focussing on analysing delays, defects, and variations in diabetic foot care management and streamlining the patient pathway to improve quality and safety, reduce costs, and increase profit margins. Lean methodology can be used to eliminate wasteful practices and reduce variation in clinical services. Innovation in healthcare processes uses lean methodology to focus on value stream mapping of a process. This in turn leads to superior utilization of hospital resources.

Keywords: Healthcare, Diabetic Foot, Care Management

Introduction

Abu Dhabi is experiencing rapid economic growth and fast becoming an attractive base for healthcare investment 1. The healthcare system attracts a large number of nationals and none national workers. This leads to continuously changing demographics and cultural social structure. The prosperity Gross Domestic Product (GDP) and life style of the population results (The Canback Global Income Distribution Database, 2015) in an increased rate of high risk diseases such as diabetes placing the existing health care infrastructure under pressure 2. Ogrin et al. (2013) 3 suggest that a well-coordinated multidisciplinary team is the most effective way to provide diabetic foot management and reduce the overall burden of disability on society. A robust support system that can sustain the diabetic population increases healthcare service demands but improves cost efficiency and activities of daily living 4. The recent establishment of “Daman” as the national health-insurance carrier places my tertiary hospital in a prime position to become a major regional diabetes provider. Developing a diabetic foot centre of excellence would enable sustainment for an increased demand being placed on the current diabetic foot care services.

Methodology

Using lean methodology redesigns the flow of patients, materials, information and or clinicians. This then streamlines processes and systems to improve patient outcomes. Lean innovative solutions continuously improve processes as the industry evolves. The methodology employs a systematic approach utilizing several tools to achieve intended outcome. A SWOT assessment (Appendix 1) was used to analyse the Strength and Weaknesses (SW) of the Diabetic Foot care clinic services in relation to: 1. Stakeholders, 2. Financials, 3. Customers and Community Stakeholders, 4. Service Quality & Operational Efficiency, 5. Learning Growth & Infrastructure. A search was performed using the following databases: CINAHL, PUBMED. Search was performed using the following key words: lean methodology, lean thinking, diabetic foot care, cost effective, multidisciplinary team, waste reduction, value added mapping, and industrial quality management, 60 second diabetic foot assessment with appropriate
problems and being at risk of diabetes will be identified. Index (ABI) and toe pressure so as the severity of foot nurses may access vascular status with an ankle brachial screening for high risk and report. In diabetic foot clinic the multidisciplinary diabetic foot team after foot foot team members. Nurses should communicate with seconds assessment and collaborate with other diabetic foot examination using monofilament within a 60 seconds assessment and collaborate with other diabetic foot team members. Nurses should communicate with the multidisciplinary diabetic foot team after foot screening for high risk and report. In diabetic foot clinic nurses may access vascular status with an ankle brachial index (ABI) and toe pressure so as the severity of foot problems and being at risk of diabetes will be identified.

Another element of diabetic foot care excellence provided by nursing is the accurate selection of appropriate dressing according to wound/ulcers type, e.g., wet or dry. Dressing choice is extremely important as it is designed to keep the wound clean, maintain wound moisture levels, and support debridement and reduction of bacteria. Accordingly, all diabetics should be referred to the diabetic clinic in order to be evaluated, screened, diagnosed and avail comprehensive foot care annually. Diabetic foot nurses examining patient’s feet in clinic(s) should complete the initial patient evaluation screening list and examine the level of limb health via movement, moisture, color, temperature, edema, pain and sensation.

Place: According to the organization’s internal data analysis, there were 29,484 diabetic outpatient visits, out of which, 57 visits with wound complication during the studied period. For the same period of time, 17,704 patients were admitted with diabetes mellitus (Internal patients’ data analysis). Patients may show up in late stages of their disease to the hospital. This variable means they may end up anywhere in the hospital rather than going through the designed care pathway.

In the studied period, the hospital admitted 244 diabetic inpatients. Twenty-three of those ended up with amputation, seven patients lower limb amputations, (3 legs and 4 toe/toes amputation). Diabetic patients develop serious life threatening complications. The average length of stay for diabetic amputee patients was 34.7 inpatient days (Data extracted based on principal diagnosis code, from local internal electronic system).

Multidisciplinary teamwork is a driving force behind the success of a diabetic foot clinic, in fact most patient pathways today (Samuel, 2014). Due mainly to an increased aging population with comorbidities, sound teamwork has become necessary for successful patient outcomes.

Process: The innovative new process will focus on improving compliance through standard patient care screening and assessment aiding early identification of high-risk patients. This process improvement not only ensures early intervention and reduction of hospital admissions but also reduces costs and increases patients’ satisfaction. The lean process begins by helping focus on early assessment and identification of high-risk of diabetic foot patients every visit. The existing process of diabetic foot patients’ care happens in five different clinics based on the type of visit (Appendix 2). This process starts with registration, waiting for nurse assessment and examination (foot care/general assessment), referral to diabetic foot clinic, possible procedure and education. Patient then re-booked for another appointment. In case the patient needs another clinical service (i.e. vascular consult), patient has to be re-registered again in the system. Existing policies and procedures do not allow nurses to refer patients to different specialities; neither can nurses register patients under their own services (e.g. wound care clinic), patients must be registered under a physician name as per insurance requirements. Diabetic foot clinic is not accessible in booking lists via registration but only through direct appointment; requiring a special referral to be seen. These referrals are done manually as no automated system exists. Appendix 2 shows a process map of existing journey flow for diabetic foot patients. The proposed new process dealt with non-value added steps in seeing diabetic foot
patients. A multi-disciplinary team was formed to study the existing process and improve it. The team consisted of a physician, vascular surgeon, wound care nurse, quality assurance, and patient access, marketing and finance representatives. The existing process was carefully mapped detailing all steps. Geographical layout of five clinics was drawn and the patient journey traced. Consensus reached by all team members including timings of each step. Follow up discussions proposed non-value added process steps be eliminated.

Non-value added steps:

1. Duplication of patient examination
2. Duplication of registration
3. Patients’ referrals to other specialties during the visit
4. Diabetic foot re-assessment in the diabetic clinic

Appendix 3 shows new process steps and layout reflecting a leaner, efficient approach to patient care providing effective and timely services.

Measuring outcomes of clinicians and patient adaptation to new process will be via data extraction from electronic medical record. Extracting data from the medical record system retrospectively includes timings of patient’s registration-assessment, examination, education/procedure completion, and patients’ check out. This approach will be used also to standardize treatment methods, and decrease the probability of patient complaints and incidences from delay to treat. Nurses can also prioritize the patient’s urgency for treatment using the new process flow. The multidisciplinary team will then triage the level of urgency by following clinical protocols or guideline (60 seconds diabetic foot tool). The Diabetic Foot Clinic will provide optimum healing for people with diabetic foot disease and a holistic, coordinated wound care regime for all patients in the system.

All UAE national patients are covered by medical insurance and are given free treatment. Expatriates’ insurance is covered either by insurance agencies or by company sponsorship. A small minority may be classified as self-pay. Healthcare clinicians are obliged to follow the legal regulations in terms of providing health services. An analysis of DFU patient’s needs from the last three years outpatients’ clinical visits has made it possible to justify the establishment of the MDT consisting: Two Internists, Wound Care Nurses, Orthopedic surgeon, Vascular surgeon, General surgeon, Radiologist and interventional radiologist, Microbiologist, Podiatrist and Clerk and educator. The diabetic foot clinic will help the organization by increasing registered patient visits through leaning the existing process. This in turn increases organization revenue. Decrease of waiting time also leads to more efficient resource utilization and organizational savings. The medical need and expenditure for diabetic foot care have increased markedly over the past decade. The diabetic foot centers viability is dependent on revenue, and its clinical effectiveness is based on generated revenue and the multidisciplinary approach to diabetic foot care. Diabetic foot is the most common cause of hospitalization and health system concerns in diabetic patients. Specialized diabetic healthcare providers are assigned to the prevention and diagnosis of diabetic foot complications. Nurses as members of the diabetes care team not only need to play the role in clinical health care, but public education, health system management, patient case management and monitoring the activities of daily living. The goals of health promotion are to achieve disease prevention, effective patient care and ensure patients’ treatment compliance. To achieve these goals, healthcare professionals play different roles: providing clinical care, care connectors, educators, consultants, leaders, researchers and patient advocates. They combine science and art to provide health services, seeking to balance physical, emotional, mental, social and cultural norms with spiritual needs. Compliance to standard procedures, policies, guidelines through evidence-based practice, will increase the knowledge in management of care of diabetes and diabetic foot wounds. All educational information, trainings, conferences were offered to all staff but still there is no standard of care being done to patients with diabetic foot wound. Having a new process or framework requires promotion and marketing. The diabetic foot clinic is promoted through two directions, the first by healthcare providers. This approach will be through meetings, flyers, and circulars. All-important information will be specified in the flyer. Educational sessions will be conducted to all involved healthcare providers on the new process and layout. Most importantly, senior leadership engagement and support will be evidenced and regular communication to all staff. Marketing department will be involved in the process of promoting the creation of the new clinic. Other healthcare organizations will be notified and the new process and referral guidelines explained. The other
direction will be focused on patients and community. Special patients’ education program will be held in the clinics. This program will involve all staff involved in the patients’ journey. It will include physicians, nurses, dieticians; wound care nurses and other professionals. Healthcare diabetic foot care education printed materials will be developed to comply with patients and family’s needs. Marketing department will contact local media for publicizing the new process and to educate the community about it. The community education will focus on encouraging patients to take a direct appointment with the diabetic foot clinic made available in the new system.

**Results and Discussion**

Our vision is to have a lean diabetic foot care management process in the hospital by end of 2018 that is properly equipped with all resources. The clinical information outlined in our internal statistical reports (2012, 2013 and 2014) clearly shows the need and benefits for implementation of a DFU lean pathway but strategies to overcome current barriers preventing the hospital from forging ahead must be sought. Our goal is to set up a multi-disciplinary team to implement the lean diabetic foot care process for all patients at risk of diabetic foot ulcers with the aim to empower patients to participate in their management. Strategies consist of a comparison of the current management of patients with diabetic foot ulcers at the hospital to future management of these patients defined by the new lean process. Support and approval from the senior management team is the key successful factor to implement the lean process and resolve several barriers currently contributing to delays in implementation. Establishing evidence of the successful implementation of the lean process starting with launching patient surveys and observations of clinical practice to compare treatment before and after the establishment of a lean DFU pathway (NICE, 2011). We plan to document the level of care and ask the patient about quality of life criteria and monitor implementation of on-going treatment plans. The new process results are shown below in appendix 3. Most important of these results is the new layout having a decrease 68% in total process time and allowing for 18 additional patients per week to register. The results of the new layout implementation were:

- Using diabetic foot care assessment as a key process.
- Having an own minor OP’s nurse.
- Educate patients to be aware of side effects and to call immediately when they have something
- Discussion with all staff to have a standard process

Also the results out of the process changes were:

- A total time reduction of 83% or 144 min (Appendix 4)
- A total waiting time reduction of 93% or 105 min (Appendix 4)
- A total process time reduction of 68% or 47 min (Appendix 4)
- Involvement of DF team
- Much reduced patient ways

**Conclusion**

The 5P’s (Product, Place, Process, Price, and Promotion) strategies are introduced to improve healthcare services. The above healthcare marketing study recommend to add the 5th P (Process) as core of healthcare marketing plan approach to improve or establish any healthcare services. A healthcare marketing plan should be purposefully and consistently developed to be part of routine and integrated to achieve the organization mission. These strategies (5P’s) are necessary to develop and execute the healthcare services and growth of the profession that customers as well as the healthcare community which can embrace these services. Considering that the support of top management is a necessity for a transition to a market and make sure of marketing represents a “central success factor”. The 5P’s can guide the healthcare marketing and ensure effectively reaching the market requirements toward providing the needed services. The right 5P’s marketing plan implementation gets into a pro-active mode and will be part of the culture.

**Financial Disclosure:** There is no financial disclosure.

**Conflict of Interest:** None to declare.

**Ethical Clearance:** All experimental protocols were approved under the Quality Management, Abu Dhabi, United Arab Emirates and all experiments were carried out in accordance with approved guidelines.

**REFERENCES**


New Ruthenium Metal Complexes for their Activity with DNA and Cells of Cancer/DFT-B3LYP Calculations

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¹Department of Physics, College of Sciences, University of Kufa, Iraq

ABSTRACT

In the current study a ruthenium (II) metal complex \([\text{Ru(bpy)}_2(\text{H}_2\text{saltsc})]^+\) (bpy = 2,2'-bipyridine) (2saltsc = salicylaldehyde thiosemicarbazone) was investigated using DFT/B3LYP with different basis sets. The results showed that the geometric properties agree with experimental data. Three metal complexes were designed and suggested as new isotopes of the ruthenium metal complex. The energy gap of the new ruthenium metal complexes were in the range 0.7034 to 0.7644 eV, this value makes the ruthenium metal complexes have applications lie in the semiconductor region. The calculations obtained that the compound A4 has a smaller energy gap and high molecular polarizability, also more active to interact with other molecules or species than the compounds A1, A2 and A3 according to the quantum chemical parameters. In addition, the highest fraction of electrons transferred is connected with the best inhibitor, while the least fraction is related to the inhibitor that has the least inhibition efficiency. In general, the results showed that the ruthenium metal complexes have high ability to interact with other species or molecules such as DNA and cells of cancer.

Keywords: Ruthenium metal complex, DFT, Basis sets, HOMO, LUMO.

Introduction

For many years ruthenium and its compounds are represented important role in organometallic chemistry. Ruthenium metal is definitely a metal star in the current search for a treatment agent in various medical uses. The ruthenium metal compounds are well famous for their high application as drug applicants, where the ruthenium metal complexes are very important as anti-cancer, anti-bacterial and anti-parasitic drugs. The past of ruthenium complexes equally cis-platin competitors initiated in 1980, after chloro-ammine-Ru (III) analog complexes were create as an anti-cancer activity. The activity against metastatic cancers is a common feature of other ruthenium complexes, some of ruthenium complexes newly arrived medicinal trials as an anti-cancer, anti-metastatic and efficient drug. In current years, many research groups have investigated the structure, properties and spectroscopic of ruthenium compounds by using chemical quantum mechanics with density functional theory. The quantum mechanical calculation can give information and data on the electronic structures and many properties of compounds, and additionally it analyzes important details about the electronic structure to be studied and analyzed. Current work represents a theoretical study by employing the DFT/B3LYP with different basis sets such as LANL2DZ, LANL2MB and SDD for investigating the ruthenium metal complexes and design new metal complexes for ruthenium metal after the choice of stable and the most accurate of basis sets then report the computational results.

Computational Details

The DFT method used for molecular calculations in the gas phase by using the Gaussian09 package program, as well as Gauss View 5.0.8, which was used to prepare...
the input files to Gaussian09 and draw the initial structure of the ruthenium metal complexes\textsuperscript{13,14}. The full geometry optimization calculations have been performed for the ruthenium metal complexes with the B3LYP functional “Becke’s three parameter hybrid functional with the LYP correlation functional” done with ECPs “the relativistic Effective-Core Potential” such as LANL2DZ “effective core Los Alamos National Laboratory 2-Double-Z”, LANL2MB “Los Alamos ECP plus MBS” and SDD “Stuttgart Dresden triple zeta ECPs” basis sets\textsuperscript{15-17}. The use of these basis sets is recommended because it gives sufficient precision to the system of heavy metal complexes\textsuperscript{16,17}, so they have been used and compared for the purpose of selecting the best and most accurate in the current study.

Results and Discussion

The relaxed structure of ruthenium (II) metal complex (A1)\textsuperscript{18} was optimized at three levels using DFT with B3LYP/LANL2DZ, B3LYP/LANL2MB and B3LYP/SDD for comparison. The basis sets “SDD, LANL2DZ, and LANL2MB” are used effective core potentials to decrease the calculation cost\textsuperscript{15,17}. The use those basis sets with ECP on ruthenium metal replaces the inner core electrons\textsuperscript{17,19}. The results obtained by the DFT method showed the effective theory in determining the geometrical optimization of molecular structure in which the relax of the structure was complete without any imaginary frequency and the total energies are minimize at virial ratio “\textit{V/T}” were (2.00507, 2.00345 and 2.00624) using the LANL2DZ, LANL2MB and SDD basis sets respectively. These results were obtained because the DFT method is taken into account for all corrections due to the interaction that occurs between the electrons in the molecular structure. Fig. 1. denoted optimized geometry of the ruthenium metal complex(A1) by using DFT with B3LYP/LANL2DZ level in ground state. Table 1. refers the geometric structures (bands and angles) of the ruthenium metal complex (A1) theoretically by DFT method and B3LYP with deferent basis sets LANL2DZ, LANL2MB and SDD and have been found a good agreement comparison with the experimental values\textsuperscript{18} but the LANL2DZ was more accurate. The calculation results showed that the LANL2DZ basis set was more perfect for ruthenium metal complexes. The choice of stable basis sets is very significant for the most accurate calculation of the characteristics of metal compounds. In the current study selected the LANL2DZ basis set appropriate to optimized molecular structures. After confirming the method and its accuracy and selecting the bases set (LANL2DZ), suggested three metal complexes were designed as new isotopes of ruthenium metal complex active sites to interact with DNA and cells of cancer. Fig. 2. indicates the relax structure of the three structures molecules under study labeled A1, A2, A3 and A4 by using DFT/B3LYP/LANL2DZ. Table 2. indicates the electronic properties (E\textsubscript{HOMO}, E\textsubscript{LUMO} and E\textsubscript{gap}) for the studied molecules (A1, A2, A3 and A4) consequently, higher values of E\textsubscript{HOMO} indicate a better tendency towards the donation of electrons, increasing the adsorption of the inhibitor for mild steel and therefore better inhibition efficiency. E\textsubscript{LUMO} refers the ability of the molecule to accept electrons. The value of energy gap is a significant properties as a function of reactivity of the inhibitor molecule towards the adsorption on the metallic surface. It is important that the values of E\textsubscript{HOMO}, E\textsubscript{LUMO} and the gap between HOMO and LUMO properties the molecular chemical stability. Egap determining stability of the compound, chemical reactivity, optical and electrical properties. In addition, the smaller Egap is a sign of the biological reactivity of the complex. All the ruthenium metal compound under studied has applications within the range of the semiconductor area. The values of the HOMO and LUMO energies as well as the energy gap of the ruthenium complexes are important to obtain information on the electronic absorption to know the energy of electron transmitted from HOMO to LUMO. This means that it must be associated with the less optical transmission of energy in the electronic spectrum. The smallest value of Egap means the more reactivity. According to the Egap values in the ranking of the complexes should be: A4˃A2˃A1˃A3.. denotes the distribution of the HOMOs and LUMOs (in 3-D) due to the LCAOs-MOs according to the coordination of ruthenium metal complexes by employing the LANL2DZ/B3LYP-DFT. Table 3 displays the molecular polarizability values of the ruthenium molecules includes the molecular dipole moment “D. M.” in Debye and molecular polarizability in a. u. From results in Table 2 we can observe two notes; first the compound A4 has the heist D. M (13.2305 Debye) and that molecular A3 has the lowest D. M in which more symmetric structure compared to others. The second note that the molecular polarizability of all structures are in order of (\(\alpha_z > \alpha_y > \alpha_x\)), and all the suggested ruthenium molecules have different average polarizability “\(\alpha_{\text{avg}}\)” in which this mentions to constructing new structures have new electronic properties and therefore, have high ability
to interact with other species or molecules. In general, the results showed that the new ruthenium metal complex structures have high ability to interact with other species or molecules such as DNA in particular compound A4. It illustrates the MEP surfaces “molecular electrostatic potential surfaces” of the complexes (A1-A4). The diverse values of MEP at the surfaces are symbolized by diverse colors. The negative regions the MEP surfaces are connected to electrophilic and the positive regions related to nucleophilic reactivity \(^9\). Where the negative area of MEP is determined for compounds mainly depending on sulfur, nitrogen and chlorine atoms, demonstrating that they are the most appropriate and important locations for electrophilic dose. As for the maximum positive region is located on the 2H atoms of the O-H and C-H, displaying that they are probable locates for attack by nucleophiles. The ESP surfaces of complexes displayed the potentials were dragged toward the region of highly electronegativity, and consequently, give one to understand to determining the effective ends positions of compound to connection with the surrounding species or molecules to construct new metal complexes. The produced maps of ESP are results from the strength of attraction or repulsion for the area surrounding the molecule. Generally, the ESP surface is dragged toward the negative charge (chlorine and oxygen atoms of high electronegativity). Significant quantum chemical properties such as ionization potential \(I_e\) (eV), electron affinity \(E_a\) (eV), electronegativity \(E_N\) (eV), chemical potential \(\mu\) (eV), electrophilicity (eV) and back donation \(\Delta E\) (eV), these parameters are measured and describe the activity of the compounds. The calculations of properties are carried out by the Koopmans theorem (KT) \(^{11,12}\). The ionization energy ranking of mentioned complexes are: A3>A4 >A2>A1. We can note that the compound A3 has a larger value of \(E_a\) and \(E_N\) comparison with other complexes, this means, that the A3 has high ability to acceptance electrons and small excitation energies may need to an electron transfer. From Table 4 shows the order of \(E_N\) were A3 >A4 >A2>A1. The complexes A4 and A3 have large value of. This means, that compounds A4 and A3 have a high ability to interacts with other species. The \(\Delta E\) in Table 3. Thus, the highest fraction of electrons transferred is linked with the best inhibitor (compound A4), while the least fraction is associated with the inhibitor that has the least inhibition efficiency (A3).

<table>
<thead>
<tr>
<th>Band and Angle</th>
<th>Experimental</th>
<th>LANL2DZ</th>
<th>LANL2MB</th>
<th>SDD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ru1-S1</td>
<td>2.430 Å</td>
<td>2.4742 Å</td>
<td>2.6210 Å</td>
<td>2.5360 Å</td>
</tr>
<tr>
<td>Ru1-N6</td>
<td>2.068 Å</td>
<td>2.1028 Å</td>
<td>2.3081 Å</td>
<td>2.2972 Å</td>
</tr>
<tr>
<td>S1-C28</td>
<td>1.70 Å</td>
<td>1.8010 Å</td>
<td>1.8102 Å</td>
<td>1.7520 Å</td>
</tr>
<tr>
<td>C28-N7</td>
<td>1.33 Å</td>
<td>1.3813 Å</td>
<td>1.4634 Å</td>
<td>1.3986 Å</td>
</tr>
<tr>
<td>C28-N6</td>
<td>1.41 Å</td>
<td>1.4010 Å</td>
<td>1.3121 Å</td>
<td>1.4421 Å</td>
</tr>
<tr>
<td>N6-N5</td>
<td>1.41 Å</td>
<td>1.4291 Å</td>
<td>1.4612 Å</td>
<td>1.4423 Å</td>
</tr>
<tr>
<td>N5-C27</td>
<td>1.24 Å</td>
<td>1.2501 Å</td>
<td>1.1908 Å</td>
<td>1.2580 Å</td>
</tr>
<tr>
<td>C27-C26</td>
<td>1.47 Å</td>
<td>1.4976 Å</td>
<td>1.4314 Å</td>
<td>1.4983 Å</td>
</tr>
<tr>
<td>C26-C21</td>
<td>1.40 Å</td>
<td>1.43014 Å</td>
<td>1.4513 Å</td>
<td>1.4370 Å</td>
</tr>
<tr>
<td>C21-O1</td>
<td>1.28 Å</td>
<td>1.3031 Å</td>
<td>1.3058 Å</td>
<td>1.3075 Å</td>
</tr>
<tr>
<td>N6-Ru1-S1</td>
<td>66.7 deg.</td>
<td>68.9212 deg.</td>
<td>70.3231 deg.</td>
<td>69.6517 deg.</td>
</tr>
<tr>
<td>Ru1-S1-C28</td>
<td>82.6 deg.</td>
<td>85.5211 deg.</td>
<td>86.0341 deg.</td>
<td>84.2136 deg.</td>
</tr>
<tr>
<td>N6-C28-S1</td>
<td>107.1 deg.</td>
<td>109.0362 deg.</td>
<td>110.1641 deg.</td>
<td>109.0651 deg.</td>
</tr>
<tr>
<td>N7-C28-S1</td>
<td>125.6 deg.</td>
<td>127.0146 deg.</td>
<td>127.4261 deg.</td>
<td>128.0102 deg.</td>
</tr>
<tr>
<td>C28-N6-N5</td>
<td>118.5 deg.</td>
<td>119.8341 deg.</td>
<td>120.0121 deg.</td>
<td>119.8460 deg.</td>
</tr>
<tr>
<td>N6-N5-C27</td>
<td>119.3 deg.</td>
<td>121.3012 deg.</td>
<td>121.2163 deg.</td>
<td>122.0083 deg.</td>
</tr>
<tr>
<td>N5-C27-C26</td>
<td>123 deg.</td>
<td>124.0260 deg.</td>
<td>124.1236 deg.</td>
<td>125.0231 deg.</td>
</tr>
<tr>
<td>C27-C26-C21</td>
<td>121 deg.</td>
<td>121.8942 deg.</td>
<td>122.341 deg.</td>
<td>123.0569 deg.</td>
</tr>
<tr>
<td>O1-C21-C26</td>
<td>123 deg.</td>
<td>124.5410 deg.</td>
<td>124.983 deg.</td>
<td>124.7124 deg.</td>
</tr>
</tbody>
</table>
Table 2: The electronic properties ($E_{\text{HOMO}}$, $E_{\text{LUMO}}$ and $E_{\text{gap}}$) of A1, A2, A3 and A4

<table>
<thead>
<tr>
<th>Metal Complexes</th>
<th>$E_{\text{HOMO}}$ (eV)</th>
<th>$E_{\text{LUMO}}$ (eV)</th>
<th>$E_{\text{gap}}$ (eV)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1</td>
<td>-2.5875</td>
<td>-1.8650</td>
<td>0.7225</td>
</tr>
<tr>
<td>A2</td>
<td>-3.4561</td>
<td>-2.7497</td>
<td>0.7064</td>
</tr>
<tr>
<td>A3</td>
<td>-3.6874</td>
<td>-2.9230</td>
<td>0.7644</td>
</tr>
<tr>
<td>A4</td>
<td>-3.5377</td>
<td>-2.8343</td>
<td>0.7034</td>
</tr>
</tbody>
</table>

Table 3: Quantum chemical parameters of complexes A1, A2, A3 and A4

<table>
<thead>
<tr>
<th>Metal complexes</th>
<th>$I_k$ (eV)</th>
<th>$E_{\Lambda}$ (eV)</th>
<th>$E_{\eta}$ (eV)</th>
<th>$\mu$ (eV)</th>
<th>$\Delta E$ (eV)</th>
</tr>
</thead>
<tbody>
<tr>
<td>A1</td>
<td>2.5875</td>
<td>1.8650</td>
<td>2.226</td>
<td>-2.226</td>
<td>6.859</td>
</tr>
<tr>
<td>A2</td>
<td>3.4561</td>
<td>2.7497</td>
<td>3.102</td>
<td>-3.102</td>
<td>13.629</td>
</tr>
<tr>
<td>A3</td>
<td>3.6874</td>
<td>2.9230</td>
<td>3.305</td>
<td>-3.305</td>
<td>14.291</td>
</tr>
<tr>
<td>A4</td>
<td>3.5377</td>
<td>2.8343</td>
<td>3.186</td>
<td>-3.186</td>
<td>14.430</td>
</tr>
</tbody>
</table>

Figure 1: The band and angle of the ruthenium metal complex (A1) using B3LYP/LANL2DZ, B3LYP/LANL2MB and B3LYP/SDD

Figure 2: Optimized structures of ruthenium metal complexes A2, A3 and A4

Conclusion

The electronic structure was optimized by using a DFT/B3LYP with DFT/B3LYP method with different basis sets (LANL2DZ, LANL2MB and SDD). The geometric results were showing that the structural properties are in a well compatible with experimental results. The choice of base sets is very significant for calculating characteristics of the properties of a metal complex, so we choose the LANL2DZ basis set because it was more accurate for ruthenium atom. We showed the new suggested complexes have energy gap applications lie in the semiconductor region. The complex A4 is more active than A1, A2 and A3 due to their highly molecular polarizability and small energy gap. The parameters $I_k$ (eV), $E_{\Lambda}$ (eV), $E_{\eta}$ (eV), $\mu$ (eV), ($eV$) and $\Delta E$ (eV) approve the inhibition efficiency in the order of A4>A3>A2>A1. The new ruthenium complexes have active sites interact with DNA and cells of cancer. The highest fraction of electrons transferred is connected with the best inhibitor, while the least fraction is related with the inhibitor that has the least inhibition efficiency. In general, all the ruthenium metal complexes have high ability to interact with other species or molecules such as DNA, but the complexes A4 and A3 are more active than the A1 and A2.
Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the University of Kufa- College of Sciences- Department of Physics, Iraq and all experiments were carried out in accordance with approved guidelines.

REFERENCES


Pioneer Data for Initiating Prostate Cancer National Screening Program in Baghdad

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¹Family Medicine Specialist, Baghdad Al Karkh Health Directorate, Iraq; ²Assistant Professor, Al-Mustansiriyah University, College of Medicine, Department of Surgery, Baghdad, Iraq

ABSTRACT

Prostate cancer is one of the commonest men cancers in the world, about 1600000 newly diagnosed cases yearly worldwide and 366000 men died every year around the world because of this disease. Seventy seven histopathologically diagnosed prostate cancer patients were interviewed in the urology department of Alyarmook Teaching Hospital in Baghdad/Iraq during 6 months period (from 1st June 2018 to1st December 2018) and direct questions were asked about age, symptoms at time of presentation and family history for each patient. A total of 77 patients with prostate cancer were included in this study, their ages ranged from 51 -90 years with a mean age of (70.6 years ± 7.3 SD.). The biggest age group 39 patients (50.6%) were extending in the age from 71-80 years. Positive family history of prostate cancer in first degree relatives was noted in 10 patients (12.9%) of the cases Most patients with positive family history had their fathers affected 7 patients (70%) while 3 patients (30%) had their brothers affected. The most common presenting clinical symptom in our patients was dysurea in 41(53.2%) patients followed by urine retention in 36 (46.8%) patients.

Keywords: Prostate cancer, age, family history, symptoms, screening.

Introduction

Prostate cancer is one of the commonest men cancers in the world, about 1600000 newly diagnosed cases yearly worldwide and 366000 men died every year around the world because of this disease.¹ As stated by the last WHO statistics reported in 2017, 432 men died in Iraq because of prostate cancer which represent 0.25% of all deaths, age adjusted dying estimate was 7.02 per 100000 persons which grades Iraq 152 internationally.² Public screening means applying suitable screening test for certain disease to a target group of people defined by certain criteria such as age in well organized system.³ Prostate cancer usually affects elderly men and rarely found in patients less than 55 years old.⁴ Probability for man with first degree relative having prostate cancer is about 2 to 2.5 times to develop prostate cancer than man with negative family history for the disease.⁵ It is exceedingly acceptable that prostate cancer includes offensive and inactive kinds, inactive prostate cancer may stay asymptomatic for long time without causing mortality, while the offensive kind will cause symptoms and lead to death.⁶ Usually prostate cancer is asymptomatic during early disease stages but with disease progression, lower urinary tract symptoms may start to appear such as dysurea, nacturia, poor stream, urine retention and burning micturation, as the disease becomes more advanced other symptoms like hematuria, hematospermia and erectile dysfunction may develop, bone pain with generalized weakness and weight loss, urinary or fecal incontinence may indicate distant metastasis with compression on other organs such as the spinal cord.⁷ Aim of the study: the aim of this study was to describe recent prostate cancer age specific, clinical and family history informations in Baghdad which help in developing national screening program for this disease.

Methodology

Seventy seven histopathologically diagnosed prostate cancer patients were interviewed in the urology department of Alyarmook Teaching Hospital...
in Baghdad/Iraq during 6 months period (from 1st June 2018 to 1st December 2018) and direct questions were asked about age, symptoms at time of presentation and family history for each patient, all cases of prostate cancer were included with no exclusion

Results and Discussion

Between 1st June 2018 and 1st December 2018 a total of 77 patients with prostate cancer were included in this study, their ages ranged from 51 -90 years with a mean age of (70.6 years ± 7.3 SD.) The biggest age group 39 patients (50.6%) were extending in the age from 71-80 years, table 1 showed the age distribution of the studied sample. Positive family history of prostate cancer in first degree relatives was noted in 10 patients (12.9%) of the cases (Fig.1). Most patients with positive family history had their fathers affected 7 patients (70%) while 3 patients (30%) had their brothers affected (table 2). The most common presenting clinical symptom in our patients was dysurea in 41(53.2%) patients followed by urine retention in 36 (46.8%) patients (Table 3).

Prostate cancer incidence is strongly related to age with the highest incidence rates being in older men. In this study the age range was 51-90 years with a mean age of 70.6 years. This was in accordance with the mean age (70 years) of ustoo organization [8] and the cancer society of Finland [9] However it differed from a study reported by Oluwole op. [10] which recorded a mean age of 64.5 years and other comparable African series; Mandong [11], Akang [12], Echimane [13], Angwafo [14] and Eke [15], this is because black men are usually affected at an earlier ages than white men [16] The peak age frequency in our study lied in the ages between 71-80 years (50.6%).this result agreed with that of cancer researches in uk (2013-2015) [17-20] which stated that their age specific incidence rates peak in the 75-79 age group, also it agreed with European and American studies where their prostate cancer patients mainly present in the 8th decade [21]. However in our patients prostate cancer occurred a decade earlier as compared to their counterparts in studies made by Oluwole [22], Ugare [23] and Mohammed [24] which found the peak age at diagnosis was in the 7th decade. This may be due to the concept that colored men are at greater risk to have prostate cancer even at earlier ages than white men with more malignant course of the disease, the exact reasons for these differences are not known although a lot of theories tried to explain that it might be due to inherited genes, environmental, social or economic causes [16]. In the current study positive family history of prostate cancer in the first degree relatives was noted in 10(12.9%) patients, this developed because of multifactorial effect of inherited genes, similar environment and daily life behaviors, our finding was consistent with the results of Steinberg [25] (15% positive family history), however it was lower than other studies published by Samuel [26] and by Chen [27] which showed positive family history in 17% and 20% of the cases respectively. In our study 70% fathers and 30% brothers were affected by the disease a result which agreed with previous studies, Steinberg [25] and Chen [27] but it disagreed with that of Samuel [26] which showed nearly equal percent of affected fathers and brothers. The most common presenting clinical symptom in our patients was dysurea in 41(53.2%) patients followed by urine retention in 36 (46.8%) patients and this was in consistence with other references like studies of Bollinger[28] and Thomas[29] which stated that lower urinary tract symptoms with heamaturia are the commonest early symptoms of prostate cancer.

Table 1: Frequency and percent of different age groups for patients with prostate cancer

<table>
<thead>
<tr>
<th>Age</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>51-60</td>
<td>4</td>
<td>5.2%</td>
</tr>
<tr>
<td>61-70</td>
<td>26</td>
<td>33.8%</td>
</tr>
<tr>
<td>71-80</td>
<td>39</td>
<td>50.6%</td>
</tr>
<tr>
<td>81-90</td>
<td>8</td>
<td>10.4%</td>
</tr>
<tr>
<td>Total</td>
<td>77</td>
<td>100%</td>
</tr>
</tbody>
</table>

Table 2: frequency and percent of father and brother positive family history for prostate cancer patients

<table>
<thead>
<tr>
<th>Affected relative</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Father</td>
<td>7</td>
<td>70%</td>
</tr>
<tr>
<td>Brother</td>
<td>3</td>
<td>30%</td>
</tr>
<tr>
<td>Total</td>
<td>10</td>
<td>100%</td>
</tr>
</tbody>
</table>

Table 3: Frequency and percent of presenting symptoms for patients with prostate cancer

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Frequency</th>
<th>Percent</th>
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</thead>
<tbody>
<tr>
<td>Burning micturation</td>
<td>31</td>
<td>40.3%</td>
</tr>
<tr>
<td>Dysurea</td>
<td>41</td>
<td>53.2%</td>
</tr>
<tr>
<td>Urine retention</td>
<td>36</td>
<td>46.8%</td>
</tr>
<tr>
<td>Heamaturea</td>
<td>21</td>
<td>27.3%</td>
</tr>
<tr>
<td>Back pain</td>
<td>7</td>
<td>9.1%</td>
</tr>
</tbody>
</table>
Conted…

<table>
<thead>
<tr>
<th>Condition</th>
<th>No.</th>
<th>Percentage</th>
</tr>
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<tbody>
<tr>
<td>Suprapubic pain</td>
<td>2</td>
<td>2.6%</td>
</tr>
<tr>
<td>Heamatospermia</td>
<td>1</td>
<td>1.3%</td>
</tr>
<tr>
<td>Urgency</td>
<td>6</td>
<td>7.8%</td>
</tr>
<tr>
<td>Generalize weakness and weight loss</td>
<td>9</td>
<td>11.7%</td>
</tr>
</tbody>
</table>

**Figure 1**: Percent of positive and negative family history in patients with prostate cancer

**Conclusion**

Most of the patients with prostate cancer in our study presented late with a peak age of diagnosis was the 7th decade. Men with positive family for prostate cancer are more vulnerable to have the disease especially with affected fathers or brothers. Most of the cases of prostate cancer presented with lower urinary tract symptoms mainly dysurea with or without hematuria.

**Financial Disclosure**: There is no financial disclosure.

**Conflict of Interest**: None to declare.

**Ethical Clearance**: All experimental protocols were approved under the Baghdad Al-Karkh Health Directorate, Iraq and all experiments were carried out in accordance with approved guidelines.

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Psychological Study of Ethics, Values and Functionality for understanding Attitudes, Habits, Beliefs, Functional Skills in a Staff of University of Babylon

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ABSTRACT

Social values play a significant role in shaping positive social behavior and often alienating society from all that is affecting their needs, then the conviction that they have generated makes them proud and perhaps sanctified it, which makes it need long periods to change it as a form not as a content form, therefore, social values in the form of social behavior seeks to impose social reality within formal and informal social institutions, eventually, the individual transmits his ideas to the official social institutions. This makes the formal and informal interaction a complex process and intertwined in the context of official control. Thus, this process will undoubtedly be reflected in the employee’s performance inside the official institution negatively and positively. Social values have a great importance in the behavior of individuals in educational institutions, as they were depended on changing behavior patterns in different work environments to control the behavior of individuals in society, as well as how do they affect their performance inside the educational institution, therefore, values are as a key element in understanding attitudes, habits, beliefs, managerial and functional skills that reflect the individual and collective behaviors of the individual inside the formal social institution.

Keywords: Values, social values, functioning, employee, university

Introduction

The saturation of individuals in society value system makes them an integral part of society and this is what distinguishes their behavior and attitudes towards the others, every action produced by the individual is in itself carrying the meanings of the value that agreed by the society to deal with them, also has become determined as a social paths and ideas towards the things or persons who deal with them, since the educational institution has completely different nature of the social reality that the individual lives and be based on informal social relations 1, It is obliged to drift according to the mechanisms that used in the dealings and determine the light of the relationships of its members, assessing their performance according to the benefits of conventional and this complicates the subject of the debate between official and non-official, thus it affects the performance of the employee to his work because of the interrelationship with Social obligations and functional obligations. Here, the functional behaviors appear in some cases but with social cover. The stability of the individual inside the society is directly linked to the stability of social values and the way they deal with them. Social values are the real link of the individual with the society in general 2, thus it affects all his actions, emotions and behaviors with the others, therefore, the process of dealing with social values needs to analyze and interpret the behaviors that the individual adopts in his life especially inside the official social institutions that adopt a complex system of controls and instructions that define and restrict the individual within its framework and this makes the performance depends heavily on the balance between formal and informal. On this basis we can say that social 3 values directly affect the human personality in the framework of social interactions within the institutions, which is reflected mainly in the evaluation of its performance. The aim of the research is to know the importance of social values and their relation to the performance of the employee. Identify the most important ways to improve the performance of the

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employment. Identification of the most important social values affecting the performance of the job. Performance is a behavior in which the individual contributes to the expression of his contributions to the achievement of the objectives of the institution to support this behavior by the institution to ensure quality and quantity. Miller & Bromiley defined performance as “the employee’s ability and experience in how to use the available material and human resources in front of him and which he used them in such a way as to be able to achieve goals that set for him and to the institution. Functionality defined as: It is the activity done by the employees through their performance, duties, responsibilities, tasks and each according to their job position so that the optimal performance of the employees is by carrying out the responsibilities, tasks and duties to the fullest extent. David defined it as: a set of activities and practices carried out by employees of the organization in a purposeful and efficient manner that could be consistent with the objectives and plans issued by senior management decisions. Functional performance can be defined as: a set of activities and tasks that are practiced by the university employee in the educational institution for the purpose of achieving the goals efficiently and effectively according to the administrative resources and regulations, the administrative and technical procedures and the specific methods of career and administrative work. An employee is defined as a person entrusted with the performance of work in the service of a public facility administered by the State or a person of public law. The employee is also defined as: any person who works in the State or public sector permanently and the rights, duties and obligations imposed by the public interest. A job is defined as a specific job or civil office that requires its occupant to perform certain duties or responsibilities whether full-time or not.

The University: The university is known as an educational institution specialized in preparing human resources for the society as an important human resource or an institution composed of professors and students. It is a place of comprehensive knowledge.

The importance of social values of employees and ways to improve their performance: The subject of values is one of the most controversial topics that scholars and thinkers are interested in. They are still interested in them, so the social values shared by a group of individuals that affect the fields of work are: “Religious, economic, humanitarian, financial, political, organizational, disciplinary, leisure, participatory and other values” have a strong influence on the performance and behavior of individuals in the institution, the social values have great importance in the lives of individuals and society, because they affect human relations in all of their forms, therefore, they are important social necessities in the lives of individuals and groups, because they are in the form of cultural and social trends motivations, values may appear new in human behavior, which some can see as a characteristic of human behavior. The importance of social values for individuals lies in the fact that they help to build the life of the individual, also to form a personality, to define his goals and objectives, and the means of achieving these goals and objectives. It also represents a frame of reference that governs the actions of individuals in their private and public life. They work to control their behavior and direction, for example, the Secretariat is valuable if adopted by the individual directed by the deviation. The religious and social values adopted by the individual are protected from error. They act as a protective factor and In addition, it acts as a personal development agent. It highlights the importance of social values to society by helping them to connect cultural parts with each other and to link multiple elements and systems so that they appear consistent and provide the basis for those systems to settle in the minds of community members who belong to that culture. Values serve to provide members of society with a life of prosperity, stability and balance. In the sense that they collect members of society to survive through the format of the values of the individual thinking of his work as an attempt to reach the goals and ends in itself rather than looking at the work as an attempt to satisfy the motives and desires, so the highest values in any group is the goal that seeks To all members to reach something an important justification for existence. While some social and economic researchers believe that values play a prominent role in shaping and embodying the culture of the institution and have an impact on the performance of individuals, especially those values that relate to the scientific format if it can be used as a tool to solve problems, where managers and employees can focus on differences and similarities in their values and enables the manager to change his management style in line with the values of employees, in order to improve their performance, so that the employee who behaves at a performance level is somewhat different based on the values it holds, it will end the conflict with
other employees on the one hand and his administration on the other and thereby lead to a low level of his job performance. The importance of integrity in institutions through the dissemination of culture, Fair institution is adopting an administrative, educational and scientific approach to improve the members of the phenomenon of corruption and commitment to integrity in the work of all kinds and forms, but stems from the principle of responsibility in creating and forming a civil servant is able to cope with the abnormal conditions that have passed by society.

1. The value of sincerity in work and not to drop out: The sincerity to work of social and functional values must prevail in the employees of any profession for the purpose of increasing production and accessing to the results of it, because each profession in society values, ethics committed to, affect the individual and acquire these values through home or school, literary teachings and other sources of social values, the values of sincerity in work also play a great role in guiding the human and preparing his energies and behaviors in all aspects of life with the texts of the performance of the institution, this individual performance is reflected in turn on the performance of the institution as a whole and achieve the goals that seek to reach it.

2. The value of respect for time: Estimating and respecting the value of time is a cultural feature of developed societies, because it makes it a framework through which all elements of development, programs and goals are achieved. It is time that reveals skill and precision when the subject becomes an idea, a motive and a work. Here, institutions that seek development and progress must recognize the value of time and move away from random planning, implementation and follow-up. It is not enough to have material resources, wealth or money, but must use and realize the value system that sets the real development by exploiting those resources, the most important is to appreciate and respect the value of time. Therefore, the employees’ sense of the value of time within the institution and its investment in the performance of the tasks and tasks assigned to them must follow the culture that brings them all this leads to its effective role in the performance of the job within the institution.

3. The value of loyalty and functional affiliation: The concept of loyalty and belonging of modern social and administrative concepts, has been highly respected by researchers and scholars, given the impact on the behavior and attitudes of individuals, its impact on the institution in which they work. Therefore, loyalty is composed of pride in belonging and a sense of integration with the institution, its distinguished paths and to participate in achieving this, the sense of personal friendship of the members of the institution is supposed to be this value of the first natural behaviors and important, which must be characterized by human behavior in the institution. that this value is very important in the life of institutions and has a clear impact on the work process and the level of performance of employees in the institution and the achievement of its objectives effectively and distinctly, the sense of belonging and loyalty to the institution leads the individual to reduce his negative behavior such as leaving work or absence or frustration

4. Value of Tolerance: This value is an important social value indicating that it does not give tolerance to the application of regulations, regulations and instructions or non-compliance with the regulations governing the activities of the institution. Tolerance means flexibility in dealing with and not taking serious approval towards employees in the institution. Hence the employee should be characterized as welcomed sense, passionate, has the ability to persevere and does not acquire towards his colleagues and his superiors, waiting for the opportunity to get them.

5. Value of cooperation: Cooperation refers to a social process which is the main form of social relations and interaction within groups. People cannot come together without cooperation or without working together for common interests. Cooperation works to strengthen morale, generate enthusiasm and connect among the members of the group in close association and cooperation is great importance in the energy levels of the individual, group, state or institutions and other lifestyles.

6. The Value of Incentives: Management, sociology and psychology stressed the value of incentives
and their effective impact on the performance of institutional workers. It is one of the means to encourage individuals to work effectively and efficiently, whether those incentives are physical or moral. Therefore, it has a great impact in encouraging employees to develop and improve their performance and to do more in the achievement and development of performance and increase productivity and intellectual energy as the absence of incentives and rewards are the obstacles that reduce the determination of individuals in the institution and affect the level of performance and productivity.

7. The value of specialization and the division of labor: The principle of specialization and division of labor is one of the general and distinctive features of the success of institutions in its work, since there are a group of individuals in the workplace, it is useless only through division of labor and the individual is responsible for certain actions with some The appropriate powers to do what is entrusted to him, this helps to master the work and to provide him with the skills and experience in performance which will lead to high efficiency and performance of individuals, that specialization helps to raise the administrative efficiency.

Conclusion

Social values have a great importance in the behavior of individuals in educational institutions, as they were depended on changing behavior patterns in different work environments to control the behavior of individuals in society, as well as how do they affect their performance inside the educational institution, therefore, values are as a key element in understanding attitudes, habits, beliefs, managerial and functional skills that reflect the individual and collective behaviors of the individual inside the formal social institution.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Faculty of Arts, University of Babylon, Iraq and all experiments were carried out in accordance with approved guidelines.

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Role of Toll-Like Receptor Gene Polymorphisms in Patients with Type 2 Diabetes and Diabetic Foot Ulcer

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ABSTRACT

This study mainly aims to evaluate whether Thr399Ile polymorphism in TLR-4 genes is related to DFU in a sample of Iraqi patients with type 2 diabetes mellitus (T2DM). The case-control study included 120 patients with the type 2 diabetes, 60 participants with the type 2 diabetes and foot ulcer group I, 60 participants with the type 2 diabetes group II and 60 controls group III. TLR-4(Thr399Ile) genotyping was done by Polymerase chain reaction (PCR) followed by restriction analysis. There was no statistical difference in the distribution of TLR-4 (Thr399Ile) genotypes between the 3 study groups, the genotypes in group I included CT 6 (10.0%) and TT 0 (0%) was compared with wild type CC 54 (90.0%) while CT 10 (16.7%) and TT 0 (0%) was compared with CC 50 (83.3%) in group II and in group III CT 7 (11.7%) and TT 0 (0%) was compared with CC 53 (88.3%). The distribution of genotypes between group I and group III was (OR= 1.2, 95% CI: 0.4-3.8, p = 0.8) while when comparing group I and group II (OR=1.8, CI=0.6-5.3, p=0.3). On the other hands, the comparison between group II and group III was (OR= 0.7, 95% CI: 0.2-1.9, p = 0.4).

Keywords: diabetic foot, gene polymorphism, toll-like receptors, type 2 diabetes mellitus.

Introduction

Type-2 diabetes refers to a progressive long-term metabolic aberration, characterized by hyperglycemia and relative insulin deficiency. It is much more prevalent than type-1 diabetes, accounting for (90-95%) of the diabetic population. It is commonly associated with a number of complications as diabetic retinopathy, nephropathy, cardiovascular disease (CVD) and neuropathy. Diabetes mellitus is one of the most common metabolic aberrations that interfere with wound healing. It has been reported that diabetic subjects show prolonged inflammatory and proliferative phases of wound healing. In addition, diabetic foot ulcer (DFU) occurs in 15% of the diabetic population, and responsible for 85% of the associated lower extremity amputations. DFUs and the subsequent amputations significantly reduce the survival rates. It is estimated that 50% of diabetic patients exposed to amputations have a 2-year survival rate, whilst the survival is 5 years for diabetic patients having DFUs without amputations. The uncontrolled hyperglycemia impedes the normal defense mechanisms. It has been reported that leukocytes dysfunction is positively correlated with poor glycemic control. Supportingly, the metabolic aberrations of diabetes induces the production of proinflammatory cytokines and increases the activity of matrix metalloproteinases, which in turn prolong inflammation and impede wound healing. Toll-like receptors (TLR) are a wide group of evolutionarily transmembrane pattern recognition receptors (PRRs). They are expressed on sentinel cells such as macrophage and dendritic cells, which in turn recognize the invading pathogen conserved molecules or endogenous damage signals and induce the innate immune response. TLRs play a pivotal role in development of the innate immune response. TLR4 is strongly involved in the pathogenic process of type-2 diabetes, through induction of a chronic sub-clinical inflammatory process, which further causes dysfunction of the pancreatic B cells. The resulting uncontrolled hyperglycemia is positively correlated with poor healing process. In human diabetic wounds, differential expression of TLR4 leads to impairment of the wound healing cascade.
and finally to chronic non-healing ulcers. Due to the single nucleotide polymorphisms (SNPs) in the extracellular domain of TLR4, the deregulation of the TLR4 signaling may alter the ligand binding capacity and disturbs the pro- and anti-inflammatory cytokines, hence modulating the risk of chronic inflammation, thereby delaying wound healing. The cosegregating SNP which result in the change of amino acids in the extracellular domain of TLR4 have been identified. This SNP, namely Thr399Ile (rs4986791), affect the TLR4 mediated effector functions in a variety of ways. These polymorphisms reduce the binding efficiency of TLR4 with its endogenous and exogenous ligands, and other reported that these polymorphisms reduce the extracellular accumulation of functional TLR4 thereby resulting in inadequate TLR4 signaling in response to microbial infection.

Materials and Method

The study involved 180 Iraqi subjects. Group 1 including 60 patients with T2DM and DF. Their mean (standard deviation [± SD]) age, diabetes mellitus (DM) duration, and body mass index (BMI) were 56.9 ± 9.2 years, 10.7 ± 4.8 years, and 27.1 ± 3.8 kg/m², respectively. Group 2 including 60 patients with T2DM and without DF. Their mean (± SD) age, DM duration, and BMI were 47.9 ± 8.6 years, 2.9 ± 1.3 years, and 30.1 ± 4.1 kg/m², respectively. Group 3 including 60 the healthy control group, their mean (± SD) age and BMI were 45.0 ± 8.9 years and 30.1 ± 4.1 kg/m² respectively. The patients were recruited, from those who attended the Center of Diabetes and Endocrinology in Al-Sader hospital in Najaf city During the period from September 2017 to February 2018. The study protocol was approved by Kufa University ethical committee. All participants underwent a complete screening panel, including medical history, clinical examination, and assessment of BMI. Biochemical profile included fasting and, glycated hemoglobin, Urea and creatinine, total cholesterol, and triglycerides (data available at Table 1) TLR4(Thr399Ile) genotyping were performed by Polymerase Chain Reaction-Restriction Fragment Length Polymorphism (PCR–based RFLP) analysis.

Genotyping of TLR4(Thr399Ile, rs4986791): Genomic DNA extracted from peripheral blood leucocytes was performed using Flexi Gene DNA kit, TLR4(Thr399Ile) genotyping was performed by PCR–restriction fragment length polymorphism technique. The PCR reactions were performed in a total volume of 25mL containing 2μl genomic DNA, 12.5X PCR Master Mix, 0.6μl of each forward and reverse primers For TLR4(Thr399Ile) genotyping, the primer set used was forward: 50 GGTTGCTGTCTCAAAGTGATTTTGGAGAA -30 and reverse: 50 ACCTGAAGACTGGAGGTGATTTAATGCT -30. The PCR products were visualized by 3% agarose gel electrophoresis under UV light.

The cycling conditions: The thermocycler program conducted initial denaturation at 95°C for 5 minutes followed by 35 cycles of denaturation at 95°C for 30 mnts, annealing at 62°C for 30 mnts, extension at 72°C for 30 mnts, and a final extension step at 72°C 10 minutes. Final hold 10°C for 10 minutes. The generated amplicon is a 407bp fragments. The wild type allele (C allele) produced a single band of 407bp, while the polymorphic allele (T allele) produced 2 bands of 378 and 29bp.

Statistical Analysis: All statistical analyses were performed by using Statistical Package of Social Science software (SPSS) computer program (Version 22, SPSS Inc., Chicago, IL, USA).

Results and Discussion

The mean-fasting blood glucose, glycated hemoglobin, urea and creatinine were highly significant in group I in comparison to groups II and III (P<.001). (Data are summarized in Table 1). Regarding TLR there was no statistically significant difference noticed in the distribution of the wild type or the polymorphic TLR4(Thr399Ile) genotypes between the different study groups. (Data are summarized in Table 2). TLRs play a vital role in mammalian innate immunity as the pattern-recognition receptors. They are activating by pathogen-associated molecular patterns and endogenous molecules, triggering the activated of signal transduction pathways, that stimulate dendritic cell maturation and the production of cytokine. These receptors play an important role in activating innate immunity. TLR4 polymorphism has been suggested to be associate with atherosclerosis and chronic inflammatory disease in Caucasians. Furthermore, a study conducted by 16 who reported that the TLR4 (Thr399Ile) gene polymorphism have strong association between prevalence of diabetic neuropathy in T2DM. To the best of our knowledge there is no study has been proved the association of TLR4 (Thr399Ile) gene polymorphism with development of DFU and T2DM in Iraq.
In present study there was no significant association in the distribution of TLR4-Thr399Ile gene polymorphism between the three groups and these results were in agreement with 17 who showed a non significant association of Thr399Ile polymorphism in T2DM patients. This may be explained by the fact that the T2DM The patient is generally unable to provide a sufficient inflammatory response due to the compromised ability to fight infection. On the other hand, the result of present study was disagreement with 11 who reported a significant association between TLR4-Thr399Ile gene polymorphism and development of DFU in T2DM might be associated with impaired expression and action of TLR4 in T2DM patient resulting in impairment the healing of wound and developing of DFU in patient with T2DM. Another study conducted by 18 have clearly shown that any deregulation in the TLR4 mediated downstream signaling may lead to chronic non healing ulcers in humans. The differences of these results may be due to the ethnicity in different populations and may be due to the small volume of samples in this study.

### Table 1: Differences of age, duration, clinical and biochemical parameters according to study groups

<table>
<thead>
<tr>
<th>Parameter (mean ± SD)</th>
<th>Group 1</th>
<th>Group 2</th>
<th>Group 3</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td>56.9 ± 9.2</td>
<td>47.9 ± 8.6</td>
<td>45.0 ± 8.9</td>
<td>&lt;0.001*</td>
</tr>
<tr>
<td>Duration (years)</td>
<td>10.7 ± 4.8</td>
<td>2.9 ± 3.0</td>
<td>–</td>
<td>&lt;0.001*</td>
</tr>
<tr>
<td>BMI (kg/cm2)</td>
<td>27.1 ± 3.8</td>
<td>30.1 ± 4.1</td>
<td>27.8 ± 3.3</td>
<td>&lt;0.001*</td>
</tr>
<tr>
<td>FBS (mg/dl)</td>
<td>223.6 ± 83.1</td>
<td>212.2 ± 69.7</td>
<td>101.9 ± 17.5</td>
<td>&lt;0.001*</td>
</tr>
<tr>
<td>HbA1c (%)</td>
<td>9.0 ± 2.8</td>
<td>8.0 ± 1.9</td>
<td>5.3 ± 0.5</td>
<td>&lt;0.001*</td>
</tr>
<tr>
<td>Total cholesterol (mg/dl)</td>
<td>210.7 ± 65.1</td>
<td>214.5 ± 51.6</td>
<td>201.9 ± 58.1</td>
<td>0.48</td>
</tr>
<tr>
<td>HDL (mg/dl)</td>
<td>42.8 ± 12.1</td>
<td>42.8 ± 9.3</td>
<td>40.1 ± 10.9</td>
<td>0.30</td>
</tr>
<tr>
<td>LDL (mg/dl)</td>
<td>123.2 ± 50.2</td>
<td>135.5 ± 36.5</td>
<td>125.3 ± 44.3</td>
<td>0.44</td>
</tr>
<tr>
<td>Triglycerides (mg/dl)</td>
<td>170.7 ± 96.7</td>
<td>181.9 ± 87.0</td>
<td>157.8 ± 80.6</td>
<td>0.33</td>
</tr>
<tr>
<td>Blood urea (mg/dl)</td>
<td>42.7 ± 21.7</td>
<td>32.2 ± 11.0</td>
<td>29.1 ± 7.1</td>
<td>&lt;0.001*</td>
</tr>
<tr>
<td>Serum creatinine (mg/dl)</td>
<td>6.5 ± 2.8</td>
<td>4.5 ± 3.2</td>
<td>0.6 ± 0.15</td>
<td>&lt;0.001*</td>
</tr>
</tbody>
</table>

### Table 2: TLR4 results in the three studied groups

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Group1(G1) N=60 N %</th>
<th>Group2(G2) N=60 N %</th>
<th>Group3(G3) N=60 N %</th>
<th>All groups P</th>
<th>G1 with G2 OR(95%CI)</th>
<th>G1 with G3 OR(95%CI)</th>
<th>G2 with G3 OR(95%CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>TLR4 CC</td>
<td>54 90.0</td>
<td>50 83.3</td>
<td>53 88.3</td>
<td>0.5</td>
<td>0.3</td>
<td>1.8(0.6-5.3)</td>
<td>0.8</td>
</tr>
<tr>
<td>TLR4 TC</td>
<td>6 10.0</td>
<td>10 16.7</td>
<td>7 11.7</td>
<td>0.5</td>
<td>0.3</td>
<td>0.6(0.2-1.6)</td>
<td>0.8</td>
</tr>
<tr>
<td>TLR4 allele</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C allele</td>
<td>114 95.0</td>
<td>110 91.7</td>
<td>113 94.2</td>
<td>0.5</td>
<td>0.3</td>
<td>0.6(0.2-1.6)</td>
<td>0.8</td>
</tr>
<tr>
<td>T allele</td>
<td>6 5.0</td>
<td>10 8.3</td>
<td>7 5.8</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Conclusion**

Our findings show that the Thr399Ile polymorphisms seem not a molecular risk to diabetic foot ulcer in type 2 Iraqi diabetic patient.

**Financial Disclosure:** There is no financial disclosure.

**Conflict of Interest:** None to declare.

**Ethical Clearance:** All experimental protocols were approved under the College of Medicine, University of Karbala, Karbala, Iraq and all experiments were carried out in accordance with approved guidelines.

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Safety Measurement among Pregnant Women with Anemia at Babylon Teaching Hospital

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ABSTRACT

Objectives: To assess socio demographic characteristics, reproductive characteristics of pregnant women. To find out the relationship between the socio demographic, reproductive characteristics and safety measurement. A descriptive analytic design was conducted on (purposive sample) of (90) pregnant women with anemia at Babylon teaching hospital for maternal and children in Al- Hilla city. The tool used for data collection is an instrument for the period from 20th February to 30th July 2018, consists of four-section; involving socio demographic, reproductive characteristics, dietary and healthy measurement. Descriptive and inferential statistics are used to analyze the data. The finding of the study depict that (28.9%) of women aged (17-22) years, (45.6%) were Primary educational level ; (60.0%) were (2-4)family numbers, most of them were house wives; (57.0%) were enough economic status; (62.0%)were resident in urban areas; (51.0%)were overweight (25 – 29.9) kg/m^2; according to reproductive characteristics ; (59.0%)were have gravidity(3-4); (60.0%)were not have antepartum hemorrhage; (42.2%) were period between conception and other(1 year); (43.3%)were Parity (1-2); (53.3%)were 2nd trimester of gestational age; (47.7%)were use contraceptive;(60.0%)were having abortion; according safety measurement most variables were fail assessment. There is association with all items at P≤ 0.01.

Keywords: Safety Measurement, Pregnant Women, Anemia.

Introduction

According to the World Health Organization, Anemia through conception, it influences four of every ten conception women and is the underlying reason of approximately 115,000 maternal decease annually in poor nations a previous study showed that over sixty percent of women experience anemia through pregnancy. It is related to increased rates of maternal and perinatal decease, premature delivery, low birth weight and other adverse outcomes. The World Health Organization estimates that two billion people over thirty percent of the world’s populations are anemic, although prevalence rates are variable due to differences in food habits, socioeconomic conditions lifestyles, and rates of communicable and non-communicable diseases. A study was done in Erbil city. Among conception women in the third trimester; the hemoglobin level of <11 gm/ dl. The overall prevalence of anemia was fifty- five. Five percent, with the highest rate among the age group of < twenty years and ≥ forty years. Low consumption of iron-folate supplements, overcrowding index, poor dietary habit, multiparty, the presence of a specialist doctor and monthly screening for anemia were significantly related to the prevalence of anemia. The authors concluded that high in the prevalence of anemia among conception women in Erbil city, all the cases are of mild and moderate severity which is related to many factors such as overcrowding, poor dietary habit, gravidity, shortage of iron-folate supplements, lack of qualified staff, and poor counseling. Anemia is generally preventable and easily treatable if detected in time. Effective management of anemia involves treatment of the underlying reasons, restoration of the hemoglobin concentration to normal levels, and treatment and prevention of complications. Despite this fact, anemia is a common cause of morbidity and death during conception.
Methodology

A descriptive analytic study. Non-probability (purposive sampling). which consists of (90) conception women with anemia at Babylon teaching hospital for maternity and children in Al- Hilla city, data collected from the period of 20th February to 30th July 2018. The instrument was constructed for the purpose of the study. The Instruments consisted of four section:

Demographic Date Sheet: This part include, (age, educational level, family numbers, economic status, resident, BMI).

Reproductive Variables include, (gravidity, suffered antepartum hemorrhage, duration between conception and other, parity, gestational age, use of contraceptive, No. of abortion. gestational age was determined on source information on menstrual history and early ultrasound examination

Safety measurements: include (9)items. These items are rated according to three level Likert scale (never, sometimes, always) and scored ( 1,2,3 ). Data were analyzed using the Statistical Package for Social Sciences ( SPSS ) version 19. Through the application of descriptive statistical data analysis include ( Frequencies, Percentages, and Cum. Percent ) and arithmetic mean with standard deviation, Mean of score (M.S.) with their Standard Deviation (SD), Cutoff point = 3+(2+1)/3=2 and inferential statistics Summary Statistics tables including: Mean of score (M.S.) with their Standard Deviation (SD), Relative Sufficiency (R.S. %), and their assessment by cutoff point ( 66.67% ) due to scores ( 1, 2, 3 ) which are reported Pass and Failure ( Under/Upper ), as well as reassessment scoring by ( Bad, Moderate, and Good ) through the intervals ( 33.33 - 55.54 , 55.55 - 77.76 , and 77.77 – 100 ) respectively. Where Relative Sufficiency ( R.S. % ) is calculated by: R.S % = Mean of Score / No. of Scoring Scales

* 100%, Contingency Coefficients for the association tables& Chi-Square test

Results and Discussion

The present study identified the safety measurement among pregnant women. The result revealed that age ranged (17-22) years. This result is advocated with. (5) a study in Iraq, which revealed the most common type of anemia in conception women, the minimum age was 17 years and maximum of 42 years, less than half of them were primary educational level. This finding agrees with (6)in Uganda which stated that the Primary level of conception women was a danger factor for developing anemia. the highest percentage of participants were having (2-4) family numbers. this finding disagrees with (7)in Ethiopia who reported that conception women with family 4 and above were more likely to be anemic as compared with those with 2 and less..(sixty -two.0%) of conception women live in urban. These findings have similarity with (6), a study in Uganda found anemic conception women were lived in Urban, (55.6%)of participants were not enough economic status. This similarity with (8) study in Nigeria that found women with low socio-economic class had a fourfold risk for anemia compared to those from high social class. Regarding Reproductive variables, results of present study shows that the majority of the study sample (59.0%)were gravidity numbers (3-4). The findings (7) revealed that number of pregnancies(gravidity) was associated with anemia. The odds of developing anemia were higher among women with 5 and above pregnancies as compared with those who had 3 pregnancies , (60.0%) of the study sample, were not having antepartum hemorrhage. This result is In same line with(9) that found (95.92%) of pregnant women with anemia not having antepartum hemorrhage. (43.3%) of the study sample were parity (1-2). This results is disagree with (7) study revealed that as parity increased the chance of developing anemia among the respondents increased. For instance, pregnant women with parity 5 and above were highly to be anemic. Also is advocated with (6) that found anemia among multipara pregnant women more than nullipara. (42.2%), of the study sample were (1year) between conception and other. is disagree with finding (9) in Nigeria found Interval between pregnancies 2 to <4 years among anemic pregnant women. Regarding gestational age (trimester) The results of present study shows that the majority of the study sample were second trimester, they are accounted(53.3%),The finding of (10)were revealed that age at current pregnancy (trimester) were found to be important variables. As trimester increased the chance for developing anemia was also increased. This result was supported by a study conducted in Saudi Arabia by (10)and India by (11) which both showed that a high prevalence in the second and third trimester. This may be gestational age increases pregnant women shared their resource with fetus which may expose to decreasing iron . (47.7%) of present study were used hormonal injection of contraceptive,
finding is agree with study in Ethiopia found most of anemic pregnant women have history of contraceptive usage, (60.0%) of the study sample were having abortion. This result is agree with that found (58.8%) of them experienced abortion 1 to 3 times. This result found significant association between demographical data and anemia. This result is in disagreement with that found there is no relation ship with age(p value 0.874), also family size and anemia revealed a positive relation.,for instance, pregnant women with family 4 and above were more likely to be anemic as compared with those with 2 and less. The results of present study shows that (66.7%) of the study sample were sometimes eating meat. that found eating red meat regularly may help increase the amount of iron acquired from the diet. Also that found body absorbs iron from meat better than any other food sources. This result may be the economic stats. (56.7%) of the study sample were always eating green vegetable. shows pregnant women must eat foods rich in iron such as green leafy vegetables and cook their food in iron utensils and cooking very long be avoided. We must encouraged those to eat green leafy vegetables because very cheap and available in all season and rich in substance need to body. shows Legumes food include, are excellent plant sources of fiber, protein, iron, folic acid (B9) the body needs more of during pregnancy. Eating Dry fruits, (60.0%) of the study sample were never eating dry fruits. stated that one portion of dried fruit can provide of many vitamins and minerals, including folic acid, iron and potassium. They are natural laxatives. Dates are rich in fiber, potassium, iron, consumption regulary in the third trimester may help facilitate cervical dilation and reduce the need to induce labor. Regarding to milk drinking shows that (60.0%) sometimes don’t Drink milk or yogurt derivatives (cheeses and other) During meals, Related to tea result found (42.2%) Sometimes Don’t Drink tea or coffee during meals and (49.9%). Drinking tea or coffee after one hour of eating food, this fail assessment of pregnant women. result that found (98.8%) drink tea and (52.9%) drink tea before meal shows some foods, like milk, coffee or tea, can actually block your body from absorbing iron. While you don’t have to stop eating them completely, you should avoid consuming them with your iron-rich meals. Adding a glass of orange juice with your breakfast can easily double the amount of iron your body absorbs. Consider adding other foods high in vitamin C, like chili and bell peppers, to your daily meals to increase your iron intake. As opposed to refined grains, whole grains are packed with fiber, vitamins and plant compounds. Oats and quinoa also contain a fair amount of protein, which is important during pregnancy. Additionally, whole grains are generally rich in B-vitamins, fiber and magnesium. All of these are frequently lacking in the diets of pregnant women. prevents treatment with iron supplements has always been given in combination with folic acid and this has been included as part of routine antenatal care provided to pregnant women at every visit in developing countries.

<table>
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<th>Table 1: “Distribution of Socio Demographic Characteristics of (90) pregnant women with anemia” No. (90)</th>
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<tr>
<td><strong>Variables</strong></td>
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<td>Mean ± SD</td>
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<td>Educational Level</td>
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<tr>
<td>Family numbers</td>
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<td>Economic Status</td>
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<td>Resident</td>
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<th>Table 2: Distribution of Reproductive variables of pregnant women with anemia</th>
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<tr>
<td><strong>Reproductive Variables of Women’s</strong></td>
</tr>
<tr>
<td>No of gravidity</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Suffered antepartum hemorrhage</td>
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Conted…

<table>
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<th>Safety measurement</th>
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<th>%</th>
<th>$\chi^2$-test</th>
<th>P-value</th>
<th>MS</th>
<th>SD</th>
<th>RS</th>
<th>Ass.</th>
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<td>1-Eating red meat daily</td>
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<td>13</td>
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<td>.000</td>
<td>2.04</td>
<td>.58</td>
<td>68.0</td>
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<td>Sometimes</td>
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<td></td>
<td>Always</td>
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<td>18.9</td>
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<td>2-Eating dark green vegetable</td>
<td>Never</td>
<td>2</td>
<td>2.2</td>
<td>42.5</td>
<td>.000</td>
<td>2.54</td>
<td>.54</td>
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<td>Sometimes</td>
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<td>3-Eating Dry Fruits</td>
<td>Never</td>
<td>54</td>
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<td>.000</td>
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<td>.58</td>
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<tr>
<td>4-Don’t Drink milk or yogurt derivatives (cheeses and other) During meals</td>
<td>Never</td>
<td>18</td>
<td>20.0</td>
<td>28.8</td>
<td>.000</td>
<td>2.00</td>
<td>.63</td>
<td>66.6</td>
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<td></td>
<td>Sometimes</td>
<td>54</td>
<td>60.0</td>
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<td>Always</td>
<td>18</td>
<td>20.0</td>
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<tr>
<td>5-Don’t Drink tea or coffee during meals</td>
<td>Never</td>
<td>16</td>
<td>40.0</td>
<td>9.9</td>
<td>.007</td>
<td>1.78</td>
<td>.73</td>
<td>59.3</td>
<td>F</td>
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<tr>
<td></td>
<td>Sometimes</td>
<td>38</td>
<td>42.2</td>
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<tr>
<td></td>
<td>Always</td>
<td>36</td>
<td>17.8</td>
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<tr>
<td>6-Eating grain (brown bread, grit)</td>
<td>Never</td>
<td>4</td>
<td>4.4</td>
<td>9.80</td>
<td>.007</td>
<td>2.54</td>
<td>.58</td>
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<tr>
<td>7-visiting health center according to schedule of visit</td>
<td>Never</td>
<td>12</td>
<td>13.3</td>
<td>16.5</td>
<td>.000</td>
<td>2.3</td>
<td>.70</td>
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<td>Sometimes</td>
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<td>41.1</td>
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<tr>
<td></td>
<td>Always</td>
<td>41</td>
<td>45.6</td>
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<tr>
<td>8-taking folic acid according to instruction</td>
<td>Never</td>
<td>2</td>
<td>2.2</td>
<td>65.9</td>
<td>.000</td>
<td>2.6</td>
<td>.51</td>
<td>89.6</td>
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<td>71.1</td>
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<td>9-taking iron as prescribed</td>
<td>Never</td>
<td>30</td>
<td>33.3</td>
<td>15.0</td>
<td>.010</td>
<td>1.8</td>
<td>.69</td>
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<td></td>
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<td>50.0</td>
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<td></td>
<td>Always</td>
<td>15</td>
<td>16.7</td>
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</table>
Table 4: Association of Socio-Demographical Characteristics variables with the dietary measurement among (90) pregnant women

<table>
<thead>
<tr>
<th>Relationships for safety measurement and Demographical Characteristics</th>
<th>Safety measurements C.C Sig. C.S</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>.918 .000 HS</td>
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<tr>
<td>Educational Level</td>
<td>.833 .000 HS</td>
</tr>
<tr>
<td>Family numbers</td>
<td>.789 .000 HS</td>
</tr>
<tr>
<td>Economic Status</td>
<td>.656 .000 HS</td>
</tr>
<tr>
<td>Resident represented</td>
<td>649 .000 HS</td>
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</table>

Table 5: Association of reproductive variables with the safety measurement

<table>
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<tr>
<th>Relationships for reproductive Characteristics &amp; safety measurement</th>
<th>Safety measurements associated with anemia C.C Sig. C.S</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gravidity</td>
<td>.779 .000 HS</td>
</tr>
<tr>
<td>Suffered antepartum hemorrhage</td>
<td>.700 .000 HS</td>
</tr>
<tr>
<td>Duration between conception and other</td>
<td>.804 .000 HS</td>
</tr>
<tr>
<td>Parity</td>
<td>.773 .000 HS</td>
</tr>
<tr>
<td>Gestational age</td>
<td>.793 .000 HS</td>
</tr>
<tr>
<td>Use Hormonal Contraceptive</td>
<td>.778 .000 HS</td>
</tr>
<tr>
<td>No.of abortion</td>
<td>.700 .000 HS</td>
</tr>
</tbody>
</table>

Conclusion

The finding of the study depict that (28.9%) of women aged (17-22) years, (45.6%) were Primary educational level; (60.0%) were (2-4) family numbers, most of them were house wives; (57.0%) were enough economic status; (62.0%) were resident in urban areas; (51.0%) were overweight (25 – 29.9) kg/m²; according to reproductive characteristics; (59.0%) were have gravidity(3-4); (60.0%) were not have antepartum hemorrhage; (42.2%) were period between conception and other(1 year); (43.3%) were Parity (1-2); (53.3%) were 2nd trimester of gestational age; (47.7%) were use contraceptive; (60.0%) were having abortion; according safety measurement most variables were fail assessment. There is association with all items at P≤ 0.01.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the Maternal and Neonatal Health Nursing, College of Nursing, University of Babylon, Iraq and all experiments were carried out in accordance with approved guidelines.

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13. Nyaruhucha CN, Tanzan J. Food cravings, aversions and pica among pregnant women in Dar es Salaam, Tanzania; Health Res. 2009; 11(1) PP:29-34


The Effect of Maternal Level of Mother Education on the Prevalence of Dental Caries in School Aged Children

Wissam Hamid Al-Janabi¹, Hassan Faleeh Farhan AL-Sultani¹
¹P.O.P. Department, College of Dentistry, University of Babylon, Iraq

ABSTRACT

The objective of the present study was to conduct a cross-sectional study on a sample of Iraqi children to assess the correlation between mother’s level of education and dental caries. This cross-sectional study was carried out on children aged 6 to 10 years at pediatric dental clinic in College of Dentistry, University of Babylon, Babylon Province, Hillah city, Iraq between November 2017 and August 2018. Clinical assessment of dental caries was done according to the WHO oral health surveys-basic methods in 2013. Mother’s level of education was determined through completion of a questionnaire, which included information about the child’s age, gender, and mother’s level of education. The level of mother education was classified into illiterate, literate (read and write), primary school, secondary school and higher school education. These were scored as 0, 1, 2, 3 and 4, respectively. The achieved sample size was 60 children (mean age= 7.90 ± 1.36 years, 51.7 % boys and 48.3 % girls. dmfs scores were negatively correlated with age of children in which dmfs scores decrease with age. No significant difference (P.>0.05) was found between dmfs scores of boys and girls. The majority (50%) of children were from parents of middle level educational background.

Keywords: level of education, school age children, oral health

Introduction

The level of education in our community is reflected by the proportion of people who are literate as well as the proportion of literate individuals, who have achieved higher levels of education. Indeed, the body of data supporting the direct relationship between health care and wellbeing and the level of education is so big 1-7. Mother who is literate can achieve her goals and develop her knowledge in a way that can be mirrored on the health of her children 1. This is attributed to the fact that the decision concerning child health, including dental care is the responsibility of parents and in our communities of the mother during most of children life 8. A review and meta-analysis study has shown that mothers’ education is one of the significant predictors of the level of dental caries in children 9. Child oral health has been proved to exhibit strong association with mothers’ level of education in a study included children aged between 9 to 12 years 10. Among socioeconomic determinants, mother education has been proved to be linked to the state of oral health in children; however, the exact way of interaction between mothers’ level of education and child oral health is not clearly understood 11. In medical practice it has been found that, among sociodemographic characteristics such as economic level, employment and education, the level of education is number one factor that affects adult health and wellbeing 12. The dental caries is the result of a demineralization focus in tooth surfaces triggered by metabolic acts that happen in the tooth plaque situated in the area being affected 13. Caries during early childhood usually affects number of teeth, by happening in regions regarded of low risk and by demonstrating fast progression 14. It has been hypothesized that family environments or social factors related to mother influence bacterial acquisition 15; therefore, the behaviors related to oral health, visiting dental care, inadequate oral hygiene, and frequent intake of sugar containing feeding have been considered as predisposing factors for caries during early childhood 16. Indeed, the pathophysiology of dental caries involves interaction among biological factors such as saliva, diet and biofilm 17, as well as sociodemographic factors which
can modulate the outcome of biological factors and on the top of the list of sociodemographic factors is the level of education 18,19. Among socioeconomic determinants, mother’s level of education has been proved to be linked to the prevalence of dental caries in children; however, the exact way of interaction between mother’s level of education and dental caries is not clearly understood. Therefore, the objective of the present study was to conduct a cross-sectional study on a sample of Iraqi children to assess the correlation between mother’s level of education and dental caries.

**Methodology**

This study was approved by the ethical approval committee at the College of Dentistry, University of Babylon. Following that, verbal and written consents were obtained by parents and or persons, who take care of children, who participated in the present study. The study was carried out on children aged 6 to 10 years at pediatric dental clinic in College of Dentistry, University of Babylon, Babylon Province, Hillah city, Iraq between November 2017 and August 2018. Clinical assessment of dental caries was done according to the WHO oral health surveys-basic methods in 2013 20. Mother’s level of education was determined through completion of a questionnaire, which included information about the child’s age, gender, and mother’s level of education. The level of mother education was classified into illiterate, literate (read and write), primary school, secondary school and higher school education. These were scored as 0, 1, 2, 3 and 4, respectively. A sample of children was selected randomly. In other words, the first child was chosen according to a random number out of 25 (the usual daily rate of children seen) and then every 10 children, a child is selected. Data was analyzed using SPSS version 23. Quantitative variables were expressed as mean, range, median and inter-quartile range, whereas, categorical variables were expressed as number and percentage. Mann Whitney U test was used to study difference in mean between two groups in case of non-normally distributed numeric variables. Spearman Correlation Coefficient was used to assess correlation between age and dmfs score. The level of significance was set at $P \leq 0.05$.

**Results and Discussion**

Table 1 shows general characteristics of the studied group according to the age and gender. The achieved sample size of this study was 60 children (mean age= 7.90 ± 1.36 years). The highest percentage (25.0 %) of children, who participated in the study was among 7 years old group, while the lowest percentage (16.7 %) was among 10 years old group. The sample included 31 boys (51.7 %) and 29 girls (48.3 %) with male to female ratio was (1.07:1). Table 2 illustrates the distribution of children according to their mothers’ level of education. The majority (50%) of children were from parents of middle level educational background, followed by those from parents of low educational level (40%). The percentage of children from parents of high level of education was the lowest (10%). The distribution of children according to dmfs score is shown in table 3. The dmfs score ranged from 1 to 12 and the mean was 6.28 (± 2.50) with a median and inter-quartile range of 6.00 (4.00). There was significant negative correlation between age of child and dmfs score ($r = -0.259$, $P = 0.025$); however, the line of correlation was ill-fitting so that the $R^2$ value was very small (0.081) which indicates that the line can explain only 8.1 % of correlation among children enrolled in the current study. Figure 2 displays boxplots of dmfs scores by gender. There was no significant difference ($p> 0.05$) in dmfs score level between boys and girls in which the means were 6 (± 3) versus 6 (± 4.5) respectively. Figure 3 shows the median and inter-quartile range of dmfs score of children according to their mothers’ level of education. Values of median and inter-quartile range were 7 (3.5), 7 (4), 6.5 (2.25), 4 (2.4) and 4 (2.4) in illiterate, literate, primary school, secondary school and higher education respectively. There were significant differences ($P <0.05$) in the dmfs scores between children of mothers with higher education and those with secondary education from that of the children of rest of women. However, no significant difference was obtained when higher education was compared against secondary education ($P > 0.05$). To our knowledge, it is from the many studies conducted in Iraq to evaluate the relationship between mothers’ level of education and dental caries among school age children. Literature reports that tooth decay is a disease that is multifactorial. It happens due to the interaction of some blamed reasons, whether biological or social. The interaction of cariogenic bacterial agents with the required substrate, in a susceptible child, during a certain time, facilitated by a long list of economic, social, and cultural events, affect the evolution and development dental caries 31. One of the most important factors is the mother level of education. The present study showed that the dmfs scores were high among children from parents of low and middle level.
educational backgrounds, and how among children from parents of high level of education. In other words, dental caries and the state of oral health in children is affected by mothers’ level of education in such a way mothers, who are more educated have children with better dental health than that of mothers, who are less educated. Till now there is no clear consensus in the available published articles regarding the value of mother’s level of education on the acquisition and development of children dental caries. Several authors suppose that there is no significant correlation between these two conditions. The results described in our article are in line with results that suggest that the higher the level of education of mothers, the lower the incidence of dental caries in their children. The inadequacy of guidance related the baby’s oral hygiene was proved to be a predominant player in relation to outcome of dental health, as most mothers have little or essentially no information about dental care and when to start the baby’s oral hygiene or when to visit the dentist for the first time. Several authors proved the efficacy of women knowledge in the fight against dental caries in children, since mother knowledge about dental decay may protect against early tooth decay in children.

Table 1: Characteristics of children enrolled in the study

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td></td>
</tr>
<tr>
<td>Range (min.-max.)</td>
<td>4 (6-10)</td>
</tr>
<tr>
<td>Mean ± SD</td>
<td>7.90 ± 1.36</td>
</tr>
<tr>
<td>6 years, n (%)</td>
<td>11 (18.3 %)</td>
</tr>
<tr>
<td>7 years, n (%)</td>
<td>15 (25.0 %)</td>
</tr>
<tr>
<td>8 years, n (%)</td>
<td>13 (21.7 %)</td>
</tr>
<tr>
<td>9 years, n (%)</td>
<td>11 (18.3 %)</td>
</tr>
<tr>
<td>10 years, n (%)</td>
<td>10 (16.7 %)</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
</tr>
<tr>
<td>Male, n (%)</td>
<td>31 (51.7 %)</td>
</tr>
<tr>
<td>Female, n (%)</td>
<td>29 (48.3 %)</td>
</tr>
<tr>
<td>M: F ratio</td>
<td>1.07:1</td>
</tr>
<tr>
<td>Total</td>
<td>60</td>
</tr>
</tbody>
</table>

Table 2: Distribution of children according to their mothers’ level of education

<table>
<thead>
<tr>
<th>Education level</th>
<th>Education Score</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Illiterate</td>
<td>0</td>
<td>9</td>
<td>15.0</td>
</tr>
<tr>
<td>literate</td>
<td>1</td>
<td>15</td>
<td>25.0</td>
</tr>
</tbody>
</table>

Table 3: Dental caries status according to dmfs scoring

<table>
<thead>
<tr>
<th>dmfs score</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Range (min.-max.)</td>
<td>11.00 (1.00 - 12.00)</td>
</tr>
<tr>
<td>Mean ± SD</td>
<td>6.28 ± 2.50</td>
</tr>
<tr>
<td>Median (IQR)</td>
<td>6.00 (4.00)</td>
</tr>
<tr>
<td>1-3, n (%)</td>
<td>10 (16.7 %)</td>
</tr>
<tr>
<td>4-6, n (%)</td>
<td>22 (36.7 %)</td>
</tr>
<tr>
<td>7-9, n (%)</td>
<td>20 (33.3 %)</td>
</tr>
<tr>
<td>10-12, n (%)</td>
<td>8 (13.4 %)</td>
</tr>
</tbody>
</table>

Figure 1: Correlation between age and dmfs score

Figure 2: dmfs score according to the gender of children
Figure 3: Median dmfs score according to mothers’ level of education

Conclusion

The association between mothers’ levels of education and their children dental care and oral health is significant and this implies that education programs should be encouraged to increase awareness of women about early dental caries in children.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the University of Babylon/College of Dentistry/P.O.P department, Iraq and all experiments were carried out in accordance with approved guidelines.

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The Impact of a Strategy Roaming Exhibition in the Skills of Logical Thinking in the Second Grade Student’s Average in Science

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¹College of Basic Education, University of Babylon, Babylon, Iraq

ABSTRACT

Aims search Identify Impact of the Roaming Gallery Strategy In the logical thinking skills of second-grade intermediate students, And to merit s From Target Put Researcher Hypothesis Zero Which States : No exist Difference ZO indication Statistic At level indication (0.05) between Average Degrees Students the group Experimental Non - eBay Sidersen according to Strategy Roaming Gallery and average Degrees Students the group Control Non - eBay Sidersen according to The way Normal in a A test Logical thinking skills, and in order T s h s Of which Researcher Applied Experience in a Half The second From General Study (2018-2019) m, If Formed a sample search From (82) students From Students Class The second is average in a Average of sincere dawn and b image random Done Distribution to me Two groups By (41) students for every Total has Done Award The two groups in a Variables Next : Age Time, Test Logical thinking skills In Light B Behavior And Importance Relativity For content, Done Preparation A test Achievement author From (40) paragraph From A selection From Multi, has Achieved Researcher Specifications Cykometric For testing, continue Implementation Experience (8) weeks.

Keywords: Strategy Roaming Gallery, Achievement, Logical Thinking Skills

Introduction

That age Information With his data Present And its possibilities The future Is represented in a Challenges Which Touching The project Educational level All His goals And strategies And organized In words Other His entries Operations And its outputs, And impose This age Currently under pressure Increasing For events Type From the change in a Priorities The project Educational level Associated with With its outputs From Learners and this is Extension Information is being Accompanied by With guidance Globalization And openness market Production And competition Economic development between Communities Humanity has become Forms Obsession For leaders Education in a Many From Countries the world Of Salah Organized Education Form And content The On Technique Education or The On Merge Technology in a Education Merge Aims to me has evolved Skills And work Educational level All His style and work Collective Collaborative And the initiative Innovation And creativity And research And evolution Education 0 that Matter Science considered as one The most important Science Natural Which Contains On Many From Concepts And phenomena Which Hard Understand them And dealing with her if What Submitted In a manner Just him And correct They are Needed to me Clarification And rounded to me Minds Students Until They can From Understand them And understand them And dealing By in a their lives Daily, and on Though From Importance this is Science Except. It Characterized Inertia Wan most Schools Lacking to me means Teaching Modern in a teaching Matter Science Nor Still Depends On Styles Old Standard in a Teaching And adoption Indoctrination And conservation And say it interaction Students While between them Pictures From Their participation inside Class, Than LED to me Low level Teaching For the student So Requires Use means Teaching Talk in a education Matter Science To be able Order From Building Knowledge And owning them Skills Handcrafted And mental Building trends

DOI Number: 10.5958/0976-5506.2019.01469.4
Positive Toward Science And therefore Checks Goals education Scientific in a Preparation The individual The Illuminati Scientifically Which is being ZO efficiency And effective in a Together as such that education Scientific Emphasizes On Use The individual Skills Trends And means Teaching Modern in a Teach them In their lives Daily To face Their problems Which Face them in a their lives Daily And their impact On the society and on Science So , With regard to Thinking for me Order We see that Roads Old No Do it Useful Nor focus On the side Intellectual And mental for them And especially Thinking Logical Than mirror Negatively On Their level Study Valley that to me Their aversion For the article And weakness in a Balance Scientific research They have and this is What I conclude Researcher Including she has From Experience Level Students And to see On Records Special With its substance Science For some Teachers And teachers Found Shortages in a level Collect them For example Science and low Large in a Percentage Success in a Stage Medium that teaching Matter Science concentrate Degree Basis On Learn Order How do They think No How do They memorize Curriculum And decisions Study From Without Understand them And clarify them And assimilation in a Situations Life, And accordingly On that Must that concentrate teaching Matter Science On Phrase From Objectives Education in a Different Areas Educational And scientific And emotional And psychology It is done that From Through Submit Knowledge And attention Development Thinking Scientific research I have Students And realize greatness Al-Bari in a Creation From Through Phenomena Scientific Which they study it And development Ethics Science I have Order To perform to me planting Building Character Conscious Purposeful Working to me Repair the society And the shoulder With him And with Communities Other. And from Worth Mentioning that Strategies Teaching may I became famous Recently And sold Her reputation The I started this is Strategies Running Nothing Slowly And developed It was Applied Indeed Education And he became to her 6 Role Large And the importance Because she List On development Skills Thinking Special Students and this is No Limited On Stage Study Just But On all Stages Study Because she She did Indeed On Development Cognitive I have Students She walked away About save Subject Just. And that Skills Thinking Logical she Series From Activities Mentality Which get up By Student From Yup Perception What Happen or occur From Changes effect in a The properties The things And its characteristics And access to me clues Supports Destinations consideration or Reject them, from Through Ability On save And collection And analysis And organization And generating the information And evaluate them. as such It considered as Activity Which may Done Development Its outcome Practice Student For activity What Supported by nutrition Feedback, And all Skill From Skills Thinking Logical Consists From Skill Subsystem Smaller Of them, and any Palaces in One Skills Subsidiary Impact On Quality And careful the performance Overall (Cottell, 1999: 21) . And from Skills Thinking Logical Used 7 in a search Present are: Skills group Information : It is Arrangement the information From Yup A Shaddamha Effectively Include three Skills Subsystem she Skill Comparison, And skill Classification, and skill The order, as follows:

A. Skill Comparison: It is During which You can not Student From Identify and on Existence Phenomenon And their components Different From Through finding points Similar And the difference And check relations While Among them.

B. Skill Category: The longer Basis Building Knowledge For the student, And mission To progress And development Scientific research, But considered as From Most important Skills Special Thinking Used To separate And sorting The things Depending on Of its properties And functions And its characteristics.

C. Skill Order: Means put The things And concepts or Events Which Linked While Among them In a manner or By another in a Context Consecutive According For standard Certain.

Skills generation Information: It is Skill Basic And from During which You can not Student From Ability On Forecasting And drafting Assumptions, And include The following:

A. Skill Search: Looking Student About informations To answer On the question Presented, with group And arrange Information

B. Skill Experimentation: Ability Student On Subjugation Prospects Previous And assumptions in a Measures the operation Applied.

C. Skill Composition: Capacity On Aggregation Elements Ideas and production Buildings And plans And ideas New.
D. Skill Conclusion: It is capacity Student And enable it From Delivery to me Conclusion And the reasons or The result

E. Skill Prediction: is Accreditation On the information Previous From Yup Prediction With the occurrence incident or phenomenon in a the future

F. Skill Representation: is Show Concepts or the information And take it out In a manner Tables or Graphics Graphic or maps Conceptual.

Design Demo to search: It boasts variable Independent (Skills Thinking Logical) and (Method Regular) , and variable Follow (Logical thinking skills) , so Use Researcher the design Demo And equitably Two groups search one of them Experimental And the other Officer.

Community search and his eye: Is represented Community search Present Students Class The second is average All of them in a Schools (Secondary And preparatory) day Governmental organizations And subsidiaries Directorate education in a Governorate Babylon Of the year Study (2018-2019 m), while a sample search Represented School (intermediate Fajr sincere Girls) And that Number Students the sample Practice (36) students Which will study Students On according to (Strategy Roaming Show) , and Number Students the sample Control (36) students Which will study Students On according to (Method The normal) . equivalent My group Search: Conducted Researcher equivalent Statistically between Students The two groups Practice And control in a Some Variables Which effect On Results Experience, For a difference the society studying between The two groups Control The experimental, keen Researcher On Procedure equivalent Variables The following (Age Timeline Calculated Months, test Collection), as She did Researcher Make Parity in a Variables Mentioned For my group search Showed Results according to table 1.

Preparation Accessories search: that From Things the basic Search Which The On According to them Implementation of Procedures search It is this is Supplies

B: (Content (Article Scientific): The Determination Content Which get up Researcher Taught For students My group search Through Period Procedure Experience (For separation) Study II) of the General Study (2018-2019) CE, has been Include Content Refraction of Light, As Prepared Researcher 16 Plan Of the group Practice Which Studied according to (Strategy Roaming Gallery) as well Of the group Control Which Studied On according to (Method Standard) . a tool search: Done Preparation steps From Yup a tool Search (test) Collectivism is represented Including Come: Determination the purpose From the test Achievement: The Purpose From the test Collective he is Measurement Collectible Students Class Second Medium (Info And experiences And skills) in Matter Science in a a study Refraction of light. Determination Goals Test: After What Done Determination the purpose Basic From the test Collective Complete Determination Target From the test To find out Bezel Investigation That Objectives She did Researcher Drafting Number From Objectives Behavior. Determination Paragraphs Test: Done Researcher Select Number Paragraphs the test Collective Which Be Of which the test As Hit (40 paragraphs) . Analysis For paragraphs the test Collective Statistically: is done analysis Paragraphs the test Collective As It comes:

- Difficulty Paragraph: Found that Factor difficulty Paragraphs From Through Procedure Analysis Statistics For paragraphs the test Collective Ranges From (0.37-0.70) thus Prepare Paragraphs the test Collective Good all of them And suitable in a Difficulty.

- Discrimination Paragraph: from Qualities the homework Availability The task in a Paragraphs the test Which Property Discrimination It means Possibility Detection About Differences Individual For female students And prepare Items the test Valid As It was Factor Highlight them he is (0:20) What Above, ranging Values Factor discrimination Paragraph in a the test Collective What Between (0.38-0.71), thus considered as Paragraphs in a the test Collective Related Factor discrimination Appropriate And good. effectiveness Alternatives Wrong: Done Researcher analysis Statistically (Up) 27% degree And lower 27% degree) to find effectiveness Alternatives Wrong Tetroj Between (-0.12 - 0.34-) it was Turns out From that that all Alternatives Paragraphs the test Collective Effective And so on Prepare all of them Suitable.

Stability Test: Depends Factor stability the test On Relationship between Paragraphs the test all of them or between Each a paragraph And another, and it turns out that From Through Consistency Paragraphs And stability His grades, Can an account Factor stability the test Using Relationship Oh between Modules the test.
Methods Finding Stability Test

- **Method Retail Mid-term**: Tadhzh The way From More Methods Use, And back that to me It Avoid Defects Other For some Roads And from Yup Get On Two photos Are equal For the test She did Researcher Divide Paragraphs the test to me Paragraphs Even And individuality And by choice Students the sample Exploration And the amount (100) answer, and extract Factor Engagement Pearson between Grades Marriage And individuality Done Get On amount Worker Stability and he (0.87), and why It was Factor stability Retail Halfway No Measures Homogeneity Total For the test (For it is stability For half Only) , so Done Procedures Correction Using Factor Spearman Brown, if D (0.93) from Destination consideration Specialists It is Factor stability Good

- **Method Koder-and Richardson 20**: Done Implementation Equation Koder - Richardson On basis Degrees The students, Found Researcher that Values stability the test he is (0.83) and so on Prepare Values occasion And good So Prepare the test Fixed. Implementation a tool Search : Done Flags My group search Control And experimental Before a week By appointment the test Collective It was Apply it distance Finished From teaching Subject Which Done Identified For my group search in a that One, supervised Researcher On Process Implementation The test.

### Results and Discussion

Prepared Researcher A test Reproduction distance End Subject Education For both The two groups Which She did Researcher Taught their As I showed Results Excellence the group Altger j pric On the group Control according to table 2. Notes From table the previous the group Practice Excel On the group Control in a the test Collective So exist Difference ZO indication Statistic in a level Significance between Average Degrees Students the group Practice Who They study Matter Science in accordance with the strategy of the Roaming Exhibition And Average Degrees Students the group Control Who They study Subject itself The way Standard in a Collection Favor the group Experimental.

**Table 1: Two groups Practice And control in a Some Variables Which effect On Results Experience**

<table>
<thead>
<tr>
<th>Variable</th>
<th>The group</th>
<th>Sample size</th>
<th>SMA</th>
<th>standard deviation</th>
<th>The degree of freedom</th>
<th>T value Calculated</th>
<th>T value Table</th>
<th>Level of significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age calculated in months</td>
<td>Experimental</td>
<td>36</td>
<td>171.482</td>
<td>12.253</td>
<td></td>
<td>0.998</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Control</td>
<td>36</td>
<td>174.933</td>
<td>16.454</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Test information bug Elsa</td>
<td>Experimental</td>
<td>36</td>
<td>54.658</td>
<td>16.917</td>
<td>68</td>
<td>0.195</td>
<td>2</td>
<td>Not statistically significant</td>
</tr>
<tr>
<td></td>
<td>Control</td>
<td>36</td>
<td>53.875</td>
<td>15.656</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Logical Thinking Skills Scale</td>
<td>Experimental</td>
<td>36</td>
<td>27.773</td>
<td>7.818</td>
<td></td>
<td>0.754</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Control</td>
<td>36</td>
<td>29.144</td>
<td>7.273</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Table 2: A test Reproduction distance End Subject Education For both The two groups**

<table>
<thead>
<tr>
<th>Statistics the group</th>
<th>the number</th>
<th>SMA</th>
<th>Standard deviation</th>
<th>variance</th>
<th>The degree of freedom</th>
<th>Values Altaiatan</th>
<th>Level of significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experimental</td>
<td>36</td>
<td>26.03</td>
<td>6.30</td>
<td>39.57</td>
<td>69</td>
<td>2.158</td>
<td>2</td>
</tr>
<tr>
<td>Control</td>
<td>36</td>
<td>22.64</td>
<td>6.78</td>
<td>45.84</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Conclusion**

a Average of sincere dawn and b image random Done Distribution to me Two groups By (41) students for every Total has Done Award The two groups in a Variables Next : Age Time, Test Logical thinking skills In Light B Behavior And Importance Relativity For
content, Done Preparation A test Achievement author From (40) paragraph From A selection From Multi, has Achieved Researcher Specifications Cykometric For testing, continue Implementation Experience (8) weeks.

Financial Disclosure: There is no financial disclosure.

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5. Haider S. Skills Thinking Concept I am Measured, I 1, house Wael For publication and distribution Oman, Jordan. 2018
The Impact of Scamper’s Strategy in Developing Creative Thinking and Achievement for Fifth Graders in the Field of Eloquence and Application

Ibtisam Sahib Mussa AL-Zuwainy
College of Basic Education, University of Babylon, Iraq

ABSTRACT
The study was conducted at Babylon University, College of Basic Education, and aims to identify the effect of the SCAMPER strategy in developing creative thinking and achievement of fifth grade students in the field of rhetoric and application. The researcher adopted the experimental method and randomly selected the sample, reaching (56) (29) students for the experimental group studied according to the SCAMPER strategy and (29) students for the control group, which is taught according to the usual method, the researcher prepared the first two tests to identify the previous experience of the students and the second test is the final test of the researcher also adopted the test of the ability of creative thinking prepared by Sayyid Muhammad Khair Allah. After exhausting the validity and consistency of the achievement test applied by the researcher to the experimental and control groups, the results showed that the experimental group studied according to the SCAMPER strategy on the control group The researcher recommended the need to use Scamper’s strategy in teaching rhetoric and application, because of the impact on the development of creative thinking among students.

Keywords: scamper strategy, creative thinking, achievement, rhetoric and application

Introduction
The researcher believes that the success of the educational process depends on the success of the teaching method adopted by the teacher in the delivery of learning material to him and bring them to mind, and must follow the new strategies in education, and keep pace with developments in the age in which to live away from the usual methods that lead to stagnation and boredom. The teaching strategy is of great importance in education, which has led to the emergence of many modern strategies such as Bob Eberle 1994 (SCAMPER), which is aimed at developing creativity. It aims to generate and generate new ideas and flexibility in creativity and diversification of these ideas, Steps to generate the new idea, and each letter of the name of the strategy indicates the stage or step of its steps. The use of the SCAMPER strategy in teaching leads to the creation of the teacher and increases his ability to reflect on new ideas and apply them in practice in the field of specialization and the ability to innovate in the presentation of lessons and implementation and evaluation, and the design of innovative educational tools and the beginning to find solutions and proposals for issues or problems that The role of the teacher is therefore controlled, disciplined, facilitative and facilitative, inspecting the work of groups to ensure that each member participates in discussion and dialogue, and maintains classroom discipline. Thinking plays a vital role in the student’s success and progress within and outside the educational institution because their performance in the educational and testing tasks, and the life situations during the study, and after their completion (such as relationships with others and the requirements of the work) are the result of their thinking and the extent of their success or failure. Success decreases if teachers do not provide appropriate learning and training skills to carry out the thinking processes and skills required for...
The current research problem is summarized by answering the following question: What is the impact of the SCAMPER strategy on achievement and the development of creative thinking for fifth graders in the field of rhetoric and application. Scamper’s strategy of modern brainstorming is creative, which is integrated into brainstorming circles. The brainstormer, to create a new set of stimuli and generate more ideas, and to avoid the brainstorming and the inability to reach the stage of crisis and drought in generating new ideas.

Methodology

Experimental Design: The choice of experimental design is one of the important steps that the researcher has to undertake when conducting a scientific experiment. The advantage of empirical design is that it alleviates the difficulties faced by the researcher when conducting the statistical analysis obtained after conducting his experiment. Van Dalin (1985) Determining the type of experimental design depends on the nature of the problem and the conditions of the research sample. Therefore, the researcher adopted experimental design with a partial adjustment appropriate to the current research conditions.

The research community and its design: The identification of the research community is one of the important methodological steps in educational research, as the research procedures and the efficiency of its results depend on it. The sample is part of the society being chosen according to scientific rules and foundations to properly represent society. The researcher chose a representative sample of the community. The researcher visited the General Directorate for the Education of Babel to find the names of the preparatory and secondary schools in the center of Babil province. After identifying the names of the schools, the researcher visited the schools to find out the number of people in each school. Al-Hawra Preparatory School for Girls and Al-Tahrir Girls’ Secondary School. In the random drawing method, Al-Hawra Preparatory School for Girls was selected as the first experimental group to be exposed to the first independent variable (Scamper model), and the secondary school of girls for the control group that will study their students (the normal method). The number of female students in the sample was 56 students, 27 in the experimental group and 29 in the control group.

Students in the experimental group and one student from the control group, to the researcher’s belief that they have previous experience on the subjects to be studied in the experiment, which may affect the accuracy of the search results or the internal safety of the experiment. It is clear from Table (4) that there is no statistically significant difference at (0.05) in the academic achievement of the parents of the two groups because the calculated value of Ka2 was (0.779), which is less than the tabular value of (7.82), which indicates that the two groups are equal in this variable.

1. The educational achievement of mothers: It is clear from Table (5) that there is no statistically significant difference at (0.05) in the educational achievement between the mothers of the students of the two groups because the calculated value of (Ka2) was (0.619), less than the value of (k2), which indicates that the two groups are equal in this variable.

1. Test the previous information: The researcher tested the previous information consists of (20) test paragraph consists of two questions of the first type of test complement and the second type of test interview (pair) for the purpose of equivalence in this variable, and the response to the paragraphs of the test through a form distributed to students, By giving one degree for the correct answer, zero for the wrong or abandoned answer, to be the total score of the test (20)

Table (3) shows the arithmetic mean, variance and standard deviation of the two groups. In order to determine the difference in the test scores of the tribal creative thinking using the T-test, it was found that the difference is not statistically significant at (0.05), because the calculated T value was (0.876) Of the table T value of (2.05) at (54), which shows the equivalence of the two groups of research, table (1).

1. Adjust the non-experimental variables: The researcher tried to avoid the effect of some extraneous variables in the course of the experiment and then in its results. The following are some of these variables and how to control them:

1. Experimental Extermination: This is the effect of leaving a number of female students subject to experimentation, or their discontinuity from work, resulting in this effect in the results and did
not experience the entire duration of the process to leave or break out of school. Except for the individual absences that the research groups were exposed to in small, almost equal proportions.

2. Experimental and Accident Accident Conditions: Experiment in the current research has not been subjected to any emergency or incident that hinders its functioning and affects the dependent variable next to the independent variable.

3. Differences in sample selection: The researcher tried to avoid the effect of this variable in the results of the research by random sampling of the sample, and the parity between the two research groups, as well as the homogeneity of the students of social and cultural research groups to a large extent to their belonging to a single social environment. It is true that the test measures the object for which it was prepared and that the quality of the test is good if it is true, and the honest test is actually measuring the ability, character, or direction that the test is designed to measure. (80%) of the specialists were mainly to accept the test paragraphs after verifying the clarity and difficulty of the paragraphs and the strength of discrimination and stability, so got (30) paragraphs of the test on They agreed and deleted (6) paragraphs and modified some paragraphs that were valid after they were modified.

4 The pilot application of the test:

Analysis of test paragraphs: The analysis of the test paragraphs is to improve their quality and to detect their difficulty or difficulty, in order to exclude or redraft the invalid paragraphs and to preserve what was valid. This is done through individual responses to each of the test paragraphs.

Sincerity Test: The researcher used the same sample used to calculate the stability of the test by extracting the correlation matrix between the five test tests which are: Uses tests, dependencies, attitudes, and improvements., And fragmentation as in Table (2). In order to obtain the degree of saturation of these tests with the ability to think creatively, the sum of each test is divided by the square root of the total sum, and Table (3) shows that. Table 3 shows that the degree of saturation of battery tests with the ability to think creatively high, it is limited between (0.64 - 0.73), which indicates the authenticity of this battery internationally.

1. Test application for testing: The researcher applied the test of the ability of creative thinking and the achievement test on a sample of 38 female students in the fifth grade in Al-Talayyah Preparatory School for Girls after confirming the completion of the subjects. The researcher aimed at the following:

A. Ensure the clarity of the test paragraphs:
After the test was distributed to the students of the survey sample, they were asked to give their observations about any paragraph of the test, and to inquire about any word or phrase they find vague or unclear, it turns out that the test instructions and paragraphs were mostly clear and understood by all students.

B. Determination of test time:
Procedures for applying the experiment. Using the T-test for two independent samples to determine the significance of the differences between these two averages, there were statistically significant differences between the two groups. Table (5) shows that: The results showed that the students of the experimental group were superior to the students of the control group in the creative thinking test. The reason can be attributed to:

1. Scamper’s strategy helped students understand, understand, absorb and preserve information.

2. The Scamper strategy helps the school to be the role of mentor and supervisor instead of the role of telegram, resulting in the emergence of positive impact in the collection of students.

3. Scamper’s strategy is to organize students’ thinking by making them walk in specific logical steps to achieve their goals accurately.

4. Effectiveness of Scamper’s strategy in motivating students to think and creativity.

5. Scamper’s strategy has been instrumental in developing students’ abilities and strengthening their thinking skills.

6. Scamper’s strategy reinforces previous knowledge as a basis for new learning and curiosity to think through the lesson, by asking questions and thinking deeply to answer them.
Table 1: Arithmetic mean, variance and standard deviation And the following two values of previous information test scores

<table>
<thead>
<tr>
<th>The Group</th>
<th>The Number</th>
<th>Average</th>
<th>Standard deviation</th>
<th>Degree of freedom</th>
<th>t.test</th>
<th>Statistical significance at level 0.05</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experimental</td>
<td>27</td>
<td>10.67</td>
<td>3.174</td>
<td>54</td>
<td>2.05</td>
<td>0.876</td>
</tr>
<tr>
<td>Control</td>
<td>29</td>
<td>9.97</td>
<td>3.201</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 2: Link matrix between the five sub-tests

<table>
<thead>
<tr>
<th>Test Name</th>
<th>Uses</th>
<th>Implications</th>
<th>Situations</th>
<th>Improvements</th>
<th>Falter</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Uses</td>
<td>1</td>
<td>0.399</td>
<td>0.424</td>
<td>0.380</td>
<td>0.375</td>
<td>2.578</td>
</tr>
<tr>
<td>Implications</td>
<td>0.399</td>
<td>1</td>
<td>0.495</td>
<td>0.375</td>
<td>0.261</td>
<td>2.53</td>
</tr>
<tr>
<td>Situations</td>
<td>0.424</td>
<td>0.495</td>
<td>1</td>
<td>0.325</td>
<td>0.245</td>
<td>2.489</td>
</tr>
<tr>
<td>Improvements</td>
<td>0.380</td>
<td>0.375</td>
<td>0.325</td>
<td>1</td>
<td>0.385</td>
<td>2.465</td>
</tr>
<tr>
<td>Falter</td>
<td>0.375</td>
<td>0.261</td>
<td>0.245</td>
<td>0.385</td>
<td>1</td>
<td>2.266</td>
</tr>
<tr>
<td>Sum</td>
<td>2.578</td>
<td>2.53</td>
<td>2.489</td>
<td>2.465</td>
<td>2.266</td>
<td>12.328</td>
</tr>
</tbody>
</table>

Table 3: The degree of saturation of battery tests with the ability to think creatively

<table>
<thead>
<tr>
<th>Test order</th>
<th>Test Name</th>
<th>Saturation degree</th>
</tr>
</thead>
<tbody>
<tr>
<td>the first</td>
<td>Uses</td>
<td>0.73</td>
</tr>
<tr>
<td>The second</td>
<td>Implications</td>
<td>0.72</td>
</tr>
<tr>
<td>the third</td>
<td>Situations</td>
<td>0.70</td>
</tr>
<tr>
<td>the fourth</td>
<td>Improvements</td>
<td>0.70</td>
</tr>
<tr>
<td>Fifth</td>
<td>Falter</td>
<td>0.64</td>
</tr>
</tbody>
</table>

Table 4: Test results for two independent samples to test achievement

<table>
<thead>
<tr>
<th>The group</th>
<th>The number</th>
<th>Average</th>
<th>Standard deviation</th>
<th>Degree of freedom</th>
<th>t.test</th>
<th>Statistical significance at level 0.05</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experimental</td>
<td>27</td>
<td>27.89</td>
<td>2.006</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Control</td>
<td>29</td>
<td>18.66</td>
<td>3.595</td>
<td>54</td>
<td>14.953</td>
<td>2.05</td>
</tr>
</tbody>
</table>

Table 5: The results of the T-test of two independent samples in the creative thinking test

<table>
<thead>
<tr>
<th>The group</th>
<th>The number</th>
<th>Average</th>
<th>standard deviation</th>
<th>Degree of freedom</th>
<th>t.test</th>
<th>Statistical significance at level 0.05</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experimental</td>
<td>27</td>
<td>123.37</td>
<td>23.957</td>
<td>54</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Control</td>
<td>29</td>
<td>99.66</td>
<td>23.680</td>
<td></td>
<td>3.879</td>
<td>2.05</td>
</tr>
</tbody>
</table>
Conclusion

In the light of the research results, the researcher can conclude the following: Scamper’s strategy to help students generate a large number of information by providing them with the opportunity to train their minds to engage in an exchange of views in a friendly atmosphere and challenge ideas with justification while retaining respect. The presentation of the lesson according to the steps of the strategy Sempr helped to the occurrence of conflicts of knowledge among students, which urged the use of previous ideas and rebuild in the brain, to rebalance. Effectiveness of Scamper’s strategy in teaching rhetoric and application, which reflected positively on the achievement of students of the fifth grade literary. Teaching using the Scamper strategy led to the development of thinking processes among students of the fifth grade literary. The use of the Scamper strategy is in line with the emphasis on the positive role of the learner because it is the main axis in the educational process called for by modern education.

Financial Disclosure: There is no financial disclosure.

Conflict of Interest: None to declare.

Ethical Clearance: All experimental protocols were approved under the University of Babylon- College of Basic Education, Iraq and all experiments were carried out in accordance with approved guidelines.

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The Impact of Teaching Critical Thinking Skills in Achieving Fourth Grade Students

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ABSTRACT

The aim of the research is to identify the effect of teaching on the main thinking skills in the achievement of the fourth grade students in the history subject. In order to verify the objective, the researcher put the zero hypothesis which states: There is no statistically significant difference at the level of significance (0.05) The basic thinking skills and average grades of the students of the control group who will study according to the usual method in the test of collecting the history material, and to achieve it according to the experience of the second half of the academic year (2018-2019), The study sample consisted of (60) students of the fourth grade students in the preparatory school of the revolution, and were randomized to two groups (30) students in each group. The groups were rewarded in the following variables: age, IQ test scores, For the subject of history, and in light of the relative importance of the content and behavioral purposes, an achievement test was constructed consisting of (40) multiple choice types.

Keywords: Critical Thinking Skills, Fourth Grade Students, Achievement, History

Introduction

History is one of the oldest branches of social materials and a fundamental pillar in it, because it is a chronological record of all the nation’s sciences, arts and literature, which is the basis of the present and the basis of the future, and represents the nation’s character that distinguishes it from other nations ¹. Since history can be used in all spheres of life, the study of the past can not be separated from the present man and what is required is useful in the solution and management of the present and predict the future, and may not rely on the prevailing ideal (history repeats itself), to say, not to benefit from history it really does not repeat the exact same Pveselath, but this does not negate the existence of conditions to the future history of this concept the student can provide the opportunity to take advantage of missteps and blunders of others, because it is broader and more different than any personal experience universal experience, and here The comprehensive scientific study

Rees our history is very important, because it enables us to see our past and ponder seriously because he was a beacon guiding generations present in the re - past exploration process, and re - evaluation in turns with him this past general and heritage to the creative force in our present, because the present is inseparable from the past, and that past It is inseparable from the future.

Stages of pivotal thinking: First: Focus skill: A cognitive skill that requires specific mental actions and contributes to building students’ perceptions when they face the problem of failure to achieve goals ². This skill helps students to collect phenomena, to operate the appropriate information required by the processes of mental knowledge, and to make it possible to store, classify and collect. This information is usually retrieved and retrieved using the senses. Third: Skills of remembering: The lowest levels of thinking include remembering facts, terminology, events and characteristics. Fourth: The skill of organization: is the process in which the classes of things or phenomena in a particular system are arranged, or arranged according to these categories of mutual relations. Fifth: The skill of analysis: It is the mental process by which the phenomenon of a composite faculty is disassembled from its constituent components to its partial components. If we want to understand the nature of any work done by the student,
we must analyze this work in its different parts. Sixth: The skill of generation: This skill includes the processes of organizing and analyzing how to connect parts of each other, and note in these skills that new information and experiences come completely and collectively and constitute a new intellectual and cognitive construction and the function of the teacher to generate ideas in the minds of students.3

Methodology

It includes an overview of the procedures that were carried out to achieve the research objectives, starting with the research methodology and experimental design, defining the research community and its sample, the equivalence of the research groups (experimental and control), preparation of the research requirements and tools, Will be displayed as follows:

The experimental design of the research includes the independent variable (axial thinking skills), the usual method, and the dependent variable. Therefore, the researcher used experimental design that is partially controlled by two equal groups, one experimental and the other controlling.

The research community and appointed: Represents the research community the current fourth grade literary students all in schools (secondary and junior high) day government of the General Directorate of Education in Babil province (center) for the academic year (2018-2019 m), not less than the number of fourth grade people. The researcher chose the (preparatory of the revolution) in the center of the province of Babylon in a deliberate way to conduct his research, it was found that it includes two divisions of the fourth grade literary (a, b), the researcher chose Division (a) method of random drawing (drawing method) to represent The experimental group and the number of students (30) students who will study their students according to (skills of Axial thinking), the same way the researcher chose randomly Division (b) to represent the control group and the number of students (30 students), which will examine its students according to (the usual way).

Preparation of research requirements: The research requirements are fundamental to the research, according to which the research procedures are carried out. These requirements are as follows: Scientific Article (Content): The scientific material that the researcher is teaching has been determined for the students of the two research groups during the period of the experiment Aldra C - II) of the academic year (2018-2019 m), and the scientific material included the last three chapters of the history textbook for fourth grade literary.

Search tool: The steps of the search tool (the collection test) are:

Determine the purpose of the achievement test: The purpose of the envisaged achievement test is to measure the collection of literary fourth grade students In the history.

Determination of the objectives of the test: After the purpose of the test was determined the objectives of the test to determine the extent of achievement and the researcher formulated a number of behavioral goals.

Determination of the test paragraphs: The researcher determined the number of paragraphs that constitute the test achievement as the number of paragraphs of the test (40 paragraphs).

Directed paragraphs of the test: was drafted paragraphs of test grades as preliminary in the light of the contents of the map of experiential, and chose the researcher type test (multiple choice) which is one of the best objective tests, consisted test of 40 test paragraph, distributed to the levels of Bloom ‘s cognitive (knowledge, Comprehension, Application, Analysis, Composition, Calendar), and the last three topics of the history book for the fourth grade literary year (2018 - 2019).

Test instructions: Instructions and special instructions are formulated on how to answer. (Choosing one correct alternative to the paragraph, answering all paragraphs, the time period for answering, writing the triple name, the row and the division in the assigned space).

Answers the test correction: After that was drafted paragraphs of the test and choose the type of test, the standard for correct answers mode, as developed (one degree of each paragraph test correct) and (zero to answer the wrong, and the paragraph left, who did not need the student, paragraph, which put her more than Selection) and therefore the highest final score for the achievement test is (40 degrees) and the minimum grade (zero).

Believe the test: It was confirmed virtual honesty to test the sincerity of the content, as the results showed that the apparent honesty obtained a ratio of agreement
The application in the phase of the first reconnaissance on a group of fourth-grade students, so it is a test summative honest in measuring the comprehension and comprehension of students in the fourth grade in the subject of history.

The pilot application for the test of achievement: including the following

Application exploratory first: The achievement test applied in the phase of the first reconnaissance on a group of fourth-grade literary students from non-research sample, and the number of students (65 students), the purpose of knowledge and clarity of instructions and guidelines for testing and the extent of understanding and clarity of the paragraphs of the test for students and calculate the necessary test time duration. The researcher recorded the exit time for each student. In calculating the arithmetic mean of time, it was found that the time required to answer all the test paragraphs was (38) minutes.

The second application exploratory: The test was applied to a sample of 150 students in the fourth grade of non-literary research sample, and the purpose of the analysis of the paragraphs of the achievement test statistically paragraph of the difficulty, discrimination paragraph, the effectiveness of the wrong alternatives.

Statistical analysis of the test scores: The test scores were analyzed as follows:

The difficulty of paragraph: To conduct statistical analysis of the paragraphs of the test grades found that the difficulty of its paragraphs coefficient ranges from (0.33 - 0.6) and thus longer paragraphs achievement test are all good and difficult occasion.

Discrimination of the paragraph: An important feature that must be provided in the test paragraphs is the distinguishing feature. It means that the items or paragraphs can detect the individual differences of the students. The test items are valid. The coefficient of distinguishing the items is (20) and above, and the value of the coefficient of distinction between the test scores is between (0.43 - 0.69). 43-0.69) Thus, the subjects of the achievement test are characterized by good and appropriate discrimination.

Effectiveness of wrong alternatives: The researcher conducted a statistical analysis (highest 27% and lowest 27%) degree to find the effectiveness of the wrong alternatives ranging from (-0.15-0.44-) (-0.1 5 - 0.4 4 -) and it became clear that the paragraphs of the achievement test alternatives are all effective and thus are suitable for all counting.

Stability of the test: The stability coefficient of the test depends on the relationship between each paragraph or between the paragraphs of the test all, and this is evidenced by the stability of degrees and consistency of paragraphs, and can calculate the stability of the test. Using the legal relationship between the test units, and the characteristics of the good test to be consistent and true and so that the test paragraphs have a clear meaning must be true and consistent at the same time, the stability indicates that the test scores when you return it again, that is to indicate the balance and stability degrees Students in the test.

Methods of finding the stability of the test:

Retail mid-term method: This method is one of the most widely used methods, because they avoid other disadvantages and some of the ways to get two equal test, the researcher divided the test into individual paragraphs and even-numbered paragraphs. By choosing answers to the scoping sample students and the (150) answer, Extracted Pearson correlation coefficient between the scores of odd and even paragraphs were obtained on the consistency factor of (.91), As the retail stability of the mid-term test coefficient does not measure the overall homogeneity of the test (because the stability of only half). Therefore, the correction was done using the Spearman Brown coefficient (0.95) which is a good stability coefficient from the point of view of the specialists.

Way Cooder-Richardson 20: The application of the equation Cooder - Richaderson according to the students' grades. The researcher found that the test stability value is (0.89) and thus is a good value and suitable so the test is constant.

Application of the research tool: The experimental and control groups were informed of the date of application of the test, one week prior to its completion, and was applied after the completion of teaching the specific material for the two research groups at one time. The researcher supervised the application of the test.

Statistical Methods: The researcher used the T-test equation (t – Testt - Test) For two independent samples to make the parity between the experimental and control groups, and the Pearson correlation equation. The researcher used the equation to correct the correlation
coefficient between the test segments (individual and marital scores) after the Pearson correlation coefficient, spss, The Excel program (Excel))

**Results and Discussion**

For the purpose of verifying the null hypothesis, which states: (There is no statistically significant difference at the level of significance (0.05) between the average grades of the experimental group students who studied using the central thinking skills and the average score of the control group who studied according to the usual method of collecting history). It was the arithmetic average calculation deviation standard scores both sets of research in the test of the achievement was the value account T for two independent samples as in the table (2).

**Table 1: The equivalence of the two research groups**

<table>
<thead>
<tr>
<th>Variable</th>
<th>The group</th>
<th>Sample size</th>
<th>SMA</th>
<th>Standard deviation</th>
<th>The degree of freedom</th>
<th>T value Calculated</th>
<th>T value Table</th>
<th>Level of significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age calculated in months</td>
<td>Experimental</td>
<td>30</td>
<td>179,17</td>
<td>5,98</td>
<td>5858</td>
<td>0,249</td>
<td></td>
<td>Not statistically significant</td>
</tr>
<tr>
<td></td>
<td>Control</td>
<td>30</td>
<td>178,85</td>
<td>4,26</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>First semester grades</td>
<td>Experimental</td>
<td>30</td>
<td>42.89</td>
<td>14.68</td>
<td></td>
<td>0,278</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Control</td>
<td>30</td>
<td>33.64</td>
<td>12.12</td>
<td></td>
<td>0,313</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IQ test</td>
<td>Experimental</td>
<td>30</td>
<td>25,2</td>
<td>3,94</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Control</td>
<td>30</td>
<td>24,73</td>
<td>3,91</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Table 2: The results of the research in the biological test of the two groups of research (experimental and control)**

<table>
<thead>
<tr>
<th>Groups</th>
<th>The number</th>
<th>SMA</th>
<th>Variance</th>
<th>Standard deviation</th>
<th>The degree of freedom</th>
<th>T value Calculated</th>
<th>T value Table</th>
<th>Statistical significance at (0.05)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experimental</td>
<td>3030</td>
<td>2.96</td>
<td>.0 22.98</td>
<td>.2 6.20</td>
<td>5858</td>
<td>4.015</td>
<td>2.000</td>
<td>Statistical function</td>
</tr>
<tr>
<td>Control</td>
<td>3030</td>
<td>2.633</td>
<td>.35 34.31</td>
<td>.3 6.21</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Conclusion**

The pivotal thinking skills of the positive impact of the great increase in the collection of the fourth grade students of literature in material history and increase their ability to understand information and facts, knowledge and raise their school. Centralized thinking skills play a role in making students the focus of the learning process through their active participation in the educational situation that will encourage them to persevere to raise their level of science.

**Financial Disclosure:** There is no financial disclosure.

**Conflict of Interest:** None to declare.

**Ethical Clearance:** All experimental protocols were approved under the University of Babylon, College of Basic Education, Babylon, Iraq and all experiments were carried out in accordance with approved guidelines.

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Influence of Occupational Safety and Health Training toward Staff Practices at Fast Food Restaurant in Malaysia

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Abstract

Among food service establishments in Malaysia, fast food restaurant (FFR) was found having zero rate of accident that causes permanent disability and death at workplace. Result of preliminary study of this study showed occupational safety and health training gave high influence to safety and health practices among staff of the FFR. A quantitative research was conducted to identify level of influence of four major areas of the occupational safety and health training (workplace hazards and emergency procedure, personal hygiene and the use of personal protection equipment (PPE), food safety, and cleaning procedure) toward the practices of 225 FRR staff. The staff were selected randomly from various FFRs in Malaysia. Results of the preliminary study indicated overall mean level of influence of those four research variables toward staff practices at workplace was high with mean value=4.35 and standard deviation=0.37. The study suggests for the FFR management to provide future training with holistic content. This study also suggests to Malaysia Ministry of Health to establish guidelines for compulsory on-site similar occupational safety and health training to food handlers in all food service establishments for effective food safety practices as well as for the benefit of public health.

Keywords: Occupational safety and health, training, fast food restaurant, staff practices, Malaysia

Introduction

Eating out is a part of life style among Malaysian due to various reasons. Restaurant was found as the most popular destination for eating out ¹. Malaysia has various types of restaurant. Besides ethnic family restaurant, the second most popular food outlet is fast food restaurant (FFR). Result of a survey study conducted in 2018 by Cint on the most visited fast food restaurant among multiple races of Malaysian showed KFC (82.1%), McDonald’s (81.34%), Pizza Hutt (57.18%), Domino’s (46.38%), Subway (45.23%), Secret Recipe (42.09%), The Chicken Rice Chop (29.79%), Kenny Rogers Roasters (29.38%), A&W Restaurants (28.96%), Marry brown (27.71%) and Nando’s (27.6%). Value sales of almost all of the FFRs at constant in the year of 2017 prices are expected to show positive growth for value sales in year of 2022 ².

The Malaysia Services Producer Price Index (SPPI) of second quarter of 2018 showed the expenditure of Malaysian for Restaurant and Mobile Food Service Activities and Beverage Serving Activities have contributed 0.5 per cent respectively to the rose to 0.5 per cent for Accommodation & Food and Beverage as compared to the previous quarter. The increase of 2.9 per cent was driven by Restaurant and Mobile Food Service Activities (+3.4%), Beverage Serving Activities (+2.9%) and Event Catering and other Food Service Activities (+0.6%) ³. The statistics indicates Malaysian has high buying power that led them to eat out, the FFR service having high demand and it is important for the contribution to Malaysia gross domestic profit.

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High demand in FFR services signs busy activities in the FRR kitchen as well as high frequent of the restaurant staff expose to hazards. There are 10 occupational sectors in Malaysia that reported involve in accident at workplace. However, accident rate that cause permanent disability and death in the hotel and restaurant service sector was found the lowest if compare to other nine occupational sectors. Within the hotel and restaurant service sector, FFR chain contributed to zero per cent of accident rate that cause permanent disability and death.

A preliminary study was conducted to identify what are factors that influenced the FFRs practice until achieve zero per cent of accident rate that cause permanent disability and death. Finding of the study found occupational safety and health training was a major influence to staff practices working in the FFRs. Therefore this quantitative study was conducted to identify areas of the training that contributed to the positive achievement on occupational safety and health of the FFR.

**Methodology**

This study employed sequential exploratory of mixed method research design. The study was started with qualitative research method by interviewing FFR staff to identify in depth the influence factors toward the achievement of zero per cent of accident that cause permanent disability and death in FFR service. According to 1, interview data collecting technique provides rich data if compare to data collecting using survey method. Saturation of data indicated 10 of the FFR staff were interviewed. They were selected applying convenience sampling technique from various FFRs in Wilayah Persekutuan of Malaysia that reported having the lowest accident rate compare to the same brand of FFR outlets in other 12 states of Malaysia. Finding of the qualitative study showed that four major areas in the occupational and safety and health training have influenced the FFR staff practices working in the FFR. They were workplace hazards and emergency procedure, personal hygiene and the use personal protection equipment (PPE), food safety, and cleaning procedure.

These four areas later on have been used as research variables for quantitative research method and items development for research instrument of questionnaire. Data were collected from 225 out of 544 FFR staff in Wilayah Persekutuan. The 225 sample size of the study that selected randomly was determined by the following equation:

\[
S = \frac{X^2 NP (1-P)}{d^2 (N - 1) + X^2P (1 - P)}
\]

where \(S\) = sample size; \(X^2\) = confident level (at 3.841); \(N\) = population size, \(P\) = ratio of population at 0.5, \(d\) = degree of accuracy at 0.5

The questionnaire had been verified by two experts in the field of Food Service Management and Occupational Health and Safety. A pilot study was conducted at one FFR in Johor State and involved 23 restaurant staff. Result of the pilot study found overall validity value of the instrument was high with \(\alpha\) value = 0.90 while validity value according to research variables of workplace hazards and emergency procedure, personal hygiene and personal protection equipment (PPE), food safety, and cleaning procedure were 0.76, 0.82, 0.76 and 0.87 accordingly.

Those values showed that items of the research instrument are acceptable and the research instrument can be used for actual data collecting. According to 5, validity value of survey research instrument that close to 1.0 indicates the research instrument has high value of validity, consider very good and ready to be used for data collecting. Data of this study were analysed using descriptive statistical of frequency, mean and standard deviation, which assisted by Statistical Packages for Social Science (SPSS) version 22.0 computer software.

**Result and Discussion**

40 items were prepared to measure four variables of the study. Those items were related to types of workplace hazard, emergency procedure, personal hygiene of staff, the use of PPE, food safety, food handling, safe cooking oil handling, safe oil trap cleaning procedure, hand wash, safe dish washing procedure, proper steps of waste disposal, hardware safety precautions, safe raw food material handling, food storage, right method serving food, safe drainage system operation and chemical handling.
Results of this study indicated overall influence mean level of research variables toward staff practices at workplace was high with mean value=4.35 and standard deviation=0.37. Mean value of each research variable for workplace hazards and emergency procedure: mean=4.29 and standard deviation=0.40; personnel hygiene and the use of PPE: mean=4.40 and standard deviation=0.35; food safety: mean=4.28 and standard deviation=0.39; and cleaning procedure: mean=4.43 and standard deviation=0.32 (refer to Table 1).

Table 1  Content of Occupational Safety and Health Training in FFR

<table>
<thead>
<tr>
<th>No</th>
<th>Research Variables</th>
<th>Overall influence</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Mean</td>
<td>Standard Deviation</td>
</tr>
<tr>
<td>1</td>
<td>Workplace hazards and emergency procedure</td>
<td>4.29</td>
<td>0.40</td>
</tr>
<tr>
<td>2</td>
<td>Personnel hygiene and the use of PPE</td>
<td>4.40</td>
<td>0.35</td>
</tr>
<tr>
<td>3</td>
<td>Food safety</td>
<td>4.28</td>
<td>0.39</td>
</tr>
<tr>
<td>4</td>
<td>Cleaning procedure</td>
<td>4.43</td>
<td>0.32</td>
</tr>
<tr>
<td></td>
<td>Overall</td>
<td>4.35</td>
<td>0.37</td>
</tr>
</tbody>
</table>

Researcher studied on safety training in 108 FFR at Porto Alegre observed only 21.7% of the FFR staff attended the training. The study suggested for the management of the FFR to make the safety training compulsory to all of their staff so that adequate food safety conditions can be offered for the consumers.

A case study on fast-food employee’s experience at three different FFRs conducted by suggested that employees’ training and supervision require more attention to safety procedures. Greater manager accountability for employee noncompliance emphasis on employee education could help FFRs minimize threats to public health and strengthen the fast-food industry.

A study revealed that those who exposed to food safety training demonstrated better practices in handling raw food and cooking equipment. Similar findings were observed in their study on the effect of an intervention targeting perceived barriers (TPB) to improve the handling of food-contact surfaces amongst food handlers. That study found that those given TPB-based intervention (targeting barriers) performed better than the control group.

A study to assess knowledge and practice of food hygiene and safety among food handlers in FFRs in Benin City, Edo State by indicated knowledge was significantly influenced by previous training in food hygiene and safety (p = 0.002). Food handlers who had worked for longer years in the FFRs had better practice of food hygiene and safety (p = 0.036). The level of education of respondents did not significantly influence their practice of food hygiene and safety (p = 0.084). Although, 299 (85.4%) food handlers were generally clean, skin lesions was seen in 4 (7.3%) of them.

Researcher measured food safety knowledge of 297 out of 1084 food handlers at FFRs in Jordan. Result of their study showed the overall knowledge of food handlers on food safety concepts is moderate. They had poor knowledge regarding foodborne pathogens and safe storage, thawing, cooking and reheating of the foods but had good knowledge on personal hygiene and symptoms of foodborne illnesses. Food handlers who enrolled in food safety training had significantly (P < 0.05) higher total food safety knowledge score compared to the score of those who did not enrol the training. The study suggested adopting proper food safety education training to food handlers, periodic evaluation of food handlers’ knowledge and food safety training materials would improve the food safety status in foodservice institutions.

Research finding showed food safety training that targeted the attitudes, normative beliefs and perceived behaviours of school canteen food handlers resulted in suggestion for improvement in food safety knowledge, practices and sanitary conditions of the food handlers to offer potential to reduce the incidence of foodborne diseases amongst primary-school children. Suggestion for further improvement was addressed to content of the safety training in relation to high-risk food, cross contamination, food poisoning and temperature control.
The latest, 12 reported a cross-sectional study to assess safe food handling practices, food safety knowledge, and adherence for the implementation of Hazard Analysis and Critical Control Point (HACCP) among 53 food safety managers working in randomly selected food service establishments in Qatar. About 66% and 68% of managers had college degree and were trained on HACCP respectively. Results of the study also showed that casual sit-in and fine dine-in restaurants were the only food service establishments that consistently kept records on safe food handling practices (100%), followed by fast-food food service establishments (36%). Managers’ training and education level were highly correlated with the probability of their employees receiving food safety training. The study demonstrated that training and education are important factors that directly give impact to food safety working culture in food service establishments.

Finding of this study shows occupational safety and health training provided by FFR has highly influenced the safe and health FRR staff practices at workplace. This finding is consistent with previous studies by 7, 8, 9, 10, 11 and 12. However, the complexity of the training depends on the size, complexity of the workplace, nature of hazards and potential hazards exist at the FFR.

Kitchen is a place where almost all food is stored, prepared and cooked. Although working in the FFR industry is generally safe, however, the FRR staff are often exposed to hazards. For instance, unhygienic kitchen will have high potential to food contamination and high risk of hazard, injuries (slips, falls, burns, cuts) and illness (due to working too quickly and standing in a long hour), which, threatening safety and health of kitchen staff and will give impact to their lives, income, family members and financial challenges. Having knowledge and skills to identify both visible and less visible hazards at workplace, plan effective solution to prevent injuries and illness will assist the FRR staff practicing safety and health while working.

Internal health and safety working policies of FFR to carry out at workplace is important. However, the one who are responsible to sustain the safe working atmosphere is the restaurant staff. Therefore, occupational safety and health training program was perceived the best strategy to expose the staff with safety and health policies, guidelines and issues. The training should be compulsory to all FFR staff that usually dominated by teenager that usually having low academic background, insufficient working experience and immature.

The Occupational Safety and Health Act (OSHA) of 1970 regulate employee safety to mitigate incidences of death or workplace injuries. The Act sets out the rights of employees to have safe working environments, to be trained about the functioning of equipment, to be provided with safety gear, to get information about hazards in the workplace, to ask Occupational Safety and Health Administration to inspect the conditions of the workplace without retaliation from their employer and to be informed of hazards that are pertinent to the job such as handling of chemicals like soaps, detergents and disinfectants used in cleaning (to secure their health and safety, the staff must have access to material safety data sheets that provide information on the chemical content of substances used in the workplace) 13.

According to United State of America Food and Drug Administration (FDA), food service workers are required to maintain high levels of personal hygiene to protect them from illness and prevent food contamination. Therefore they should be trained on hand-washing after and before handling food and kitchen equipment 11 as well as after using toilet, the use of food tong and or gloves for food handling, ensure taking extra effort to keep hands clean and as germ-free as possible all the time to avoid cross contamination that lead to foodborne diseases and food poisoning (although in many restaurants these days, chefs do not wear glove), wearing PPE, keep health and personal hygiene, understand food-borne illnesses, how to diagnose symptoms and procedures for reporting illnesses in time to avoid contagion and contamination.

**Conclusion**

Finding indicates occupational safety and health training provided by FFR highly influenced staff practices at workplace. The training was compulsory to all new staff (given during orientation week) and also for senior staff (conducted as in-house trainings for staff development program). Through the training, the staff were exposed to important issues related to FFR occupational safety and health requirements like working standard operating procedure (SOP), the importance of wearing PPE, food safety, safe food handling, safe food storage, waste disposal, working with correct ergonomic and the function of FFR safety facility at the premise. The safety and health practices
of the staff were contributed to the achievement of zero rate of permanent disability accident and death and low rate of workplace accident. Current study also suggests to Malaysia Ministry of Health to establish guidelines for compulsory on-site similar occupational safety and health training as FRRs do to food handlers in all food service establishments to improve the existing Food Handling Training for effective practices on food safety and restaurant cleanliness as well as for the benefit of public health.

Conflict of Interest: NIL

Source of Funding: Self Source

Ethical Clearance: Done by Research Committee

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Does University Students’ Stress Have an Impact on their Psychological Well-Being?

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Abstract

This study aimed to investigate the impact of stress on psychological wellbeing among the students from various faculties in Universiti Teknologi Malaysia. The questionnaire was administrated and was distributed to a sample of 368 students in the selected university. The findings illustrated that anxiety showed non-significant impact on psychological wellbeing. Depression and stress were instead found to have significant impact on the psychological wellbeing. In order to improve this phenomenon, it is highly recommended that university should take necessary proactive actions in helping students manage their mental health needs. Access to interventions and prevention programmes needs to be strengthened within the university settings.

Keywords: Stress, Psychological wellbeing, Case Study

Introduction

Being a university student is a stressful phase for an individual. They are required to juggle different roles in being a student as well as continuously developing as a person while undergoing role transition from adolescent to adulthood. Examinations, group projects and activities as well as relationship issues are among stress-inducing events faced by university students. As a consequence, they are directly and indirectly exposed to different kinds of mental health issues that may interfere with their daily functioning. The failure to cope with these multiple roles may lead to the feelings of hopelessness, exhaustion, impaired functioning, rumination, lack of sleep, and poor sleep quality¹.

Among different mental health problems, stress, anxiety and depression have been identified as the most common amongst university students². It was previously highlighted that the prevalence of depression and anxiety was 15.6% among undergraduates and 13% among graduate students³. In recent years, there has been a shift of focus on research from disorder and dysfunction oriented to well-being and positive mental health⁴. It was also highlighted the increasing evidence that support promoting well-being rather than just treating illness⁵. While these views apply to the general population, emerging studies of psychological well-being among university students has been conducted and showed various results⁶, ⁷, ⁸, ⁹, ¹⁰, ¹¹, ¹². Despite this, very few studies examined psychological well-being, particularly among Malaysian university students.

One recent study was conducted in a public university in Malaysia which reported the age group of 41 years and above possessed the highest level of psychological well-being¹³. It was also studied public university students and reported that there is a significant relationship between age and the level the psychological well-being of the students, suggesting that the well-being of the students increases with age¹⁴. However, these two studies only focused on postgraduate students, and investigated the level of psychological well-being for different age groups.

DOI Number: 10.5958/0976-5506.2019.01473.6
Another study conducted by Md Nordin & Abu Talib\(^1\) has found that 503 Malaysian university students (34%) showed symptoms of poor psychological well-being. One of the factors that could affect students’ psychological well-being is stress. There are various factors that can lead to stress among students, for instance financial difficulties\(^16, 17\), academic pressure\(^18, 19, 20, 21\), unconducive study environment\(^20, 22\), lack of career preparation\(^20\), negative perception towards personal appearance\(^18, 21\), and poor relationship with peers\(^18, 21\).

Poor management of these stressors could eventually affect students’ psychological well-being, such as anxiety and depression\(^23\). This finding is further supported by Andrews & Wilding\(^16\) who concluded that stress not only may affect students’ mental health but also their academic performance. Conversely, students who were not satisfied with their academic performance may experience a higher stress level than other students\(^24\). Apart from poor academic performance, students are also feeling stressed out due to too many assignments at one time\(^20\), lack of revision time, difficulty in understanding the lessons, unable to answer lecturers’ questions, the anticipation in waiting for examination result\(^19\), and extra co-curricular activities\(^18\). Moreover, a significant correlation between workload and academic stress was found among students\(^19\). In other words, higher workload leads to higher stress among university students, and consequently affecting students’ psychological well-being.

These academic stressors may be due to unconducive study environment which includes uncomfortable place of study, noisy lectures, and small lecture room\(^20\). The researchers also revealed another factor that can cause stress among students. University students were concerned about their career prospects (80%)\(^20\). In specific, they lacked of the knowledge and skills in resume writing (87%), have poor English language proficiency (80%), and feeling unprepared for their future career (93%).

Another contributor for stress among university students is their concern towards personal appearances. A significant relationship was found between physical development and stress, which includes feeling ugly, overweight and acne problem\(^21\). Poor relationship with peers can also lead to stress, thereafter affecting students’ psychological well-being. The researchers have also found a significant correlation between peer factors and stress, such as not having friends, unlike by friends, unhelpful friends, and friends who like to critique. This finding is also supported by Ooi\(^22\). In conclusion, there are various factors that can cause stress among university students. As shown by past studies, it is the ability of the students to cope with these stressors that would determine their state of psychological well-being.

This study is conducted mainly to investigate the impact of stress, depression, and anxiety in psychological well-being among university students.

### Material and Method

This study adopts a quantitative approach, using questionnaire as the main instrument for data collection. A total of 375 surveys were distributed to undergraduate students from various faculties in Universiti Teknologi Malaysia using convenience sampling method. Out of 375 responses, only 368 were valid and analysed.

Apart from collecting data on respondents’ background information, this study has adopted 21 items from Lovibond and Lovibond\(^23\) Depression, Anxiety, and Stress Scale (DASS) and 12 items from Goldberg\(^26\) General Health Questionnaire (GHQ) to measure the students’ stress and psychological health respectively. Data collected was then analysed using descriptive statistics i.e. frequency and percentage, as well as inferential statistics i.e. PLS-SEM. SEM is one of the methods that analyses multivariate data which involves multiple variables in one study. It allows the researcher to study the relationship between different variables in one proposed framework.

### Results

The following part displays the demographic details such as gender, age, race, marital status, educational level, and their name of courses in the university. Table 1 shows the distribution of respondents by their gender, age, races, faculties, courses, etc. Overall, majority of the participants were female (73%), aged between 19-24 years old (96%), from the Malay ethnicity (83%), and holds other types of academic qualification such as the university foundation course (49%), There is a balanced between the number of respondents from the engineering and the social sciences course, 50.3% and 49.7% respectively, whereby the highest number of respondents were from the Faculty of Management (40%), followed by the Faculty of Electrical Engineering (19%). Most of them were in Year 2 (54%) and Year 3
and 99% of them were unmarried.

Table 1. Demographic information

<table>
<thead>
<tr>
<th>Demographic</th>
<th>Frequency</th>
<th>Percentages (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>19-24</td>
<td>355</td>
<td>96.4</td>
</tr>
<tr>
<td>25-29</td>
<td>11</td>
<td>3.0</td>
</tr>
<tr>
<td>30-34</td>
<td>1</td>
<td>0.3</td>
</tr>
<tr>
<td>35-39</td>
<td>1</td>
<td>0.3</td>
</tr>
<tr>
<td><strong>Sub-Total</strong></td>
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<td>100.0</td>
</tr>
<tr>
<td><strong>Race</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Malay</td>
<td>307</td>
<td>83.4</td>
</tr>
<tr>
<td>Chinese</td>
<td>44</td>
<td>12.0</td>
</tr>
<tr>
<td>Indian</td>
<td>9</td>
<td>2.4</td>
</tr>
<tr>
<td>Others</td>
<td>8</td>
<td>2.2</td>
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<tr>
<td><strong>Sub-Total</strong></td>
<td>368</td>
<td>100.0</td>
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<tr>
<td><strong>Faculties</strong></td>
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<td></td>
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<tr>
<td>Faculty of Management</td>
<td>146</td>
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</tr>
<tr>
<td>Faculty of Electrical Engineering</td>
<td>71</td>
<td>19.2</td>
</tr>
<tr>
<td>Faculty of Chemical &amp; Energy Engineering</td>
<td>53</td>
<td>14.4</td>
</tr>
<tr>
<td>Faculty of Biosciences &amp; Medical Engineering</td>
<td>37</td>
<td>10.0</td>
</tr>
<tr>
<td>Faculty of Education</td>
<td>36</td>
<td>9.7</td>
</tr>
<tr>
<td>Faculty of Computing</td>
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<tr>
<td>Faculty of Mechanical Engineering</td>
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<tr>
<td>Faculty of Islamic Civilization</td>
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<td><strong>Sub-Total</strong></td>
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<tr>
<td><strong>Courses</strong></td>
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<td></td>
</tr>
<tr>
<td>Engineering</td>
<td>185</td>
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<tr>
<td>Social Sciences</td>
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<td>49.7</td>
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<tr>
<td><strong>Sub-Total</strong></td>
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<tr>
<td><strong>Year of Study</strong></td>
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<td></td>
</tr>
<tr>
<td>1</td>
<td>3</td>
<td>0.8</td>
</tr>
<tr>
<td>2</td>
<td>200</td>
<td>54.3</td>
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<tr>
<td>3</td>
<td>146</td>
<td>39.7</td>
</tr>
<tr>
<td>4</td>
<td>19</td>
<td>5.2</td>
</tr>
<tr>
<td><strong>Sub-Total</strong></td>
<td>368</td>
<td>100.0</td>
</tr>
<tr>
<td><strong>Marital Status</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single</td>
<td>363</td>
<td>98.6</td>
</tr>
<tr>
<td>Married</td>
<td>5</td>
<td>1.4</td>
</tr>
<tr>
<td>Widow/Widower</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><strong>Sub-Total</strong></td>
<td>368</td>
<td>100.0</td>
</tr>
<tr>
<td><strong>Highest Educational Level</strong></td>
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<td>Upper Secondary</td>
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<td>Pre-University</td>
<td>47</td>
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<td>Matriculation</td>
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<tr>
<td>A-Level</td>
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<td>Others</td>
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</tr>
<tr>
<td><strong>Sub-Total</strong></td>
<td>368</td>
<td>100.0</td>
</tr>
</tbody>
</table>
The following Table 2 shows the results of the inferential statistical analysis. In summary, the result revealed that depression has a significant ($t>1.96$) impact on psychological wellbeing, hence supporting Hypothesis 1. Hypothesis 3 was also supported whereby this study has found a significant impact of stress on students’ psychological wellbeing. However, it was found that anxiety has non-significant impact on psychological wellbeing due to their $t$ values are less than 1.96, where $\beta = -0.069$. Hence, Hypothesis 2 is not supported in this study. This study also found that between stress, depression, and anxiety, the students’ psychological wellbeing were mostly affected by depression, followed by stress and anxiety.

Table-2. Summary of findings

<table>
<thead>
<tr>
<th>Paths</th>
<th>Path Value</th>
<th>SE</th>
<th>$t$-value</th>
<th>Hypotheses Decisions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Depression $\rightarrow$ Psychological Well-being</td>
<td>0.498</td>
<td>0.066</td>
<td>7.590</td>
<td>Supported</td>
</tr>
<tr>
<td>Anxiety $\rightarrow$ Psychological Well-being</td>
<td>-0.069</td>
<td>0.082</td>
<td>0.839</td>
<td>Not Supported</td>
</tr>
<tr>
<td>Stress $\rightarrow$ Psychological Well-being</td>
<td>0.343</td>
<td>0.057</td>
<td>6.033</td>
<td>Supported</td>
</tr>
</tbody>
</table>

Conclusion

Inevitably, university students will consistently face different challenges that may affect their state of mental health. As this study has shown, stress and depression have an impact of the students’ psychological wellbeing. It is imperative for university to take necessary proactive actions in helping students manage their mental health needs. Access to interventions and prevention programmes needs to be strengthened within the university settings. Furthermore, the university should take necessary actions to encourage students to improve help-seeking especially to those experiencing high levels of stress, anxiety and depression symptoms. Consequently, it is hoped that the risks of more negative implications such as diagnosable psychological disorders can be reduced. This study highlighted the significant role of mental health aspects particularly stress, anxiety and depression in influencing the psychological wellbeing among university student.

Conflict of Interest: The authors declare that they have no conflict of interest.

Funding: This work was supported by the Universiti Teknologi Malaysia RUG [grant number: Q.J130000.2629.13J91].

Acknowledgement: All authors contributed equally to the conception and design of the study.

Ethical Clearance: Done by Research Committee

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Role of Emotional Intelligence and Mental Health in Improving Performance

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Abstract

Emotional intelligence has been concerned due to its contribution in enhancing occupational mental health at workplace. Many studies had been conducted to examine its role in improving the overall performance of organizations. Till the recent years, new insight has been brought up in examining the effect of emotional intelligence on organizational justice. However, there is insufficient empirical evidence in proving the significant impact of emotional intelligence on organizational justice, especially in Asia context, particularly Malaysian manufacturing sector. Malaysia is known as collectivism country, where the matter of fairness is highly concerned. Hence, it is important to investigate how emotional intelligence improve the perception of fairness among the employees in Malaysia context. Therefore, this conceptual paper proposed to examine the impact of each emotional intelligence’s dimensions on the organizational justice, which might contribute to the existing literature of the effect of emotional intelligence towards organizational justice in Malaysia.

Keywords: Emotional Intelligence, mental health, Malaysia

Introduction

Emotional intelligence (EI) has been receiving attention from the scholars in the field of occupational psychology due to its contributions in occupational mental health¹ ². Many researchers had studied the contributions of EI to several work-related outcomes, such as job performance³, perceptions of stress⁴, as well as organizational commitment⁵ among their respondents. The role of EI has been discussed actively by the scholars because it is believed that the ability of EI could assist the employees in maintaining healthy working environment by being tolerance and patience⁶.

There are few EI models developed by the past scholars. Among those developed EI models, it was argued that Mayer and Salovey⁷ Ability-based EI Model is the most recognized EI theory which viewed EI as mental ability⁸. Ability-based EI Model consists of four branches, where it is believed that the four branches of EI could provide a clear and logical comprehension in understanding the concept of EI⁹. In this conceptual paper, the four dimensions of EI are proposed in examining their impacts on organizational justice (OJ). The first dimension is Regulation of Emotion (ROE). A person with the ability of ROE is prone to have the ability to overcome emotional disturbance when he regulates his emotions effectively⁷. The second dimension is Self-Emotion Appraisal (SEA), where an individual tends to have the ability to appraise, alter, and observe their own emotions or moods when incidents happened at their workplace⁷. The third dimension is Others’ Emotion Appraisal (OEA), where the individual is more likely to have the ability to understand and to assess others’ emotion⁷. The fourth dimension is Use of Emotion (UOE). An individual with UOE ability tends to have the ability in creating emotions that can improve their cognitive functions, such as decision making and problem solving⁷.

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In recent years, the contributions of EI in enhancing employees’ performance at workplace has attracted the attention of the scholars of human resource development\textsuperscript{10}. Among the work-related variables, organizational justice (OJ) has recently arisen as one of the crucial components that could enhance overall performance of organizations\textsuperscript{11}. OJ is defined as the extent to which the employee perceived fairness in job related matters at their workplace\textsuperscript{12}. OJ can be divided into four dimensions, namely distributive, procedural, informational, and interpersonal justice\textsuperscript{13}. It was argued that OJ plays a significant role in affecting the behaviour as well as the attitude of employees in organizations\textsuperscript{14}. Due to the importance of OJ, the antecedent that could affect the perception of OJ among the employees should be examined thoroughly in order to improve the level of OJ. According to Fairness Theory, it is believed that employees’ fairness judgement could be formed through the process of emotional or cognitive function\textsuperscript{15}. Hence, this study attempts to propose the investigation of the impacts of EI’s dimensions on OJ. This idea is further supported by another scholar that, an emotional intelligent worker is less likely to perceive OJ negatively\textsuperscript{16}. This is because employees with higher EI tend to use their emotions effectively in motivating themselves to overcome with unfairness\textsuperscript{16}.

**Problem Statement**

The role of EI has been proved in affecting peoples’ perceptions\textsuperscript{17}. Similarly, in the context of organizations, it is believed that EI is a potential antecedent that could affect the perception of employees in the aspect of OJ. However, it was claimed that, there is a lacking of discussion on EI’ roles towards employees’ attitude and behaviour at workplace, especially organizational justice\textsuperscript{16}. This is further supported by another scholar, where it was mentioned that, EI was just newly introduced as the factor that could affect perceived OJ in the recent literature of workplace justice\textsuperscript{18}. In other words, the knowledge of the relationship between EI and OJ is still lacking in the body of literature.

Although there are few studies that have examined the impact of EI on OJ, those studies are mainly conducted in the Western context\textsuperscript{16, 18}. It should be cautioned that Western countries have different culture or practices as compared to Malaysia context, hence generalization is very limited. For example, Malaysia is a collectivist country, while Western countries practice individualism\textsuperscript{19}. It is important to gain insight on the antecedents that could affect OJ among Malaysian because collectivists tend to highly concern the level of fairness at their workplace\textsuperscript{20}. As far as we know, there is no previous study conducted in Malaysian context to examine the impact of EI on OJ, specifically in manufacturing sector. In addition to that, although previous studies have examined the impact of EI on OJ, there is a lacking of empirical evidences that used Mayer and Salovey’s Ability-based EI Model to measure the impact of EI to OJ\textsuperscript{16}. Hence, there is a calling for further empirical study that examine the impact of EI’s dimensions to OJ, using ability-based EI model in Malaysian manufacturing context.

A direct relationship between EI and OJ was found in few previous studies. It was claimed that EI has significant influence in affecting employees’ perception on OJ through the personality of employees\textsuperscript{18}. Besides, it was also revealed that EI is able to significantly influence employees’ interpretation on organizations’ fairness matters, then affecting their perception of OJ\textsuperscript{16}. It is believed that employees with higher EI tend to perceive positive OJ due to their abilities in managing and regulating their emotions when they faced injustice at workplace\textsuperscript{21}. The proposed conceptual framework is developed for this conceptual paper based on the findings in previous empirical studies, as shown in Figure 1. Based on the findings above, five hypothesis are stipulated as below.

**Hypothesis 1:** There is a significant impact of EI on OJ.

**Hypothesis 2:** There is a significant impact of Regulation of Emotion on OJ.

**Hypothesis 3:** There is a significant impact of Self-Emotion Appraisal on OJ.

**Hypothesis 4:** There is a significant impact of Others’ Emotion Appraisal on OJ.

**Hypothesis 5:** There is a significant impact of Use of Emotion on OJ.
Methodology

Research Design and Samples

In order to test all the proposed hypotheses, the authors intended to adopt quantitative approach. When researcher plans to test objective theory via examining the impacts among variables, he should use quantitative research method\textsuperscript{22}. Besides, it is claimed that, quantitative research is well-known to be used to examine the impacts between variables\textsuperscript{23}. Hence, in order to examine the impacts between the dimensions of EI and OJ, the authors employed quantitative approach. This will be a cross-sectional study, where the authors will collect the data at one time only. The authors will employ survey method, where questionnaire will be distributed to collect the response of selected respondents. The respondents of present study will be the employees from Malaysian manufacturing companies. Multi-stage sampling method will be adopted in the stages of choosing samples.

Measures

Emotional Intelligence. This study adopted Wong and Law\textsuperscript{24} Emotional Intelligence Scale (WLEIS), where the concept of WLEIS is similar with the concept of Mayer and Salovey EI Ability Model. The instrument consists of 16 items that measure each dimension of EI, namely Regulation of Emotion (ROE), Self-Emotion Appraisal (SEA), Others’ Emotion Appraisal (OEA), and Use of Emotion (UOE). The sample of the items is, “I am able to control my temper so that I can handle difficulties rationally”. Each item is given five Likert scales, from 1=strongly disagree to 5=strongly agree. The construct of EI was tested with reliability, and it scored 0.89, indicating a high reliability value.

Organizational Justice. This study adopted Colquitt\textsuperscript{13} Organizational Justice Scale, where it consists of four dimensions, namely distributive, procedural, informational, and interpersonal justice. The instrument consists of 20 items that measure each dimension of OJ. The sample of the item is, “My outcome is justified, given my performance”. Similarly, each item is given five Likert scales, from 1=strongly disagree to 5=strongly agree. The construct of OJ was tested with reliability, where it scored 0.86, indicating a high reliability value.

Data Analysis

Structural model will be used to analyse the data. This is because majority of the researchers agreed that structural model is suitable to be employed when the researchers need to explain the impacts of variables by using path diagrams\textsuperscript{25}. The structural model’s validity is assessed through multicollinearity, coefficient of determination ($R^2$), effect size and path coefficients. In order to test the hypotheses, the author will make a decision on the acceptance or rejection of hypotheses, depending on the result of path coefficients, $t$-values, as well as $p$-values with a significance level of 0.05.

Conclusion

To summarize, the impact of EI on OJ has been less explored by the past studies. Hence, this conceptual paper proposed a framework to illustrate the influence of the dimensions of EI towards OJ. The authors attempts to discover the significance of EI dimensions’ impact on the perceptions of OJ among the employees in Malaysian manufacturing companies. It is believed that interesting insight could be provided since there is a lacking of study that examined the impact of EI’s dimensions on OJ, especially among the respondents in the context of
Malaysian manufacturing sector.

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

**Funding:** Financial assistance was provided by Zamalah Universiti Teknologi Malaysia.

**Acknowledgement:** All authors contributed equally to the conception and design of the study.

**Ethical Clearance:** Done by Research Committee

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The Psychological Distress among Youths in Nigeria

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Abstract

Studying at school under specific distress condition such as war requires resilience and persistence among students to survive. This paper is written with the intention to highlight war experiences among Nigerian youth at school under the pressure of war condition. Studies have shown that they struggle in their learning at school. The tension between educational requirement and the safety of life become common dilemma that most of Nigerian students were facing in their everyday schooling life. The difficulties have been found by many studies to affect not just to their schooling life but their personal development. They are to develop emotional and psychological problems that affect their personality development which manifest the symptoms of psychological distress such as irritability, insomnia, sleeping disorders, fear, aggression, confusion and an inability to concentrate. These developments facilitated the emergence of behavioural problems that lead to the prevalence of negative attitude towards schooling among secondary school students in Nigeria. As a result it affect the amount of motivation to display by youths in order to achieve success in school activities and all other extra-curricular activities that aims at development of social interaction among youth irrespective of their socio-economic, tribal or religious inclination. The discourse is intended to highlight what need to be done in order to assist how the youth can survive in their educational life at school under the hard condition like war experiences.

Keywords: youth, psychological distress, psychological trauma, posttraumatic stress disorder, trauma, Nigeria.

Introduction

Nigeria as a nation witnessed various ethno religious and political instabilities since from the return of democratic government in 1999. The emergence of the country as a poverty-stricken nation as a result of poor leadership facilitated the emergence of various extremist groups seeking to establish an independent and sovereign state out of Nigeria. The nation has been considered as one of the countries in Africa that is currently facing security challenges in form of kidnapping, arm bandits and also the fast-growing nation in term of militant activities¹.

The Niger Delta region serve as main source of Nigeria national income and the hub of oil and gas production in Nigeria that accounts for 95 percent of foreign exchange earnings, 95 percent of national budget, 80 percent of government revenue and over 80 percent of national wealth². But yet, the region remains neglected without infrastructural facilities and effective health care delivery system. Given this, the people of the region believe that they are carrying the burden of developing other regions of the country whilst their region is neglected and considered backwardness in term of human and material resources in the country. This development promotes the emergence of terrorist groups carrying out various attacks in order to set themselves free against economic marginalization of their region.

The emergence of the region as a pillar supporting the economy of the country and at the same time the most neglected areas in term of infrastructural development. This greatly opened the way for the emergence of various militant groups such as Niger Delta Volunteer

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The Northern region characterize with a unique form of violent that created an indelible impact on the entire educational system of many students in the region. The conflict in this zone is known as Boko Haram crisis that is purely meant to put a stop or stumbling block against Western education system and Western Euro-American Christian ideology. The words Boko Haram are Hausa terms which mean western education is forbidden. The sect emphasized more on the child to be educated in Islamiyya schools across the northern region. The kind of education to be imparted must be in line with the teaching of Islam. The core education system that involve mixing boys and girls in one class or school must be stopped; wearing of shirt and short skirt by girls that appear half naked must be abolished. The sect emphasize greatly on the complete adherence and tolerance of Islamic law in the search of Islamic knowledge. The knowledge acquired must be employed in the service of Islam and for the wellbeing of entire humanity.

The sect like the other militants groups draws its members mainly from disaffected youth, unemployed high school and university graduates, and destitute children. The activities of the group became even more dangerous and threat to security challenges in 2004 when students, especially in tertiary institutions in Borno and Yobe states, withdrew from school, tore up their certificates, and joined the group. The activities of the sect affected greatly the emotional and psychological well-being of many students in Nigeria. The exposure of children to various forms of war atrocities such as the loss of loved ones, displacement, hunger and famine, and the fear of school attack that may likely to occur at any time of the day during the school hours has negative impact for student’s mental health and psychological well-being. Children are affected by Psychological problems such as irritability, insomnia, sleeping disorders, fear, aggression, confusion and an inability to concentrate, which greatly affects their ability to have a loving relationship with their family, friends and to perform well in school.

Source of Psychological Distress Among Youth in Nigeria

The Boko Haram insurgency is one of the obnoxious events in the history of Nigeria. The insurgency characterized with various forms of atrocities melted on innocent youth irrespective of genders, religious or tribal inclination in Nigeria. As a result of this development an increasing number of children from schools and outside schools especially the “Al majirai” street boys or abandon children have also been forcefully recruited by rebel group mostly in conflicted affected areas. These children carry out diverse multiples roles, including fighting, and sometime they are as used as human shield against their leaders who were assign in fore front during the course of fighting with the government forces. More so, female child soldiers were used for sexual slavery rendering various sexual services to the militant and sometime they save as the wives of the commanders or reward to those who fight bravery and cause serious ailment to the enemy or rival.

It is important to note that the highest numbers of girls abducted by the Boko Haram in one single attack of Government Secondary School Chibok in Borno state was 276 girls mostly ranging between the ages of 17 and 23. The incident became one of the most remarkable events in the history of the world in which over 200 girls were abducted in one single attack. There was record of frequent cases of sexual abuse and harassment in the concentration camp of Boko Haram. The abducted girls were turn in to sex machine, the prevalence of unwanted pregnancy and sexually transmitted diseases.
like chlamydia, genital herpes, gonorrhea, HIV/AIDS, syphilis and trichonomiasis were common among the abducted girls. Studies conducted to explore the health consequences of the youth that were subjected to sexual abuse and harassment found that the victims of sexual harassment develop some symptoms of psychological distress such as unhealthy behaviours may occur indirectly as a result of the violence, common among these include increased reports of fear, anxiety, insomnia, headaches, aggression, anger, hostility, poor self-esteem, and suicide attempts. These facilitated seriously in the emergence of psychological trauma, and post-traumatic stress disorder among the war victims subjected to various kinds of atrocities. As reported by one of the victims of sexual harassment regarding the group that:

“(they) went from house to house. When they arrived at our house, they wanted to marry me, and I refused. I told them I wouldn’t marry anyone without my father’s consent. They came back again at night and kidnapped me.” Aisha (17) was forced to “marry” a fighter, and she became pregnant. “I hated the baby,” she said, but a woman she didn’t know showed her kindness and taught her to love her son. “She preached to me about his innocence.” —Reported by Larisa Epatko, PBS News hour, October 19, 2016.

It is common for victim of unwanted pregnancy by force is more predictive of a mother at-risk for the prevalence of mental health and behavioural problems than other types, because she will uncared without proper needed for the wellbeing of both the mother and infant, but little research has examined the question of “severity” of unwantedness empirically. Identifying a pregnancy as unwanted was associated with the highest rates of maternal depressive symptoms, perceived stress, and negative paternal and social support.

There are a number of possible consequences that are likely to suffer by women and their children of unwanted pregnancies within their community over a longer period of time. Psychologically, women that become the victim of unwanted pregnancies might be at-risk for poor psychological well-being during and after the perinatal time. The prevalence of psychological disorders, such as perinatal depression, can over a period of time negatively affect parenting and relationship domains. In addition, unintended pregnancies are associated with prenatal and perinatal risks for the infant’s health and developmental wellbeing, such as prematurity, low birth weight, and lower likelihood of being breastfed.

Years of war in Nigeria especially during the peak of Boko Haram insurgency weakened the entire health systems in Borno state and contributed significantly to a long-term deterioration in infection control practices. The failures for effective and efficient management of health sector in the state tend to have direct health consequence that cause drastic increase in infant and maternal mortality cases. Likewise, there also a range of other socio-economic consequences that will affect people’s health.

The disruption in agricultural activities due to the frequent attacks carried by the Boko Haram insurgents on villagers that depend on agriculture at subsistence level means that food insecurity has deteriorated which directly has negative consequences on peoples’ health and emotional wellbeing. Studies show that food insufficiency is associated with higher prevalence of poor health conditions, including stomachaches, headaches, and cold; and that severe hunger can predict chronic illness among both preschool and school-age children. It also contribute to toxic stress – the strong, unrelieved activation of the body’s stress management system.

**Conclusion**

During the period of war or insurgency many youth in Nigeria particularly in Borno state lived in unhealthy and dangerous situation. The problems posed by the war affect every aspect of human life. There were constant lacks of electricity, deterioration of health sector, lack of safe drinking water and frequent kidnapping and abducting of secondary school students either in the school or their way. The attacks carried out on schools by the insurgents using explosive weapons or through employing young girls in order to carry out suicide bombing serve as the distressing condition that negatively affect the emotional and psychological wellbeing of most secondary school students in Borno, state Nigeria. These development results in the emergence of ill health situation characterize with frequent headaches, stomachache, frequent high fever among youth mostly living in the volatile areas and concentration camps.

It is recommended that in order to assist youth who experiencing such distress like war in their educational life we should consider a proper care and concern, considerate and responsible teachers, parents and other
members of the society that willing to be with them along the way. Several suggestions as follow are worth to be considered:

There is the need to establish functional guidance and counselling centre in schools to address some of the psychosocial problems. This will help to instil confidence among the victim that will help them to develop positive attitude.

Government should encourage various programme using mass media aim at enlighten the people the roles to play in solving out some of the psychosocial problems associated with war in Nigeria.

There is the need for taking proper care for those who suffer from life threatening illness that result from school attacks and if possible they should be given free medical treatment until they regain to their normal condition.

Special classes or schools should be established for those with severe psychosocial problems that cannot commensurate with normal schooling.

Conflict of Interest: NIL

Source of Funding: Self source

Ethical Clearance: Done research committee

References


Physical Activity Among Malaysian University Students: The Motives

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Abstract

Regular activities among students are always required. Studies have shown that regular activities among students are related to the fitness, focus and attention in the learning activities, student performance and attitudes. The main issue to this is that how far and how much the students willing to spend their time to engage in the physical activities on a regular basis. This study highlights the nature of students' physical activities around the campus, especially during their free time, such as weekends. The sample of the study was students in one research universities in southern part of Peninsular of Malaysia. 628 students male and female were involved in the study including various department and programme of studies. It was found that most of the participants were casual types of exerciser. Male is found to be more frequent to do physical exercise as compared to his female counter part. The motives of the activity were mostly on friends. Hence, it functions as an accelerator of the physical activities among students. It is suggested that in order to increase the possibility of the students to engage in such activities are to utilise the friends factor. The findings support the previous findings that regular physical activities accelerate the potential of healthy life among students.

Keywords: Physical activities, motives, student, student performance, friends

Introduction

It is suggested that the regular exercise will increased potentially the personal health, including reducing the risk of chronic diseases such as hyper tension, diabetics, cholesterol and alike. Consistent practices of regular exercise are proven to improve the personal mental health, social interaction and emotionally stable. It is speculated that inactivity promote obesity, heart disease and other chronic conditions. Similarly, it also reported where physical activities if done correctly and regularly will affect the personal psychological and social health which in turn improving the wellbeing and reducing stress and distress. In earlier study suggested that the physical inactivity accelerate the potential of suffering chronic diseases, whereas the active life is predicted to prevent or delay for chronic diseases. Research who was studying the older people concluded that those who engaged in intermediate and high physical activity significantly lowered the utilisation of health care and expenditure as well as lowering the prevalence of chronic diseases.

Context of Study

Regardless of the age and situation it is argued that the physical activity have the potential to increase if not to improve the personal health. With consistent and regular physical activities the individual have the opportunity to explore not just his physical benefits but also social, mental and psychological benefits.

In regards to student context, the similar perspective can also be derived. As students they are required to focus to their learning activities so that they can graduates without any problem. Physical fitness, mental strength, a stable psychological and socially adaptable to name a few is the basic requirement for active students. By having such competencies and capabilities they are expected to engage actively in their daily teaching and
learning activities. It is indicated that in order to have such energy to devote the focus to their very demanding learning activities, the students require maintaining their physical, mental and psychological in check. One of the activities is regular physical exercise.

Studies have shown that students who practiced regular physical activities have the potential to perform and engage actively in their learning. Researcher 5 defined that the physical activity is related to the motives and by understanding the motives it will increase the potential of higher level of involvement. In addressing the effect of physical activity among students, 6 suggested that the physical activity had a positive effect on improving task and reducing off-task classroom behaviour. In other word they concluded that the classroom-based physical activity have positive impacts on academic-related outcomes. Researcher 7 also found that the physical activity is significantly correlated to the school achievement.

Method

This study is conducted to explore the motives of engaging in the regular activities among students in one Research University in Malaysia and to measure how it affect to their learning performance. A structured cluster random sampling was executed to select the participant for the study. A total of 628 participants across the universities participate in the study. Descriptive analysis was conducted to identify the motives for engaging in regular physical activities around the campus.

Results

The category of the physical activity among participants were categorised into four that are ‘very active’, ‘active’, ‘casual’ and ‘leisure’. The data showed that the physical activities among students are categorised as casual activity which contributed 41.5% (261 participants) which is almost halve of the total participants. They spent times on physical between 1 – 2 times per week. The second group was the active group which contributed 29% (182 participants). Surprisingly the very active group of participants contributed quiet a big portion of percentages at 16% (100 participants). Unfortunately there are also a big number who just engaged in the physical activities mostly between 1 – 3 times per week. However the significant number of participants who engaged in what is consider as almost regular at 69 (11.0 %) participants is also recorded. Table 1 below showed the distribution of the physical activities among students.

<table>
<thead>
<tr>
<th>Times</th>
<th>Regularities</th>
<th>Frequency</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Everyday</td>
<td>VERY ACTIVE</td>
<td>100</td>
<td>16.0</td>
</tr>
<tr>
<td>6 times a week</td>
<td>ACTIVE</td>
<td>182</td>
<td>29.0</td>
</tr>
<tr>
<td>5 times a week</td>
<td>CASUAL</td>
<td>261</td>
<td>41.5</td>
</tr>
<tr>
<td>4 times a week</td>
<td></td>
<td>85</td>
<td>13.5</td>
</tr>
<tr>
<td>3 times a week</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2 times a week</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Once a week</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Once a month</td>
<td>LEISURE</td>
<td>628</td>
<td>100.0</td>
</tr>
</tbody>
</table>

If we look further by comparison between gender, the tendency to engaged to the physical activities are moving into an opposite direction between male and female. The distribution of the percentages among male shows that the regularities are increased in the frequency of the activities from less to more frequent. Whereas among female the number is decreased from more frequent to less frequent. However the bigger portion for both still the casual category. Table 2 below explain the distribution of physical activities between male and female in comparison.

<table>
<thead>
<tr>
<th>TIMES</th>
<th>Everyday</th>
<th>6 per week</th>
<th>5 per week</th>
<th>4 per week</th>
<th>3 per week</th>
<th>2 per week</th>
<th>1 per week</th>
<th>1 per month</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>26</td>
<td>15</td>
<td>34</td>
<td>42</td>
<td>50</td>
<td>45</td>
<td>46</td>
<td>14</td>
<td>272</td>
</tr>
<tr>
<td>Female</td>
<td>11</td>
<td>3</td>
<td>11</td>
<td>27</td>
<td>63</td>
<td>87</td>
<td>83</td>
<td>71</td>
<td>356</td>
</tr>
<tr>
<td>Total</td>
<td>37</td>
<td>18</td>
<td>45</td>
<td>69</td>
<td>113</td>
<td>132</td>
<td>129</td>
<td>85</td>
<td>628</td>
</tr>
</tbody>
</table>
Further analysis on the motives of the activities shown that the element of ‘friends’ play important roles in encouraging the students to do physical activities. By doing the activities they agreed that the chances to be with their friends are higher. Most of the participants also feels happy with they are with their friends doing the activities together. Table 3 below shows the distribution of responses based on the motives of the physical activities among students.

Table 3  Motives of the Physical Activities Among Students

<table>
<thead>
<tr>
<th>MOTIVES</th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>To be with friends</td>
<td>628</td>
<td>5.6354</td>
<td>1.25878</td>
</tr>
<tr>
<td>Like to be with other people</td>
<td>628</td>
<td>5.4745</td>
<td>1.37568</td>
</tr>
<tr>
<td>To meet new people</td>
<td>628</td>
<td>5.2866</td>
<td>1.46757</td>
</tr>
<tr>
<td>To improve myself</td>
<td>628</td>
<td>5.6847</td>
<td>1.23581</td>
</tr>
<tr>
<td>Invited by friends</td>
<td>628</td>
<td>4.9236</td>
<td>1.70950</td>
</tr>
<tr>
<td>To be happy with friends</td>
<td>628</td>
<td>5.4745</td>
<td>1.31158</td>
</tr>
<tr>
<td>Easily to be approached</td>
<td>628</td>
<td>5.1290</td>
<td>1.52938</td>
</tr>
<tr>
<td>Valid N</td>
<td>628</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Discussion

It shows from the result that the physical activities among student in one research university in Malaysia are varies. Although there are some who engaged in the physical activities very actively, but most of them are more to active to casual type of physical exerciser. In regards to gender, the tendency to do physical activities were moving to opposite continuu between male and female. The motives of the activity also associated to the social factor which is to get along with friend in which they can feel happy.

The findings suggest similar notion as previous studies that the element of friends play an important role in encouraging students to do physical activities at their given free time (see 5, 6. It is suggested that in order to encourage student more frequent to engaged in physical activities at a regular basis, the element of motives (in this context of study is friends) should be considered. This aligned to what being proposed by 5 that the motives of the activity plays important role for the students to engaged on regular basis.

Being with friends will also make life more interesting. As students they sometimes requires break from their very demanding activities in the classroom. As suggested by 6, the physical activity had a positive effect on improving task and reducing off-task classroom behaviour. Whether that be direct or indirect the impact of the activities on the academic-related outcomes is potentially higher. Researcher 7 also found that the physical activity is significantly correlated to the school achievement. Having active and interesting break from the study will charge their energy to do more in the learning.

Conflict of Interest: NIL

Source of Funding: Self source

Ethical Clearance: Done research committee

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Big Five Personality and Eating Disorder Symptoms among Students in a Malaysian Public University: A Cross-Sectional Study

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Abstract

Eating disorders are arising in Malaysia at alarming rate, yet studies examining eating behaviour such as eating disorder symptoms in Malaysia is still at infancy stage. Since personality traits can affect an individual’s health-related behaviour, it is crucial to explore its association with eating disorder symptoms. This study explores the link between the Big Five Personality and eating disorder symptoms among university students at a Malaysian public university. A total of 139 respondents participated in this cross-sectional study. Big Five Inventory (BFI) was employed to measure personality traits, while an abbreviated 26-item version of Eating Attitude Test (EAT-26) was used to examine eating disorder symptoms. Data was analysed using Statistical Package for Social Science version 22.0. The findings revealed that there is a weak positive association between neuroticism and eating disorder symptoms (r=0.266, p<0.01). a weak negative association was recorded for agreeableness and eating disorder symptoms (r= -0.228, p<0.01) and between conscientiousness and eating disorder symptoms (r= -0.18, p<0.05). No significant association was recorded for extraversion (r= -0.008, p=0.926) and openness to experience (r= -0.008, p=0.890) with eating disorder symptoms among the university students. This research concludes that several but not all components of the Big five personality are associated with eating disorders symptoms among university students.

Keywords: Big Five Personality; Eating Disorders Symptoms; University students; Cross-sectional

Introduction

Many researchers have supported that personality was an important factor that affects eating disorder symptoms of students [1-8]. Individual personality traits and eating styles has impact on the extent to which individuals adhere to dietary guidelines and choose recommended rather than not recommended food on a regular or daily basis [3]. It has been reported that there’s a probable link between personality and eating behaviour over a period and suggested that personality traits has impact on consuming healthy diet as well as maintaining a healthy weight [9].

Of this, university students are potentially important targets in the effort of promoting healthy lifestyles in order to reduce the risks of lifestyle-related disorders later in life [10]. This is because individuals who undergoes the transition period from adolescence to young adulthood are facing pressures from many dimensions, such as coping with their studies and handling personal, social or family relationship. Some studies reported that university students experienced high level of eating disorder symptoms [10-13], have inadequate nutrient intake [10] and have low physical activity [12], especially when they are bothered with psychosocial problems.

In addition, studies examining eating behaviour such as disordered eating in Malaysia is still at infancy stage
A cross-sectional study conducted in Klang Valley, Malaysia found that the prevalence of underweight among university students was quite high (14.3% males and 22.4% females). The study also found that 14.0% of males and 12.3% of females are categorized as overweight or obese. Another study conducted in Universiti Sains Malaysia also reported that 27.4% of the students were underweight, 9.6% of them were overweight and 1.8% were obese. Therefore, eating problems are arising in Malaysia at alarming rate, particularly among university students.

A number of research supported that personality was an important factor that affects eating disorder symptoms of students. Notably, the World Health Organization claimed that a person’s personality may be a risk factor for an unbalanced diet, and this may result in the increased likelihood of developing chronic diseases such as cardiovascular diseases, cancer or diabetes. Personality traits was also reported to have a strong relation towards some eating disorder symptoms, such as emotional and external eating as well as restrained eating and obesity. Therefore, investigating the link between personality and eating disorders symptoms is imperative.

Although research on the association between personality and eating disorder symptoms conducted overseas are not uncommon, research conducted among Malaysian students is scarce. Even though there are few research carried out in other university, there is no similar research has been conducted among the university in the southern region of Malaysia. Given the importance of the association between traits of openness to experience, conscientiousness, extraversion, agreeableness and neuroticism with eating disorder symptoms, this study was aims to investigate the association between personality and eating disorder symptoms among university students, this study aims to investigate the link between Big Five personality and eating disorder symptoms among university students in a Malaysian public university.

Material and Method

A total of 148 university students from a Malaysian public university provided informed consent and was recruited for this cross-sectional study. Big five personality was measured using the Big Five Inventory which contained of 44 items. This questionnaire was used to measure the five components of Big Five Personality; Extraversion, Agreeableness, Conscientiousness, Neuroticism, and Openness to Experience. The eating disorders symptoms was measured using an abbreviated 26-item instrument of The Eating Attitude Test (EAT-26). However, the result of the instrument does not provide a diagnosis, it only reflects on the presences of symptoms that are consistent with a possible eating disorder. Statistical Package for Social Sciences (SPSS) version 22.00 was used to analyse the results. Descriptive analysis was used to identify the demographics information while Pearson Correlation was used to investigate the association between Big Five personality and eating disorder symptoms.

Table 1 below demonstrated the findings from data collection for the demographics section.

<table>
<thead>
<tr>
<th>Table 1 Demographics Information</th>
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<tbody>
<tr>
<td></td>
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<tr>
<td>Gender</td>
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<td>Female</td>
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<td>Ethnicity</td>
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<td>Malay</td>
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<td>Chinese</td>
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<tr>
<td>Indian</td>
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<tr>
<td>Others</td>
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<td>Age</td>
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<tr>
<td>18-20</td>
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<td>21-23</td>
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<tr>
<td>24-26</td>
</tr>
<tr>
<td>27-29</td>
</tr>
<tr>
<td>Body Mass Index</td>
</tr>
<tr>
<td>Underweight</td>
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<tr>
<td>Normal Weight</td>
</tr>
<tr>
<td>Overweight</td>
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<tr>
<td>Obese</td>
</tr>
</tbody>
</table>

The association between Big five personality and eating disorder symptoms are shown in Table 2. The findings demonstrated there is a weak positive association between neuroticism and eating disorder symptoms (r=0.266, p<0.01). In contrast, a weak negative association was recorded for agreeableness and eating disorder symptoms (r= -0.228, p<0.01) and between conscientiousness and eating disorder symptoms (r= -0.18, p<0.05). No significant association was recorded for extraversion (r= -0.008, p=0.926) and openness to experience (r= -0.008, p=0.890) with eating disorder symptoms.
disorder symptoms among the university students.

Table 2: The association between Big Five Personality and eating disorder symptoms

<table>
<thead>
<tr>
<th>Big Five Personality</th>
<th>Mean (SD)</th>
<th>Eating disorder Symptoms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Extraversion</td>
<td>3.13 (0.60)</td>
<td>-0.008 0.926</td>
</tr>
<tr>
<td>Agreeableness</td>
<td>3.55 (0.41)</td>
<td>-0.228** 0.007</td>
</tr>
<tr>
<td>Conscientiousness</td>
<td>3.17 (0.53)</td>
<td>-0.180* 0.034</td>
</tr>
<tr>
<td>Neuroticism</td>
<td>3.00 (0.65)</td>
<td>0.266** 0.002</td>
</tr>
<tr>
<td>Openness to Experience</td>
<td>3.37 (0.60)</td>
<td>-0.012 0.890</td>
</tr>
</tbody>
</table>

*Note: *Correlation is significant at the .05 level, **Correlation is significant at the .01 level.

Discussion

The current research postulates that there is a weak positive association between Neuroticism and eating disorder symptoms among university students, which is in line with a number previous research 1, 7, 25-28. Neuroticism are found to be the principal contributor of eating disorder symptoms 29, and have a significant positive correlation with eating disorder symptoms 3. One of the study suggested that high scorer of Neuroticism has higher risk in developing disordered eating behaviours, and the impulsiveness facets of Neuroticism are found to be the predictor of eating disorder subtypes35. For instance, dieting and bulimia subscales of Eating Attitude model 30 are significantly correlated with Neuroticism. A study among 323 psychology students from a Canadian university found that higher level of neuroticism lead to higher body dissatisfactions, thus, resulting in the engagement of disordered eating behaviours28. It was argued that people who are more vulnerable to stressful or emotional situations have higher tendency to eat more food to feel secure or comfortable31. In such, Multidimensional Model 32 has further explain the association of Neuroticism that contribute to development of eating disorder symptoms through negative affect under personal factors.

Next, the findings revealed that there is a weak negative association between Agreeableness and eating disorder symptoms, in line with several previous research 7, 21, 28, 31. It was reported that agreeableness were negatively related to unhealthy eating behaviour such as uncontrolled eating 21, and emotional eating 31. It was argued that the regulation of healthy eating attitude were directly and positively associated with Agreeableness33. Agreeableness is also negatively associated with BMI, whereby obese individual who are more likely to displayed disordered eating has lower agreeableness score21. Another research also suggested that obese women that engaged in dieting possess higher level of agreeableness than those who are not dieting 4. One of the fundamental causal factor of eating disorder symptoms, body dissatisfaction were found to be negatively related to agreeableness 28.

Likewise, a weak negative association was also found between Conscientiousness and eating disorder symptoms in the current study. The findings are similar to several previous studies 7, 21, 25, 28. It was claimed that higher level of eating disorder symptoms are associated with low level of conscientiousness 7, 28, and it is negatively related to unhealthy eating behaviour 21. Moreover, another study has proposed that the dimension of oral control has no significant correlation with overall Conscientiousness score, while the dieting subscale are correlated significantly with self-discipline facets of Conscientiousness 25. The correlation are further explained by the findings that people with high level of conscientiousness are more likely to adopt regulatory retrained eating, less likely to practice external eating and emotional eating, and tend to practice healthier diet such as high consumption of fruits and vegetables 3.

No significant association was recorded for Extraversion and eating disorder symptoms. Contradictorily, previous research has proven that Extraversion was positively and significantly associated with eating disorder symptoms because of more embedded in social nets28, thus exposed more to tasty foods with great smell that lead to external eating 3. Extraversion lead to endorsement of the importance of thin body from their active engagement in social network 29, which has been highlighted as a causal factor in both developmental model of eating disorder symptomatology 32, 34. On the other hand, some researchers proposed that there was a significant negative correlation between extraversion and eating disorder symptoms 23, whereby lower scores on the extraversion facets of assertiveness and positive emotions contributes significantly to higher level of eating disorder symptoms. One study among 196 undergraduates students reported that the respondents
with greater risk of eating disorder symptoms are those who scored high in neuroticism and low in extraversion. Interestingly, the research found that Extraversion are found to be unrelated to eating disorder symptoms among those with low level of neuroticism\textsuperscript{37}. Therefore, in line with that research it can be concluded that Extraversion and eating disorder symptoms has no association in the current study because the students are reported to have the lowest scores in Neuroticism.

Moreover, the current study also recorded no significant association between Openness to Experience and eating disorder symptoms. This is consistent with several past studies \textsuperscript{3, 21, 28, 33}. Meanwhile, this findings is contradicted with one study conducted among 289 psychology students that reported that openness to experience are weakly and negatively correlated to cued eating \textsuperscript{7}. However, although openness to experience do not related to eating style and eating disorder symptoms, it is proven that openness to experience plays an important role in individuals' adherence to a healthy and balanced diet \textsuperscript{1}.

**Conclusion**

The aim of the study is to investigate the association between personality and eating disorder symptoms among university students. A weak positive association was found between neuroticism and eating disorder symptoms. Agreeableness and conscientiousness, the association were weak negatively related to eating disorder symptoms. No association was recorded between extraversion and openness to experience with eating disorders symptoms. Therefore it can be concluded that several but not all Big five personality domain is associated with the eating disorder symptoms of an individual, particularly university students.

**Conflict of Interest Statement:** The authors declare that they have no conflict of interest.

**Source of Funding:** The author(s) received no specific funding for this work

**Ethical Clearance:** Research committee approval was obtained

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The Association between Emotional Intelligence and Depressive Symptoms Among Nurses in a Malaysian Private Hospital

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Abstract

Nurses are predisposed to depression due to the nature of their work, where it is emotional demanding. Since depression is a type of mood disorder, emotional intelligence is believed to act as a protective factor against depression among emotional labours. The purpose of this study is to investigate the association between emotional intelligence and depressive symptoms among nurses in a private hospital in Malaysia. A total number of 125 respondents participated in this cross-sectional study. Wong and Law Emotional Intelligence Scale was used to measure emotional intelligence among respondents whereas Center for Epidemiologic Studies Depression Scale-Revised (CESD-R) was used to measure depressive symptoms among respondents. The collected data was analysed by utilizing Statistical Package for Social Science (SPSS) version 22.0. This study had found a weak negative association between emotional intelligence and depressive symptoms ($r=-0.217$, $p=0.015$). Specifically, self-emotion appraisal ($r=-0.237$, $p=0.008$), use of emotion ($r=-0.209$, $p=0.019$) and regulation of emotion ($r=-0.242$, $p=0.006$) were found to have a negative association with depressive symptoms. On the other hand, others’ emotion appraisal was the only dimension which showed that it does not have significant association with depressive symptoms ($r=0.013$, $p=0.882$). It can be concluded that nurses who possesses higher level of emotional intelligence tend to experience lower level of depressive symptoms. Hence, any effort of increasing the level of emotional intelligence among nurses should be done in order to lower the risk of depression.

Keywords: Emotional Intelligence; Depressive Symptoms; Nurses; Cross-sectional

Introduction

Over the past several years, emotional intelligence (EI) had received much attention as a factor that was useful in understanding and predicting individual’s performance at workplaces, home and even at schools. It was argued that individuals who possess the ability to maintain emotional balance using emotional skills are better adjusted to their social circle, enjoy better quality of life and are physically and psychologically healthy. Mayer and Salovey defined EI as the ability to monitor one’s own and others’ feelings and emotions, to discriminate among them, and to use this information to guide one’s thinking and actions. Therefore, EI is like an umbrella that captures a broad collection of interpersonal and intrapersonal skills. EI plays a very important role in determining one’s life success.

Unsurprisingly, recent studies had shown that EI is highly correlated with psychological health and wellbeing. People with various symptoms of depression generally reported lower emotional intelligence scores. Depression is a common illness worldwide, with...
more than 300 million people affected. Depression is a serious mental health illness to the extent where it can cause the affected person to suffer greatly and function poorly at work, at school and in the family. At its worst, depression can lead to suicide.

Undeniably, some jobs are more depression-prone than other occupations due to stress, unpredictable or long working hours and complexity of job nature. Healthcare workers, typically nurses were more prone to depression, with the risk twice more than the general public. Nurses can have irregular and long working hours with little sleep as well as much less personal time. Like other personal care professions, nurses may feel fulfilled in helping other people but having to face sickness and death every single day for a prolonged period of time. Among health workers, nurses were more likely to be reported depressed, since they had to deal with human suffering, pain, joy, sadness and they need to offer help to those who need their care.

It was claimed that emotional and physical exhaustion, workplace stress, together with feeling a lack of control had been shown to contribute to depression and nurses were reported to suffer depression at twice the rate of the national population. Moreover, other researchers proposed that the prevalence of depressive symptoms among health care professionals were high, which typically influenced by environmental stress as well as work process. Slowness in activities, disinterest, reduced energy, apathy, difficulty concentrating, recurrent negative thoughts, loss of capacity in planning and altering the perception of truth were evidence that signal depression among nurses.

Nursing personnel are regarded as a professional team with increased stress, anxiety and depression due to their work routine, where they were forced to cope with pain, sadness and death. Fatigue from an increased workload and inability of nurses to cope with emotional needs of patients or their families may increase their level of stress. EI is a key skill for nurses in patient care, and this skill may contribute to patient’s therapeutic relationship as well as the nurses themselves, in terms of their mental health.

Apart from that, several studies had investigated the association between EI and depression among nurses. For example, several researchers reported a negative linear correlation between EI and three examined emotional state (depression, stress and anxiety) among nurses. Existing findings had shown that EI played an important role in a profession that not only required technical expertise, yet mainly relied on the physical and psychological care of human beings. However, the role of EI in the development of the nursing profession have not yet been adequately studied, especially in Malaysia context. Only a few local studies in Malaysia explored the association between EI and depression, by having nurses as main population such as the study by Bakri and Ali. With the aim of filling this gap, the present study examines whether EI (self-emotion appraisal, others’ emotion appraisal, use of emotion and regulation of emotion) is associated to depressed mood in nurses in a Malaysian private hospital.

**Material and Method**

A total of 125 nurses from a Malaysian private hospital provided informed consent and was recruited for this cross-sectional study. Emotional intelligence was measured using the Wong and Law Emotional Intelligence Scale dimensions which consists of 16 items and four dimensions, known as self-emotion appraisal, others’ emotion appraisal, use of emotion and regulation of emotion. The depressive symptoms was measured using the 20-items Center for Epidemiologic Studies Depression Scale and had been revised to adapt the symptoms of major depression as according to Diagnostic and Statistics Manual of Mental Disorders Fifth Edition (DSM-5). Statistical Package for Social Sciences (SPSS) version 22.00 was used to analyse the results. Descriptive analysis was used to identify the demographics information while Spearman correlation was used to investigate the association between emotional intelligence and depressive symptoms.
Table 1 below demonstrated the findings from data collection for the demographics section.

### Table 1 Demographics Information

<table>
<thead>
<tr>
<th>Demographic Information (n=125)</th>
<th>Frequency (f)</th>
<th>Percentage (%)</th>
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<tbody>
<tr>
<td>Gender</td>
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<td></td>
</tr>
<tr>
<td>Male</td>
<td>18</td>
<td>14.4</td>
</tr>
<tr>
<td>Female</td>
<td>107</td>
<td>85.6</td>
</tr>
<tr>
<td>Age (year)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Below 20</td>
<td>4</td>
<td>3.2</td>
</tr>
<tr>
<td>20-30</td>
<td>66</td>
<td>52.8</td>
</tr>
<tr>
<td>31-40</td>
<td>29</td>
<td>23.2</td>
</tr>
<tr>
<td>41-50</td>
<td>20</td>
<td>16</td>
</tr>
<tr>
<td>More than 50</td>
<td>6</td>
<td>4.8</td>
</tr>
<tr>
<td>Year of Services</td>
<td></td>
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</tr>
<tr>
<td>Below 1</td>
<td>17</td>
<td>13.6</td>
</tr>
<tr>
<td>1-3</td>
<td>34</td>
<td>27.2</td>
</tr>
<tr>
<td>4-6</td>
<td>18</td>
<td>14.4</td>
</tr>
<tr>
<td>7-9</td>
<td>15</td>
<td>12</td>
</tr>
<tr>
<td>More than 9</td>
<td>41</td>
<td>32.8</td>
</tr>
<tr>
<td>Average Working Hours per Day</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less than 7</td>
<td>14</td>
<td>11.2</td>
</tr>
<tr>
<td>7-9</td>
<td>86</td>
<td>68.8</td>
</tr>
<tr>
<td>More than 9</td>
<td>25</td>
<td>20</td>
</tr>
<tr>
<td>Total</td>
<td>125</td>
<td>100</td>
</tr>
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</table>

The association between emotional intelligence and depressive symptoms are shown in Table 2. Primarily, there is a significant and negative association between emotional intelligence and depressive symptoms among nurses, yet it is weak (r=-0.217, p=0.015). In other words, when nurses are having higher level of emotional intelligence, they tend to report lower level of depressive symptoms. Looking particularly into each EI dimensions, there is no significant association between others’ emotion appraisal and depressive symptoms (r=0.013, p=0.882). In contrast, remaining EI dimensions have demonstrated a significant and negative association with depressive symptoms, whereby self-emotion appraisal (r=-0.237, p=0.008), use of emotion(r=-0.209, p=0.019) and regulation of emotion (r=-0.242, p=0.006). In a nutshell, the result of correlation analysis indicates that there is a significant and negative association between emotional intelligence and depressive symptoms among nurses. Among all the EI dimensions, others’ emotion appraisal is the only variable that does not show correlation with depressive symptoms.

### Table 2: The emotional intelligence and depressive symptoms among nurses

<table>
<thead>
<tr>
<th>Variables</th>
<th>r</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self-emotion Appraisal and Depressive Symptoms</td>
<td>-0.237**</td>
<td>0.008</td>
</tr>
<tr>
<td>Others’ Emotion Appraisal and Depressive Symptoms</td>
<td>0.013</td>
<td>0.882</td>
</tr>
<tr>
<td>Use of Emotion and Depressive Symptoms</td>
<td>-0.209*</td>
<td>0.019</td>
</tr>
<tr>
<td>Regulation of Emotion and Depressive Symptoms</td>
<td>-0.242**</td>
<td>0.006</td>
</tr>
<tr>
<td>Emotional Intelligence and Depressive Symptoms</td>
<td>-0.217*</td>
<td>0.015</td>
</tr>
</tbody>
</table>

*Note: *p<0.05, **p<0.01; n=125
Discussion

Based on the research findings, there is generally a significant negative association found between emotional intelligence and depressive symptoms among the nurses. Similarly, previous literatures reviewed by researcher had broadly demonstrated a significant association between emotional intelligence and depressive symptoms. For instances, there was a negative linear correlation among the three examined emotional state categories (depression, stress and anxiety) and all of the relative EI categories (recognition and expression of emotions, use of emotion to facilitate thoughts as well as emotional control) among nursing personnel. Additionally, a study conducted to examine how emotional intelligence impacts on depression among professional caregivers showed that the higher the participant’s EI scores were, the lower they scored on the depression scale.

More particularly, the significant negative association between EI dimensions (self-emotion appraisal, use of emotion and regulation of emotion) with depressive symptoms of current study is congruent with the findings of several previous researches. Based on the summary of past studies, it can clearly be seen that emotion regulation, use of emotion as well as emotion clarity (can be referred as self-emotion appraisal) are the most crucial EI dimensions in determining level of depression. Regulation of emotion is negatively correlated with depression because individuals who possesses high ability to regulate own emotion can accurately perceive and appraise their emotional states, know how or when to express their feelings and can effectively control their mood states.

On the other hand, some researchers argued that higher ability of self-emotion appraisal and use of emotion are always associated with lower depressive symptoms whereby individuals reported greater ability to discriminate clearly among feelings. In this context, individuals’ capability of attending to own feelings can successfully allow them to facilitate their thought and making decision out of it.

Nevertheless, high level of self-emotion appraisal may often have a positive relation with depression, typically in the cases where individuals are overly paying attention on their negative emotions, also known as pathological attention. As a result, bias toward negative emotions can be considered as a trait marker of depressive symptoms. In other words, emotional perception without proper emotional regulation has rather negative consequences and may subsequently contribute to depression.

On the contrary, it was stated that clinically depressed patients tend to score low in understanding others’ emotions and this statement is supported by another research where significant negative correlation was found between late life depression and ability to accurately identify emotion in others. However, current research revealed that others’ emotion appraisal shows no significant association with depressive symptoms among nurses in Hospital X.

All in all, Wong and Law claimed that the EI dimensions self-emotion appraisal (SEA), use of emotion (UOE) and regulation of emotion (ROE) assess intrapersonal aspects of oneself whereas others’ emotion appraisal (OEA) evaluates interpersonal aspects. Interpersonal abilities are believed to be related to better personal or social relationship, while intrapersonal skills are expected to have relationship with subjective well-being, where high level of all these EI dimensions can generally lower the rate of depressive symptoms.

Conclusion

The aim of the study is to investigate the association between emotional intelligence and depressive symptoms among nurses in a Malaysian private hospital. In short, results of current findings had discovered that emotional intelligence is negatively correlated with depressive symptoms. Specifically, a very weak negative association are indicated between EI dimensions and depressive symptoms as according to the research’s findings (self-emotion appraisal, others’ emotion appraisal, use of emotion and regulation of emotion).

Conflict of Interest Statement: The authors declare that they have no conflict of interest.

Source of Funding: The author(s) received no specific funding for this work

Ethical Clearance: Research committee approval was obtained

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Teacher Well-being and Mental Health at Schools

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Abstract

Teaching is often characterised as a stressful profession and schools in general have paucity of desirability as a workplace. Teacher wellbeing and mental health has been the focus of numerous studies highlighting multitude of factors. The factors both positive and negative have a complex interplay, some residing within the control of teachers while some beyond. The article aims to highlight the most important factors affecting well-being and mental health of teachers in schools. It appears that both factors internally as well as externally affects the teacher well-being in their career life as a teacher at school.

Keywords: teaching profession, teacher well-being, mental health

Introduction

It is widely accepted that teachers are the most essential factor in school that contributes to student achievement, fulfilment and accomplishment. Likewise it is also recognised that teacher well-being is firmly connected to the quality of their work ¹³. Research has identified various reasons for poor retention of school teachers having connection with teacher well-being. Dated work from as far back as 2005⁴ reveals that if teachers have no sense of well-being at work- can experience a feeling that that they lack skills, which can lead to high levels of attrition and extreme stress. Over the last half a century, teaching has been perceived as being in the league of generally considered high-stress professions⁵. Unbearable workload, uncalled student behaviour, low pay, lack of career growth, unsatisfactory workplace environment, lack of understanding relationships with colleagues, pupils and administrators and a multitude of other problems plague education systems in major parts of the world⁶.

On the contrary, there is a real substantive link between employee well-being and its impact in the workplace. Employers now acknowledge that actively promoting well-being amongst the employees could reinforce positive results, the likes of increased productivity and quality⁷. Briner and Dewberry⁸ argue that improving school performance may also have a positive effect on the well-being of teachers and vice versa. Teacher well-being is specified to have an impact on student achievement or on school performance at the broader scale. Making a case for this, Briner and Dewberry⁸ found that teacher well-being accounted for 8 percent of the deviation of SAT (Standard Assessment Test) scores in the UK.

Teacher Well-Being

A number of studies have found teacher wellbeing to be significantly lower than other professional occupations such as health, social work, finance and human resources. While many scholars believe that individuals have responsibility for their own wellbeing, a numerous other factors over varying time periods can have a damaging impact on one’s wellbeing. Some of these factors are within one’s control while some are not⁹,¹⁰.

The rapidly changing interplay between teachers and their environment is shaped by perceptions of the teachers their aptitudes and the way they handle the environment¹¹. Even though the school environment is fundamental to the well-being of teachers, family contexts, colleagues and broader organizational, social,
environmental and cultural contexts interact with the prior to varying degrees. Increasingly, system and societal views, beliefs and administrative influences impact the well-being of educators. Lastly, the time of occurrence of events, choices and actions can play a key role in affecting the well-being of teachers. The following discussion is a glimpse into the most common individual and relational factors that affect the mental health of teachers in schools.

According to Grenville-Cleave and Boniwell\(^{12}\) a number of studies have stated well-being and control perceived by teachers to be substantially lower than that of non-teachers. Four themes central to control can be identified in literature- autonomy, authenticity, connection to others, and resilience. According to the authors at least some of the basic psychological needs of teachers remains unfulfilled, specially their need for autonomy, connectivity and competence. This has a negative impact on teacher self-efficacy\(^{12}\).

In a similar note, Fetherston and Lummis\(^{13}\) by analyzing qualitative data gathered from interviews of 11 secondary teachers and three senior level administrators in Western Australia came to conclusion that teachers follow a path to resignation that is very close to student attrition from school. The process involves being watched (surveillance), becoming labelled as abnormal, being subject to discipline, and eventually resigning. Likewise, Johnson and Birkeland\(^{14}\) from analysis of their longitudinal collected data in the United States confounded that teachers who left the profession within the first three years saw their careers as short-term occupations or had experienced frustration or a sense of failure. Studies from Europe, Australia and the USA suggest that teachers have become dissatisfied with burdensome administrative tasks and expectations for curriculum change, while at the same time have a sense of increased levels of accountability, surveillance and role conflict and the problems are most prominent amongst young and beginning teachers\(^{15-17}\).

With the decrease of self-efficacy, teachers sometimes lack resources to deal with negative emotions. A legion of published studies have recognized teaching as one of the most stressful occupations\(^{18-21}\). According to Curry and O’Brien’s\(^{22}\), teachers face both work and institutional stress on a daily basis. Their study sums up the most common educational stressors:

- Overly bureaucratic schools and education systems;
- Greater demand in service with little regards to limited school resources;
- Unrealistic expectations on teachers to handle difficult pupil behavior which includes misdemeanors, aggression, and lack of motivation in students;
- Dearth of time for planning;
- Overemphasis on accountability procedures to amplify efficiency;
- Marginalization of teachers from playing any role in policy-making;
- Teachers and school systems have also been affected by global stressors. Teaching is affected by the likes of terrorism, natural catastrophes, growing inequality in socio-economic conditions and shifting population demographics. To add to this, legal or federal policy regulations also contribute to increased levels of stress experienced by teachers in and out of work\(^{22}\).

Curry and O’Brien\(^{22}\) assert that if not addressed and resolved, the stress experienced by teachers may lead to a possible burnout. Burnout “is characterized by emotional fatigue, disengagement, irritability, and apathy resulting from the work environment”\(^{23}\). In addition, according to Maslach and Leiter\(^{24}\), burnout is the dislocation index between what individuals are and what they have to do. It results in depletion in principles, dignity, resolve and determination.

According to Jennings and Greenberg\(^{25}\) lack of supportive teacher-student relationships, effective classroom management, and successful social and emotional learning program implementation contribute to classroom climate that is not favourable to learning\(^{32,33}\). The deficit in teacher social-emotional competence and wellbeing may provoke a “burnout cascade” that may have devastating effects on classroom relationships, management, and climate. In a similar vein, Palomera et al.\(^{26}\) seek to demonstrate the need for developing emotional competencies in teaching in order to enhance wellbeing.

Hartney’s\(^{27}\) work focused on how to enhance teaching quality and effectiveness by providing teachers with professional learning in stress management, specific to the stressors of teaching. She found existing
research that clearly identified key stressors for teachers, and evidence-based stress management approaches that have been shown to be effective in mitigating teacher stress and improving teaching quality. Newly appointed teachers to rural areas where large proportions of Indigenous students attend experience heightened levels of stress and burnout. Likewise, Sharplin et al.\textsuperscript{28} studied 29 teachers in remote Western Australia and reported that all participants articulated experiences of stress but had developed coping strategies, namely, those of a direct-action nature; of a palliative kind; or ones where avoidance was used. Thereby mental and health and well-being is significantly affected by the ability of individual teachers to cope with stress.

Relational factors identified in the literature as inhibiting the well-being of teachers include student misconduct, parental issues, management and leadership support or lack of support, and strenuous situations that arise with peers. Ross et al.\textsuperscript{29} report that teachers have to absorb high levels of accountability inside schools and all these stressors ranging from student discipline issues, to poor working conditions and lack of emotional support are linked to burnout and eventually leaving the profession. The emotional nature of the teaching profession is also often overlooked. Teachers can have repeated experiences of unpleasant emotions owing to the relational factors leading to burnout\textsuperscript{30}.

On the contrary, positive relationships with students, parents, peers and management can have a positive influence on teachers’ sense of wellbeing and mental health. This is an area that warrants further research. According to Spilt et al.\textsuperscript{31} the interpersonal relationships between students and teachers have not often been studied as a contributing factor to teacher well-being. A positive sense of wellbeing does indeed contribute to work satisfaction and productivity, and most importantly, teachers’ positive influence on their student’s wellbeing and academic achievement.

**Final Thoughts**

The study of teacher wellbeing is vital because it not only adds to the understanding of careers in teaching but also helps to develop a conducive school environment which will enhance commitment and reduce attrition. Many studies have attempted to find the factors that affect the mental health of teachers but one must understand that it is a complex phenomenon which has to be comprehended as a whole.

**Conflict of Interest:** NIL

**Source of Funding:** Self source

**Ethical Clearance:** Done research committee.

**References**


24. Maslach C, Leiter MP. The thruth about burnout.
Work Safely at Workplace: Does Work Experience Influence Workers Safety Behaviour?

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Abstract

Most of the issues related to safety practices in organization are always being related to the interaction between managerial aspect and workers behaviour on safety. However, previous study showed that demographic factors reported to be significant as there was an argument about how working tenure affects safety compliance differs between experienced and inexperienced workers. Thus, this study aim is to investigate the different between workers’ experience and inexperience on workers safety compliance. Using quantitative research design, data were collected through self-report questionnaires. This study used AMOS version 22 and SPSS version 22 to test confirmatory factor analysis (CFA) and analysis of the descriptive data. T-test analysis has been performed to test the differences between experience and inexperience on workers safety compliance. The respondents for this study were 239 production workers in two Automotive Manufacturing and Assembly plants in Selangor, Malaysia. Results revealed that there were insignificant differences between inexperienced and experienced workers on the safety compliance. In conclusion, this research highlighted that there is no differences of safety compliance based on the working tenure. As contribution, this study provides information in promoting safety practices. Organization should focus on safety implementation for all workers despite their differences of work tenures because every worker are exposed to risk and require safety support from organizations. The research findings can be used by automotive manufacturing as a guideline for workers’ safety compliance enhancement.

Keywords: Safety Behaviour, Safety Compliance, Working Tenure, Automotive Industry

Introduction

Manufacturing industries had lead the numbers of reported occupational accident with more than 50 percent from the overall report from 2011 until August 2018¹. Thus, the workers safety on one of the largest industry in manufacturing which is automotive industry cannot be ignored. In Malaysia, the automotive industry classified as heavy industry and regarded as largest auto markets in the ASEAN region². According to the National Automotive Policy (NAP), automotive industry forecast to contribute 10 percent on the Malaysia’s GDP on 2020 where the production expected to increase to 1.35 million units. As for manpower, additional of 150,000 workers were expected towards 2020³. Automotive industry also contributes to Malaysia economic growth with investment of RM2.7 billion in 2017. Hence, this industry should be keep competitive and safe.

However, in contrast to the contribution from automotive industry in the manufacturing sector, it shows that occupational accident were highly reported in manufacturing sector which included automotive sector. Until October 2018, manufacturing industry has lead the numbers of reported occupational accident with total of 1303 cases (1188 non permanent disability, 90 permanent disability and 25 fatality)¹ (Refer Figure 1). This unsafe situation could threatening the industry growth and workers performance where⁴ previous research highlights that safety practices had increase the performance and perceived as good investment.

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Figure 1: Occupational Accidents Statistics by Sector until October 2018
(Source: DOSHM, 2019)

Nonetheless, safety standard seldom emphasized the ‘human element’ when developing and implementing essential safety process and procedure. This situation is contrary to the behaviour-based system as a critical methodology to observe workers’ behaviour and provide feedback, especially on safety climate and safety behaviour. It had been reported that workers’ reaction to safety was vary according to the workers’ circumstances; working on shift or a normal working hour or being inexperienced or experienced based on their working tenure. The inconsistency result in previous studies that observing workers safety perception regarding the differences of their work experience and working tenure leaved researcher with question mark on how the actual pattern happen in Malaysia automotive manufacturing and assembly plants and it related to safety behaviour among the production workers in the plants.

As conclusion, integrating workers’ demographic factors of working tenure in predicting safety behaviour are important as these factors will lead to different responses from workers. The study is conducted in Malaysia’s automotive manufacturing and assembly plants with the production workers as the research sample. Automotive manufacturing and assembly plants were chosen because of its important role in contributing to Malaysia economic growth; yet, the safety issues seem to be in a dire situation as supervisors are reported to neglect safety practices. Moreover, the occupational accident in manufacturing sector ranking the highest until October 2018. The persistency of this situation is alarming as neglecting safety could lead to a domino effect on workers safety behaviour.

Work tenure and safety compliance

In organisational safety practices, safety compliance had been of the focus. As the rising of reported occupational accidents, one of the factors to this was related to workers’ low responsibility on safety behaviour. The issues might arouse as safety knowledge was unable to being translated into actual behaviour and practical application. The example for this problematic situation is the workplace might be provide with safety banners and signage, but the actual workplace hazards was not addressed and control which lead to unsafe behaviour practices by workers. The issues of safety compliance can be viewed from demographic factors. The findings can assist the organisation in developing strategies for organisational safety practices and management. Inexperienced and experienced workers (working tenure) expose to variance situation. Thus, this demographic factors could assist in designing more effective and flexible safety strategies suite with workers background. Based on the above discussion, the significant of present study had been highlighted. Present research intent to contribute to safety literature by investigated current pattern of working tenure (experienced and inexperienced) correlation to workers safety compliance.

The studies that linked working tenure and safety behaviour is rather inadequate and conflicting. Research among nurses reported that novice nurses with short tenure are associated with medication error. In the medical field, safety is a top priority of which this research can conclude that a short tenure workers might failed to follow the safety procedure. Similar findings is presented by Gyekye and Salminen in their study among industrial workers in Ghana. Their study reveals that experienced workers have the best perception on safety, which found to be more compliant with the safety procedure and recorded low accident concurrently. On the other hand, the inexperience workers are found to be the least compliance with safety policies and have low safety perception. The experience and inexperience workers different responses to safety were explained by the concept of familiarity and perception on hazard. The longer exposure to the organisational environment allow experienced workers to acquire obligatory knowledge and awareness of the safety procedure and process in the organisation. Inexperience workers response on safety might be low due to the lack of sense of belonging and low sense of responsibility as they are yet to receive ample safety knowledge.

However, a study by Zeitlin on four groups of chain saw users found contradictory findings; inexperience workers showed a higher safety compliance. The findings indicate that inexperience workers performed a higher safety compliance while operating the chain saw compared to experience workers. Interestingly, the members in group made an assessment on risk using their individual experience and safety orientation and acted accordingly. A further investigation is required to determine if individuals’ perception can influence
group perception. Gyekye and Salminen\(^6\) suggested that analysing the differences of working experience could be used to assess organisation strategy to develop safety programme for particular groups. Most of previous studies supported the notion that experienced workers with ample safety knowledge tend to comply with the safety procedures, thus less accident reported. Despite the mixed conclusion, numerous research supported the argument that experienced worker impact positively on safety behaviour. Thus, the present research investigating the effect of workers tenure between inexperienced and experienced on group safety climate, safety behaviour and task performance can be a novel contribution as organisation will be to see the latest trend of this topic.

**Hypothesis:** There is a significant difference in workers safety compliance between inexperience and experience workers.

**Method**

**Data collection**

This study was conducted among production workers of automotive manufacturing and assembly plants in Malaysia. The respondent for this study were 239 production workers from plant A and plant B. The researcher used SPSS version 22 to perform independent T-test to identify the differences between inexperienced and experienced worker correlation with their safety compliance.

**Respondent background**

In this research the majority of the respondent is male workers (97.1%) as compared to only seven female respondents (2.9%) with a total of 239 respondents of production workers from the automotive manufacturing plants. The respondents who participated in this study were mostly 30 to 49 years old (166 respondents) and in general, the respondents have more than 10 years working experience (72%).

**Working Tenure**

Working tenure refers to as working experience\(^6\) or job-relevant knowledge gained over time\(^20\). Others studies refer to working tenure as the numbers of time the workers performed for a given task \(^21\). In this research, working tenure is define as working experience observed from two constructs, namely inexperienced (working less than 6 years) and experienced (working less than 6 years) workers\(^6\).

**Safety compliance**

Safety compliance had been evaluated by safety behaviour scale by DeArmond and colleagues\(^22\). The scale comprises what is lacking in the other scale, in regards to examine the workers voice in safety issues. For instance, safety behaviour scale by DeArmond et al.\(^22\) used an item “I appropriately report injuries, accidents, or illnesses”. Moreover, in this safety behaviour instrument, the items purposely evaluated the behaviour of safety practices among workers. The instrument contains 4 items assessing safety compliance. All items rate ranges from 1 (never) to 6 (always). Even the items is only 4 items, the instrument show high reliability (r=.70)\(^22\).

**Findings and discussion**

Confirmatory Factor Analysis for Safety Compliance

The results of this research were obtained from 239 production workers from the automotive manufacturing plants in Malaysia. The CFA 1-factor safety compliance reported to be fit as the RMSEA was < 0.08 (0.07), CFI (0.97) and GFI (0.95) reported to be > 0.90. The results of CFA of 1-factor safety compliance are presented in Table 1.

<table>
<thead>
<tr>
<th>Model</th>
<th>(X^2)</th>
<th>Df</th>
<th>(X^2/df)</th>
<th>RMR</th>
<th>RMSEA</th>
<th>CFI</th>
<th>GFI</th>
<th>AIC</th>
<th>CAIC</th>
</tr>
</thead>
<tbody>
<tr>
<td>n=239</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-factor</td>
<td>71.56</td>
<td>33</td>
<td>2.17</td>
<td>0.04</td>
<td>0.07</td>
<td>0.97</td>
<td>0.95</td>
<td>115.56</td>
<td>216.57</td>
</tr>
</tbody>
</table>

Note: The 1-factor included 4 items for safety compliance.
The Differences of Safety Compliance between Inexperience and Experience Workers

An independent *t*-test was conducted to compare the differences of workers safety compliance between inexperienced and experienced workers. The findings of the analyses presented in Table 3. The findings reported that no significant differences between inexperienced and experienced workers in predicting safety compliance (*t*=1.22, *p*=n/s). The result revealed that workers’ differences on work experience were not related to their response to comply with the safety.

Table 2: Independent *t*-test result for the differences of safety behaviour (safety compliance and safety participation) between inexperience and experience workers

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th><em>t</em>-test</th>
<th>Sig</th>
</tr>
</thead>
<tbody>
<tr>
<td>Working Tenure</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Inexperience</td>
<td>5.04</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Experience</td>
<td>4.85</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Safety compliance</td>
<td></td>
<td>1.22</td>
<td>Not sig.</td>
</tr>
</tbody>
</table>

Note. *N*= 239; Not sig. = not significant, *p < .05, **p < .01, ***p < .001

Discussion and Conclusion

In every manufacturing and assembly plants, it was a requirement for them to establish safety department that ensures the safety practices in the organization. The safety department functions are to make sure the safety policies able to be outline and practise in the manufacturing and assembly plants. Regarding the safety policies, workers had been guided with safety regulation and procedure in completing their work task. With the execution of safety policies, it becomes mandatory for workers to comply with the safety regulation and procedure that lead to workers enhancement of safety compliance. It is because if workers failed to follow the safety regulation and procedure, they have to face punishment or disciplinary action. Hence, the implementation of this enforcement encourages workers to comply with the safety rules and regulation despite their differences in experience.

For production workers, when they have been given the necessary resource to comply with their task for instance safety equipment, skill, knowledge and support, they able to behave accordingly for performance increment. Above discussion had shown on how the enacted safety policies as a set of obligation and the failure for them to obey it leads to punishment or demerit. To avoid punishment or being demerit the production workers despite years of work experience they have tended to behave safety accordance with the safety regulations and procedures. In other words, regardless of their working experiences, workers required to effectively complete their task according safety policies. Hence, it explained why there are no differences between experienced and inexperienced workers in predicting workers safety compliance.

As conclusion, the result provides current trend that working experience of workers is not significant to influence safety compliance. From a practical perspective, the findings from this study was beneficial for an organization when developing and implementing safety program by focusing to all workers regardless of their working experience and accumulated knowledge on safety issues. Indeed, all workers need to be provided with safety encouragement and information. Meanwhile, the safety policies, procedure and practices need to be implemented thorough with any violation suggested for disciplinary act.

Conflict of Interest: NIL

Source of Funding: Self source

Ethical Clearance: Done research committee

References


Relationship among Vocational Preference, Self Concept and Educational Needs of Married Women in Women Center for Continuing Education, Sokoto State of Nigeria

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Abstract

The major purpose of the study was conducted to find out relationship among self-concept, vocational preference and educational needs of married women in women centre for continuing education Sokoto on senior secondary school married students. The study used a descriptive research of the correlational type design, with a population of 270 senior secondary school married students, the whole population was used as sample and purposive sampling was employed as sampling technique. The instruments used in this study were: Adopted (A) Akinboye’s Adolescent Personal Data Inventory Subscale-A (APDI) for measuring self-concept and (B) researcher designed questionnaire named Questionnaire for Vocational preference and educational needs (QVPEN) which was used in measuring vocational preference and Educational needs respectively. Four hypotheses were formulated, hypotheses 1-3 was analysed using Pearson product moment correlation coefficient, while hypothesis 4 was analysed using multiple regression. The major findings of this study are: there is significant relationship between self-concept and vocational preference, there is significant relationship between self-concept and educational needs, there is also significant relationship between vocational preference and educational needs and self-concept is more related to educational needs than vocational preference of married women in women centre for continuing Education. Recommendation were made as efforts to enhanced married women vocational preference through workshops their educational needs can be improved by provision of adequate qualified Teachers, enhancement of their self -concept through teacher’s efforts and school counsellors.

Keywords: Self-concept, Vocational Preference, Educational Needs, Married Women, Centre for Continuing Education

Introduction

Societies are integrally linked; the relations, roles, attitudes and practices are clearly differentiated in terms of societal values. Education is a key factor in overcoming the difficulties that women face and a basic tool for empowering and bring them into the mainstream. Nigeria society for development education does not only provides knowledge and skills to improve health and livelihood. Education gives women status, virtue and confidence in decision making. And reduce poverty. The need for women education is emphasized all over the world this fact is presented by1,2.

One of our greatest needs is to spread education among our women as a matter of fact there is room for the extension of education even among men. The condition of such that any attempt its spread deserves help and encourage from all quarters.
Marriage as a social institution serves a number of social functions. First it serves as a basis for family formation, which in itself serves as a basic for human procreation and child socialization. A married woman working to undergo a course of study may often have to combine these marital obligations specified for her with her study and this may have some serious devastating effect on her study. Women are faced with challenges of education despite the fact that they have many other roles to play in the home as mothers and wives.

Everyone has an image or concept of himself as a Unique person or self, different from every other self. Regard self-concept as a multi-dimensional hierarchical construct that constitutes a person’s perception of his total self (such as physical self, mental and cognitive self, social, moral and psychological self). According to self-concept is important because it shows emphasis on possibilities and excellence, therefore an individual (student) can always put his education to his use for the betterment of the society. It is all these components of self that merge together to form an individual’s global self-concept which is widely viewed as determinants of human behaviour. Some scholars consider self-concept as a mediating variable that hinders or facilitates attainment of other desirable outcomes such as academic achievement, career interest, vocational preference, vocational choice.

Person’s work is probably the most dominant single influence in the course of his life. It affects his family structure, his social and intellectual activities, economic status, personality and happiness. Therefore, person has to be well informed and guided in vocational preference. Blamed the society because it places demands and responsibilities on individuals and also expects students to choose vocation that will yield great financial gain to the students rather than security and satisfaction. This is the reason why students are carried away by fantasy or illusion or the prestige that is attached to jobs such as medicine, accountancy and engineering, which make them to choose careers that does not relate to their personal construct training or that outstrip the available opportunities, thus causing a lot of problems. Vocation is finding a suitable job or occupation for one’s self. It is among the functioned goals of Nigeria educational system. Researcher explain to provide not only man – power but people who could mount the various available jobs.

It is with regards to the dissatisfaction with the level of development of women education in the state that the government has made education free for female. It became clear that illiterate women in the focus communities (Hausa and Fulani) were very keen to become literate and numerate, thus adult literacy was included in the free Girl Education Program (GEP) project design. This is with the view of easing remarks financial problem. This does not seem to be achieving the goal aimed at especially at the secondary and tertiary levels. As a result of this the number of graduate female students in Sokoto State is so low such that, few females in comparison to their male counterpart in the state are found in public or private employment. This serious and unfortunate situation has been attributed to some factors such as culture, misconception of religion, academic background, status of women and parental attitude towards women education. The findings of the research will help women to choose a better career according to the learning facilities available in their schools. It is also hoped to help women to have better self-concept of themselves in their academic life and also marital life.

**Problem Statement**

Academic performance is a reflective outcome of effective learning. This provides information about the academic worth of the learner. This is to say that for women to be able to carry out their social responsibilities they have to be well educated, but unfortunately women in Nigeria and in Sokoto state in particular are surrounded by a number of social problems. are researchers that identified vocational preference not relevant to one’s self-concept could lead to dissatisfaction, unproductivity or even dismissal from job. General life satisfaction depends heavenly upon the ability of a person to get a job that is congenial to his self-concept. This show the compatibility between self-concept and vocational preference. One of the problems of this study is to identify if women relates their self-concept with their vocational preference. The research investigated the relationship between self-concept and educational needs and relationship among educational needs and vocational preference of married women in Sokoto centre for continuing education.

The study focused on the educational needs of married women in Sokoto state. With regards to the issue of environment, women access to education.
and schooling and attitudes of husbands, parents and community was investigated. Federal Government of Nigeria has made efforts to establish education centres for continuing Education for Adults in which women centre for continuing education, Sokoto was inclusive and this was to fill the gap between the literates and illiterates and to make people gain economic empowerment and to create rooms for higher education. Like acquisition of SSCE result enrolment into Polytechnics, Colleges of Education Universities as the case may be.  

Hypotheses  

Methodology  

The Research design of the study was descriptive research of the correlational type. Descriptive research according to involves collection of data through development of questionnaires or another instrument like interviews. The population of the study was 270 senior secondary school, (SSS I, II and III) married students, in which purposive sampling was employed where all the population was used as sample SS1 (85), SSII (70) and SSIII (115).  

Instrumentation  

Adopted Adolescent, Personal Data Inventory Subscale A (APDI). This was adopted and was used to measuring self-concept. The APDI consists of 30 items that basically examine the various ways the child perceives himself. Rating of respondents was done using 2-points Likert scale. The rating ranges from least like me to most like me (from 1 to 5). 4 was taken against any item as most like me and 2 against any item as least like me. The co-efficient alpha was equal to 0.75, and Cronbach’s alpha as .874. The highest score for each respondent is 150 and the least 30. So the scores obtained by a student in this instrument represent the level of his/her Self-concept.  

Researcher design Questionnaire for Vocational Preference and Educational Needs. (QVPEN). It contained forty items, based on 4-likert scale ranging from Strongly Agree (4)- Strongly Disagree (1). Cronbach’s alpha of .76 was reported. The highest score for any respondent in the instrument is 160 (4×40) and the lowest in 40 (1×40). Before completing the scale the respondents responded to demographic questions based on age and class.  

Results and Discussions  

Data collected were analyzed using the Pearson Product-Moment Correlation Coefficient to test hypotheses 1, 2, and 3, while Multiple Regression Analysis was used to test hypothesis 4. To retain or reject hypotheses, an alpha level of, 0.05 was set.  

H01 There is no significant relationship between Vocational Preference and Self Concept of Married Women in Women Centre for Continuing Education.  

Table 1: Relationship between Vocational Preference and Self Concept of Married Women, in Women Centre for Continuing Education.  

<table>
<thead>
<tr>
<th>Variable</th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
<th>Df</th>
<th>r_{std}</th>
<th>r^2</th>
<th>P - value</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>VP</td>
<td>270</td>
<td>9.93</td>
<td>2.911</td>
<td>268</td>
<td>0.687</td>
<td>0.472</td>
<td>0.001</td>
<td>Significant</td>
</tr>
<tr>
<td>SC</td>
<td>270</td>
<td>11.93</td>
<td>5.424</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 1 gives the vocational preference (VP) and self-concept (SC) along with their corresponding number of observations P = 0.05 , since P<0.05,(0.001), it is concluded that there is significant relationship between vocational preference and self-concept, hence the hypothesis is rejected).This finding is in accordance with13,14. But this findings contradicts. The extent of the relationship is 47.2%. But there was a statistically significant difference in mean score for self-concept (M=11.93, SD=5.424) and vocational preference (M=9.93, SD=2.911) .  

Ho2: There is no significant relationship between vocational preference and educational needs of married women, in women centre for continuing education Sokoto.
Table 2: Relationship between Vocational Preference and Educational needs of Married Women in Women Centre for Continuing Education

<table>
<thead>
<tr>
<th>Variables</th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
<th>Df</th>
<th>Rcal</th>
<th>$r^2$</th>
<th>P value</th>
<th>decision</th>
</tr>
</thead>
<tbody>
<tr>
<td>VP</td>
<td>270</td>
<td>9.93</td>
<td>2.911</td>
<td>2.68</td>
<td>0.754</td>
<td>0.569</td>
<td>0.001</td>
<td>Significant</td>
</tr>
<tr>
<td>EN</td>
<td>270</td>
<td>11.05</td>
<td>4.230</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Vocational preference (VP) and educational needs (EN), $P = .05$ level of significance, since $P=.001$ less than 0.05, it is concluded that there is significant relationship between VP and EN, hence Ho2 is rejected. The extent of the relationship is 36.9%. This finding corresponds with 14,23,24. However, there was a statistically significant difference of mean score between VP ($M=9.93, SD=2.911$) and EN ($M=11.0, SD=4.230$).

**Ho3:** There is no significant relationship between self-concept and educational needs of married women, in women centre for continuing education.

Table 3: Relationship between self-concept and educational needs of married women, in women centre for continuing education.

<table>
<thead>
<tr>
<th>Variables</th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
<th>Df</th>
<th>Rcal</th>
<th>$r^2$</th>
<th>P value</th>
<th>decision</th>
</tr>
</thead>
<tbody>
<tr>
<td>SC</td>
<td>270</td>
<td>11.93</td>
<td>2.424</td>
<td>2.68</td>
<td>0.858</td>
<td>0.736</td>
<td>0.001</td>
<td>Significant</td>
</tr>
<tr>
<td>EN</td>
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<td>11.05</td>
<td>4.230</td>
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</tbody>
</table>

Married women’s self-concept and educational needs are significantly related, $P=0.001$. This indicates that there is significant relationship between SC and EN, hence Ho3 is rejected because P-value is less than 0.05. The degree of relationship is 73.69%. This goes with the findings of 3,23,24, but contradicts 8, which he found out low and negative relationship. Although there was difference in mean score between SC ($M=11.93, SD=2.424$) and EN ($M=11.05, SD=4.230$).

**Ho4** Vocational preference and self-concept are not related to Educational needs.

Table 4: Self-concept, Vocational preference relation to educational needs.

<table>
<thead>
<tr>
<th>Variable</th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
<th>B</th>
<th>P - value for B</th>
<th>$t_{cal}$ for B</th>
<th>R</th>
<th>R-Sq</th>
<th>df for $F_{cal}$</th>
<th>$F_{cal}$</th>
<th>P - value for $F_{cal}$</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>VP</td>
<td>270</td>
<td>9.93</td>
<td>2.911</td>
<td>0.452</td>
<td>0.001</td>
<td>7.997</td>
<td>0.887</td>
<td>0.787</td>
<td>2 &amp; 267</td>
<td>492.032</td>
<td>0.001</td>
<td>Significant</td>
</tr>
<tr>
<td>SC</td>
<td>270</td>
<td>11.93</td>
<td>5.424</td>
<td>0.502</td>
<td>0.001</td>
<td>16.535</td>
<td>0.878</td>
<td>0.787</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>EN</td>
<td>270</td>
<td>11.05</td>
<td>4.230</td>
<td>0.568</td>
<td>0.183</td>
<td>1.335</td>
<td>0.183</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

A constant of linear relationship: $EN = 0.183\ VP + 0.502$ SC
From the table above the squared part correlations shows that vocational preference has 4.5% self-concept accounted for 5.0% and educational needs accounted for 1.8%. Although vocational preference was an explanatory variable of educational needs, analysis of regression coefficients indicated that self-concept, B = .502, t = 16.53, P <0.05 is the significant predictor when they were in the model. Thus, self-concept is more related to educational needs than vocational preference. But both vocational preference and self-concept are significant related to educational needs it corresponded with 14. The extent of the relationship is 78.7%.

Conclusion

The result of this study revealed that there is significant relationship between vocational preference and self-concept. Thus, married women that have higher perception of who they are tend to have better vocational preference that suits their self-concept or personality. Self-concept is related to educational needs meaning that higher perception of self-concept tends to have significant perception of their educational needs. Significant relationship between vocational preference and educational needs existed. Married women mostly use the available knowledge, occupational information and skills for their vocational preference. The finding of also revealed that self-concept is more related to educational needs than vocational preference.

Based on this findings of this recommendations were made as efforts should be made to enhance the vocational preference of married women through workshops, dissemination of occupational information by school counsellor. Married women educational needs can be improved by provision of adequate and qualified teachers, conducive learning environment, adequate teaching and learning materials, acquisition of skills, reduction of domestic chores and positive attitude of parents and husbands towards women education. Self-concept of married women can also be enhanced through teacher’s efforts and school counsellors by explaining that higher and positive perception of, it makes them to be congruent and be motivated towards effective learning and choice of vocation.

Conflict of Interest: NIL

Source of Funding: Self source

Ethical Clearance: Done research committee

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Exploring the Middle Phase Principals’ Leadership Journey: Evidence from Malaysian Primary Principals

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Abstract

Academics in principalship studies had explored the principals’ pathways into experiences and challenges faced within their authorised appointment at schools. Thus, the purpose of this study was to explore middle phase Malaysian primary principals’ leadership journeys through series of interviews with five primary principals who were purposely selected. Findings revealed that middle phase Malaysian primary principals have encountered several challenges; motivating teachers, solving school’s financial issues and improving their school’s academic performance. They also initiated some efforts such as creating the school’s succession planning and built a good relationship with teachers. In addition, within this middle phase, they also revealed that they have higher level of confidence in leading their schools towards excellence.

Key words: Public schools, middle phase leadership journey, primary principals.

Introduction

Empirically, the school principal is the most indispensable individual who governs the school and achieves school excellence through their leadership qualities [1, 2]. In Malaysia, with the implementation of the new National Educational Blueprint 2013-2025, it will prepare prospective principals for encountering complex and challenging school issues [3]. Thus, training and preparations of principals are emphasised in producing quality leadership [4]. Through continual training, principals are equipped with knowledge and with suitable leadership competencies; indeed, the National Principalship Qualification for Educational Leaders (NPQEL) certification is required for the appointment as a school principal. Through these two major strategies, it is believed that principals’ leadership qualities will be much improved since it is proven that preparatory programs and their experiences have significant factor towards their leadership excellence [5].

In relation, principalship trajectories are defined as the principals’ professional journey through their length of time at different stages starting from preparatory stage until retirement phase [6, 7]. Initially, Earley and Weindling (2004) [8, 21, 22] posit that study of theory of principalship stages has positive implication which can be employed to improve principals’ knowledge, support and preparation for effective principalship [9, 6]. Even though the study of principalships’ career pathways is quite intriguing, there is still much to be explored due to limited relevant literatures and insufficient attention that has been paid to research into principals’ career stages in school leadership [10, 11] especially within the Malaysian principalship context. In this sense, Steyn (2013) [2] emphasised that only recently, more studies started to focus on leadership journeys after realising the importance of trajectories as a mechanism in enhancing the professional training and socialization processes.

Middle phase leadership journeys literature

Since the late 1980s, there have been many studies, conducted predominantly within English schools, which have qualitatively examined the pathways to principalship. Recent studies by Ingate in 2006 [12] discovered that principals who in the middle phase leadership were felt more comfortable in creating a good teamwork with their own teachers and focuses on school improvement and establishing standards to improve the school’s operational system. In Greece, Theodosiou
(2015) [7] found that Cypriot principals tried to establish the reciprocal relationships, collaboration, and personal communication with staff and parents. In addition, they also talked about the school’s vision and the changes affecting teachers’ professional development and parental support, and upgrading the school’s infrastructure and resources. At this middle phase, principals focused on the school’s instructional practices resulting in a higher level of trust, bonding, and reciprocal relationships between teachers and principals as means for school improvement. Lastly, in Malaysia, Wai-Bing and Omar (2014) [13] found that in the middle phase leadership, known as the identity formations stage, the principals tried to establish their identity through establishing interpersonal skills and relationships with their teachers and staff. Thus, principals acted like a motivator and coach in building teachers’ motivations and commitments, and concurrently, building a good relationship with teachers. They also enhanced the instructional leadership practices when they emphasised the importance of teaching and learning as an indicator for school growth and development.

The aim of the study

Despite numerous studies investigating principalship pathways, there is little evidence reported on the investigation of Malaysian primary middle leadership phase. Therefore, the main aim of this study is to explore Malaysian primary principals’ career stages which specifically focus on their middle phase leadership journey. It is hoped through this study, it provides a closer look at the primary principals’ middle phase leadership with related to their preparation programs.

Methodology

Sample and interviewing

In this study, five middle primary principals were chosen through purposive sampling strategy. Data was obtained from their experiences, viewpoints and perceptions on their middle leadership phase. As for data collection purpose, interview was selected as the major approach to obtain data from primary principals who related to their life experiences of principals and through interviews, it also permitted principals to discuss and reveal their own standpoints and experiences. In collecting the data, the ethical considerations were also adhered; the primary principals’ consent and the confidentiality of the interview data [14, 15]. Firstly, the subjects gave their approval by filling in the consent form provided by the researcher before the actual data collection commenced. Secondly, it was the duty of the researcher to protect the real identity of the subjects due to issues that may involve individuals within the administration and implementation of the policy [16].

Since there was lack of clarifications on determining the principalship stages, the interview’s protocol items constructed were based on previous literature on principalship stages. During interview, primary principals were asked on pertinent questions which related to their career stages experiences such as;

Based on your leadership journeys as middle phase principals, could you explain your experience and journey as middle stage primary principals?

Do you feel confident in leading your school within the middle leadership phase?

Data analysis

After the actual data were collected from five primary principals regarding their middle phase leadership, the interview data were analysed structurally accorded to the procedures of thematic analysis. In the first stage, all interview data were transcribed. Next, data were re-read at least twice to comprehend the principals’ feedbacks and comments. Next, the transcribed data were compared with the actual recording data to ensure the accuracy of the data which later lead to data familiarisation phase and the emergence of data coding [17; 18]. Thirdly, each transcription was reviewed and the relevant sentences highlighted to assist in assigning the codes as part of the process called ‘generating initial codes’. The codes that were employed were in the form of a word or short phrase [19; 20]. Further, codes were categorised into small units according to their similarities and differences. Later, data were synthesised into patterns and similarities categorisation.

Findings

Higher level of confidence

In this phase, principals revealed that they were motivated and confidence to lead their schools. Thus, they felt happy in fulfilling the routine tasks of leadership.

After a few years, I have experienced many elements in school management, which has implications [for my]
level of self-confidence in leading my school.

Improving schools’ performance

In describing primary principals’ experiences in the middle stage, Principal R admitted that she had to struggle with the efforts to improve her school’s financial issues, which were in a poor situation when she arrived. Hence, she had to devote most of her time to ‘correct’ her school’s financial procedures.

When I arrived, I [had] to settle the financial issue, which was the initial task to be fulfilled. Even though I considered that as [an] initial challenge, I [had] to ‘study’ the grassroots of the financial issue and most of my time was devoted [to] settling it.

Sustaining the previous principals’ systems and procedures

Even though a majority of principals commented on the improvement process, principals also talked about maintaining the positive achievements and changes made by previous principals. Some principals believed that some significant improvements should be maintained to avoid teachers becoming confused since they were accustomed to the school’s operational system.

There are elements which should be sustained, as introduced by [the] former principal. Any improvement shouldn’t be drastically implemented to [prevent] teachers’ confusion. I also believe that any improvement should also align with the school culture.

Building relationships with teachers

At this stage, most principals also tried to build a good relationship with the teachers to increase their commitment. In the process of ‘winning’ teachers’ commitment’ and encouraging positive relationships, the principals employed a range of strategies, such as having meals with teachers, holding frequent discussions with teachers, and lastly, providing some advice. In this sense, Principal C explained about her continuous advice to instil in teachers professional values:

I continuously advise my teachers on the usage of the official leave which [is] meant only for emergencies cases. I also talked on reasons why they should be at school which [are] related [to] students’ teaching and learning processes which was neglected once they were on leave.

Similarly, Principal E highlighted her approaches to provide significant encouragement for teachers’ motivation with the purpose to change teachers’ negative attitudes to become instead more positive about fulfilling their obligations.

I think it is my duty to change teachers’ attitudes to [become] positive. One approach that I frequently employed was the admiring approach when they produced [good quality] work. It is part of developing their motivation for much [better quality] work in the future. At the same time, I also gain their trust and friendship.

Motivating teachers

From the interviews, two primary principals revealed that they were quite privileged when they encountered lesser challenges as a result of the strict character of the former principal. As a result, they did not experience many problems with teacher discipline, but they had to provide motivation in gaining the teachers’ confidence.

I was fortunate because the previous principal was a very strict person when I entered the school; I faced [a] lack of issues in terms of teachers’ discipline. However, I had to build teachers’ level of confidence and motivations.

Succession planning through talent management

In this stage, principals manage the leadership succession planning, which involved immersing talented teachers through a developmental process, such as teacher leadership and distributed leadership approaches. Through these approaches, senior teachers are trained and supported through empowerment and delegation and are allowed to make decisions within the scope of their responsibilities. Principal C, for instance, described the process of succession planning:

I also emphasised the concept of succession planning to my deputys and senior teachers especially when out of the office. Through this approach, it provides exposure and training to my senior teachers to make decisions. Thus, through empowerment and delegation, I provided them with chances to decide what is best for our school.

Overcoming the school’s problem through networking
In the middle phase, primary principals continued to improve the school’s performance with the support of the local communities through the effective networking approaches in resolving issues with the school’s finances and resources. Similarly, Principal D highlighted her school’s financial issues and problems with the maintenance of facilities which required financial resources and support from the local community, the parent-teachers association (PTA), and non-governmental organisations.

In order to enhance the school’s capacity, we had to find some resources from the local communities. In fact, their management is helping with our students’ programs. Additionally, our PTA also provided their best in ensuring the successful completion of our academic programs. For instance, we just received some allocations for ICT facilities.

**Discussion**

In general, it is concluded that Malaysian primary principals underwent the middle phase leadership journey in which they have to implement some improvement towards school’s academic performance and financial situation. In the middle phase, the recurrent activities among the primary principals were on change management and focusing on the processes of improving the school administration’s operational procedure. Therefore, the improvement phase started with principals’ initiatives to correct all previous weaknesses and mistakes with some changes. Simultaneously, primary principals also tried to solve all the school’s problems.

In the middle stage, they obtained a level of confidence in improving their school’s performance. Besides improving the schools’ management system, primary principals tried to establish positive relationships in the process of adapting themselves to teachers and staff. Further, they also started to introduce some changes within the school context and developed the school’s succession planning as a platform such as teacher leadership and distributed leadership programs for preparing senior teachers and the middle-layer leaders for their future role as school leaders. In addition, they also share their leadership and decision-making responsibilities with senior teachers. Next, primary principals were later preceded with macro-level changes through a series of collaborations with local communities in improving the school’s overall accomplishment, such as networking with the local community, the PTA, and non-governmental organisations. Through positive networking with the local communities, principals attained support for the school’s growth, dealing with school management issues and attaining the allocation funds and resources (Refer Figure 1 below).

![Diagram of the Middle Phase of Primary Principalship](image-url)
Limitations

In this study, the limitations of the research are also acknowledged. Firstly, the exploration typically used semi-structured interviews with five primary principals which are challenging to be generalised. The perceptions and feedbacks reported were typically based on the five primary principals’ views. Therefore, it was hard to generalise the middle leadership journey of the primary principals through only one type of data collection, namely, interviews. In terms of sampling, this study interviewed five primary principals to explore qualitatively the leadership journeys or principals’ middle leadership journeys which strongly limited to their perceptions, experience and standpoints. Secondly, this study was conducted in public primary schools which reflected on the national medium primary schools. To list the patterns and journeys, principals from preschool education centres, private-funded schools whether primary or secondary, and religious-based schools can be studied to identify differentiations in schools’ organisational culture and values and can be compared and tested.

Conclusion

In general, this study has provided an insight into the career progression of Malaysian primary principals, a field which has been little explored by local researchers. Through the findings of the study, the Malaysian educational authorities will be able to record and outline the principals’ professional and leadership journeys in order to provide support in terms of programs and courses to prepare prospective principals with the knowledge, skills and disposition needed to face complex and challenging school issues.

Source of Funding /Acknowledgement

This research was supported by a grant from the Fundamental Research Grant (FRGS) by The Ministry of Higher Education (MOHE) and Universiti Teknologi Malaysia (UTM) vote no FRGS/2/2014/SS109/ UTM/02/07.

Conflict of Interest: NIL

Ethical Clearance: Done research committee

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Depression and Perceived Social Support: Overview

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Abstract

This paper provides a content analysis of studies focusing on depression and the perceived social support that have been published in online journals from Science Direct database. A total of 328 articles on depression and the perceived social support were selected from 2014 to 2018. Then, 10 articles were selected and analysed based on the scope and the highlighted category. The main focus is to conduct content analysis based on (i) the people who give and receive social support, (ii) ways of giving social support, (iii) the main finding of the articles. The result shows social support from parents is vital to prevent and treat depression. Parents are expected to increase parenting skill and knowledge in developing children positive self-image and empathy towards others. This helps their children to handle stressful life better and serve social support for those in need. The study also found limited discussion on spiritual support in dealing with stress and depression.

Keywords: depression, social support, content analysis

Introduction

Depression is amongst the menacing psychological problem infecting people globally. There are more than 300 million people suffered from mental health problems including depression with a significant upward trend from 2005 to 2015 which makes it the fourth serious medical illness in the community. Depression symptom can vary from mild to severe depending on individuals. Generally, depression will slowly fade in few days, however some have to live with depressive disorder for weeks, months and years.

Today’s modernization challenges people’s physical and intellectual. Urban development contributes to the increasing rate of social problems, culture, economic issues and psychological syndromes such as illegal substances, mental and marriage problem. These conditions lead to mental stress and depression among community.

Social support is important during major life transitions and stressful situations. There are several types of social support namely perceived, functional and enacted social support. Perceived is the process of interaction in relationships which improves coping, esteem, belonging and competence through actual or perceived exchanges of physical or psychological resources. Functional encompasses emotional, instrumental, and informational support. Enacted refers to the specific supportive behaviours to individuals by their social networks.

Problem Statement

This global issue has put depression as the second leading cause of death between 15 to 29 years-old.
According to the World Health Organization (WHO),
close to 800,000 people die due to suicide every year. In Malaysia, local experts believed more than 2,500 suicidal cases happened every year caused by financial problem, poverty, relationship issues, drug abuse and critical physical illness.

In Malaysia, suicidal attempts and completed cases are rampant regardless races and religions. Many shut themselves off from the world due to stress and depression. According to the national edict, suicide is a serious crime as for Muslim, there is a special verse in Quran states the prohibition of suicide; “And do not kill yourselves [or one another]. Indeed, Allah is to you ever Merciful.” (Surah An-Nisa:29)

Postpartum period depression is another significant public health concern, affecting women, infants and families. Thoughts of suicide and infanticide are symptoms of severe postpartum depression. Moreover, this type of depression has major effects on child development. These infants and children would have sleep problems, temperamental difficulties, aggressive and hyperactive, low self-esteem, anxiety, passive and too dependable which make them vulnerable to depression.

Depression is a serious psychological disease and complex interaction of physiochemical and physical factors that enables changes in individual’s lifestyle. People suffer from depression feel disappointment, sad and lose hope to live and feel happy. However, there are effective treatments available to curb this disease.

Therefore, it is important to care about social support in depression because stress is buffered by social support. The stress-buffering model suggests that social support can be intervene by providing necessary social resources. Social network members play the roles as sources of information regarding appropriate health behaviour, contribute to positive mental health and reduce PTSD among communities affected by violence.

Objectives

This study analyses content of articles on depression and the perceived social support in ScienceDirect database based on following aspects:

- the people who give and receive social support
- ways of giving social support
- the main finding of the articles

Methodology

This research method focuses on content analysis which studies and interprets chapters in books, transcript, interview, discussion, historical document, speech, commercial dialogue, theatre script or any other platforms of communication. In content analysis, significant theme or scope of study will be determined by analysing and reporting the data.

This study cross-examines 328 articles published in ScienceDirect database. The key words used were “social support” and “mental health” from 2014 - 2018. A total 113 articles were selected from this filtered process. Another limitation was made to articles with more than 50 times of key word occurrence. This step is important to ensure only related and relevant articles for comprehensive review. Finally, 10 articles were identified and examined based on 4 elements identified for this research.

Results and Discussion

The content analysis focuses on these 4 aspects which are (i) group of people who give and receive social support, (ii) ways to give social support or types of social support, (iii) issues or area of concern and (vi) the result of the study. The findings show numbers of literature on the correlation between social support and depression. Despite of the advancement of technology such as online social network and working abroad, many are struggling to get through stressful life events.

Most articles focused on women and adolescents. These two groups are more likely to develop depressive symptoms such as getting pregnant and giving birth, having child with special need or disability, being old and vulnerable. They are the central in the household, especially in making decision regarding health, diet and child rearing. Pregnancy, giving birth and rearing children pressure women mentally and emotionally if none social support existed.

Most studies revealed families’ support especially parents is more capable to deal with depression factors. This study signals parents’ responsibility to develop their children social and communication skill. Positive family communication has greater potential to equip their children in making friends and prevent them...
from being lonely that leads to depression. Parents need to enhance good parenting skills to develop empathy and willingness to support each of their children\textsuperscript{15}. Empathy promotes a comfortable environment; emotional comfort and reassurance in the family and society\textsuperscript{12,25}.

This study documents a wide range of social support such as listener, showing care and understanding, spending time together and giving good and comforting advice. These simple habits need to be encouraged since the early ages of life\textsuperscript{1}. Strengthening good self-ethics is the precaution against depression. Individuals with a purpose of life are prone to handle depression well\textsuperscript{9}.

From the analysis, social support on spiritual support is limitedly discussed. Having strong faith in Allah is the main factor for someone to remain positive. Spiritual social support is trained by reminding and reconnecting the individuals with Allah. Prayers and zikr are additional acts to support individuals with depression and other mental illness\textsuperscript{1,18}.

**Conclusion**

This content analysis shows that social support benefits in preventing and curbing depression. Strong family ties are needed cope with stressful life events, especially on adolescents and women. It is suggested that parents play greater roles in developing children positive self-image, empathy, social and communication skills. However, this content analysis discloses inadequate literature of social support in spiritual relationship with God in coping with depression.

**Conflict of Interest:** NIL

**Source of Funding:** Self source

**Ethical Clearance:** Done research committee

**References**


Coping Strategies and Challenges among Visual Impaired Students

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Abstract

The present study explored the coping strategies and challenges among student with visual impairment. In Malaysia, visually impaired people category approximately 8.9% including student at the university level. Government of Malaysia has recognize lifelong learning on this category of disability as one of the focus to be approaches and strategies to fulfill their education needs. Furthermore, student with visual impairment also need to be proactive to set up their coping strategies based on the challenge they faced. Coping strategies elaborated based on The Goodness of Fit Model. Effective coping strategies focused on three aspect of student needs in the university students living with visual impairments in adaptive behaviour on campus, mobility on campus, and reading materials and resources. Moreover, the discussion drive the student to be more excellent in their new coping strategies in the university surrounding.

Keywords: Coping, Visual Impair students.

Introduction

The World Health Organization¹ defined the concepts of impairments, disabilities, and handicaps are interrelated. Impairments are abnormalities in the system or organ functioning, body structure and/or appearance (any loss or abnormality of psychological, physiological or anatomical structure or function). Impairments represent disturbances at the organ level. The functional consequences of impairments are disabilities (any restriction or lack of ability to perform an activity in the manner, or within the range, considered to be normal for a human being).

Malaysia consists of two geographically distinct areas, West Malaysia (Peninsular Malaysia), and East Malaysia (located on the island of Borneo), with a total of 14 states. It is a country with multiple ethnicities comprising Malays (58%), Chinese (24%), Indians (8%), and other indigenous groups (10%). The estimated population of Malaysia in 2018 is 32.4 million as compared to 32.0 million in 2017 with an annual population growth rate of 1.1 per cent. The registered Person with Disabilities (PWD) at the Department of Social Welfare, Malaysia in 2017 were 453,258 persons. PWD in physical category recorded the highest number which was 35.2 per cent, followed by Learning disability category (34.8%) and Visually impaired category (8.9%). Speech category recorded the lowest registration of 0.5 per cent².

Government of Malaysia has recognized the lifelong learning and provision of learning opportunities for people with disabilities. To justify the government’s seriousness, The commitment has been a responsibility of the Ministry of Women, Family and Community Development (MWFC) and they review various approaches and strategies to fulfill the intention of Malaysian Plan of Action for People with Disabilities 2016-2022 that is in line with Government Persons with Disability (PWD) Policy and the 11th Malaysian Plan (RMK11). The Government continued to provide care and support for the disabled people through various
programs such as campaigns from the voluntary organization, offering postgraduate programs in the universities and providing financial support that related with Core Strategic 3 (Goal 5 Incheon Strategy) – Increase PWD Access for Education; Strategy: Increase PWD access to a quality and inclusive education at all stages including lifelong learning towards talented and potential development of human resources.

Ministry of Women, Family and Community Development has stipulated specific categories of vision disabilities and meanings. Blind in both eyes or blind in one eye or limited vision in both eyes or any other permanent visual impairment. Visual disabilities can be divided into:- Low vision means vision that is worse than 6/18 but equal to or better than 3/60 even with the use of visual aids or a visual field that is less than 20 degrees from fixation. Blindness means vision of less than 3/60 or a visual field of less than 10 degrees from fixation. Less than 3/60 means counting Fingers (CF), Hand Movement (HM), Perception of Light (PL) and No-Light Perception (NPL). Other permanent visual disturbances (must be confirmed by an Ophthalmologist)4. Severe visual impairment and blindness, though less common, still impact a significant portion of youth, with approximately 25 per 1,000 youth under 18 years of age being blind or visually impaired5.

According to Convention on the Rights of Persons with Disabilities6 stated that persons with disabilities (including visual impairment) should be guaranteed the right to inclusive education at all levels, regardless of age, without discrimination and on the basis of equal opportunity. In addition, the convention stated that state parties should ensure that adults with disabilities have access to general tertiary education, vocational training, adult education and lifelong learning and persons with disabilities receive the necessary support, within the general education system, to facilitate their effective education.

In the recent global political and economic development as well as in the highly intense competition, education has become one of the effective tools to enhance the capability of human capital to remain sustainable. Vital perspective of human being about the opportunities in higher education, it plays a huge role in individual development and nation building. Today, education is important in developing one’s intellectual and personal quality. This scenario also applies to PWD in Malaysia therefore, as a consequence; they need more education opportunities to upgrade themselves. For persons with disabilities, education is a vital part of their lives and enabled them to read and write, to speak in English language, to find a job and involved in making decisions along with their family members7. In addition, education is important as it able to give one’s a better life, respect from others, realize one’s rights and gain interpersonal skills7. Ministry of Education do provides special education programs at primary and secondary school level for three types of disabilities, namely, hearing, visual and learning disabilities8.

Past research about PWD in Malaysia include prevalence of blindness and low vision9 accessibility of visually impaired passengers10, adult learning for PWD11, the evolution of special education12, special education for children with disabilities13, the right of people with disabilities and social exclusion14, scenario on access and facilities for PWD15, provisions of disabled facilities at public transport stations16. According to previous research17 12 challenges faced by students with visual impairment in the higher education in Malaysia, 1- socializing on campus, 2- mobility on campus, 3- reading materials and resources, 4- acceptance among lecturers and staff at the university, 5- personal difficulties, 6- ICT facilities on campus, 7- computer facilities, 8- financial difficulties, 9- education opportunities for the visually impaired, 10- role of societies or non-governmental organizations, 11- choice of programs available at the university, and 12- daily facilities. Youth with visual impairments experience significant academic and social-emotional concerns. With regard to educational outcomes, untreated visual impairments can lead to lower academic achievement18.

Coping is defined as an individual’s cognitive and behavioural efforts to manage stress. The term coping process refers to what the individual actually thinks and does in a specific encounter and the way in which these efforts change over the course of the stressful encounter19. A review of the literature suggests that the positive coping strategies of proactive coping, hope, and humour share a cognitive-emotional process and result in better adjustment among individuals with disabilities20, 33.

**Theory**

The focus of this review is based on The Goodness
of Fit Model, an alternative approach for evaluating coping emphasizes the process rather than the outcome. The central idea of this approach is goodness of fit, the appropriateness of the coping strategy given the demands and constraints of the situation. Effective coping depends on two fits: the fit between reality and appraisal and the fit between appraisal and coping21. The fit between reality and appraisal refers to the match between what is actually going on in the person-environment transaction and the person’s appraisal of the personal significance of that transaction and his or her options for coping.

**Adaptive behaviour on campus**

Adaptive behaviour is diverse by definition, as it mirrors a person’s efforts to adjust to the various environmental demands he/she is faced with22. Previous study defined that adaptive behaviour is include communication, daily living skills and socialization23. Adaptive behaviour is potentially amenable to behavioural interventions or adjustments in the environment, which could have a positive impact on a person with visual impairment’s life 24.

According to Papadopoulos et al.23 lifetime learning refers to the provision of learning opportunities in the educational institution, each individual can gain appropriate and meaningful personal, social, academic and vocational skills in order to correspond to the demands of the society. Moreover, the instruction of these skills can increase personal effectiveness and independence, self-direction, vocational awareness and self-advocacy. Several studies have shown that key to successful transitions for students with disabilities are a range of key skills, including self-determination, self-advocacy, problem-solving, self-management, use of assistive technology, resilience, understanding of strengths and weaknesses and study skills25.

Socialization in campus might be different from previous secondary education experience. Student with visual impairment need to adjust with their new campus life and peers perceptions26. Based on Brown et al.26, their research finding provides evidence for the need to support interactions between normal student and student with disabilities that encourage each to play a valuable role. Instead, future efforts should focus on increasing the level of mutuality between students when interacting on class tasks and should improve opportunities for meaningful social interactions as well. High self-esteem in individuals with visual impairments is positively linked to the social support27.

**Mobility on Campus**

A challenge for students with visual impairment can be getting independently. An obvious individual adjustment is the provision of mobility support to enable the student to learn necessary routes around the institution. General practice includes restricting the amount of movement that students need to make between lectures (e.g. not scheduling consecutive lectures on opposite sides of the campus). The receipt of mobility support relies on the student engaging with this support, and for them to have existing mobility skills to draw upon. Most of the students needed close support from an adult or peers, and some of them clearly learned best when working alone with the teacher, free from other distractions. However, the teachers all had the ambition that the students should also be engaged in activities together with peers28.

Instead of being able to go between lectures independently, student will reliant upon a sighted guide. Sighted assistance are needed at first, as they learned to navigate their new environment, but over time they were able to learn the necessary routes, illustrating how the amount of support that a visual impairment student will require is progressive17.

In Malaysia, Kadir and Jamaludin29 discover that the visual impaired emphasize on the design of guiding blocks, tactile direction or warning indication to facilities in the building, and signage of the building. According to their findings, notice that policies have been given extra attention to guidelines or design for the wheelchair bound user, while other PWDs like the hearing impaired were neglected.

**Reading Materials and Resources**

Central to the concept of higher education is the aspiration for the student to become an independent learner, facilitated through independent study. For students with visually impaired, this is often problematic due to barriers in obtaining accessible copies of text, beyond the immediate control of the institution. University can promote inclusive practice by providing copies of reading lists in sufficient time for alternative formats to be obtained and subscribing to accessible online journals/e-books. This can advantage all students
as they have more time to access reading material to conduct preparatory reading and have more options for accessing texts.

The use of social media is an everyday occurrence for blind and partially sighted people. It is a very important tool for this user group to help them with tasks such as information seeking and social interaction for leisure and work purposes and to feel connected with society. However, barriers to full accessibility to online content can also result in negative feelings for visually impaired users, such as frustration, time wasting and uncertainty over content which may have been missed.

The previous study, the data highlighted that blind and visually impaired students suffer from information overload more than their peers and this must be borne in mind when designing assessment tasks and delivering them. Students with vision impairments are using digital tools innovatively and creatively to cope with the challenges of their transition experience. Transition 2.0 represents a significant shift from the way transition to university has conventionally been seen by scholars and it refers to a generation of young students with vision impairments which has grown up using digital technologies as part of their daily lives.

**Conclusion**

To conclude, by exploring on coping strategies by the university student with visual impairment based on The Goodness of Fit Model, and focused in adaptive behaviour on campus, mobility on campus, and reading materials and resources, the institutional level and the higher education system can support the basic needs of this minority student in the university community.

**Conflict of Interest:** NIL

**Source of Funding:** Self source

**Ethical Clearance:** Done research committee

**References**

8. Manisah Mohd Ali et al. 2006. Inclusive education is a concept that allows students with special needs to be placed and received instruction in the mainstream classes and being taught by mainstream teachers. Malaysian Ministry of Education, students with special needs. 2006;21(3):36–44.


Obesity and Prolactin in Various Populations

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Abstract

Association of Obesity with altered levels of serum prolactin (PRL), a marker of stress is well documented. The objective of this systematic review and meta-analysis was to estimate the association between obesity and PRL according to sex, ethnicity and age. PubMed, Web of Science (WoS) & EBSCO database were searched from the 5th to 20th of October 2018. Two reviewers independently extracted data from 12 cross-sectional studies that used body mass index (BMI), waist circumference (WC) or waist-to-hip ratio (WHR) as measures of obesity and aggregated using the random-effect model. The correlation (r) for BMI and PRL was -0.231; 95% confidence interval (CI) = -0.392 to -0.055) in adults and (r = -0.500; 95% CI = -0.622 to -0.354) in children. In adults, r for BMI and PRL was greater in women than men by -0.127 (95% CI = -0.178 to -0.05) and greater in European populations r=0.156 (95% CI = -0132 to -0.079) than Middle Eastern populations r = -0.655(95% CI = -0.880 to 0.191). Obesity is associated with decreased levels of PRL, and the association is greater among women and Europeans. The emergence of difference between different genders was observed only in adulthood.

Keywords: Prolactin, meta-analysis, obesity, sex differences, systematic review.

Introduction

Adipose tissue dysfunction is a hallmark of obesity-induced metabolic disorders. It is a feature of type 2 diabetes and accelerated cardiovascular disease1, which is a leading cause of mortality and morbidity in developed and developing countries. A 2004 population-based cross-sectional study conducted in all Malaysian states found an overall prevalence of obesity of 12.3%, which was 280% higher than that in 1996.4 Many well-accepted theories associate the pathophysiological mechanisms observed in obesity predisposing to cardiovascular accidents.5 These metabolic syndromes are associated with reduced levels of serum prolactin (PRL) in humans and rodents, raising the question of whether low PRL levels contribute to metabolic dysfunction.1

In many species, prolactin is of biological importance and plays a major role in determining the deposition and mobilisation of fat. In human physiology, except for pregnancy, prolactin secretion is altered by increasing body weight in both children and adults. Prolactin appears to be a marker of hypothalamic-pituitary function; the prolactin response to insulin-hypoglycemia, thyrotropin-releasing hormone stimulation and other stimulatory factors may be diminished. Further, obesity alters the 24 h spontaneous release of prolactin. The association of obesity with prolactin is primarily due to the broad distribution of prolactin receptors correlating to its concurrent functions. Due to its presence on adipocytes, the prolactin receptor (PRLR) is an important effector modulating adipocyte fate and differentiation with impact on energy homeostasis, and adaptive thermogenesis.6 Studies show the association between adiposity and sex hormone also showing synergy between obesity in their association with various hormone levels such as estrone, estradiol and prolactin.7

Several cross-sectional studies narrative reviews have linked prolactin with obesity.8 Studies were done in populations of different sex, ethnicity and age have reported varying degrees of association between obesity and prolactin. To date no systematic review or meta-
analysis has been done, gathering the evidence to assess such associations according to population characteristics. In this systematic review and meta-analysis, the study aims to investigate the associations between obesity and prolactin in general adult and child populations as well as sub-populations of males, females, and Asians.

Method

Data sources and searches

The data source search was conducted between 5th to 20th October 2018. Standard search engines and websites such as PubMed, WoS & EBSCO for cross-sectional studies of obesity and prolactin were used. The text words and MeSH terms ‘Prolactin’, ‘body mass index’, ‘BMI’, ‘waist circumference’, ‘WC’, ‘waist-hip ratio’, ‘WHR’, ‘overweight’ and ‘obesity’ were used. We also conducted searches on ProQuest and Google Scholar to retrieve grey literature. Only studies written in English published between the year 1966 to 2018 were included in this review.

Data extraction and quality assessment

The extracted data set was subjected to assessment by two independent assessors. Articles that were not agreeable by both the reviewers was resolved by consensus by the third reviewer. Reviewers extracted information on author names, year of publication, study design, study setting, as well as in male and female participants. The characteristics of the participants from the extracted studies included sex, age, ethnicity, mean BMI, WC, WHR, prolactin, obesity prevalence and prevalence of altered prolactin. Spearman or Pearson correlation coefficients were also extracted as the outcome data. Sex-specific data were collected wherever available. Strengthening the Reporting of Observational Studies in Epidemiology (STROBE), a checklist for cross-sectional studies was used to reduce the risk of bias of individual studies. Studies that failed to meet any of the checklist items were excluded from analysis, as shown in the flow chart.

Data synthesis and analysis

Eligible studies were grouped based on their effect measures that included, age group (children or adults), sex (male or female), ethnicity (European, Middle Eastern, African & North American) and a measure of obesity (BMI, WC or WHR). Separate reviews were conducted for these selected studies.

The results synthesised included studies using random-effects meta-analyses, and we have reported the results in the form of correlation coefficients with corresponding 95% confidence intervals (CIs). Meta-regression models of correlation coefficients evaluated the association between each of the criterions accounted for BMI, WC and WHR with PRL by including sex (male or female) and ethnicity (European, Middle Eastern, African & North American) of study subjects as categorical moderators.

The effect measures are reported here as part of our systematic review. All statistical analyses were conducted using Comprehensive Meta-Analysis Version 3.
Results

Search results and study inclusion

In our preliminary literature search a total of 1,962 potentially relevant abstracts and full texts were identified. From the extracted articles, we used the inclusion and exclusion criteria to identify and extract 53 full-length papers that the reviewer found to be most relevant. These 53 articles were then assessed for eligibility. Out of the 53 studies, using the STROBE index, we included a total of 12 studies in our review. The 44 studies excluded were rejected for reasons mentioned in the flow chart. Search using Google Scholar and ProQuest for any grey literature showed no article that relevant or eligible to our study.

We gathered studies from 1981, and these studies had sample sizes ranging from 11 to 1121. Among these studies, 9 studies provided an effect measure that was sex-specific which included 1087 males and 1780 females, 7 studies covered around 25774 North American/Europeans (German, American, Italian, Australian, Polish and Swiss), 3 studies observed 193 African & Middle Eastern people (Egyptian, Nigerian & Turkish) and one study focused on 122 children.

Immunoassay test was commonly used in all the studies to estimate serum prolactin. One study used immune-fluorometry, two used immune-radiometry, one used enzyme-linked immunosorbent assay; two used chemiluminescence immunoassay and 4 used immune-assay.

Obesity and Prolactin

Irrespective of age, ethnicity or gender of the participant the studies used in this review showed the measure of obesity to be associated with PRL. The overall random-effects summary correlation between

Flow chart showing protocol for study selection including justification for exclusion. Body-mass index (BMI); Prolactin (PRL); waist circumference (WC); waist-hip ratio (WHR). Low quality studies defined as failing to meet the following STROBE criteria; data source/measurements (n=1) objectives (n=0) statistical methods (n=0), participants (n=0), main results (n=0), limitations (n=0)
obesity and PRL was strong \( r = -0.231; 95\% \text{ CI} = -0.393 \) to \(-0.055\). In adults, the random-effects summary correlation coefficient between BMI and PRL was strong \( [r] = -0.177; 95\% \text{ CI} = -0.265 \) to \(-0.086\). The random-effects summary correlations between PRL with WC \( (r = 0.40; 95\% \text{ CI} = 0.31 \) to \(0.48\) and WHR \( (r = -0.499; 95\% \text{ CI} = -0.728 \) to \(-0.169\) in adults were strong. Studies in children also showed strong associations between both BMI with PRL reported in a study in Italian children\(^9\). The random-effects summary correlation between BMI and PRL in children was strong \( (r = -0.500; 95\% \text{ CI} = -0.622 \) to \(-0.354\).

**Gender**

We assessed the potential impact of sex in the association between obesity and PRL in adults using meta-regression, subgroup analysis and qualitative review of data. Using sex moderators, the results from meta-regression models showed that the correlation was stronger in women than men. The average difference in the correlation coefficients between BMI & PRL in men and women were \(-0.127\) \(95\% \text{ CI} = -0.178 \) to \(-0.079\). This was found to be significantly higher in women than men as shown in many of the studies.\(^10\)

**Ethnicity**

Studying the association between obesity and PRL using meta-regression and qualitative review of data showed a difference between various ethnic populations that included European, Middle Eastern, African & North American populations regardless of sex. In meta-regression models that include sex and ethnicity moderators, the correlations between BMI, WC and WHR with ln (PRL) were significantly greater in European and Middle Eastern population by \(-0.121\) \((-0.170 \) to \(-0.071\) \) & \(-0.655\) \((-0.880 \) to \(-0.191\) \) when compared to the other ethnic groups. Due to the insufficient number of studies in African & American groups, it was not possible to compare the ethnic differences through subgroup analyses.

**Discussion**

Our study shows an inverse association of obesity with PRL level in most of the observed population. Meta-regression, subgroup analyses and a qualitative review of data revealed stronger associations between obesity and PRL in women when compared with men, especially within the European population. The conduct of subgroup analysis indicates a correlation between PRL and BMI in children of both the genders, especially in Italy. Substantial studies have established the pathobiology linking obesity to PRL.\(^6\) It is well established that a variety of hormones and cytokines are released from adipose tissue contributing to the secretion of PRL.\(^1\)

The main factor contributing to excessive weight gain in children is the impaired balance between energy intake and expenditure.\(^11\) PRL is produced by the pituitary gland and by other tissues including adipose tissue where it acts as a cytokine.\(^12\) Peripherally, it is regulated by insulin and is affected by obesity in a depot-specific manner.\(^13\) PRL was shown to influence two of the most important adipokines - adiponectin and leptin. PRL was described to inhibit adiponectin serum concentration in both humans and mice.\(^14\) This effect match those described on lipogenesis because adiponectin can activate AMP kinase which in turn inhibits acetyl CoA carboxylase (ACC) and thus inhibits lipogenesis.

In our study, a greater scale of association between obesity and PRL in women compared with men has been observed. However, the pathophysiological mechanisms behind the sex difference, within the context of obesity, remain unclear. One of the probable reasons could be because of the effect of circulating oestrogens.\(^8\) The evidence suggests that the hypothalamic alteration, which may occur in those with a propensity for obesity, not only involves the control of pituitary but also affects the control of the sympathetic nervous system through prolactin.\(^15\)

**Ethnicity**

Our literature search yielded studies investigating the relationship between prolactin and obesity mainly in the European population. There were few studies from the Middle-eastern population and even fewer from the North American & African population and none reported among the Asian population. Most of the studies conducted were among the European population that evaluated the association between BMI and PRL, and further suggest a stronger correlation in women when compared to men. On the contrary, most of the studies investigating the Middle-eastern population used either WHR or WC and PRL. The important role of lifestyle in modifying the association with obesity has been well chronicled in many studies. PRL levels have been
associated with diets high in glycemic loads. There is already evidence that the European diet plays a major role in the development of atherosclerosis.

**Age**

The main factor contributing to excessive weight gain in children is the impaired balance between energy intake and expenditure. Our results from the meta-analysis conducted show that in obese adolescents and children, just as in the obese adults, there is a hypothalamopituitary disorder which affects prolactin release. Both in normal and obese children, it was found that there are no differences between males and females of the same age and the same pubertal stage that existed. A larger study population is recommended to reduce this bias further and make the results more reliable.

**Limitations**

Firstly, we were not able to draw casual inference on the association between obesity and PRL as the studies included a cross-sectional design that limits this effort. There is a lack of prospective studies estimating the link between weight gains longitudinally and PRL. Secondly, due to the limitation in the evidence of literature accounting for the differences in BMI, WC and WHR between European and Middle-Eastern, African & North American populations there might be a bias observed in our comparisons made based on ethnicity. Thirdly, anthropometric measures of obesity have a limited diagnostic capacity for body fatness in both adults and children and may result in the misclassification of patients with altered PRL levels. Finally, measures of publication bias could not be reasonably estimated due to the limited amount of studies in each subgroup analyses. Publication bias is an inherent limitation to virtually all meta-analyses.

**Conclusion**

Obesity is inversely associated with the levels of PRL. This association is stronger in women than in men especially in the European population when compared with the Middle-Easterners. The implementation of sex-specific PRL cut-offs might be considered for improving cardiovascular disease (CVD) risk assessment conducted in European populations. It is further recommended for the current CVD risk prediction models considering the incorporation of PRL to provide risk assessment methods that account for the sex-specific associations between measures of obesity and PRL. Also, the association between obesity and PRL was not found to be different between male and female children. Currently, the pathophysiology leading to sex and ethnicity differences in the association between obesity and PRL in adults are not well understood. The absence of such sex differences in childhood and its emergence in adulthood could indicate a role associated with the hypothalamopituitary axis.

**Conflict of Interest Statement**: NIL

**Funding**: Self-funded

**Ethical Clarence**: Clearance obtained from Research Medical Council, MAHSA University

**References**


Reliability of Module Emotional Intelligence for Children: Building Positive Emotions of Malaysian Children

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Abstract

Children who have a good level of emotional intelligence will be able to manage their lives in a more orderly and harmonious. Good emotional control is a very important aspect in the well-being of individuals. This study aims to identify the reliability of emotional intelligence module (EQ) in building positive emotion in preschool children. The samples involved a total of 100 preschool children aged four to six years in Terengganu, Malaysia. The analysis used was Rasch Model analysis to see the reliability level of Emotional Intelligence Module (KE) in building positive emotions of children. The findings show that the module is used to record a good level of reliability which is the reliability of the (person) is 0.74 and reliability of the item is 0.89. This shows the selection of the sample is appropriate and in keeping with the characteristics of the research objectives. While the items that have been built are valid and appropriate to the level of ability and understanding of the study sample.

Keywords: Module Emotional Intelligent for Children, Malaysian children, rasch model.

Introduction

Socioemotional support at preschool plays an important role in building emotional intelligence among children to achieve excellent achievement at this time and in the future⁵. Referring to a study conducted ⁶ showed that individuals who are successful in life whether in daily life or even career only use 20 percent of the intelligence intellect than 80 percent of emotional intelligence.

A failure in academics and behavior which is incompatible with the norms of society is caused by a deficiency of one field of interpersonal intelligence⁹,¹⁷. Researcher¹⁸ says that one of the key skills that must be learned by a child during its development is to establish effective communication skills with others. Elements of interpersonal and communication skills are some of the sub-elements contained in the constructs of EQ¹⁰,¹³.

Recognizing the importance of emotional intelligence since early childhood, the researchers decided to test the extent of the reliability level of emotional intelligence module (EQ) existing in building positive emotion in preschool children. This module can also be used as a reference to facilitate the smooth process of teaching and learning in the classroom.

Problem Statement

This study touches on issues arising out of the implementation of teaching and learning at the core socioemotional preschool children in Malaysia. Some issues have been identified that lead teaching and learning process rooted socioemotional difficult to run. Based on studies conducted¹¹ showed that the preschoolers were found to be weak in the one of the elements in socioemotional sphere which is the element of achieving emotional intelligence.
In addition, the results of interviews conducted with the teachers in preschool shows that emotional intelligence elements and other elements in the cord socioemotional only made the subject side only. The lack of teaching aids and teaching and learning modules which specializes in spinal socioemotional also cause difficulties for teachers to implement teaching and learning. Difficulty teachers to carry out teaching and learning, this is because there are no guidelines that provide disclosures in a planned and systematic way that is based on the syllabus.

Recognizing this problem, the researchers decided to use emotional intelligence module (EQ) which was ready for use in research on preschool children aged four to six years in Terengganu, Malaysia. Researchers use this module to examine to what extent the reliability level of emotional intelligence module (EQ) in building positive emotion in preschool children in Terengganu.

**Method**

This study is done to look the reliability emotional intelligence module (EQ) in building positive emotion in preschool children. The emotional intelligence module (EQ) in building positive emotions of these children will be given to two preschool teachers in two different preschools for them to use the whole activity available in the module with the researchers monitored. Implementation or use of the module in a preschool run for two months. After the expiration of the implementation of the module, the researchers will get the children EQ data using Sullivan Emotional Intelligence Scale for Children that have been adapted to suit the scope of Malaysian children. After that, the results that were obtained are analyzed using the Rasch model to see the reliability and usability of emotional intelligence module (EQ) in building positive emotions of children in Terengganu.

**MODULE EMOTIONAL INTELLIGENCE FOR CHILDREN: BUILDING POSITIVE EMOTIONS OF MALAYSIAN CHILDREN**

Through this module, children will be applied to the four elements of emotional intelligence to be mastered by them to achieve positive emotions. Four of these elements is to build self-concept, build momentum and a positive attitude, build confidence to communicate and build self-control abilities.

Children who are able to build self-concept can be positive about the strengths and weaknesses of self. They can express ways to overcome their own weaknesses with teacher guidance. In addition, children who are working to build momentum and a positive attitude will have a good degree of patience, self-reliant, confidence to do something, can foster an attitude of love and mutual help. Next, the children were able to build the confidence to communicate can speak and ask with confidence. They can also interact with confidence, telling stories and giving opinions. Children who are able to develop the ability to control themselves will know how to control his emotions in an unpleasant situation.

Accordingly, the modules that cover all of these elements will be used by researchers to serve as a mechanism to help raise another child’s emotional intelligence. Children need the help of adults or their friends who are more capable to guide and express things learned easily. This method is based on the theory of the Zone of Proximal Development (ZPD) to support it. According to researcher, children who have learning difficulties can be resolved when getting help from an adult or collaboration with his friend.

Thus, the role of adults is essential to help children express what they learn. With the aid of teaching and learning modules that build emotional intelligence available, expected a bit much to help teachers carry out their task of teaching emotional element at the preschool children. The implementation of this module is carried out in stages. The module has ten events that represent sub-elements build emotional intelligence. Table 1
shows the theme, sub-elements and related activities carried out.

Table 1. Themes, Activities and Elements of Emotional Intelligence Building

<table>
<thead>
<tr>
<th>The sub elements to build Emotional Intelligence</th>
<th>Learning standards</th>
<th>Activities</th>
<th>Themes</th>
<th>Emotional Element Emphasis</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSE 2.1: Building a Self-Concept</td>
<td>PSE 2.1.3: Be positive about self-esteem.</td>
<td>Activity 5</td>
<td>Let’s Build</td>
<td>Know To Understand The Emotions</td>
</tr>
<tr>
<td></td>
<td>PSE 2.1.4: Stating how to overcome self-weakness with guidance.</td>
<td>Activity 2</td>
<td>What Do I Feel?</td>
<td>Know To Understand The Emotions</td>
</tr>
<tr>
<td>PSE 2.2: Building a Positive Spirit and Character</td>
<td>PSE 2.2.2: Create passion and positive qualities such as patience, unity and helping.</td>
<td>Activity 3</td>
<td>‘Gotong-royong’</td>
<td>Know to Use Emotion</td>
</tr>
<tr>
<td>PSE 2.3: Build Confidence for Communicating</td>
<td>PSE 2.3.4: Speak confidently.</td>
<td>Activity 4</td>
<td>Helping Neighbours</td>
<td>Know to Use Emotion</td>
</tr>
<tr>
<td></td>
<td>PSE 2.3.5: Ask with confidence.</td>
<td>Activity 1</td>
<td>Who am I?</td>
<td>Know To Identify Emotions</td>
</tr>
<tr>
<td></td>
<td>PSE 2.3.6: Interact with confidence.</td>
<td>Activity 6</td>
<td>Let’s Buy</td>
<td>Know To Identify Emotions</td>
</tr>
<tr>
<td></td>
<td>PSE 2.3.7: Tell stories and give opinions.</td>
<td>Activity 10</td>
<td>Baju Rayaku</td>
<td>Know To Identify Emotions</td>
</tr>
<tr>
<td></td>
<td>PSE 2.3.8: Demonstrate his/her own abilities through various communication methods such as painting, singing and acting.</td>
<td>Activity 7</td>
<td>My ambition</td>
<td>Know To Identify Emotions</td>
</tr>
<tr>
<td>PSE 2.4: Building Ability to Self-Controls</td>
<td>PSE 2.4.2: Controlling emotions in unpleasant situations.</td>
<td>Activity 8</td>
<td>Bad weather</td>
<td>Know to Control Emotions</td>
</tr>
<tr>
<td></td>
<td>PSE 2.4.3: Specifies ways how to control yourself in an unpleasant situation.</td>
<td>Activity 9</td>
<td>The important of water</td>
<td>Know to Control Emotions</td>
</tr>
</tbody>
</table>
Reliability of Module Emotional Intelligence for Children: Building Positive Emotions of Malaysian Children

The reliability of the module has been tested using the Rasch model analysis that aims to see whether the module is built it has enough capacity to help build preschool children emotional intelligence. Rasch analysis results show the characteristics of a good reliability of 7.73 logit of a range of items and also for the range of 10:49 logit. It shows the measuring stick is long and impressive, namely by 3.19 logit. Hint PCA which is 56.2 percent above the 40 percent minimum extent necessary in Rasch analysis. This proves that built module capable of become a mechanism to assist the development of emotional intelligence of preschool children.

Measuring Instruments

The instrument used in this research using emotional intelligence module (EQ) in building positive emotions of preschool children. To identify the level of preschool children emotional intelligence, researchers will use the Sullivan Emotional Intelligence Scale for Children (EISC), which has been adapted in the context of preschool children in Malaysia. The EISC Measurement include the ability to identify emotions (identifying emotion), the ability to understand emotions (emotion understanding), the ability to control emotions (controlling emotion) and the ability to use emotions (using emotion)

EISC provides a subset of test measurements through facial expression, storytelling, understand and regulate emotions. There is a 20-item test to identify the level of emotions through facial expressions (face expressions) and eight items tested through narrative (storytelling). Both subset of the domain is under examination to know identify emotions. Domain for know to understand the emotion had 12 and next nine item contained in the domain know emotions. There is another section under emotion had 12 and next nine item contained in the domain know emotions. There is a 20-item test to identify the level of emotional intelligence. The last section is empathy domain know emotions. There is another section under emotion had 12 and next nine item contained in the domain know emotions.

Researchers have changed some of the items that are appropriate to the tendency of concentration of children in Malaysia. In addition, every facial expression under the domain identify emotions also changed out and replaced with facial expressions that resemble those

<table>
<thead>
<tr>
<th>Table 2. Emotional Intelligence Domains</th>
</tr>
</thead>
<tbody>
<tr>
<td>Domain</td>
</tr>
<tr>
<td>Know To Identify Emotions</td>
</tr>
<tr>
<td>Test through storytelling</td>
</tr>
</tbody>
</table>
| Know To Understand And The Emotions | Part I | Jama is playing bicycle in the park one Saturday afternoon. She looks at her good friend sitting down right in her path. He is trying to fix his damaged bicycle. | Jama bermain basikal di taman pada suatu petang Sabtu. Sama ada dia melihat kebenaran dia bermain basikal. Kawan karibnya sedang cuba untuk melihat kebenaran yang rasuk.
| | a. Would Jama feel sad that her friend’s bicycle was damaged? | a. Adakah Jama akan berasa sedih melihat kebenaran kasus yang melibatkan rasuk |
| Know To Control the Emotions | 2C | You want to listen to some music in your room, but you can’t find the new CD you got for your birthday. You spend a long time searching, and then you see the CD in your brother’s room. You had already asked Mark not to take things without asking. | Anda ingin mendengar musik di dalam bilik anda, tetapi anda tidak dapat mencari CD baru hadiah hari jadi anda. Anda menghabiskan masa yang lama mencari CD, dan kemudian anda melihat CD anda di bilik adik anda. Anda telah mengingatkan adik anda untuk tidak mengambil barang-barang kecuali anda memberi kebenaran untuk tak bertahap kepada anda.
| | a. Should you yell at your brother for taking your CD? | a. Patutkah anda akan menyeru adik anda kerana telah mengambil CD anda tanpa kebenaran? |
| Know To Use the Emotions | 1D | Your best friend gets a new bike and is very happy. Would you feel happy for your friend? | Rakan baik anda mendapat basikal baru dan dara sangat gembira. Adakah anda akan turut berasa gembira untuk rakan anda? |

of Malaysia. Next, the researchers changed the scale of the survey responses of three choices to two options only. Examples, ‘Yes’, ‘No’, and ‘I Do not Know’ was changed to ‘Yes’ and ‘No’. This is because the scale of the response of ‘no’ and ‘I Do not Know’ had the same identity score. Table 2 shows examples of items adaptation EISC instruments in the context of Malaysia preschool children.
Findings

Table 3 shows the reliability of the person is 0.74. This suggests that the selection of the sample for this study are accurate and meet the characteristics required by the objectives of the study. Next, this table also shows the reliability of the items also registered at high score of 0.89. This proves that the items that have been built and used is valid because it corresponds to the level of ability and understanding of the study sample.

Table 3. Reliability of Module Emotional Intelligence for Children: Building Positive Emotions of Malaysian Children

<table>
<thead>
<tr>
<th>PERSONS</th>
<th>102 INPUT</th>
<th>100 MEASURED</th>
<th>INFIT</th>
<th>OUTFIT</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>SCORE</td>
<td>COUNT</td>
<td>MEASURE</td>
<td>ERROR</td>
</tr>
<tr>
<td>MEAN</td>
<td>134.6</td>
<td>76.0</td>
<td>1.44</td>
<td>.31</td>
</tr>
<tr>
<td>S.D</td>
<td>6.9</td>
<td>0</td>
<td>.62</td>
<td>.05</td>
</tr>
</tbody>
</table>

REAL RMSE: .31  ADJ.SD: .53  SEPARATION: 1.71  PERSON RELIABILITY: .74

<table>
<thead>
<tr>
<th>ITEMS</th>
<th>76 INPUT</th>
<th>76 MEASURED</th>
<th>INFIT</th>
<th>OUTFIT</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>MEAN</td>
<td>177.1</td>
<td>100.0</td>
<td>.00</td>
</tr>
<tr>
<td>S.D</td>
<td>12.6</td>
<td>0</td>
<td>.89</td>
<td>.08</td>
</tr>
</tbody>
</table>

REAL RMSE: .29  ADJ.SD: .84  SEPARATION: 2.87  ITEM RELIABILITY: .89

Conclusion

The findings indicate that the development of teaching and learning modules to build emotional intelligence (EQ) kindergarten children have a very

Conflict of Interest: NIL

Source of Funding: Self source

Ethical Clearance: Done research committee

References


Social Support as Mediating Effect of Psychological Well-Being amongst Emerging Adolescents

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Abstract

Current study investigates mediation model design through a quantitative survey. Paper-pencil questionnaires were administered to 100 emerging adolescents who were purposely selected, aged around 12 to 14 years old from Johor, Malaysia. Findings indicated that parental involvement, psychological well-being and social support have significant positive correlations. Mediation model analysis based on SPSS Macro Process by Hayes was executed for examining whether social support had any significant mediating effect on parental involvement and psychological well-being. The outcome of the analysis showed that social support was a significant mediator between parental involvement and psychological well-being. Parents involvement for emerging adolescents was also shown to be important for the psychological well-being among emerging adolescents.

Keywords: Social Support, Psychological Well-Being, Emerging Adolescents Development

Introduction

Bronfenbrenner’s ecological theory of development stressed the importance of parental and community involvement, and the social environment in promoting adolescents’ behavioural and psychological growth¹. Since the living context of emerging adolescents is claimed to have a proximal effect on their overall development, the perception of the environment as a supportive resource will have an effect on their psychological well-being.

Parental involvement in adolescence was found to have an impact on emerging adolescents, especially those facing hormonal changes and difficulty in social adjustment. Therefore, parental guidance, support, and companionship is significantly important at this stage to fulfil their need for love and sense of belonging as stressed by Maslow’s ᵃ²Hierarchy of Needs Theory.

Researchers have suggested that there is a direct linear relationship between secure parental attachment and their psychological well-being³–⁸. However, the research was based on the respondents’ subjective experiences within a specific cultural context, and do not sufficiently measure actual parental involvement and its association with the individual’s psychological well-being. Thus, our research sets out to examine the direct relationship between perceived parental involvement and the psychological well-being of emerging adolescents, as well as how social support mediates between the two.

In a longitudinal study by Ramamurthy⁸, adolescents aged between 12 to 18 who enjoyed positive moments with their parents were found to feel more contented and supported when facing psychological distress. They also reported experiencing a healthier adulthood²³. Thus, current research examined the level of social support, parental involvement, and psychological well-being among emerging adolescents and the relationships between these variables.

Method

The targeted population in this study are emerging adolescents aged 12 to 14 years’ old who live with grandparents or parents, in the Pontian district of Malaysia. Parents of these emerging adolescents often arranged a lot of tuition classes for their children to ensure that they would not be left out in the new learning
environment. These emerging adolescents spend most of their time at tuition centres or the school, and were not able to enjoy quality bonding sessions with their parents. A total of 100 respondents from three tuition centres in Pontian were recruited for this study.

A revised perceived parental involvement instrument established by with high internal consistency (Cronbach alpha .76 to .83) and a test retest reliability (ranged between .87 and .68.) was used in this study. The social provisions scale developed by in 1987 to examine the degree of respondents’ social relationship in their life was adopted in the current research for assessing PSS (Cutrona & Russell, 1987). This scale consists of 6 social support dimensions (Attachment, Social Integration, Reassurance of Worth, Reliable Alliance, Guidance and Opportunity for Nurturance) with a total of 24 items. Internal consistency of the scale reported with Cronbach’s alpha ranged from .60 to .70. The Cronbach’s alpha from the sample of the current study was .84. Ryff’s Psychological Well-being Scale was adopted in this research, which was developed by Carol Ryff in 1989 based on the six factors model of psychological well-being theory for assessing the positive functioning among . This PWB scale had been continuously revised into various versions which are available in 84, 54, 42 and 18-item format since 1996 and had been published in more than 500 . Researcher had adopted the 42-item PWB which consists of 6 psychological well-being dimensions namely autonomy, environmental mastery, personal growth, positive relation, purpose in life, and self-acceptance to identify the well-being of emerging adolescents. Internal consistency of the scale reported with alpha ranged from .60 to .70. The PWB was rated on a 6-point Likert-type interval scale ranging from 1 (strongly disagree) to 6 (strongly agree). The Cronbach’s alpha from the sample of current study was .91.

Data were analysed by mean, pearson’s correlation and a mediation analysis model by using SPSS MACRO PROCESS v 3.3 by Andrew F. Hayes. The analysis was used to investigate the significance of perceived social support as a mediator between perceived parental involvement and the psychological well-being of emerging adolescents.

Results and Discussion

Table 1  Mean and Correlations amongst social support, psychological well-being and parental involvement.

<table>
<thead>
<tr>
<th></th>
<th>M</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Social Support</td>
<td>2.70</td>
<td>.645**</td>
<td>.546**</td>
<td>1</td>
</tr>
<tr>
<td>Psychological well-being</td>
<td>2.99</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Parental involvement</td>
<td>3.83</td>
<td>.738**</td>
<td>.546**</td>
<td>1</td>
</tr>
</tbody>
</table>

*p < .05, **p < .01

There was a significant positive relationship between perceived parental involvement and psychological well-being. A higher level of perceived parental involvement translates into greater psychological well-being of emerging adolescents. However, the effect of perceived parental involvement was not as significant to the psychological well-being of the respondents, when there is presence of perceived social support. This shows that social support has a mediating effect between the two.
Moradabbasi mentioned that there might not be a direct relationship between parental attachment and the psychological well-being of emerging adolescents, as self-esteem and internal security serves as protective factors. Other than parental attachment, the development of an individual’s self-esteem and internal sense of security can be attributed to other factors, such as the perceived level of social support an individual receives. Therefore, researchers hypothesized that there is a significant mediating effect of perceived social support \((M)\) on the relationship between perceived parental involvement \((X)\) and psychological well-being \((Y)\) of emerging adolescents. Based on the output of SPSS MACRO PROCESS version 3.3. statistical analysis for mediation model, the lower level Confidence intervals (LLCI) and upper level Confidence intervals (ULCI) is more than zero. This further establishes the hypothesis that the effect of perceived parental involvement on the psychological well-being of the respondents were mitigated with the presence of perceived social support as mediator.

The mediating effect of perceived social support \((M)\) on the relationship between perceived parental involvement \((X)\) and psychological well-being \((Y)\) was supported by Roth, Suldo and Ferron. They suggested that parental involvement was important in developing strength of character at the age of identity formation as well as boosting the adolescents’ self-esteem. Whether emerging adolescents can develop a healthy social network and hence experience greater psychological well-being in their lives are often determined by being aware of their strengths and having a sense of purpose in life.

Furthermore, Tomyn added that as long as youths have good parental or social support, they can maintain optimal psychological well-being compared to those who shared the same negative experiences without the warmth and support of parental involvement in their life. Findings found that disabled youths tend to enjoy their learning and rehabilitation process when they were accompanied by their parents compared to those without their parents’ presence.

However, Toikko and Rantanen alerted that studies of psychological well-being among emerging adolescents in relation to perceived parental involvement and perceived social support has to be examined against other socio-environmental factors and cultural values. These values include level of independence and the ability to strive for happiness, which are not determined by the level of parental involvement and social supports. Emerging adolescents who live in a community with low public welfare and safety would have lower psychological well-being. For example, those living in countries strife in war might often experience starvation, anxiety and panic.

Parents who are actively involved in their children’s life and have a good relationship with their children can help them to deal with the psychological distress in their transit into adolescence. Overcoming these psychological distress will help them develop their resilience towards greater challenges they might face in future.

**Conclusion**

Living in a competitive and stressful era with the advancement of technology can be stressful. Hence, psychological well-being of vulnerable groups including emerging adolescents are at risk given that they are in an ambivalent stage in searching for their identity. In order to encourage healthy psychological and socioemotional development in emerging adolescents, parents’ involvement and adequate social support are necessary.

**Conflict of Interest:** NIL

**Source of Funding:** Self Source

**Ethical Clearance:** Done by Research Committee.

**References**

4. Öztürk A, Mutlu T. The relationship between attachment style, well-being, happiness and social


Investigating Value Co-creation Behaviour among International Postgraduate Students in Malaysia’s HEI’s

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Abstract

This study investigates the impact of gender, scholarship status, marital status and country of origin among the various factors of value co-creation behaviour – namely, participation behavior and citizenship behavior of the international postgraduate students towards Higher Education Institutions (HEI’s) in Malaysia. Drawing upon a sample of 110 international postgraduate students, the independent sample t-test results suggest that there are differences in case of information seeking and responsible behavior between the international postgraduate male and female students towards their respective universities. However, the outcomes show no differences in value co-creation factors in the case of scholarship status and marital status among these students studying in Malaysia’s HEI’s. The one way ANOVA result reveals an interesting insight that the extent of showing tolerance varies among the students from various countries towards their respective universities. The findings have implications for universities seeking to compete in a complex market-driven higher education setting.

Keywords: Value co-creation behavior; International postgraduate students; Higher education marketing

Introduction

Education is a service industry which presents a particular set of challenges for practitioners¹, and in the service industry, the main focus is on the students-cum-customers. Therefore, several service-providing companies/institutions show the relevance of active participation of their customers for the development of resonating value propositions supporting competitive advantages in the market. Central to such customer participation are co-creation behaviours that facilitate beneficial relationships among market actors.

The growth of higher education in Malaysia can be seen in several areas: increase in students’ enrolment, increase in the number of higher education institution (HEIs), increase in government spending, additional government policies in promoting education and the country’s continuous need for human resources².

Internationalisation of higher education in Malaysia is a rising phenomenon of the recent decades. It is recorded that 18,242 international students studied in Malaysia in 2001⁴ and in 10 years, it grew to 86,919, which was equivalent to a 16% growth per annum. The country has articulated goals of becoming “the world’s sixth-biggest education-exporting country by 2020 with a target of 2,00,000 international students studying in Malaysia’s HEIs”³,⁵. As of 2014, this goal is deviating from the target⁶ primarily due to declines in the three largest current sources of international students (Nigeria, Yemen and Iran) which provide “nearly half the foreign students in Malaysia”⁷.

Both public and private HEIs in Malaysia have to take more responsibilities for the overall products and services offered to customers. Therefore, HEIs in Malaysia are required to adopt relationship marketing aspects such as value co-creation behaviour as a form of business strategies for strategic activities in their operations and thus to create competitive advantage. The increased interest of the company/institution managements to encourage customer co-creation behaviours has attracted scholarly attention and resulted in preliminary research. Recently, Yi and Gong⁷ established the
significance of “value creation behaviour” (VCB) – a multi-dimensional construct manifesting various value co-creation activities. Value co-creation is “a relatively abstract concept in line with service-dominant logic’s (SDL) zooming out perspective”.

This study intends to investigate how the international postgraduate students vary in terms of gender, scholarship status, marital status and the country of origin towards the various dimensions of value co-creation behavior. To complement the objective, the research question is framed as whether (or not) there are any differences in terms of gender, scholarship status, marital status and country of origin towards value co-creation behaviour dimensions towards the international postgraduate students in Malaysia.

**Literature Review**

Service-dominant (S-D) logic is a school of thought that views all businesses as service providers who exchange service for service as the fundamental basis of exchange. With the evolution towards a dominant logic of marketing in which customers (students) are not merely responders but rather active value co-creators, researchers have begun to focus on customer (such as students) behavior in this regard, extending previous customer behavior literature that focuses on the customers’ decision-making process at the time of purchase (such as student enrolment) in the higher education institutions. To explain the nature of customer value co-creation behavior, some studies use a multidimensional approach and identify distinctive components, whereas other studies follow a unidimensional approach.

Value co-creation behaviour is conceptualized as “customer participation behaviour” (CPB) and “customer citizenship behaviour” (CCB). CPB refers to the involvement of customers (such as students) in “producing and delivering service” in higher education institutions. For instance, if customers (i.e. students) interact with the service provider (i.e. HEIs) during the service provision process to seek and share information, it is customers’ in-role behaviour which is essential for value co-creation to occur. It is operationalized as “information seeking, information sharing, responsible behaviour, and personal interaction”. During information seeking, customers engage in information exchange to clarify service (e.g. university service) status or parameters and satisfy other cognitive needs. Customers (i.e. students) share information to ensure that the service offered by employees (e.g. university staff) is appropriate with individual needs. Customers must demonstrate responsible behavior to support a successful value co-creation process as partial employees of the firm.

CCB, such as “suggesting additional service improvements, helping other customers, and spreading positive word-of-mouth, is an extra-role behaviour which gives additional advantage to firms or higher education institutions in this case. CCB in the form of feedback, advocacy, helping, and tolerance is considered a value-added service to the firm and is not the primary responsibility of the customers such as students. The first dimension of CCB in the current study, i.e. providing feedback, refers to providing or suggesting information to the service provider (i.e. HEIs). In the current study, helping refers to students assisting other fellow students regarding the problems arising during service delivery in any sort of educational or campus activities. Students’ tolerance refers to being patient in case of any discrepancies of the desired university services. Students’ tolerance will plausibly help the HEIs in the aggregate overall. The last dimension is called advocacy/recommendations, which refers to customers (i.e. students) recommending the service provider (i.e. HEIs) to other students, relatives, friends and so on.

**Methodology**

Malaysia’s expectation was to attract international students by 2015, focusing on postgraduate and sponsored international students in particular. The main target countries for international student recruitment are from Asia, the Middle East and Africa. China, India and Indonesia are particularly targeted among Asian countries because they are the largest student markets in the region and because they share language and cultural similarities with Malaysia’s Chinese, Indian and Malay communities, respectively. The international postgraduate students of two leading universities in Malaysia, one public and one private, have participated in the survey of this study. They were students of Masters, PhD, and Postgraduate Diplomas from various departments. Purposive sampling was used to select the respondents. A total of 200 questionnaires were distributed and 110 of them were usable and complete that is used for analysis. The response rate
was 55%. The CVCCB (customers’ value co-creation behaviour) scale was adapted from Yi and Gong. The original scale contains two dimensions, namely, CPB and CCB as measured by 29 items. The items were measured using seven-point Likert scales (1 – strongly disagree and 7 – strongly agree). Data were analysed using SPSS 22.

**Discussion and Findings**

Based on the 110 respondents in this study, 52.7% are male and 47.3% female international postgraduate students. 38.2% of them are studying under scholarship and 61.8% mentioned that they do not have any scholarship. Out of 110 international postgraduate students participated in this study, 58.2% are “single” and the remaining 41.8% are “married”. Based on the nationalities of the participating international postgraduate students in this study, 24.5% are from Bangladesh; 11.8% from Indonesia; 16.4% from Yemen; 14.5% from Nigeria; 12.7% from Pakistan; 10% from India, and 10% from countries other than these.

The independent Samples t-Test was performed to see the differences among the male and female international postgraduate students towards participation behaviour dimensions (i.e. information seeking, information sharing, responsible behaviour and personal interaction) and citizenship behaviour dimensions (i.e. feedback, advocacy, helping behaviour and tolerance). Levene’s test for equality of variances shows that male and female international postgraduate students differ in case of information seeking (P-value 0.37<0.05 at 5% significant level) and responsible behaviour (P value .04<0.05 at 5% significant level). In case of marital status and scholarship status, Levene’s test for equality of variances shows no differences among the international postgraduate students as the P value is >0.05 at 5% significant level towards the dimensions of participation and citizenship behaviour.

Based on One Way ANOVA test of Homogeneity of Variances results, it is evident that the international postgraduate students from different countries are homogenous (with a P value >0.05; at 5% significant level) towards the various dimensions of participation and citizenship behaviour except helping behaviour dimension (P-value .042<0.05; at 5% significance level).

**Table I: ANOVA test results**

<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><strong>Info_Sceking</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Between Groups</td>
<td>3.680</td>
<td>6</td>
<td>.613</td>
<td>1.162</td>
<td>.332</td>
</tr>
<tr>
<td>Within Groups</td>
<td>54.364</td>
<td>103</td>
<td>.528</td>
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<td></td>
</tr>
<tr>
<td>Total</td>
<td>58.044</td>
<td>109</td>
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<td></td>
<td></td>
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<tr>
<td><strong>Info_Share</strong></td>
<td>.868</td>
<td>6</td>
<td>.145</td>
<td>.350</td>
<td>.909</td>
</tr>
<tr>
<td>Between Groups</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Within Groups</td>
<td>42.587</td>
<td>103</td>
<td>.413</td>
<td></td>
<td></td>
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<tr>
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<td>109</td>
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<td></td>
<td></td>
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<tr>
<td><strong>Res_Behav</strong></td>
<td>1.927</td>
<td>6</td>
<td>.321</td>
<td>.813</td>
<td>.562</td>
</tr>
<tr>
<td>Between Groups</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Within Groups</td>
<td>40.693</td>
<td>103</td>
<td>.395</td>
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<td></td>
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<tr>
<td><strong>Per_In</strong></td>
<td>.375</td>
<td>6</td>
<td>.063</td>
<td>.154</td>
<td>.988</td>
</tr>
<tr>
<td>Between Groups</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Within Groups</td>
<td>41.899</td>
<td>103</td>
<td>.407</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>42.274</td>
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<tr>
<td><strong>Feedback</strong></td>
<td>1.024</td>
<td>6</td>
<td>.171</td>
<td>.396</td>
<td>.880</td>
</tr>
<tr>
<td>Between Groups</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Within Groups</td>
<td>44.371</td>
<td>103</td>
<td>.431</td>
<td></td>
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<tr>
<td>Total</td>
<td>45.395</td>
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<td></td>
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<tr>
<td><strong>Advocacy</strong></td>
<td>3.105</td>
<td>6</td>
<td>.518</td>
<td>.765</td>
<td>.599</td>
</tr>
<tr>
<td>Between Groups</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Within Groups</td>
<td>69.667</td>
<td>103</td>
<td>.676</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>72.772</td>
<td>109</td>
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<td></td>
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</tbody>
</table>
Helping_Behavior | Between Groups | 40.471 | 103 | .393 |
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Within Groups</td>
<td>41.200</td>
<td>109</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>61.200</td>
<td>109</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Tolerance | Between Groups | 7.881 | 6 | 1.313 | 2.358 | .036 |
<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
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<th></th>
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</thead>
<tbody>
<tr>
<td>Within Groups</td>
<td>57.362</td>
<td>103</td>
<td>.557</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>65.243</td>
<td>109</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

From the ANOVA table, the results clarify that the international postgraduate students from various countries demonstrate similar pattern towards all the dimensions of the value co-creation behaviour except one dimension from citizenship behaviour that is tolerance (P-value .036<0.05; at 5% significance level). Hence, at least one of the nationalities (i.e. Pakistan) of postgraduate students differs significantly in terms of showing tolerance towards their respective university services. Since the equality of variance can be assumed, Duncan’s post hoc test is used to compare the tolerance behaviour among the various nationalities of international postgraduate students studying in Malaysia.

<table>
<thead>
<tr>
<th>Country</th>
<th>N</th>
<th>Subset for alpha = 0.05</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pakistan</td>
<td>14</td>
<td>5.48</td>
</tr>
<tr>
<td>Bangladesh</td>
<td>27</td>
<td>5.93</td>
</tr>
<tr>
<td>Yemen</td>
<td>18</td>
<td>6.11</td>
</tr>
<tr>
<td>Others</td>
<td>11</td>
<td>6.12</td>
</tr>
<tr>
<td>Nigeria</td>
<td>16</td>
<td>6.15</td>
</tr>
<tr>
<td>India</td>
<td>11</td>
<td>6.33</td>
</tr>
<tr>
<td>Indonesia</td>
<td>13</td>
<td>6.41</td>
</tr>
<tr>
<td>Sig.</td>
<td>.109</td>
<td>.132</td>
</tr>
</tbody>
</table>

Means for groups in homogeneous subsets are displayed.
b. The group sizes are unequal. The harmonic mean of the group sizes is used. Type I error levels are not guaranteed.

Based on this procedure, the mean of the tolerance behaviour for the international postgraduate students from Pakistan is significantly lower compared to the rest of the nationalities. The international postgraduate students from Bangladesh, Yemen, Nigeria, India, Indonesia and other nationalities’ mean of the tolerance behaviour do not differ significantly.

**Conclusion**

To achieve the country’s goal to become the regional education hub, higher education institutions in Malaysia need to bring in several changes to maintain their service excellence in the global educational platforms. These institutions need to shift from a unidirectional perspective of viewing students as largely passive receivers of value to the ones who can more actively engage in mutual value co-creation.  

Firstly, this study analyses the value co-creation behaviour dimensions namely, participation behaviour (i.e. information seeking, information sharing, responsible behaviour and personal interaction) and citizenship behaviour (i.e. feedback, helping, advocacy and tolerance) in case of several demographic aspects such as gender, marital status, scholarship status and

Cont... Table I: ANOVA test results
country of origin among the international postgraduate students in Malaysia’s HEIs. The findings of this study showed that male and female international postgraduate students differ in the case of information seeking and responsible behaviour. The international postgraduate students, irrespective of their marital status or whether they are studying under scholarship or not, show no differences towards value co-creation behaviour.

Lastly, the outcome of one way ANOVA shows that international postgraduate students do not differ in all the dimensions of the value co-creation behaviour except one from citizenship behaviour that is tolerance. The result further reveals that Pakistani students are less tolerant compared to the rest of the nationalities of international postgraduate students in Malaysia. The implication of this research is that universities might consider designing their communication strategies in such a way that can facilitate the co-creation behavior of international postgraduate students. According to Joseph and Joseph, “the items selected by the international students should be a concern by the HEIs to market positioning strategy and to strengthen their offerings in these areas”. Besides, HEIs which pay more attention to their service qualities are more likely to enrich the international students’ experience and influence students’ evaluations. True that the samples were reasonably diverse in terms of students’ gender, nationality, country of origin etc., but their size was small and they were drawn from a single country Malaysia. Future research could aim to replicate the findings with a larger sample size among other student populations (such as undergraduate students) from other emerging hub countries.

**Conflict of Interest:** No potential conflict of interest was reported by the authors.

**Source of Funding:** The paper was partially funded by the faculty of Multimedia University.

**Ethical Clearance:** Done by the research committee of Multimedia University.

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Building Employees’ Mental Health: The Correlation between Transactional Leadership and Training Program with Employees’ Work Motivation at XWJ Factory

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Abstract

This study is aimed to find out how to building employees’ mental health with the correlation between the transactional leadership and training program both partially and jointly on employees’ work motivation of XWJ Factory and it was done at XWJ Factory. The method of the study used was the quantitative method with a descriptive approach. The data collection technique was done by giving questionnaires to 80 respondents who were sampled from populations of 100 employees, and the analysis technique used was multiple linear regression analysis which is aimed to calculate the magnitude of the regression coefficient to show the correlation between the transactional leadership and training program variables on employees’ work motivation. This study has some results, such as a) transactional leadership has a significant correlation with employees’ work motivation, b) training program has a significant correlation with employees work motivation, c) transactional leadership and training program have a significant correlation with employees’ work motivation at XWJ Factory.

Keywords: transactional leadership, training program, work motivation

Introduction

Transactional leadership towards human resources has an important role in every company activity, namely in managing, regulating, managing and using all available resources productively and effectively to achieve the good condition of the employees. To improve employee performance, it is necessary to improve the quality of employees through employee training functions. Employee training is one means to create quality human resources in achieving the company’s goals and objectives.¹ The training aims to improve employee performance in achieving the work results set. Performance improvements can be done by improving employee knowledge, skills, and attitudes of employees themselves on their duties.²,³ In general, training refers to the efforts planned by a company to facilitate the learning of employees about work-related competencies.

The XWJ company established in 1967 is one of the companies engaged in dairy manufacture.

The problems in this study are: a) is there any significant correlation between transactional leadership with the employees’ work motivation of the XWJ Company?; b) is there any significant correlation
between training with the XWJ Company employees’ work motivation?; and c) is there any significant correlation between transactional leadership and training with the employees’ work motivation of the XWJ Company? With the purposes to find out: a) whether there is a significant correlation between transactional leadership with the employees’ work motivation of the XWJ Company; b) whether there is a significant correlation between training with the XWJ Company employees’ work motivation; and c) whether there is a significant correlation between transactional leadership and training with the employees’ work motivation of the XWJ Company.

**Literature Review**

Motivation is a process which is started with physiological or psychological deficiencies that drive behaviour or impulse aimed at goals or incentives. In the context of the system, motivation includes three elements that interact and are interdependent, namely: needs, incentives, incentives. Motivation is the desire to do something and determine the ability to act to satisfy individual needs. Motivation is the provision of the driving force that creates the enthusiasm of one’s work, in order to cooperate, work effectively and be integrated with all its efforts to achieve satisfaction.

In this case there are several opinions regarding leaders and transactional leadership, including a) Leader is a person who applies principles and techniques that can ensure motivation, discipline and productivity when working with other people, tasks and situations to achieve company goals; b) The leader is a person who has special skills with or without official appointments which can affect the group he leads to do business leading to achieving certain goals; c) Transactional leadership is defined as a person’s ability to affect the behaviour of others to think and behave in the framework of formulating and achieving organizational goals in certain situations; d) transactional leadership is interpreted as the ability and skill of someone who occupies the position of head of a work unit to affect the behaviour of others, especially his subordinates to think and make a real contribution in achieving organizational goals; e) Transactional leadership is defined as a set of processes that are primarily aimed at creating organizations or adjusting to conditions that change considerably.

Training is activities designed to provide learners with the knowledge and skills needed for their current job. Training includes activities that function to improve a person’s performance in the work that is being undertaken or related to this job. Training is a planned organizational effort to help employees learn the knowledge, skills, and abilities associated with a job so that they can improve work performance.

Training and development is an important organizational investment in human resources. Specifically, the training is an effort carried out in a continuous, gradual and integrated manner. This is reinforced by Rivai that training is the process of systematically changing employee behaviour to achieve organizational goals. Training is a learning process that involves the process of expertise, concepts, rules or attitudes to improve employee performance. Most training for job knowledge and skills is completed in just a matter of days. There are 2 main categories of training and development methods, namely practical methods (on the job training) and simulation methods (off the job training).

**Research Method**

The research was carried out in the XWJ Company. The research method used is quantitative research, the design of research was a survey. The variables in this study are independent variables (X1 and X2) and non-independent variables (Y). The population of this study is 100 employees at the XWJ Corporate Headquarters. The sample of this study were 80 employees. The instrument used in this study was a questionnaire using a Likert scale. The data were analyzed through the validity test then continued by the calculation of correlation.

**Research Results and Discussion**

To produce an unbiased decision in the linear regression equation or “BLUE” (Best Linear Unbiased Estimator), the symptoms of aberration are tested using the classical linear model framework. They are the linearity test, normality test, multicollinearity test, heteroscedasticity test and autocorrelation test. The results of each test were described as follows:
Normality Test: the result of the normality test shows that the independent variables and multiple linear regression are normally distributed (figure 2).

Table 1. Multicollinearity Test “Coefficients”

<table>
<thead>
<tr>
<th>Model Zero-order</th>
<th>Correlations</th>
<th>Collinearity Statistics</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Partial</td>
<td>Part</td>
</tr>
<tr>
<td>1</td>
<td>Transactional leadership</td>
<td>.800</td>
</tr>
<tr>
<td></td>
<td>Training</td>
<td>.742</td>
</tr>
</tbody>
</table>

a. Dependent Variable: work motivation

The Heteroscedasticity Test: the result of heteroscedasticity test shows that there is no certain patterns on the scatter plot diagram, as shown in figure 3.

Table 2. Autocorrelation Test “Model Summary”

<table>
<thead>
<tr>
<th>Model</th>
<th>R</th>
<th>R Square</th>
<th>Adjusted R Square</th>
<th>Std. Error of the Estimate</th>
<th>Durbin-Watson</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>.815*</td>
<td>.665</td>
<td>.656</td>
<td>4.14172</td>
<td>1.909</td>
</tr>
</tbody>
</table>

a. Predictors: (Constant), transactional leadership, training.

b. Dependent Variable: work motivation

Multiple Linear Regression Analysis: By looking at the table of calculation results on table 3, it can be
produced multiple linear regression equations, as follows:

\[ Y = 6.124 + 0.559 \times X_1 + 0.284 \times X_2 \]

From the regression equation, it can be seen that the regression coefficients of the two independent variables, namely \( b_1 \) and \( b_2 \) are positive. This means that if each independent variable (\( X_1 \) and \( X_2 \)) is increased it will have an impact on the increase in variable \( Y \) at a significant level of 5%.

**Table 3. Regression Coefficient “Coefficients”**

<table>
<thead>
<tr>
<th>Model</th>
<th>Unstandardized Coefficients</th>
<th>Standardized Coefficients</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Std. Error</td>
<td>Beta</td>
</tr>
<tr>
<td>1</td>
<td>(Constant)</td>
<td>6.124</td>
</tr>
<tr>
<td></td>
<td>Transactional leadership</td>
<td>.559</td>
</tr>
<tr>
<td></td>
<td>Training</td>
<td>.284</td>
</tr>
</tbody>
</table>

a. Dependent Variable: work motivation

**The Correlation Coefficient (R):** From the data in the table above, the value of the correlation coefficient \((R)\) is 0.815. This means that there is a strong and positive relationship between independent variables \( X_1 \) and \( X_2 \) (transactional leadership and training) on the dependent variable \( Y \) (work motivation).

**Table 4. Correlation Coefficients “Model Summary”**

<table>
<thead>
<tr>
<th>Model</th>
<th>R</th>
<th>R Square</th>
<th>Adjusted R Square</th>
<th>Std. Error of the Estimate</th>
<th>Durbin-Watson</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>.815(^a)</td>
<td>.665</td>
<td>.656</td>
<td>4.14172</td>
<td>1.909</td>
</tr>
</tbody>
</table>

\(^a\) Predictors: (Constant), transactional leadership, training

b. Dependent Variable: work motivation

**The Determination Coefficient Analysis:** From table 4 above, it is known that the value of the coefficient of determination (R Square) is 0.665 or 66.5%. This shows that the contribution or direct correlation between variables \( X_1 \) and \( X_2 \) (transactional leadership and training) with the \( Y \) variable (work motivation) is 66.5%, and the remaining 33.5% is affected by other factors which were not observed in this study. The adjusted determination coefficient was 0.656 or 65.6%. This means that the direct correlation is adjusted to 65.6% and the remaining 34.4% is an indirectly adjusted correlation.

**The t-test** is done by comparing the value of sig. \( t_{\text{count}} \) of each independent variable using a significance level of 5%. The criteria used are as follows: 1) If the value is sig. <5%, then \( H_0 \) is rejected and \( H_a \) is accepted: 2) If the value is sig. > 5%, then \( H_0 \) is accepted and \( H_a \) is rejected.

Based on the research results listed in table 6 above, the result is that the value of sig. transactional leadership variables of 0,000 and sig values. training variable is 0.020. This means the sig value of the two independent variables is <5%. Thus \( H_0 \) is rejected and \( H_a \) is accepted. So that it can be concluded that partially transactional leadership and training have a significant correlation on
the work motivation of employees of the XWJ Company.

The F test is done by comparing the value of sig. F<sub>count</sub> using a significance level of 5%. The decision-making criteria used are as follows: 1) If the value is sig. <5%, then Ho is rejected and Ha is accepted; 2) If the value is sig. > 5%, then Ho is accepted and Ha is rejected.

Based on the results of data processing obtained results as listed in the following table:

Table 5. Value F Calculate “ANOVA”

<table>
<thead>
<tr>
<th>Model</th>
<th>Sum of Squares</th>
<th>Df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Regression</td>
<td>2</td>
<td>1311.177</td>
<td>76.436</td>
<td>.000&lt;sup&gt;a&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td>Residual</td>
<td>77</td>
<td>17.154</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>79</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

a. Predictors: (Constant), Transactional leadership, training

b. Dependent Variable: work motivation

From the data listed in Table 7. It is known that F<sub>count</sub> is 76,436 with degrees of freedom are 2 and 77. The value of F<sub>table</sub> with degrees of freedom 2 and 77 is 3.12. This means that F<sub>count</sub> is greater than F<sub>table</sub> and sig F value is 0.000. This significance value means less than 0.05 (5%). So the regression equation is significant. So that it can be concluded that simultaneously, transactional leadership and training have a correlation with the employees’ work motivation of the XWJ Company.

The hypothesis that it is assumed that there is a significant correlation between transactional leadership with employees’ work motivation of the XWJ Company is accepted. Regression coefficient value of the transactional leadership variable (X1) of 0.559 explains that 55.9% effective transactional leadership will be able to increase employee’s motivation.

The Correlation between Leadership with Work Motivation: The hypothesis states that it is assumed that there is a correlation between training on employees motivation at XWJ Company is accepted. The training variable (X2) regression coefficient value of 0.284 explains that 28.4% related to training have correlation on employee work motivation. This shows that providing training for employees to be able to improve their abilities and competencies will be able to provide better work motivation.

The Correlation between Transactional Leadership and Training with Work Motivation: The hypothesis that it is assumed that there is a correlation between transactional leadership and training on employee motivation at XWJ Company is accepted. The coefficient of determination of 0.665 explains that transactional leadership and training simultaneously have correlation on the work motivation of the XWJ Company. This shows that the two independent variables examined in this study contributed 66.5% to employee motivation.

Conclusions

Based on the analysis and processing of the data described above, the results of processing data about the correlation between transactional leadership and training on the work motivation of employees of the XWJ Company, which refers to concepts and theories relevant to this study and supported by statistical methods using multiple regression models, can be concluded as follows:

a) There is a significant correlation between transactional leadership (55.9%) on employee work motivation at the
XWJ Company. This is indicated by the responses of respondents who mostly agree that leaders have carried out transactional leadership variables in accordance with what was stated in the questionnaire carried out. However, there are also variables that some respondents give low scores. Namely, according to the leaders in their transactional leadership still often use their power to employees and leaders also do not implement a system of giving punishments and rewards for employee performance consistently; b) There is a significant correlation between training (28.4%) with employees’ work motivation of the XWJ Company. This is indicated by the responses of respondents who mostly agree that the training variable is in accordance with what is stated in the questionnaire carried out. However, there are also variables that some respondents give low scores. That is, according to them the existence of training has not determined the existing mutation and promotion programs regularly and the opportunity to develop themselves which can encourage them to work more actively; c) Simultaneously, transactional leadership and training variables correlation between employees’ work motivation (66.5%).

Conflict of Interest: NIL

Source of Funding: Self source

Ethical clearance: Done research committee

References


Analysis of Nursing Quality Services

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Abstract

This study is focused on the analysis of nursing quality services, and it was done to know how the quality services of the nurses. The population of this study were the nurses and the patients at private hospitals in Jakarta, and the sampling technique used was cluster random sampling. The sample were the nurses and patients who were hospitalized at East Jakarta. The method of the study used was explanatory using a survey method with a cross-sectional approach, where the instruments of the study were a set of questionnaire with likert-scale 1-5. The results of the study show (α<0.05) show that: a) there is a significant effect of commitment of the nurses to the quality services improvement having by the nurses; b) there is a significant effect of the leadership to the quality services improvement having by the nurses; c) there is a significant effect of the ethics of the hospital to the quality services improvement having by the nurses; d) there is a significant effect of the nurses' performance to the quality services improvement having by the nurses; and e) there is a direct significant effect of the ability of the nurses, the ethics of the hospital, and leadership behaviour on the commitment of the nurse.

Keywords: nursing, service, quality

Introduction

Hospital is one form of service industry, where the existence and absence of a hospital depends on the level of public trust in using the services of the hospital. The quality services of nurse is usually associated with healing processes, reduced pain, speed in service, hospitality, and cheap service rates.¹

Service quality is a picture of the total nature of a product or service related to its ability to meet satisfaction.² Experts in nursing and health have always tried to improve self-quality, profession, and nursing equipment, as well as managerial ability of nursing, especially management of the quality services of nurse is also improved.³ There are still obstacles faced by nursing in Indonesia, including the limited human resources in nursing and the availability of integrated information technology.⁴

The cause of the declining trend in hospital hospitalization is suspected because of the human element (nurses), namely the quality services of nurse that have not been maximal in providing nursing services. Nursing is one of the professions in a hospital that plays an important role in carrying out its work, a nurse uses a standard of nursing practice.⁵

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Sasmoko,
Professor, Primary Teacher Education Department, Faculty of Humanities, Bina Nusantara University, Jakarta, Indonesia
Literature Review

There are some definitions of nursing quality services, such as: 1) a process of activities carried out by the nursing profession in fulfilling the needs of patients in maintaining the biological, psychological, social, and spiritual conditions of patients; 2) professional nursing care which refers to the 5 dimensions of service quality, namely (reliability, tangibles, assurance, responsiveness, and empathy); 3) a service that describes the product of the nursing service itself which includes biologically, psychologically, socially, and spiritually in sick and healthy individuals and is carried out according to nursing standards.

Leadership in nursing services must have the ability and skills in nursing and can influence other nurses under their supervision to carry out their duties and responsibilities in providing care and nursing care so that the goals of nursing are achieved. Leadership arises as a synergistic result of various skills ranging from administrative (planning, organizing, controlling, supervision), technical skills (management, marketing and procedural technical), and interpersonal skills. Ethics is the application of good behavior from individuals to the environment in the form of good social relations by exercising rights and obligations in accordance with the norms, rules and culture that apply to the community environment. Ethics is the intention whether the act is permissible or not in accordance with the consideration of good or bad intentions as a result.

Organizational commitment is the desire of organizational members to maintain their membership in the organization and are willing to strive for the achievement of organizational goals. In other words, that this attitude reflects employee loyalty to the organization and the ongoing process of organizational members expressing their concern for the organization and its continued success and progress.

Performance is a business carried out from work that can be achieved by a person or group of people in an organization in accordance with the authority and responsibility of each in order to achieve the objectives of the organization legally, not violating the law and in accordance with morals and ethics. The success of health services depends on the participation of nurses in providing quality nursing care for patients. Nurse performance is the activity of nurses in implementing as well as possible an authority, duty and responsibility in order to achieve the objectives of the profession’s main tasks and the realization of the goals and objectives of the organizational unit.

Research Method

This study carried out in private hospitals in Jakarta. The population of this study is: 1) patients or families over the age of 17; and 2) able to answer the questions given. The total number of the sample are 600 persons, consisted of 300 patients and 300 nurses of the hospital. The sampling technique used was cluster random sampling. The method of the study used was explanatory using a survey method with a cross-sectional approach. To get the data of this study, two sets of instruments were used: 1) a set of questionnaire filled up by the patients consisted of 24 statements; and 2) a set of questionnaire filled up by the nurse consisted of 24 statements. Both questionnaire used likert-scale 1-5.

Results and Discussion

The data of this research which were taken through questionnaires (filled up by the patients and the nurse) were analyzed as follows:

<table>
<thead>
<tr>
<th>Tangibility</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>strongly disagree</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>disagree</td>
<td>3</td>
<td>0,3%</td>
</tr>
<tr>
<td>netral</td>
<td>16</td>
<td>1,3%</td>
</tr>
<tr>
<td>agree</td>
<td>830</td>
<td>69,2%</td>
</tr>
<tr>
<td>strongly agree</td>
<td>351</td>
<td>29,3%</td>
</tr>
</tbody>
</table>

From the above data it can be concluded, 69.2% of patients admitted to East Jakarta private hospitals agreed and 29.3% said they strongly agreed that: 1) the hospital patient room had been neatly and cleanly recorded; 2) patient room feels comfortable to be occupied; 3) the appearance of the hospital nurse is neat and clean; and 4) cutlery and drink neat and clean.
Table 2. The analysis Result on the Nurses’ Reliability

<table>
<thead>
<tr>
<th>Reliability</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>strongly disagree</td>
<td>0</td>
<td>0,0%</td>
</tr>
<tr>
<td>disagree</td>
<td>0</td>
<td>0,0%</td>
</tr>
<tr>
<td>netral</td>
<td>36</td>
<td>1,5%</td>
</tr>
<tr>
<td>agree</td>
<td>1678</td>
<td>69,9%</td>
</tr>
<tr>
<td>strongly agree</td>
<td>686</td>
<td>28,6%</td>
</tr>
</tbody>
</table>

Through the table above, it can be concluded, 69.9% of patients treated at Swasat Hospital in East Jakarta said they agreed and 28.6% said they strongly agreed that: 1) nurses serve patients well, quickly, precisely, and not convoluted; 2) nurses on time in serving patients; 3) the readiness of nurses to serve patients at all times; 4) nurses act quickly; 5) the nurse reports all changes experienced by the patient at the time of the doctor’s visit; 6) nurses obey the procedure for administering drugs; 7) the nurse cares about the patient’s family complaints, and 8) the nurse immediately contacts the doctor when the patient’s condition is suddenly an emergency.

Table 3. The Analysis Result on the Nurses’ Responsiveness

<table>
<thead>
<tr>
<th>Responsiveness</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>strongly disagree</td>
<td>0</td>
<td>0,0%</td>
</tr>
<tr>
<td>disagree</td>
<td>0</td>
<td>0,0%</td>
</tr>
<tr>
<td>netral</td>
<td>23</td>
<td>1,1%</td>
</tr>
<tr>
<td>agree</td>
<td>1466</td>
<td>69,8%</td>
</tr>
<tr>
<td>strongly agree</td>
<td>611</td>
<td>29,1%</td>
</tr>
</tbody>
</table>

The table above shows, 69.8% of patients admitted to East Jakarta self-help hospitals said they agreed and 29.1% said they strongly agreed that: 1) nurses always asked about patient complaints; 2) nurses provide opportunities for patients to ask if there are still unclear; 3) nurses respond well to patient questions; 4) nurses are friendly, polite and caring; 5) nurses care about patients’ needs and complaints; 6) the nurse responds and acts well on the patient’s complaints; and 7) nurses answer all complaints and problems experienced by patients correctly.

Table 4. The Analysis Result on the Nurses’ Assurance

<table>
<thead>
<tr>
<th>Assurance</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>strongly disagree</td>
<td>0</td>
<td>0,0%</td>
</tr>
<tr>
<td>disagree</td>
<td>16</td>
<td>1,1%</td>
</tr>
<tr>
<td>netral</td>
<td>125</td>
<td>8,3%</td>
</tr>
<tr>
<td>agree</td>
<td>966</td>
<td>64,4%</td>
</tr>
<tr>
<td>strongly agree</td>
<td>393</td>
<td>26,2%</td>
</tr>
</tbody>
</table>

From the table above it can be concluded, 64.4% of patients admitted to East Jakarta private hospitals said they agreed and 26.2% said they strongly agreed that: 1) available nurses were sufficient; 2) nurses’ behavior creates a sense of security in patients; 3) nurses have education that is in accordance with their profession (educated); 4) nurses’ ability to serve patients well; 5) nurses can maintain patient confidentiality while in the inpatient room; and 6) nurses always guarantee the recovery of patients.

Table 5. The Analysis Result on the Nurses’ Empathy

<table>
<thead>
<tr>
<th>Empathy</th>
<th>Frequency</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>strongly disagree</td>
<td>0</td>
<td>0,0%</td>
</tr>
<tr>
<td>disagree</td>
<td>3</td>
<td>0,3%</td>
</tr>
<tr>
<td>netral</td>
<td>28</td>
<td>2,3%</td>
</tr>
<tr>
<td>agree</td>
<td>901</td>
<td>75,1%</td>
</tr>
<tr>
<td>strongly agree</td>
<td>268</td>
<td>22,3%</td>
</tr>
</tbody>
</table>

From the table above, it can be concluded, 76.1% of patients admitted to East Jakarta private hospitals said they agreed and 22.3% said they strongly agreed that: 1) the nurse tried to calm anxiety about the illness being suffered by the patient; 2) nurses always give special time to communicate with patients; 3) nurses do not forget to remind the safety of valuables of patients and families of patients; 4) nurses always entertain and encourage patients.
The performance of nurses at private hospital in East Jakarta have a significant effect on nurses’ quality service. The results of the test stated that the performance of nurses at private hospital in East Jakarta had a significant effect on nurses’ quality service, with a path coefficient of 10.7. This result is reinforced by the acquisition of \( p = 0.000 \) (<0.05) which indicates a significant effect. Then it can be generalized that the higher the performance of nurses private hospital in East Jakarta, the better is the quality service of the nurse.

The results of this study are consistent with Gronroos’ interactive marketing theory, which emphasizes the importance of the service delivery process to customers. Estimation of the significant relationship between hospital ethics in private hospitals in East Jakarta with the quality services of nurse have been proven through testing hypotheses. The results obtained from testing of this hypothesis are that hospital ethics has significant effect on nursing service quality, with a path coefficient of 9.3. While the significance of this result is proven by the acquisition of CR > 2 (t test), with \( p <0.05 \). These findings indicate that the better implementation of hospital ethics in the private hospital in East Jakarta, and the better nurses quality setvices.

These empirical findings are in line with Zhang and friends, where in the code of ethics of large companies in the world, one of them is to be kind to your customers.

Among the three predicted variables as builders of nursing service quality, the ethics variable of this hospital has the greatest effect, which is equal to 0.94. In addition to the founding of a significan effect of hospital ethics on the quality services of nurse, it also found a significan effect of hospital ethics on the quality services of nurse.

The test results on this study found that the leadership behavior of private hospital in East Jakarta had a significant effect on the quality services with a path coefficient of 6.3. Meanwhile, the significance of this result is proven by the acquisition of CR > 2 (t test), with \( p <0.05 \). The results of this study indicate that if subordinates assess good leadership behavior, then the level of quality services of nurses will be better as well.

Basically this study is consistent with the findings of previous experts who stated that there is a relationship between leadership and motivation and performance of subordinates. Sfantou, et al., states that leadership behavior greatly affects the success of an organization.

In addition to the significan effect of leadership on the quality services of nurse, which has been empirically proven. There is also an indirect effect of leadership on the quality services of nurse. It seems that the findings or results of the analysis of the relationship between employee commitment and the quality of this service support the findings of Alsharari and fiends.

Conclusions

Hospital management is expected to reorganize the job specifications of nurses in hospitals to eliminate the impression that nurses tend to do any work. In addition, to prevent the feeling of being burdened by daily work routines, hospital management should launch a capacity building program, based on open space courses on a regular basis (i.e. a training program held in the open), which is intended to upgrade capabilities as well as indirectly relaxation from the routine and burden of daily work.

Hospital management is also expected to provide extra attention to hospital employees (without exception), with regard to the achievements achieved by them through evaluating the nurse performance per quarter.

Hospital management can also implement Good Hospital Governance, namely management of the quality of good nursing services. This concept focuses on the principles of accountability, professionalism and transparency. The hospital’s board of directors is expected to behave as a risk challenger, to promote the hospital’s mission among hospital nurses, to act as a motivator, guide, and support for hospital nurses. Thus the leader will be a figure for the subordinates, so it does not cause misperception and will lead to confidence in the management leadership of the hospital.

Conflict of Interest: NIL

Source of Funding: Self source

Ethical Clearance: Done research committee

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Healthy Work Culture Stimulate Performance

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Abstract

The quality of higher education is largely determined by the quality of lecturers, one of which is determined by their performances. This research is aimed to find out the prior description of the lecturers’ performance of Indonesia private higher education. The method of the study used was descriptive qualitative. The entire population of the study were the lecturers in Indonesia. The sampling technique was cluster random sampling, and the research sample were the lecturers at private higher education in East Jakarta, as many as 400 lecturers. The results of the research were: (1) 85% of the lecturer stated themselves have effective and efficient performances; (2) 89% of the lecturers stated themselves have high responsibility, (3) 85% of the lecturers stated themselves having high discipline, and (4) 85% of the lectures stated themselves having a very good initiative. The implication of this study is the importance of institutional higher education regulation that meets the by maximising the lecturers’ empowerment model is the key to the realization of better education quality and create healthy work culture.

Keywords: lecturers, performance, private higher education

Introduction

In order to achieve the objectives of Indonesia’s national education, one of which is to educate the life of the nation, the quality of the Indonesian nation must be continuously improved so that it is able to compete with developed countries. Higher education is the highest level of education which has a very important role in achieving educational goals. Some important components or elements in higher education include lecturers. There are four competencies that must be possessed by lecturers based on Law No. 14 of 2005 in relation to the development of the Tri Dharma College’s duties, namely pedagogic, professional, personal and social competencies. The four competencies are very important in achieving national education goals which are manifested through the performance of the lecturer 1.

Lecturer performance is the outcome of the process carried out by the lecturer through work presentations, work implementation, work achievement, work results and performance2. Lecturer performance is one of the determinants of the success of the teaching and learning process in higher education.3

Some advanced universities have carried out a routinely and systematically performance appraisal. External and internal pressure forces the university to improve its governance system, organizational structure, and management style. Evidence can be seen through the adaptation of management tools and practices by profit entities, especially the performance measurement system into university management activities. For example, the University of Siena, Italy has actively used a dynamic performance measurement system when conducting teaching, research activities and management 4. However, there are still many universities that still have not implemented the performance appraisal to the lecturers. As the opinion of Zangouieezhadand Moshabakisay that although research in terms of resource

DOI Number: 10.5958/0976-5506.2019.01491.8
allocation and accounting systems at the university level is growing, studies on performance and management at the department and staff level at universities are still lacking. The Indonesian government through the Ministry of Research, Technology and Higher Education has actually conducted a systematic assessment of lecturer performance through the provision of lecturer certification incentives, where each lecturer who passes administratively is required to report the performance of each lecturer (tri dharma tertiary) every semester through the lecturer workload report. Some studies have found that competence has an influence on individual performance, including in educational settings. The above descriptions further strengthen the basis of how important it is to measure lecturer performance. If several researchers previously analyzed the performance of lecturers in the field of tri dharma, this study examines and then describes the performance of lecturers based on other performance indicators, namely (1) effectiveness and efficiency, (2) authority and responsibility, (3) discipline, and (4) initiative. This research is also devoted to the assessment of the performance of lecturers in private universities in East Jakarta.

**Literature Review**

Performance is to measure or monitor and report how either someone or something that is being done that applies to people, activities and organizations. While management performance is a process that helps organizations to formulate, implement and change strategies that can be used according to the needs of shareholders. Performance appraisal is one of the real manifestations of the attention of superiors to their subordinates, which ultimately encourages subordinates to work, provided the assessment process is honest and objective and there is a follow-up. Follow-up of performance appraisal is possible for employees to be promoted, developed and or rewarded to be raised. This also applies to educators in higher education. The demands of this policy lead not only to changes in the scope of the company but, the nature and intensity of academic work as performance management and quality assessment is also needed. This statement is in line with Parsons and Slabbert that says performance appraisal is a social demand for higher education, therefore it is inevitable that performance appraisal is something that is mandatory for academics to be continuously appraised under supervision, thus challenging institutional managers to manage staff performance to be more effective on achieving a higher level of productivity, achieving an increasing social demands, the number and range of institutional goals and objectives.

Effectiveness and Efficiency: The effectiveness of an organization if the goals of an organization can be achieved in accordance with planned needs, efficiency is related to the number of sacrifices incurred in achieving the goals. Getting the profession right and efficiently is important in the process of achieving goals.

Authority and Responsibility: In this case, the authority is the authority a person has to govern another person (subordinate) to carry out the tasks assigned to each subordinate in an organization. Whereas responsibility is an inseparable part or as a result of ownership of that authority. If there is an authority, it means that responsibility naturally arises.

Discipline: when obeying applicable laws and regulations. Employee discipline as the obedience of the employee concerned in respecting work agreements where employees work. Work discipline is needed to produce a good performance, with discipline employees will try to do the work as much as possible and the resulting performance will be better.

Initiatives: relating to thinking power, creativity in the form of ideas for something related to organizational goals. Every initiative instead gets attention or positive responses from superiors.

**Research Method**

This research was conducted in the area of higher education service institutions in region III. It was chosen because higher education service institutions region III has more higher educations to be served compared to other higher education service institutions in other region and the higher education service institutions region III is located in the capital city so that various characteristics of the lecturers are expected to represent all the lecturers in Indonesia. The population is all private university lecturers. The number of lecturers in the higher education service institutions region III in the 2018/2019 academic year was 21,423. The research sample used the Slovin formula with a significance
level of α 5% and the sampling technique using cluster random sampling. Was 393 respondents so rounded up to 400 respondents.

The technique of data collection is done by distributing the questionnaires via e-questionnaire and e-mail using Google Form. The analytical method used is descriptive quantitative. Questionnaire use a weighted Likert scale as follows: Answers strongly agree to be given a score of 5, agree to be given a score of 4, less agree to be given a score of 3, not agree to be given a score of 2, and strongly disagree given a score divided into four non-test question categories in the form of questionnaires based on four performance indicators. Analysis techniques with descriptive statistics that provide an overview of the weight gain of the item questions, the interval value obtained by the average number of respondents’ answers to the question items based on the weight.

The final results obtained in the form of a percentage that will be interpreted according to the reference with 5 assessment criteria, Interpretation Criteria measurement as determining the level of satisfaction of lecturers, educational staff administration and supporting staff on human resource management are: 0% -20% (very bad), 21% -40% (not good), 41% -60% (good enough), 61% -80% (good), and 81% -100% (very good).

Result and Discussion

Recapitulation of Respondents’ Responses regarding question items:

Description of Effectiveness & Efficiency

<table>
<thead>
<tr>
<th>Total Item</th>
<th>Scale and Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Num</td>
</tr>
<tr>
<td>11</td>
<td>1471</td>
</tr>
</tbody>
</table>

From table 1, the percentage of performance appraisal from indicators of effectiveness & efficiency of lecturers by comparing the total score (18,735) and the maximum score (22,000) is 85%, so it can be stated that the performance of lecturers in terms of indicators of effectiveness and efficiency is excellent. Effectiveness emphasizes the results achieved, while efficiency is more on how to achieve these goals by comparing the input used with the output produced. with high effectiveness and efficiency, it is expected that organizational goals can be achieved. This is in line with Andini, Arwiyah, Pangarso that of the six-factor variables that enter into component factors show a strong correlation with the component factor or the first factor has the largest% of variance which is 34.837% so that this factor is the most dominant factor which encourages performance in terms of ability, attitude, motivation, expertise, discipline, effectiveness and efficiency.

Description of Authority and Responsibility

Table 2. Recapitulation of the number and score of answers for indicators of authority & responsibility

<table>
<thead>
<tr>
<th>Total Item</th>
<th>Scale and Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Num</td>
</tr>
<tr>
<td>9</td>
<td>1657</td>
</tr>
</tbody>
</table>
The data in table 2 gives the results of the percentage of performance appraisal for lecturer responsibility indicators by comparing the total score (15,934) and the maximum score (18,000) is 89%. Thus it can be stated that the performance of the lecturer in terms of the Responsibility indicator is in the interpretation of excellent performance. Very good responsibility contributes to the acquisition of good results, as the results of the research on the analysis of 36 case studies in the Netherlands which are known to have implemented team-based work. Case studies were executed in 1997 by face-to-face interviews with HRM staff and line management.

This concludes from the analysis that the two types of responsibilities are the winning team. In a “hierarchical team” team leaders take responsibility for decisions regarding work preparation, support and control, while in “Shared-team responsibility” decisions are made by team members themselves. Regression method providing evidence empirically which revealed that autonomy, responsibility, information, and creativity each had a positive and significant impact on team performance\(^1\).  

**Table 3. Recapitulation of the number and score of answers for Discipline indicators**

<table>
<thead>
<tr>
<th>Total Item</th>
<th>Scale and Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Num</td>
</tr>
<tr>
<td>7</td>
<td>1027</td>
</tr>
</tbody>
</table>

The results of the analysis of the data in table 3 show that the percentage of lecturer performance assessment for indicators of lecturer discipline by comparing the total score (11,965) and the maximum score (14,000) is 85%. Thus it can be stated that the performance of the lecturer in terms of the Discipline indicators is in a very good interpretation.

**Table 4. Recapitulation of the number and score of answers for Initiative indicators**

<table>
<thead>
<tr>
<th>No</th>
<th>Total Item</th>
<th>Scale and Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>5</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Num</td>
</tr>
<tr>
<td>13</td>
<td>1770</td>
<td>8850</td>
</tr>
</tbody>
</table>

From the results of the analysis of the data in table 4, the percentage of lecturer performance appraisal for lecturer Initiative indicators by comparing the total score (22,237) and the maximum score (26,000) is 85%, which means that the lecturer performance in terms of Initiative indicators is very good.

**Conclusion**

In accordance with the results and discussion, it can be concluded that the effectiveness and efficiency, responsibility, discipline and initiative of lecturers are very high so that it is expected that with the performance of lecturers the higher education regulations can maximize the lecturer empowerment model in order to realize better quality of education and healthy work culture. The analysis shows that “Shared-team responsibility” is considered to contribute more substantially to the team’s performance results from “hierarchical teams”. This analysis helps to gain a better understanding of the relationship between HRM and organizational performance, as seen in “a human resource-based view\(^1\).
Initiatives as actions taken on their own accord from a lecturer are indeed very necessary. Finding that the participatory development process increases employee attitudes, perceived social pressure and perceived ability to take the Initiative. 16.

Work discipline has a positive and significant impact on teacher performance, Islamic leadership has an insignificant influence on teacher performance through work discipline, competence has a non-significant impact on teacher performance through disciplinary work and compensation has a non-significant impact on teacher performance through work discipline. 17. In addition, department performance improves when developed. Thus the opinion of Frese and Fay said that the personal high level can change the work situation of employees and relate to success as an entrepreneur. 18.

**Conflict of Interest:** NIL

**Source of Funding:** Self source

**Ethical Clearance:** Done research committee

**References**

Are Depressive Symptoms Linked to Self-esteem? A Study on University Students

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Abstract

Everyday experiences suggest that individual who often feel dejected from daily life and often feel sad and lonely tend to have low self-esteem. The purpose of this study is to investigate the link between depressive symptoms and self-esteem among university students. A total number of 120 respondents participated in this cross-sectional study. The Beck’s Depression Inventory (BDI-II) was used to measure the level of depressive symptoms and the Rosenberg Self-Esteem Scale (RSES) was used to measure the respondents’ self-esteem. Data collected was analysed by utilizing Statistical Package for Social Science (SPSS) version 22.0. Students were reported to experience mild level of depression (Overall BDI-II mean=15.75) and possesses moderate level of self-esteem (Overall RSES mean=16.8). Notably, this study had found a weak negative relationship between depressive symptoms and self-esteem ($r=-0.222$, $p=0.015$). It can be concluded that the higher level of depressive symptoms is linked to lower level of self-esteem among university students. Hence, appropriate prevention strategies are crucial for both; university students who possess low self-esteem as well as those who experience high level of depression symptoms.

Keywords: Depressive Symptoms; Self-esteem; University students; Cross-sectional

Introduction

In Malaysia, the National Health Morbidity Survey 2015 statistics showed that 29.2 percent, or 4.2 million, citizens above the age of 16 years suffer from mental health issues. It was reported the percentage had doubled compared to 2006 which was 11.2 % and 1996 which was 10.6% ¹. People with high self-esteem are knowingly to be happier than other people. They also tend to be less depressed, either in general or specially in outcome of stressful, traumatic events. A number of studies have confirmed this link ²,³.

Researchers have argued that people with low self-esteem has higher risk to develop clinical and mild form of depression consequently making them to feel inferior, worthless and incompetent ⁴,⁵. However, there is inconsistency in the findings of previous research despite most of psychologist agree that mental health does associated with individuals’ self-esteem. Zeigler-Hill ⁵ stated that the precise nature of the relation between mental health and self-esteem is still debatable but it is well documented that depression and low self-esteem are related. However, the direction of its relationship is a question of debate among scholars despite emerging
studies suggesting that low self-esteem contributes to the development of depression.

Nowadays, there are a lot of university students with low self-esteem and low level of mental health such as depression as they often lack self-security and self-confidence. According to Carpenito-Moyet, self-esteem derives from own perceptions, or self-evaluation, about self-competence and efficacy. However, in Malaysia, studies focusing on this topic is scarce, particularly those targeting university students. Given that depressive symptoms and self-esteem can contribute to a students’ overall level of daily functioning, this study aims to 1) identify the level of depressive symptoms among university students; 2) identify the level of self-esteem among university students; and 3) investigate the relationship between depressive symptoms and self-esteem among university students.

Material and Method

A total of 120 undergraduate students from a Malaysian public university provided informed consent and was recruited for this cross-sectional study. Self-esteem was measured using the 10-items Rosenberg Self-Esteem Scale and categorized into three levels; low M=0-10, moderate M=11-20, and high M=21-30. The depressive symptoms were measured and scored using the 21-items Beck’s Depression Inventory II (BDI-II) (total raw scores); minimal depression=0-13, mild depression=14-19, moderate depression=20-28 and severe depression=29-63. Statistical Package for Social Sciences (SPSS) version 22.00 was used to analyse the results. Descriptive analysis was used to identify the demographics information, level of depressive symptoms and level of self-esteem. Moreover, Pearson correlation was used to investigate the relationship between depressive symptoms and self-esteem.

Results

Table 1 below demonstrated the findings from data collection for the demographics section.

<table>
<thead>
<tr>
<th>Demographics Information (n=120)</th>
<th>Frequency (f)</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>28</td>
<td>23.3</td>
</tr>
<tr>
<td>Female</td>
<td>92</td>
<td>76.7</td>
</tr>
<tr>
<td>Age (year)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>18 – 24</td>
<td>118</td>
<td>93.3</td>
</tr>
<tr>
<td>25 – 29</td>
<td>2</td>
<td>1.7</td>
</tr>
<tr>
<td>Year of Study</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>26</td>
<td>21.7</td>
</tr>
<tr>
<td>2</td>
<td>36</td>
<td>30.0</td>
</tr>
<tr>
<td>3</td>
<td>58</td>
<td>48.3</td>
</tr>
<tr>
<td>Total</td>
<td>120</td>
<td>100</td>
</tr>
</tbody>
</table>

The level of depressive symptoms, self-esteem and the relationship between depressive symptoms and self-esteem are shown in Table 2 (means and standard deviations by item). Overall, the respondents were reported to experience mild level of depression (Overall BDI-II mean=15.75) and possesses moderate level of self-esteem (Overall RSES mean=16.8). In terms of the link between depressive symptoms and self-esteem, a significant and weak negative relationship was recorded (r=-0.222, p=0.015). In other words, students who experience mild level of depressive symptoms are linked with moderate level of self-esteem.
Table 2 Depressive symptoms and self-esteem among university students

<table>
<thead>
<tr>
<th>Variables</th>
<th>M</th>
<th>SD</th>
<th>Level</th>
<th>r</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Depressive symptoms</td>
<td>0.75</td>
<td>0.41</td>
<td>Mild</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Self-esteem</td>
<td>1.68</td>
<td>0.36</td>
<td>Moderate</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Depressive symptoms*Self-esteem</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-0.222*</td>
<td>0.015</td>
</tr>
</tbody>
</table>

*Note: *p*<0.05; n=120

Discussion

1) University Students’ Depressive Symptoms Level

The finding has suggested that level of depressive symptoms among university students is at mild level, contradicted to the prior studies. Depressive symptoms among university students could be caused by several reasons with most commonly reported are financial difficulty or issue such as low self-esteem. Whilst, some study emphasised on the significant role of first year in college as a challenging transitional period that contributed to further development of depressive symptoms among students in the university setting. Adjustment issue among university student is often linked to psychological conflicts related to study, value determination and interpersonal relationship crisis. Okrawaji et al for instance, found adjustment issue with student inability to form attachment with their new surroundings. Inability to make a new friend and engage in a new relationship restricts their interest towards other which may then affect their self-esteem.

As majority of university students are in their late adolescent or early adult period, experiencing these events are commonly stressful for them. Although the above is mentioned, this study reveals only a mild occurrence of depression symptoms among the respondents. This is a good sign which indicates that student might have equipped themselves with a proper coping strategy to combat stresses. Whereby, this study found an evidence that students are practicing good viewpoint whilst engaging in social relationship with mean value score is found at highest for this item (i.e. “I am less interested in other people than I used to be”). Controlled social time is a good approach to reduce depressive symptoms, since study has been suggesting that those who frequently exposed to social media or engage in unconstructive relationship are prone to poses higher depression levels. Lack of constructive interaction reduces one sense of belongingness, henceforth increases depressive symptoms (14). Consequently, adolescents who faced challenges might aggravated with insufficient social support received from their surrounding.

2) University Students’ Self-esteem Level

Self-esteem otherwise has been found in a moderate level. Finding of this study has suggested that item in particular “I take a positive attitude towards myself” is recorded as the highest compared to other items. Similarly, this study ascertained a positive state of the respondents’ self-esteem. This indicates that students in this study have a good ability to reflect themselves in a positive manner despite failure or challenges. Positive attitude in facing their failure, is an indicator that students are applying optimistic ways of thinking. Individual with a high level of self-esteem able to facilitate more adaptive behaviour in facing failure. Wherein, failure or challenges are perceived as an opportunity for them to learn and develop their capability. In lined with Erkut, a state of high self-esteem is described by the occurrence of constructive self-evaluation and clear perception on competencies development. Hence, a moderate level of self-esteem displayed in this study is a good sign that student has a decent ability to adapt and deal with unfavourable incidents occurred in their surroundings.

In contrast, those with low self-esteem might respond critically when there is a discrepancy between the desired with what they have been receiving. This is especially crucial for those who in their first-year in college, who may experience the challenges of academic pressure and navigating social adjustment for the first time. In fact, self-esteem could also be influenced by people and surroundings. This has been emphasised in prior study which found those with more support displayed a higher level of self-esteem. Berns stated that self-esteem reflects oneself worth, in which receiving constructive or functional interaction from peers and parents are
beneficial to increase self-esteem. Therefore, moderate level of self-esteem among respondents in this study is assuring, whereby, this state should be maintained or improve for more positive outlook in the future.

3) Depressive Symptoms and Students’ Self-esteem

This study has established an evidence in demonstrated the relationship between depressive symptoms and student’s self-esteem. Even though result has suggested the relationship between these two are weak in magnitude, however, paying attention to this connection for future prevention is deemed necessary. Consistent with the previous studies, higher depressive symptoms level is linked to lower level of self-esteem \(^{10, 12, 23}\). Notably, these findings supported the notion that depression is associated with low self-esteem albeit in one of the models as postulated by Orth and Robins \(^{25}\); the vulnerability and its revised models; mediated and moderated vulnerability models, the scar model, the reciprocal relation model, the precursor model and the diathesis-stress model. However, further studies are required to disentangle the actual direction of the relationship between depression and self-esteem.

This result additionally leads to the argument that self-esteem may decrease negative mental conditions and prevents depression occurrence \(^{24}\). However, little is known if based on this study, henceforth a more robust analysis and comprehensive study is needed to explore the possible relationship. In fact, established weak relationship between self-esteem and depressive symptoms among the respondents pointed out possibility for other variable to be explored in deriving a more conclusive finding.

**Conclusion**

In conclusion, this study has revealed the negative relationship between depressive symptoms and self-esteem in the samples of university students. Student depressive symptoms level is recorded at mild level. While, self-esteem has been recorded at moderate level. As mental health is an ongoing crisis in the higher institution setting, therefore more practical approach should be implemented in responding to this situation in the future.

**Conflict of Interest Statement:** The authors declare that they have no conflict of interest.

**Source of Funding:** The author(s) received no specific funding for this work.

**Ethical Clearance:** Research committee approval was obtained.

**References**


The Value Relevance of Environmental Responsibility Performance

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Abstract

In Indonesia, research on the value relevance of non-financial information is still very rare, while several studies outside Indonesia also show mixed results. This leaves a challenge to test the value relevance of environmental performance information. This research was conducted in the period of 2010 to 2017, with companies that consistently became PROPER participants for 8 consecutive periods as its research subjects. The result shows that environmental performance information provides additional value relevance, which is indicated by an increase in R squared after entering environmental performance variables.

Keyword : Value Relevance, Environmental Performance, Share Price, PROPER

Introduction

Previous research on the value relevance of environmental performance shows varying results. Some research shows that environmental performance have relevant value but has negative effect on financial performance. Disclosed information on environmental performance has a negative effect on future financial performance. This is in accordance with cost-concerned school approach, which declared that investment on environmental performance could cause cost increase, which in turn lowered companies' income and market value. Investors also do not necessarily assess a company based on their environmental performance rating. According to additional cost for companies to fulfill their environmental performance will affect companies' profitability.

Other research proved that environmental performance only has value relevance on companies with a good rating, which shows that market values environmental performance differently. The increase of environmental awareness and higher indirect costs cause future environmental performance information’s value relevance to affect an increase in the financial market. This is in accordance with the value creation school approach, which stated that the effort to increase environmental performance is one of the options to increase competitive advantage and investor’s returns.

In Indonesia, research on the value relevance of non-financial information is still rare, On the other hand, companies need to know whether their published environmental performance information has value relevance or not. The investment done by the company to achieve good environmental performance needs to be evaluated, whether these investments give value or only increasing the expenses. This research uses modified the Ohlson Model by adding Environmental Performance Ratings (PROPER) to test the value relevance. This research contributes by adding evidence on whether environmental performance has value relevance. Moreover, this research is done in the latest research period, from 2010 to 2017, which is research with the latest data. This research started in 2010 because there are a concept and method renewal on PROPER in that year. The companies used as the research subject are those who have consistently become PROPER’s participant for 8 consecutive periods.
The next parts of this research are as follow: Chapter 2 consists of literary review and hypothesis development; Chapter 3 gives the research method; Chapter 4 explains the analysis and discussions, including empirical findings. Research’s conclusion and limitation are in the last part of this research.

Theoretical Framework and Hypothesis Development

Climate change and globalization make the company and society to be more aware of the importance of corporate social and environmental responsibility. Because of that, the government had made the Law that mandates the company to practice environmental responsibility in order to reduce the impact on the environment. Environmental responsibility will help the companies in using their resource efficiently. Every company has to ensure that its environmental responsibility leads to the improvement of corporate performance. If a company does not do its environmental responsibility right, it may also affect the corporate reputation and image.

Nowadays, a company’s performance is not only measured financially but also from non-financial factors such as environmental performance. Non-accounting performance measures make it possible for the company to do continuous improvement so that the company could create value. Environmental performance is a result of corporate strategic activities, where the company tried to manage their impact on the environment. Aside from that, environmental performance is a nonfinancial result that emerges from the company’s internal process, which can be a company’s competitive advantages. The social pressure is expected to motivate the companies to be responsible for environmental performance so that the resulted information can give the signal to the stakeholders that the companies have a proactive environmental strategy.

In Indonesia, environmental performance is measured with PROPER ratings. PROPER is environmental performance ratings that are used to evaluate and give ratings to participated companies with five color codes, from the worst to the best: black, red, blue, green, and gold, which was given by Indonesia’s Ministry of the Environment annually. These ratings are given to companies whose operational facilities have significant impacts on the environments.

In the previous research, value relevance is measured with Ohlson Model as the research basis. The Ohlson Model basically connects stock price with earnings per share (EPS) and book value per share (BVPS) that can be used to influence value relevance. This model is needed to know the connection between stock price change influenced by book value and earnings. Thus, the Ohlson Model can be concluded as such:

$$R_{t+1} = \alpha_0 + \alpha_1 \text{BVPS}_{it} + \alpha_2 \text{EPS}_{it} + \varepsilon_{it}$$

Where:

- $R_{t+1}$: the stock price of $i$ company on year $t+1$
- $\text{BVPS}_{it}$: book value per share of $i$ company on year $t$
- $\text{EPS}_{it}$: earning per share of $i$ company on year $t$

Non-accounting information of environmental performance becomes one of the companies’ primary needs because of it relates with the decision making and sustainability of a company. Because of that, it is important to know the impact of value relevance from environmental performance information. Thus, this research modified the Ohlson Model by adding Environmental Performance Ratings (EPR) as a non-accounting information variable, Cash Flow Operating (CFO), and control variables from value relevance (firm size and leverage).

$$SP_{it} = \alpha_0 + \alpha_1 \text{EPS}_{it-1} + \alpha_2 \text{BVPS}_{it-1} + \alpha_3 \text{CFOS}_{it-1} + \alpha_4 \text{PROP}_{it-1} + \varepsilon_{it-1}$$

Hypothesis Development

Environmental performance information is one of the stakeholders’ demands. This is triggered by globalization and various environmental problems that happened, especially in Indonesia. Indonesia is the biggest country in South East Asia and has a complex geographical environment. According to there is a serious deforestation case in 2013. This shows that it is important to discuss environmental problems in Indonesia. The increase of awareness on the importance of environmental problems in making economic and ethical investors’ decisions causes the demand for environmental performance environment to be higher.

Previous studies found that environmental performance does not have value relevance. The companies that received high valuation in environmental performance are not necessarily being valued by investors. The investors think that the improvement of environmental performance needs a lot of expenses and will have negative impacts on future earnings. The
Improvement in environmental performance is one of the managers’ effort in using corporate resources for their own interest, and will affect shareholders return.

The additional cost to fulfill environmental performance will affect companies’ profitability. The revealed environmental performance information has negative effects on future financial performance. That research result is in accordance with cost-concerned school approach that stated that investment in environmental performance could cause increased cost that will result in the loss of income and market value.

On the other hand, there is the value creation school, where the effort to improve environmental performance is a way to improve competitive advantage and increase investor return. A green company is being more appreciated in the capital market, product, or services. Producers that shows their effort in minimizing the negative impact to the environment from their product and process, can easily spread their market or even replace their competitors who failed to promote a strong environmental performance.

Value creation school is supported by the research of that also found that environmental performance has value relevance. Environmental performance’s information is said to have value relevance if it can help the investor in making an investment decision. Based on value creation school, this research assumed that:

\[ S_{Pt} = \alpha_0 + \alpha_1 EPS_{it-1} + \alpha_2 BVPS_{it-1} + \alpha_3 CFOS_{it-1} + \alpha_4 PROP_{it-1} + \alpha_5 VC_{it-1} + \epsilon_{it-1} \]

Where:
- \( S_{Pt} \) = Stock price of company i on year t
- \( EPS_{it-1} \) = Company’s earning per share i on year t-1
- \( BVPS_{it-1} \) = Company book value per share i on year t-1
- \( CFOS_{it-1} \) = Company’s operating cash flow per share i on year t-1
- \( PROP_{it-1} \) = Company’s PROPER result i on year t-1
- \( VC_{it-1} \) = Control variable which consists firm size and company leverage i on year t-1

Research Method

To verify this research, Ohlson’s Model is used, which is modified with environmental performance ratings (PROPER) and added with independent variables such as cash from operating (CFO), and control variables. Environmental performance Rating can be considered as an additional information for accounting. The model which can be formulated in this research is as follows:

Sample

To produce accurate findings, this research applies some criteria of sample selection. First, companies which are listed in the Indonesia Stock Exchange before 2010 and remain as public companies until 2018; second, the companies have at least participated in PROPER and consistently participated in PROPER program for eight consecutive years. There are 208 firm-year that include as the final sample for the period of 2010 – 2017.

Data Analysis Techniques

Obtained data are processed by using the help of GRET’L software. To conduct hypothesis test data analysis technique, it is necessary to conduct a statistical test which is used to test the hypothesis. The hypothesis is accepted if: 1) Regression coefficient shows the relationship according to the hypothesis; 2) significant t-value <0.05. Best model selection is applied to determine whether research panel data fit with the Ordinary Least Square (OLS), Fixed Effect (FE) or Random Effect (RE). Best model selection requires a Chow test and a Hausman test.

Result and Discussion

Sample Profile

Samples which met the criteria from 2010 to 2017 were 208 observations. The selected samples represent 4 sectors on the IDX, namely manufacturing, mining,
energy and oil & gas, agro-industry and regional and service sectors

The number of companies selected as samples represents 5.87% of companies that participated in PROPER. The biggest composition is in the manufacturing sector, which is 61.54%. All selected companies are companies which are companies with high profile, which are companies that have large and widespread impacts on the environment so that the company’s activities will get the attention from the community.

**Descriptive Statistic**

The complete profile of the variables used in this research is presented in Table 1 below:

**Table 1. Variable Measurement According to PROPER Rating**

<table>
<thead>
<tr>
<th>Variable (Mean)</th>
<th>PROPER Rating</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2</td>
</tr>
<tr>
<td>Observation</td>
<td>13</td>
</tr>
<tr>
<td>SP</td>
<td>1.183,44</td>
</tr>
<tr>
<td>BVPS</td>
<td>2.189,06</td>
</tr>
<tr>
<td>EPS</td>
<td>-67,74</td>
</tr>
<tr>
<td>CFOS</td>
<td>180,22</td>
</tr>
<tr>
<td>FS</td>
<td>29,81</td>
</tr>
<tr>
<td>LEV</td>
<td>30,46</td>
</tr>
</tbody>
</table>

Table 1 also shows that companies with high PROPER rankings have better financial performance such as EPS and CFOS than companies with lower PROPER rank. Companies which receive PROPER ratings 4 and 5 have a higher mean SP, EPS and CFOS than rank 2 and 3. Companies with high PROPER ratings will receive market appreciation, which can be seen from the average share price of companies in the PROPER group 4 and 5, which are far higher than the average price of the company’s shares at a lower PROPER rating. The risk of companies with a higher PROPER rating are lower which can be seen from the LEV value, companies with a red PROPER rating have the highest LEV mean.

The results of the best model selection concluded that the fixed effect is the model that best fits the research data.

**Table 2 Panel A. Result Before PROPER**

<table>
<thead>
<tr>
<th>Coefficient</th>
<th>Std. Error</th>
<th>t-ratio</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>const</td>
<td>-23375.7</td>
<td>23329.1</td>
<td>-1.00</td>
</tr>
<tr>
<td>BVPS</td>
<td>-0.48</td>
<td>0.35</td>
<td>-1.36</td>
</tr>
<tr>
<td>EPS</td>
<td>2.46</td>
<td>1.16</td>
<td>2.13</td>
</tr>
<tr>
<td>CFOS</td>
<td>2.65</td>
<td>1.17</td>
<td>2.27</td>
</tr>
<tr>
<td>FS</td>
<td>884.72</td>
<td>805.25</td>
<td>1.10</td>
</tr>
<tr>
<td>LEV</td>
<td>33.11</td>
<td>32.61</td>
<td>1.02</td>
</tr>
</tbody>
</table>

LSDV R-squared  0.88   Within R-squared 0.08
LSDV F(30, 177) 44.46   P-value(F) 4.43e-67
Rho 0.62   Durbin-Watson 0.67

Notes: *** Significant 1% , ** Significant 5% , * Significant 10%
Table 2 Panel B. Result After PROPER

<table>
<thead>
<tr>
<th></th>
<th>Coefficient</th>
<th>Std. Error</th>
<th>t-ratio</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>const</td>
<td>−14082.8</td>
<td>22435.4</td>
<td>−0.63</td>
<td>0.5310</td>
</tr>
<tr>
<td>BVPS</td>
<td>−0.65</td>
<td>0.34</td>
<td>−1.90</td>
<td>0.0591  *</td>
</tr>
<tr>
<td>EPS</td>
<td>3.29</td>
<td>1.12</td>
<td>2.93</td>
<td>0.0038  ***</td>
</tr>
<tr>
<td>CFOS</td>
<td>2.94</td>
<td>1.12</td>
<td>2.62</td>
<td>0.0094  ***</td>
</tr>
<tr>
<td>PROP</td>
<td>−2179.02</td>
<td>523.91</td>
<td>−4.16</td>
<td>&lt;0.0001 ***</td>
</tr>
<tr>
<td>FS</td>
<td>809.90</td>
<td>770.77</td>
<td>1.05</td>
<td>0.2948</td>
</tr>
<tr>
<td>LEV</td>
<td>34.30</td>
<td>31.21</td>
<td>1.10</td>
<td>0.2732</td>
</tr>
</tbody>
</table>

LSDV R-squared 0.89
Within R-squared 0.17

Notes: *** Significant 1% , ** Significant 5% , * Significant 10%

The results show an increase after adding PROPER in the Ohlson model, R-squared increase to 0.17 from 0.08. This means that environmental performance information has additional relevance value, however; the information is responded negatively by investors. Investors still consider that environmental performance is not an investment incurred by the company for purposes that do not produce results.

This research adds new evidence that in Indonesia, as a developing country, environmental performance information provides added value relevance. The results of the research support the cost-concern school and are consistent with some of the results of previous studies conducted in developed countries 1,2,4. 4 argue that if the environmental performance of the company is getting better, the company will increase costs, reduce profits and market value. According to 22, the efforts of managers in environmental or social problems by using company resources can be interpreted by investors as managers’ personal interests to build managers’ personal image. This is feared to reduce shareholder value.

The pros and cons regarding the benefits of environmental performance information in Indonesia in particular, are intense debates, and the results of this study support the opinion of the majority of investors in Indonesia, who find that social responsibility performance is a cost which will potentially reduce shareholder value. However, the results of the study are different from what has been done by 5, who found that the market respects the environmental performance of companies which get high or low ratings differently.

**Conclusion, Implication and Limitation**

This research has a goal to prove whether environmental performance information can provide additional relevant values. The results show that environmental performance information provides additional relevant values as hypothesized and as evidenced by an increase in after adding PROPER in the Ohlson model. Even though it has additional relevant values, the environmental performance information is responded negatively by investors. The environmental performance investment conducted by companies is considered a cost by investors and does not provide benefits, which is in line with the cost concern school.

However, this study does not include all the companies participating in PROPER, due to data availability. Besides that, not many companies consistently involve in PROPER program for the 8 consecutive periods. Future research can address this issue by combining the method of data collection to reach the generalizability of results.
Conflict of Interest Statement: The authors declare that they have no conflict of interest.

Source of Funding: Self

Ethical Clearance: Research committee approval obtained

References


Emotional Intelligence in Relation to Ethical Values of Malaysian University Students

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¹Master Student, ²Senior Lecturer, School of Education, Universiti Teknologi Malaysia, Malaysia

Abstract

University students who are commonly regarded as generation Y (Gen-Y) is exposed to a lot of emotional challenges and there has been evidence of decline in moral standards among Malaysian university students. Consequently, the ethical issues among young generation might jeopardize the national aspirations to develop future intellectual generations who are capable to manage their emotions as well as to resolve ethical dilemmas. There is a lack of research investigating the emotional intelligence mechanisms in relation to university students’ ethical values. Therefore, as to cultivate the holistic well-being of a nation with good moral values among future leaders, the purpose of this study is to determine the relationship between emotional intelligence and ethical values. This study also investigate whether there are differences of emotional intelligence level and ethical values level between first year and final year students. A quantitative research design was utilized and the respondents comprised of 217 undergraduate students in School of Education, Universiti Teknologi Malaysia. USM Emotional Quotient (USMEQ-i) Questionnaire and Ethical Values Questionnaire were used as the instruments in this study. The analysis of the results were in the form of inferential statistics. Results revealed that there was a significant relationship (p < 0.05) between emotional intelligence and ethical values. The independent t-test result was clearly depicted that there was no significant difference (p > 0.05) in the scores for emotional intelligence level for first year and final year students meanwhile there was a significant difference (p < 0.05) in the scores for ethical values level for first year and final year students. The present study contributes to an understanding of the relationship and impact of emotional intelligence on ethical values. This study has highlighted that individuals with high level of emotional intelligence is perceived to be more ethical.

Keywords: Emotional Intelligence, Ethical Values, University Students

Background of Study

The aim of universities is much broader than just granting students with degrees or providing general education. Higher institutions equipped students with appropriate learning abilities and life skills that can be applied in the future. The National Philosophy of Education (NPE) calls for developing harmonious individuals who are intellectually, spiritually, emotionally and physically balanced. Thus, continuous effort in integrating emotional intelligence education and ethical values should be an ongoing focus of higher institutions for the betterment of future generations.

Several research examined university students’ level of emotional intelligence (EI) across all years of study. Ghanimat et al.,¹ highlighted that no significant relationship between the age and total EI score of female students at Islamic Azad University of Tabriz. Whereas, studies conducted by Snowden et al.,¹⁸ Ungur and Karagozoglu discovered that students’ age has a significant relation with their total EI scores.

Prior research on ethical values across all university students’ by Sanders and Hoffman found that graduate students in their final term exhibited less ethical sensitivity than their first-year peers. In contrast, Yuen in his research concluded that the higher the year of
study among accounting students the likelihood for them to be more ethical is greater.

Aside from that, former studies analyzing the relationship of EI and ethical values stressed that EI was significantly correlated with individual ethics, perceptions of other’s ethics and ethical judgment\textsuperscript{2,4}. In addition, a study by Agarwal and Chaudhary\textsuperscript{1} stated that EI enhanced our personality and moral reasoning.

Further research to examine the relation between EI and ethical values of university students would give a significant contribution towards the field of research as EI has been recognized as one of the most successful factors in the workplace\textsuperscript{14}. Holian\textsuperscript{9} suggested that future study should investigate whether skills associated with EI has an impact on ethical decisions.

Therefore, this present study examines the relationship between EI and ethical values of undergraduate students. This study also seeks to investigate if differences exist in the level of emotional intelligence and ethical values between first year and final year students when students in different years of study might experience different transitional challenges in academic and social life adjustment.

**Objectives**

The main objective of this research is to investigate the difference of emotional intelligence and ethical values level between first year and final year students. This research also analyzed the relationship between EI and ethical values of the undergraduate students.

**Methodology**

A quantitative research design was utilized in this study and the respondents comprised of 217 undergraduate students in School of Education, Universiti Teknologi Malaysia. USM Emotional Quotient (USMEQ-i) Questionnaire and Ethical Values Questionnaire were used. Independent-samples t-test was conducted to study the level of emotional intelligence and ethical values across the students’ year of study. Plus, Pearson Correlation analysis was conducted to investigate the relationship between emotional intelligence and ethical values of undergraduate students. The analysis of the results was run using SPSS version 24 and the results were in the form of inferential statistics.

**Findings**

Table 1 illustrates the group statistics on emotional intelligence of undergraduate students for first and final year students. The first year students had a slightly higher mean value (Mean = 4.21, SD = 0.41) of emotional intelligence level as compared to final year students (Mean = 4.16, SD = 0.42).

<table>
<thead>
<tr>
<th>Year of Study</th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Std. Error Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level of EI</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>First Year</td>
<td>104</td>
<td>4.06</td>
<td>.40</td>
<td>.04</td>
</tr>
<tr>
<td>Final Year</td>
<td>113</td>
<td>3.93</td>
<td>.39</td>
<td>.04</td>
</tr>
</tbody>
</table>

The independent t-test result in Table 2 was clearly depicted that there was no significant difference in the scores for emotional intelligence level for first year (M = 4.21, SD = 0.41) and final year (M = 4.16, SD = 0.42) students; t (215) = 0.85, p = 0.40.

<table>
<thead>
<tr>
<th>Year of Study</th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Std. Error Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level of EV</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>First Year</td>
<td>104</td>
<td>4.21</td>
<td>.41</td>
<td>.04</td>
</tr>
<tr>
<td>Final Year</td>
<td>113</td>
<td>4.16</td>
<td>.42</td>
<td>.04</td>
</tr>
</tbody>
</table>
Table 3 shows the group statistics on ethical values of undergraduate students. The first year students had a higher mean value (Mean = 4.06, SD = 0.40) of ethical values level as compared to final year students (Mean = 3.93, SD = 0.39).

Table 3: Group statistics on ethical values of undergraduate students.

<table>
<thead>
<tr>
<th>Year of Study</th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Std. Error</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level of EI</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>First Year</td>
<td>104</td>
<td>4.21</td>
<td>.41</td>
<td>.04</td>
</tr>
<tr>
<td>Final Year</td>
<td>113</td>
<td>4.16</td>
<td>.42</td>
<td>.04</td>
</tr>
</tbody>
</table>

As illustrated in Table 4, the independent t-test result clearly showed that there was a significant difference in the scores for ethical values level for first year (M = 4.06, SD = 0.40) and final year (M = 3.93, SD = 0.39) students; t (215) = 2.52, p = 0.01.

Table 4: Independent t-test result on ethical values of undergraduate students.

<table>
<thead>
<tr>
<th>Year of Study</th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Std. Error</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level of EI</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>First Year</td>
<td>104</td>
<td>4.21</td>
<td>.41</td>
<td>.04</td>
</tr>
<tr>
<td>Final Year</td>
<td>113</td>
<td>4.16</td>
<td>.42</td>
<td>.04</td>
</tr>
</tbody>
</table>

Lavene’s Test for Equality of Variances

<table>
<thead>
<tr>
<th>Equal variances assumed</th>
<th>F</th>
<th>Sig.</th>
<th>t</th>
<th>df</th>
<th>Sig. (2-tailed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equal variances not assumed</td>
<td>1.198</td>
<td>.275</td>
<td>.85</td>
<td>215</td>
<td>.40</td>
</tr>
</tbody>
</table>

Table 5 shows the correlations result of emotional intelligence and ethical values. The correlation coefficient of the two variables in this study had an absolute value of 1 that indicates a perfect linear relationship. There was a strong, positive correlation between emotional intelligence and ethical values of undergraduate students in the School of Education, UTM which was statistically significant (r = 0.665, n = 217, p< 0.05, two-tailed). Therefore, the null hypothesis for this research is rejected which shows no significant relationship between emotional intelligence and ethical values of undergraduate students’.

Table 5: Correlations of emotional intelligence and ethical values.

<table>
<thead>
<tr>
<th>Emotional Intelligence</th>
<th>Ethical Values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson Correlation</td>
<td>1</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td>.665**</td>
</tr>
<tr>
<td>N</td>
<td>217</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Ethical Values</th>
<th>Emotional Intelligence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pearson Correlation</td>
<td>.665**</td>
</tr>
<tr>
<td>Sig. (2-tailed)</td>
<td>.000</td>
</tr>
<tr>
<td>N</td>
<td>217</td>
</tr>
</tbody>
</table>
**Correlation is significant at the 0.01 level (2-tailed)**

*Correlation is significant at the 0.05 level (2-tailed)

**Discussion**

The independent t-test result in Table 2 has clearly depicted that there was no significant difference in the scores for emotional intelligence level for first year and final year students. Generally, most of the first year students are between 19 to 21 years old whereas final year students commonly are between 23 to 25 years old. The result of present study is consistent with the studies conducted by Ghanimat et al., that found no significant relationship between the age of the studied subjects and their total EI score. Previous studies consistently indicate that EI is a mental ability to implicate and apply emotional information which is partly intrinsic and partly acquired through life experiences. Thus, it can be assumed that the first year students can control and regulate their emotion better when the academic challenges experienced by them are not as difficult as compared to the final year students as they have just entered the university.

Previous studies emphasized that age is significantly related to students’ total EI scores. On the contrary, this research indicates different results. The difference between both findings might be related to the difference in age gap. Respondents in the present study are all undergraduate students where they mostly fall under the same age group. Therefore, not much difference in age variation that can clarify the significant difference of emotional intelligence levels among the students.

Independent t-test result in Table 4 illustrates that there was a significant difference in the scores for ethical values level for first year and final year students. Referring to the descriptive analysis result, first year students in the School of Education, UTM were perceived to be more ethical as compared to the final year students. The findings of the present study is in line with prior studies where they found that graduate students in their final term exhibited less ethical sensitivity than their first-year peers. The previous researchers concluded that as the age of the respondent increases, their ethical sensitivity becomes lesser. On the other hand, this finding contradicted with a study previously conducted by Yuen found that the higher level of students had the greater tendency of having strong intention to achieve their ambitions and hence are more ethical.

Final year students who had spent longer time in the university might have encounter varieties of external influences which seems to be more on the negative side than on the positive. The negative influences might deteriorate the awareness of practicing ethical values among graduating class students. Consequently, the students have the possibility to commit wrongdoing throughout their academic years. The deterioration in ethical behavior among students suggest that ethics education is not adequately stressed or properly taught in the academic curriculum of the learning institutions.

Based on Pearson Correlation analysis, there was a strong, positive correlation between emotional intelligence and ethical values of undergraduate students in the School of Education, UTM. Specifically, this study shows that emotional intelligence has the greatest impact on the overall ethical values scores. Students who have the ability to regulate emotions also have the capability of to think rationally and practice the ethical values. This findings is in line with prior studies where all concluded that EI was significantly correlated with individual ethics, perceptions of other’s ethics and ethical judgment. In addition, the result of the present study agrees with Agarwal and Chaudhary that EI enhances character building and guide one’s ethical conducts.

In brief, the results suggest that individuals who better evaluate their emotions tend to be more ethical. As opined by Goleman et. al, emotional intelligence is able to assist individuals’ self-awareness to appropriately respond to life challenges and maintains the relationship with others ethically. Thus, EI undoubtedly can assists in personality maturation and directs the person to take moral decisions and act professionally regardless of his own interests. Thus, students who can evaluate and regulate emotions well would also have the capability to think more rationally and ethically in decision making.

**Conclusion**

This study has investigated the relationship between emotional intelligence and students’ ethical values. The findings of this study suggest that there is a positive relationship between emotional intelligence and ethical values of undergraduate students in the School of Education, UTM. Based on the results, it is imperative for the university students to learn and be concerned
about the importance of emotional intelligence and the application of ethical values conduct. Higher institutions’ administrators and academicians are recommended to consider integrating emotional intelligence with ethical values into the curricula of higher education.

**Source of Funding:** Fundamental Research Grant Scheme (Vot. No. R.J130000.7853.5F039).

**Conflict of Interest:** No

**Ethical Clearance:** Obtained from Ministry of Higher Education, Malaysia

**References**


The Impact of Prevalence of Substance Abuse among Secondary School Students in Borno State, Nigeria

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Abstract

The objective of this study is to determine the prevalence of substance abuse among senior secondary school students in Borno State. A total of 3,298 students participated in the survey. A self-developed questionnaire with 42 items measured information on prevalence, of substance abuse, on a 5-point Likert scale. The items were first content validated by experts and pilot tested before being administered to the respondents. The data were analyzed quantitatively using descriptive statistics and a factorial ANOVA of multivariate statistical analysis. The results of the study indicated that there is high prevalence in the consumption of substances like panadol, kolanut, paracetamol and septrin among senior secondary school students in Borno State. Significance: The finding has important implication on how secondary school students could effectively prevent the prevalence consumption of dangerous substances that alter their health. Beside that the findings will help promote campaign against the use of illicit drugs among the members of the public.

Keywords: Substance Abuse, Prevalence, Consumption of Dangerous Substances, illicit Drugs

Introduction

Substance is a drug that is considered harmful and whose use is controlled by law or made illegal⁷. Substance abuse is a pattern of harmful use of any substance for mood-altering purposes. It is an excessive use of drugs (such as stimulant, depressant, psychedelics and alcohol) without medical justification¹⁴. Substance abuse is characterized by a pattern of substance use that causes grade impairment. Examples of commonly abused substances are tobacco, alcohol, cocaine, valium and heroin. Despite worldwide concern and education about substances, many youths have limited awareness of their adverse consequences. Prevalence of substance abuse vary from one country to the other. For instance, in the United State of America, 52 percent of the eighth graders and 80 percent of the high school senior have abused substance (National Youth Violence Prevention, 2000¹). World Drug

In Nigeria, many adolescents engage in various risky behaviors such as smoking, alcohol drinking and other substance abuse. Situation shows that, there is high prevalence of substance abuse among adolescents and there is high probability that, the frequency of substance abuse will continue to increase¹. Prevalence is always contrasted with incidence. prevalent used to refer to that which is widely accepted and practiced by a large number of people⁷. The prevalence of substance abuse and its effects is on the increase worldwide among youth thus, assuming a dangerous dimension while its consequences have reached a global concern. A study by⁸ revealed that, prevalence of substance abuse is the frequency of substance abuse which predisposes individuals to various risk and consequences currently demanding much attention in the contemporary society.

A study in Nigeria, by national drug law enforcement agency¹⁵, revealed that, there is a widespread of substance abuse which include consumption of cannabis, psychotropic substance, heroin, cocaine, and...
volatile organic solvent. A study by\(^3\), revealed that, the commonest substances abused by subjects were mostly caffeine, mild analgesics, and psycho stimulants. \(^2\)reported that, hypnotedatives, tobacco and psycho stimulants were the commonly abused substances with varying prevalence, in Ilorin, a city in Nigeria. However, prolonged abuse of these substances has negative consequences on health, social and psychological wellbeing of youths as well as students’ performance in schools. Prevalence of substance abuse among students seems to have rich an alarming proportion and has been identified as one of the pandemic health problems in Nigeria which demand urgent attention. Youth are predisposed to substance abuse by various risks, which result to different consequences in the society. This study seeks to determine the prevalence of substance abuse among senior secondary school students in Borno State.

**Method**

Descriptive statistics of percentage and frequency count were used for demographic information and to answer research questions while Factorial ANOVA of multivariate statistical analysis was used to test all the hypotheses and pair wise comparison test was used to consider the effect of interaction between school location and gender.

**Participants**

The population of this study involved all the senior secondary school students in Borno State. There are seventy-three senior secondary schools with sixty five thousand nine hundred and sixty senior secondary school students (65,960)\(^16\). Out of this number thirty-eight thousand nine hundred and thirty seven students (38,937) were males, while twenty seven thousand and twenty three (27,023) were female students. Stratified random sampling technique was used to select the required sample size in each stratum. A stratified random sampling technique was used because both gender and school locations were compared according to their strata. According to\(^8\) (1998) if the population is few, a sample of 40 percent should be selected to give equal representation to all. Therefore, a sample of twenty nine (29) schools comprising of 19 in urban and 10 in rural areas were sampled from the total of 73 senior secondary schools in Borno State.

**Research instrument**

A self-developed questionnaire called prevalence, risk factors and consequences of substance abuse questionnaire (PRFCSAQ) was used to collect data. The instrument was structured on 5-point Likert-type response scale and has 42 items to solicit information on prevalence, risk factors and consequences of substance abuse. Five (5) point Likert-type response modes was used on section (B) on prevalence of substance abuse which has never (1 point), Rarely (2 points), sometimes (3 points) often (4 points) and always (5 points). The reliability result on prevalence of substance abuse revealed a reliability coefficient of 0.71 for Cronbach.

**Results**

What is the prevalence of substance abuse among senior secondary school students in Borno State?

<table>
<thead>
<tr>
<th>S/No</th>
<th>Item</th>
<th>Never (N)</th>
<th>Rarely (N)</th>
<th>Sometime (N)</th>
<th>Often (N)</th>
<th>Always (N)</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>Panadol</td>
<td>579 (23%)</td>
<td>490 (19%)</td>
<td>801 (32%)</td>
<td>411 (16%)</td>
<td>261 (10%)</td>
</tr>
<tr>
<td>5</td>
<td>Kolanut</td>
<td>955 (38%)</td>
<td>351 (14%)</td>
<td>552 (22%)</td>
<td>336 (13%)</td>
<td>348 (14%)</td>
</tr>
<tr>
<td>6</td>
<td>Petrol</td>
<td>2146 (84%)</td>
<td>102 (4%)</td>
<td>250 (10%)</td>
<td>26 (1%)</td>
<td>18 (1%)</td>
</tr>
<tr>
<td>7</td>
<td>Alabukun</td>
<td>1554 (61%)</td>
<td>632 (25%)</td>
<td>263 (10%)</td>
<td>46 (2%)</td>
<td>47 (2%)</td>
</tr>
<tr>
<td>8</td>
<td>Cocaine</td>
<td>2124 (84%)</td>
<td>236 (9%)</td>
<td>125 (5%)</td>
<td>37 (2%)</td>
<td>20 (1%)</td>
</tr>
<tr>
<td>9</td>
<td>Valium</td>
<td>2007 (79%)</td>
<td>333 (13%)</td>
<td>117 (4%)</td>
<td>71 (3%)</td>
<td>14 (1%)</td>
</tr>
<tr>
<td>10</td>
<td>Marijuana</td>
<td>1782 (70%)</td>
<td>479 (18.8%)</td>
<td>183 (7.2%)</td>
<td>75 (3.0%)</td>
<td>23 (3.9%)</td>
</tr>
<tr>
<td>11</td>
<td>Paracetamol</td>
<td>274 (11%)</td>
<td>456 (18%)</td>
<td>1372 (54%)</td>
<td>225 (9%)</td>
<td>215 (9%)</td>
</tr>
<tr>
<td>12</td>
<td>Asprin</td>
<td>298 (12%)</td>
<td>736 (29%)</td>
<td>1215 (48%)</td>
<td>208 (8%)</td>
<td>85 (3%)</td>
</tr>
<tr>
<td>13</td>
<td>Chloroquine</td>
<td>181 (7%)</td>
<td>1051(41%)</td>
<td>1028 (40%)</td>
<td>239 (9%)</td>
<td>43 (2%)</td>
</tr>
<tr>
<td>14</td>
<td>Heroin</td>
<td>2044 (80%)</td>
<td>160 (6%)</td>
<td>144 (6%)</td>
<td>142 (6%)</td>
<td>52 (2%)</td>
</tr>
<tr>
<td>15</td>
<td>Septrim</td>
<td>167 (7%)</td>
<td>668 (26%)</td>
<td>1235 (49%)</td>
<td>311 (12%)</td>
<td>161 (6%)</td>
</tr>
</tbody>
</table>
Results showed responses of respondents on prevalence of substance abuse among senior secondary school students in Borno State. The result showed on item four (4) that 579 (23%) have never abuse anadol, 490 (19%) of the respondents have rarely abuse panadol, 801, (32%) of the respondents abuse panadol sometimes, 411(16%) of the respondents said they often abuse panadol while 261 (10%) of the respondents said that they always abuse panadol. Item five (5) of the same table showed that, 955 (38%) of the respondents never abuse kola nut, 351 (14%) abuse kola nut on rare occasion, 552 (22%) of the respondents abuse kola nut sometimes, 366 (14%) said they often abuse kola nut while 348 (14%) of the respondents said they always abuse kola nut. On the same table item six (6) showed that, 2146 (84%) of the respondents said they never abuse petrol, 102 (4%) said they rarely abuse petrol, 250 (10%) of the respondents sometimes abuse petrol, only 26 (1%) said they often abuse petrol, while 18 (1%) agreed that they always abuse petrol. Item seven (7) showed that 1554 (61.1%) of the respondents never use Alabukun, 632 (24.9%) abuse alabukun on rare occasion, 263 (10.3%) sometimes use alabukun, 46 (1.8%) said they often abuse alabukun while 47 (9%) said they abuse alabukun always. Results on item eight (8) showed that, 2124 (84%) of the respondents never abuse cocaine, 236 (9%) abuse cocaine rarely, 125 (5%) said they sometimes abuse cocaine, 37 (2%) of the respondents said they often abuse cocaine while only 20 (1%) of the respondents said they always abuse cocaine. Item nine (9) of the same table showed that 2007 (80%) of the respondents never abuse valium, 333 (13%) rarely abuse valium, 117 (4%) of the respondents sometimes abuse valium, 71 (3%) of the respondents often abuse valium. Result on item ten (10) showed that, 1782 (70%) of the respondents never abuse marijuana, 479 (19%) abuse marijuana rarely, 183 (7%) sometimes abuse marijuana, 75 (3%) often abuse marijuana while only 23 (1%) said they always abuse marijuana.

The result further showed on item eleven (11) that, 274 (17%) of the respondents never abuse paracetamol, 456 (18%) said they rarely abuse paracetamol, 1373 (54%) said they sometime abuse paracetamol, 225 (8%) often take paracetamol, while 215 (9%) said they always take paracetamol. Item twelve (12) on the same table showed that, 298 (12%) of the respondents never abuse aspirin, 736 (29%) said they rarely abuse aspirin, 1215 (48%) sometime abuse aspirin, 208 (8%) often abuse aspirin while 85 (3%) said they always abuse aspirin. Item thirteen (13) of the same table 4.2 showed that 181 (7%) of the respondents never abuse chloroquine, 1051 (41%) said they rarely abuse chloroquine, 1028 (40%) said they sometimes abuse chloroquine, 239 (9%) often abuse chloroquine while 43 (2%) said they always abuse chloroquine. Item fourteen (14) on the same table showed that 2044 (80%) of the respondents never abuse heroin, 160 (6%) rarely abuse heroin, 144 (6%) sometimes abuse heroin, 142 (6%) often abuse heroin while only 52 (2%) abuse heroin always. Item fifteen (15) on the same table showed that, 167 (7%) of the respondents never abuse septrin, 668 (26%) of the respondents rarely abuse septrin, 1235 (49%) of the respondents sometimes abuse septrin, 311 (12%) often abuse septrin, while only 161 (6%) of the respondents abuse septrin always. Finally result on the table showed that, kolanut, panadol and paracetamol are the substances abuse with high prevalence by the students.

Table 2: Factorial ANOVA Determining Prevalence of Substance Abuse Among Urban/Rural and Male/Female Students n=2542

<table>
<thead>
<tr>
<th>Source</th>
<th>Sum of Square</th>
<th>Df</th>
<th>Mean squares</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>SCHLLOC</td>
<td>2827.577</td>
<td>1</td>
<td>2827.577</td>
<td>72.072</td>
<td>.000</td>
</tr>
<tr>
<td>GENDER</td>
<td>3542.549</td>
<td>1</td>
<td>3542.549</td>
<td>90.297</td>
<td>.000</td>
</tr>
<tr>
<td>SCHLLOC *GENDER</td>
<td>52.758</td>
<td>1</td>
<td>52.758</td>
<td>1.345</td>
<td>.246</td>
</tr>
<tr>
<td>Error</td>
<td>99571.908</td>
<td>2538</td>
<td>39.232</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>106213.498</td>
<td>2541</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 2 showed the result of factorial ANOVA determining prevalence of substance abuse between school location (urban/rural) and gender (male/female) students. The result showed that there is significant difference on prevalence of substance abuse between school location (urban/rural) schools, and significant difference also existed between gender (male/female) students on prevalence of substance abuse.

As regard to interaction effect between school location (urban/rural) schools and gender (male/female) students, the result showed that regardless of gender (male/female) students and school location (urban/rural) prevalence of substance abuse among students was found to be insignificant. Therefore, the null hypothesis is retained and there is no need of post-hock pair wise comparison of honestly significant differences on prevalence of substance abuse between school location and gender.

**Discussion**

This study examines the prevalence of substance abuse among urban/rural senior secondary school students in Borno State, Nigeria. Social cognitive theory by $^{11}$ and psychological theory on behavioral influence by $^{13}$ were adopted to guide the study.

**Prevalence Substance Abuse**

Finding of this study showed that, there is high prevalence in the consumption of substances like panadol, kolanut, paracetamol and septrin among senior secondary school students in Borno State. This finding confirmed with WHO (2008) which stated that in Nigeria almost all human societies engage in the practice of abusing drugs either for psychiatric, religion or social reasons. The$^{14}$ stated that, in Nigeria, self-medication and treatment of illness is common and is still accepted in our contemporary society as advanced by the organ of the legislature against self-medication. This finding is also in line with$^{10}$ who stated that, multiple drug abuse is greater in the urban settlement than rural areas, the author further stated that, abuse of various substances has been reported among students, youth and unemployed.

Finding of this study revealed that, individuals were influenced by the attitude of parents, teachers and peer groups to adopt certain acts and behaviors that could predispose them to substance abuse. This statement agreed with$^{15}$ who stated that, no individual under the influence of substance can and will abide by rule and regulation in any given environment, because substance abuse alter very high percentage of behavior in an individual thereby it redirects the individual behavioral pattern.$^{6}$ concluded that, abuse of substances leads to form attitude toward drugs, low religiosity, educational and psychological disturbance. $^{7}$ opine that, individual’s risk factor such as personality trait and attitude have higher impact of substance use during adolescent. While$^{7}$ also noted that, personality traits such as hostility and low self-esteem are suggested to be positively associated with substance use. It is also established that, behavioral trait of impulsivity is an essential risk factor for the development of substance use problem and dependence among adolescents.

**Conclusion**

In this study the researchers compared the prevalence of substance abuse among senior secondary school students in Borno State, Nigeria. We found out that there is high prevalence in the consumption of substances like panadol, kolanut, paracetamol and septrin among senior secondary school students in Borno State.

**Conflict of Interest:** NIL

**Source of Funding:** Self source

**Ethical Clearance:** Done research committee

**References**

5. Crome IB. Substance Abuse and Dependence


Psychological Factors for Organizational Health

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Abstract

Psychological contract violation has been considered a phenomenon which incorporates a wide range of behavioral responses. This study examined psychological contract violation and organizational cynicism relationship that takes a systematic view in which organisational cynicism considered as negative attitude directed, particularly towards the educational sector. Using a sample of secondary public-school teachers in Malaysia. Results found that psychological contract violation positively significant with cynicism which has negative consequences on employee behavior. Furthermore, the results of the SEM procedure significantly supported the hypothesis.

Keywords: Organizational Cynicism, Psychological Contract Violation, Teachers’ Behavior.

Introduction

Unvoiced emotional issues due to interdependent culture, people feel hesitate to communicate their work-related problems directly. That produce a gap of communication between employer and employee. When a contract is violated, mistrust arises and intense emotional and attitudinal responses get evolve. The violation experiences are believed to engender feelings of unfairness and unmet expectations that damage the sense of reciprocal obligation between employer and employee. Anger, outrage, and resentment have been identified as some of the negative effects associated with psychological contract violations. The violation has also been associated with behavioural outcomes after that employee intention toward their organization will start changing. If employees don’t intend to leave their jobs, then it would be bad news for the organization because either their work-performance would be low or they start having intense relationship with their colleagues. There are some kind of psychological agreement between employers and employee, most of the time such contracts are not fulfilled; when such agreement breached, it increases the emotional intensity which referred to as a contract violation then this psychological contract violation as a negative aspect start positively associating with the organizational cynicism. In this study, we examined the relationship of perceived psychological contract violation (PPCV) and organizational cynicism (OCY) among public school teachers in Johor Bahru, Malaysia.

Literature

Psychological contract violation has been defined as a failure of the organization to fulfill one or more obligations of an individual’s psychological contract. Psychological contracts represent the belief in an obligation of reciprocity between an employee and an organization. It has been further argued that this definition focuses on the rational, mental calculation of what individuals have or have not received and downplays the emotional aspect of the violation. There is a distinction between ‘breach of contract’ and ‘contract violation’. Contracts are highly subjective assumptions of good faith and trust concerning the employee-organizational exchanges existing in the minds of the employees. When individuals feel that the organization has failed to uphold its obligations, the perceived breach occurs. Breach is essentially the identification of perceived unmet obligations; consequently, it may be a relatively short-term phenomenon and may result
in individuals returning to their relatively “steady” psychological contract state, or alternatively, it may develop into full violation. Violation, however, is an “emotional and affective state that may follow from the belief that one’s organization has failed to adequately maintain the psychological contract”\(^6\) (p.230). Contract violation is more than the failure of the organization to meet expectations; responses are more intense because the respect and codes of conduct have called into question because essentially a “promise” has been broken and it is more personalized\(^2\).

Psychological contract violation has been described as multi-faceted\(^6\) because it incorporates a wide range of responses. When a contract is violated, mistrust arises and intense emotional and attitudinal responses evolve \(^2\). Violation experiences are believed to engender feelings of unfairness and unmet expectations that damage the sense of reciprocal obligation between employer and employee. Anger, outrage, and resentment have been identified as some of the negative effects associated with psychological contract violations\(^1,2\). The violation has also been associated with behavioural outcomes such as lower organisational citizenship, reduced commitment, satisfaction, and trust while cynicism increases\(^3-9\).

The cynicism literature has identified the experience of unmet expectations and the feelings of disappointment that go along with it, as one of the primary determinants in the development of cynicism. In fact, unmet expectations have been labeled as a direct antecedent of cynicism in organizations \(^10\). The definitions and elements of both cynicism and psychological contract violations suggest that an employee-related social exchange is inherent in both constructs\(^11\). Not surprisingly, it also has been argued that these two forms of unmet expectations are linked\(^1,13\), suggesting that psychological contract violation is a fundamental determinant of employee cynicism.

The employees expect their organization to fulfill certain obligations in return for their allegiance and hard work. When the organization does not meet its expectations, negative attitudes and behavior are bound to result\(^14\). The majority of this literature provides evidence of changes to the employee and employer relationship at the attitudinal level, but there is little evidence of behavioural outcomes\(^9\). The current research intended to extend literature in behavioural context. Critical commentaries ask to what extent psychological contract violation lead to tangible changes in employee attitude and behaviour, and ultimately organizational performance.

**Relationship of PPCV and OCY**

The violation has also been associated with behavioural outcomes such as lower organizational citizenship, reduced commitment, satisfaction, and trust while cynicism increases \(^3-4\). Psychosocial interpretation of stress and burnout among teachers\(^10\), view that understanding the social context is at the heart of understanding and ameliorating teacher burnout. Psychological contract violation with several works out comes. Their research suggested that intent to quit was positively related with the psychological contract violations, but has negative results with in-role job performance out comes. Moreover, study explained that employee only seek new job when psychological contract violations leads to the feelings of anger and anxiety. Furthermore, if employee doesn’t intent to leave job, it would be bad news for the organization because employee performance will be low and relationship with colleagues will be affected as well. Many researcher also examines the effects of psychological contract violation on an individual employee in an organization and stated that it strongly influences on employees’ behavioral attitude and well-being. He emphasis to extend the research, designing broader studies which examine the interplay among psychological contract breach, so that it can be improved understanding how it influences organizational effectiveness in managing the employment relationship. Psychological contract violation as a negative aspect of the work environment\(^11\). Although cynicism has a number of negative factors which reduced the employee performance and organizational commitment. The study proved that there is some kind of psychological agreement between employers and employee, most of the time such contracts are not fulfilled; when such agreement breached, it increases the emotional intensity which referred to as a contract violation. The finding of the study indicated PCV as a negative aspect positively associated with the organizational cynicism. The magnitude of the effect was found to be strongly related. The effect of breach of psychological contract violation on employee attitude and behaviour. The study was conducted on Albanian banking sector. The unmet expectation of employees influenced the behaviour of them at workplace. The finding of the study highlighted that although the psychological contract has violated but
the intention to leave job does not grow. This case has been explained by the researcher that those employees pays their more intention towards the monitory side and try to establish a more close relation with the employer due to the economic crisis in business and economy. Therefore, it has been assumed that it would be hard to find new jobs in such circumstances. This study reveals the suggestion that proper care should be undertaken during training programs because training itself sometimes raises expectation of promotion in employees’ mind. Research indicated that lack of managerial interaction with subordinates, lack of open dialogues or face to face visibility; ignited bitterness, cynicism, anger or isolation from community activities. The study suggested defusing the possibility of psychological contract violation and future conflicts; managers or policymakers should involve employees’ voice in important decision making. Peng conducted their study on primary and secondary school teachers in China. The findings of the results were found quite different than the previous studies in the American context. The study clarified that people in China hesitate to communicate their problems in direct manners. Therefore, the researcher found unvoiced emotional issues due to interdependent culture. At such time of situation, employees keep their emotions, expectation, and suggestion inside their heart and start assuming that employer is breaching their contract which they assumed psychologically. Paillé envisioned after research that if managers provide such strategic environment for employees which has motivational training programs which also boost the level of communication between employer and employee, reported less psychological contract breach. The finding of the study also indicated that such working environment less trigger negative psychological behaviors.

Hypothesis: There is a relationship between perceived psychological contract violations and organizational cynicism.

Methodology

Three hundred and forty-one secondary public school teachers in Malaysia’s second largest state, Johor participated in this research. Targeted city in that state is Johor Bahru for data collection. Principles of respective schools received questionnaire from researcher and distributed to the teachers and 224 valid questionnaires were returned to test the hypothesis. The response rate was 80%.

Measures

PPCV

Adapted measures by Robinson and Morrison’s, 5-items instruments with the 5-point Likert scales presented by (1) Strongly Disagree and (5) Strongly Agree. Only some words of items have been changed to make it useable for the educational sector. The composite reliability (CR) of PPCV questionnaire was 0.90 with an average variance extracted (AVE) 0.66.

OCY

Organizational cynicism was measured with 7-time scale. Measurement scale presented from (1) Strongly Disagree to (5) Strongly Agree. Only some words of items have been changed to make it useable for the educational sector. The questionnaire yielding a CR 0.86 of organizational cynicism with an AVE .57.

Results

Complete list of the reflective measurement items of this study has been listed in Appendix with the assessment of their psychometric properties. All items Standardized factor loading were significantly relevant to the latent variables (as shown in Appendix) while convergent validity of the instrument has been assessed by the factor loading, Cronbach’s Alpha, composite reliability and AVE. The value of CR for both constructs were greater than 0.50 and the value of AVE were greater than 0.70. Moreover, path analysis of hypothesis found positively significant between PPCV and OCY (β= 0.187, p < 0.001).

Discussions

The findings of the current study suggested that the top management of the schools should be concerned about the deviant reactions of the teachers. The training which provided to the teachers should not increase the expectation of promotion or reward, if there are no such incentives ought to be provide after training. Moreover, teachers should provide enough space to express workplace emotions and voice-out their questions and concerns about themselves or work. The study also found the hesitation of communication in direct manner, quite common in Malaysia, which causes multiple stressors among teachers.
Acknowledgement: The authors would like to thank the University Tun Onn Hussein Malaysia (UTHM) Research funds for this paper, also all the assistance and guidance provided by proposed Professor to accomplish all the requirements of PhD.

Conflict of Interest - The author states that there is no conflict of interest with the parties involved in this research.

Ethical Clearance- Taken from research committee

References
Oral Communication Barriers Facing Arab Medical Students

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Abstract

Effective oral communication skills are critical to progress and success in academic and health care environments. As it happens, medical students at the College of Health Sciences in Umm Al Qura University in Saudi Arabia are required to perform various academic oral literacy tasks as preliminary requirement of medical curricula. These tasks include task-based learning/problem-based learning (TBL/PBL) sessions, classroom interaction, group/team work, delivering poster presentations and oral presentations. In order to navigate through these tasks successfully, they heavily depend on their ability to communicate their intended meaning—an opportunity for them to exhibit their proficiency at such tasks. Unfortunately, as these students engage in oral interactions their communication ability and progress in getting through such tasks are hindered by various barriers. This study takes a holistic view of understanding the oral communication barriers facing Arab medical students during their performance in the oral literacy tasks. Four colleges from the College of Health Sciences were chosen as targets for this study. The study adopted a qualitative research design where interviews were used as a major tool to collect data from eight current medical students and eight content area professors. Findings reveal that medical students are required to spend significant amounts of time interacting orally with each other as well as with the content area professors during these tasks. It might be argued that success or failure in such tasks depends on the tacit assumption of having good oral communication skills and communicative competence. The students were found to be facing different types of barriers; both Internal and External. The majority of the students were found to have positive attitudes towards the status, prestige and instrumental significance of oral communication skills. However, around one fourth of the students were found to think of English as an alien language and disregarded its instrumental significance.

Keywords: Oral communication, barriers, communicative competence, medical students

Introduction

Learning English as a second language (ESL) has always presented to learners as non-native speakers with unique challenges, ranging from socio-cultural to academic to psychological. Perhaps the most crucial among these challenges are the oral communication barriers that students face in performing various academic literacy tasks in different academic settings. Academic oral literacy tasks in the context of this study refer to interaction-based tasks.

For success in both academic studies and professional world, oral communication skills are clearly a critical need ¹. Hence, before students step into the professional world, their oral communication needs must be taken into consideration at tertiary level. In a study by Hinchliffe and Jolly ², effective communication was ranked fifth out of 47 statements by employers. Keeping in view the substantial contribution the oral skills make towards high individual success in academic life and at work, it is necessary to unravel the complex process of interpersonal communication skills in the first place, point out possible problems the medical students face, and explore ways to enhance oral communication skills to avoid possible breakdowns.

Literature Review

Worldwide, faculty members feel that English
language learners need to enhance their oral communication skills in class discussions and presentations. Speaking of the workplace success, effective communication remains a salient feature. Pedagogically speaking, the ability to engage in discussions and group work is very important for international students. Oral communication skills of Saudi EFL learners happen to be very poor, mainly because they hardly use English as a mode of communication.

According to Clampitt, humans construct meanings in a way that includes the spoken words, the context of the conversation, and the people participating therein. Oral communication in English among non-native speakers is more prone to breakdowns because English language can be a troublemaker in communication due to low English language proficiency where students can face problems related to oral communication skills. Such problems are often the result of not having learnt the pragmalinguistic resources such as vocabulary, grammar and a repertoire of phrases and their appropriate use in the professional context. Therefore, teaching and assessment of communication skills have become mandatory in medical education as it guarantees learning effective communication skills in medical schools which is considered one of the most important skills of a physician.

Previous studies have only looked at the existence of language learning problems in the context of English for General Purposes on exploratory level. According to Basturkmen, specific groups of language learners should be taught the language and communication skills they need or will need to function effectively in their disciplines of study, professions or workplaces. This research goes further by investigating oral communication barriers in specific tasks.

Lack of proficiency in all aspects of English language usage is one of the main difficulties faced by Arab students at tertiary level which acts as affective filters, preventing language learning. Likewise, medical terminology namely sub-technical language can cause communication breakdown among non-native speakers of English. Saudi learners do not possess the required proficiency in oral skills when they join universities. Similarly, Al-Asmari, Al-Ma’shy and Fallaj identified lack of attention, time allocation, negative attitude, fear of making mistakes etc. as barriers to learning English. Negative attitudes can result in students’ poor academic performance and can cause anxiety towards oral communication skills learning. It is in this context that this study aims to explore communication barriers through the following research question.

What barriers negatively affect oral communication skills development of medical students in oral literacy tasks at UQU, Saudi Arabia?

Materials and Method

We conducted interviews with eight current medical students and eight content area professors in order to gain complete understanding of what actually act as affective barriers from the point of view of the subjects. The interviewees were chosen by using purposive sampling method for ‘information-rich’ subjects, based on who would be a source of rich data and information about the topic under study.

Results and Discussion

Oral Communication Barriers and Academic Oral Literacy Tasks:

In response to the interview questions, both students and content area professors revealed some of the most common interaction-based literacy tasks such as TBL/PBL sessions, presentations and weekly learning projects, the skill of presenting being the most difficult for students. This necessitates developing effective communication at academic level as an essential part of the training for all the healthcare students.

Barriers to communication:

Oral communication barriers in the context of this study are classified into two main types: 1) Internal Barriers (IB) and External Barriers (EB). Next, the subtypes of these categories are elaborated in detail.

Internal barriers:

In the light of the data collected from interviews, internal barriers are split into sub-categories: i) Language-Based Barriers (LBB); and ii) Personality-Based Barriers (PBB).

The all the professors responded by pinpointing several areas of weakness the medical students suffer from. “The fragmentary language the students use during
the interactive sessions is indicative of the fact that they lack the necessary language skills.’ (content professor 1 and 7) Moreover, content professor 5 said, ‘Their limited English language ability is always a barrier.’ Content area professor 3 further elucidated that due to grammatical and pronunciation errors students avoid mostly speaking English, especially when the task is graded. Similar views were expressed by interviewee 6 who said, ‘as part of their culture, students happen to be not very expressive which hampers their communication ability and they hardly get the chance to develop their skills.’ Another reason given by content professors 2 and 4 also authenticates the same proposition. ‘Some students feel handicapped as their English is not strong enough.’ (content professor 4) Similarly, content professor 2 said, ‘Poor grasp of English language results in ineffective use of medical terminology. They lack vocabulary and therefore cannot express themselves.’ This finding is also confirmed by Abdulmohsen Al Hassan 30 who found the same results.

Next, findings from the study indicated the most common personality-based barriers such as communication apprehension (CA), stage fear, low level of self efficacy, shyness or lack of confidence, lack of expressiveness and performance anxiety. ‘Various communication problems are seen among students such as lack of confidence, stage fear, and fear of audience. They find it hard to keep their mind clear in time of pressure.’ (content area professor 1) Referring to the low level of self efficacy, content professor 5 explained, ‘they feel that English is a difficult and that they can never learn it.’ Five out of eight students revealed that students make faces and make fun of those who commit mistakes while speaking. This finding confirms the findings by Alamara, Rahim, & Abdullah, Alshahrani and Alandal, Al-ma’shy and Doerr 31, 32, 22, 33. Moreover, the majority of the students feel apprehensive when they have to speak English. They get frightened as all eyes are looking at them. Speaking at the rostrum is very difficult for some of them. (All interviewees) This finding is in line with the studies conducted by McCroskey and Asif 34, 35.

Findings revealed that one-fourth of the students hold negative attitudes towards oral communication. According to content professor 4 and 7, ‘Saudi students’ attitude towards English is positive especially the ones whose parents are educated, but there are some who think of it as a barrier.’ Content professor 3 expounded on the causes of having negative attitude: ‘For some it is a waste of time as they believe they won’t require English when they enter the workplace.’ This finding concurs with the findings by Al-bizrah et al., Guraya et al. and Zainol Abidin et al. 24, 26, 36.

External Barriers:

Owing to the potential damage caused by external barriers, the overview of the interview data deals with inclusively here. All the subjects showed their dissatisfaction with the learning environment at both school and tertiary levels. ‘We don’t have enough time to prepare for presentations as most of our time is consumed by the content subjects.’ (current student 2) The majority of the content professors admitted that medical students especially in their 2nd year are not used to presentations and they find them really hard as they mostly depend on the slides rather than doing them independently. Similarly, the pressure of the performance is so much that they seem lost. ‘Some of the students fail to answer the sequential questions at the end.’ (Content professor 1) Moreover, about the use of Arabic language both inside and outside the classroom, all the interviewees pinpointed that the freedom to use Arabic during lectures damages the students’ English language communicative competence. This finding is supported by a study conducted by Al-Ma’shy, Al Asmari and Abdulmohsen Al Hassan 22, 17, 30.

Educational background, curriculum-related issues, and past negative experiences were seen as major barriers. Current student interviewee 5 informed us about the pathetic situation in schools in Saudi Arabia: ‘We hardly get the chance to speak inside the classroom due to short time, and lecturing style where students just sit and listen to the teachers.’ This finding is supported by a study conducted by Al Maneoai 37 who asserted that the causes of students’ weak command on oral language were due to the insufficient contact hours. According to content professor 5 and 6, ‘MCQs types of exams don’t require them to rely on oral communication skills.’ They also pointed out the lack of training and preparation as potential barriers.

Conclusion

This is a qualitative investigation of the oral communication barriers facing Arab medical students of 2nd and 3rd year enrolled at the College of Health Sciences during interaction-based literacy tasks. The results of the study reveal that Saudi medical students face two
major oral communication barriers: internal and external barriers. The findings of the present study reveal that both internal and external barriers contribute to students’ poor performance and deficient communicative competence. From the analysis of the data it is obvious that as part of medical curriculum, success or failure of students during such tasks can be attributed to possessing or lacking efficient communication skills. In response to the research questions, the current students and content area professors revealed that most of the students find presenting as the most difficult task and students face formidable language-based and personality-based barriers during the oral tasks. The results of the study also indicate that developing communicative competence of students at tertiary level not only benefit them in academic education but sound oral competency can pay off students in their desired workplace. The findings of this study confirm that it should not be taken for granted that communication skills learning can occur on its own. This study has pedagogical implications for structuring curricular reforms by replicating the oral literacy tasks inside the classroom.

Conflict of Interest: NIL

Source of Funding: Self source

Ethical Clearance: Done research committee

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Promotion of Media Literacy for the Early Childhood’s Parents

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Abstract

Technological advances in the present era are very important to all aspects of life in society. One of the current phenomena is the use of media to early childhood. The current problem is that many of the early age children are using unsupervised media from both parents. They are pay less attention to the use of media for children and let them without supervision from others, especially parents. Whereas, in the media there are various contents that are sometimes not suitable for children’s consumption at an early age. Not a few parents who do not know or are not aware of the threat. So that there needs to be an intervention design that aims to increase parental awareness about the importance of knowledge about media literacy in children. The purpose of this paper is to make psycho-education about media literacy to support those who have a children in Early Childhood. This paper uses the literature review method that discusses the problem of media for early childhood and the role of parents in early childhood problems both through journals, books, news and videos, and equipped with interview methods. The findings of this paper are to make health promotion media for parents who have early childhood.

Keywords: Literacy, Media Literacy, Parents, Children, Early Childhood

Introduction

Technological advances in the present era are very influential on human life. Alia & Irwansyah suggest that technological advances have influenced many people’s views on things in everyday life, including the view of being a parent. In the past, parents still allowed their children to play outdoors with traditional games with other children. However, the current phenomenon of parents relies more on digital technology as a media game for children. Many parents who then compete to give access to digital technology to their children and provide digital technology directly in the hands of children 1.

Technology is now the most important aspect of child development. Rowan argues that technology makes children’s lives faster and more efficient. These technologies, namely television, internet, video games, mobile phones, iPods, iPads, and others have developed so rapidly that it makes a family almost unaware of the significant impact and lifestyle changes in their families. In this case parents must fortify children in accessing the media 2.

The American Academic of Pediatrics conducted a study of media use in children. The results of his research show that school-age children are more likely to be negatively affected than the positive impact of watching television. The results also showed that 90% of parents reported that their children who sat in elementary school like watching television, especially soap operas, 43% of all children under the age of 12 watch soap operas every day and 26% of children have TV in the bedroom. In Indonesia, there are also many school-age children who like to watch films, especially drama soap operas 3.
Children now spend more time with the media. Hendriyani, et al. suggested that children access to watching television on average 3 hours in school days and 7 hours on holidays, when playing electronic games about 4 hours and playing the internet about 2 hours without restrictions from both parents. According to data from the Indonesian Internet Service Providers Association in 2016 revealed that data on internet users at the age of children ranged from 768 thousand and on average accessed videos from Youtube⁴.

Current conditions can be found in various regions in Indonesia, when new media has reached children, both those in big cities and those far away in the countryside. Efendi, Astuti, & Rahayu conducted observations in three elementary schools in Bendosari Subdistrict, Sukoharjo Regency. Observations show that more than 70% of children aged 6–12 years have known, owned and were able to operate at least 2 new types of media ⁵.

An example of a technology use is a seven-year-old boy who was burned to death by imitating a scene on television in India. A seven-year-old girl named Prarthana died tragically because of imitating a scene on an Nandini TV series. In an episode, the main character is seen dancing in a circle of fire. Prarthana was reportedly imitating the scene ⁶. The case of a child who was killed was beaten by his friends as a result of watching the television series “Seven Human Tigers”. Has, a grade 1 elementary school student at the Islamic Foundation Zaidar Yahya, the victim of beatings by five of his friends at school, finally breathed his last breath, Tuesday (4/28/2015) night at around 22.00 WIB. Has then played with his friends. In the game, there were friends who hit brooms, hit and kicked, like action soap operas ⁷.

There are many kinds of impacts from this media. Faizal, et al., argues that the positive impact of the media is that it can shape children’s ways of speaking and behavior, formulate self-image and determine expectations ⁸. The negative impact of the media is the potential to pervert the norm and influence value degradation. Not a few sites that expose content with elements of pornography, commercial value, and violence, both tangible content of the site itself and in the form of advertising. This can have an impact on the behavior of children who will tend to emulate it, both in the form of solving problems with acts of violence, carrying out pornographic acts, and so on. Faizal, et al., stated that according to data from the Children’s Media Development Foundation (YPMA), the impact of the media is increasingly prevalent in violence, sexual aggression, physical and mental health, and the formation of instant lifestyles in children ⁹. The fact is that most children behave negatively because they mimic impressions in print and electronic media. This shows how powerful the influence of the media is on the development of the nation’s generation. The purpose of this study is the purpose of this paper is to make a psychoeducation design on media literacy for parents who have early childhood.

**Literature Review**

**Early Childhood**

Papalia and Feldman suggest that early childhood aged 2-6 years are children who are still in the preoperational stage. Preoperational stages are cognitive stages which are characterized by massive expansion in using symbolic thinking, or showing ability, when first appearing in the sensory motoric stages ⁸.

Hartati suggests the characteristics of early childhood are, children are egocentric, children have a great curiosity, children are social creatures, children are unique, children are generally rich in fantasy, children have a short concentration, and child is a potential learning period ⁹.

Suryana presents aspects of early childhood development, namely:

1. Aspects of physiological development
2. Cognitive Development Aspects
3. Development of Social Emotions ¹⁰

**Parenting**

Hurlock suggests that parenting is a way of parents in educating children, namely parents’ efforts manifested in the form of structuring the physical environment, children’s social environment, children’s education, dialogue with children, control of children’s behavior, determining moral values for children ¹¹.

Bibi, et al., stated that there are four types of parenting parents, namely:

Democratic parenting is a pattern of care that prioritizes children but parents do not hesitate in
controlling children. Parents in this parenting style are rational, always underlying their actions on their thinking.

Authoritarian parenting patterns that tend to set standards that must absolutely be obeyed, usually accompanied by threats. This form of parenting emphasizes parental supervision or control that is shown to the child to get obedience and obedience.

Permissive parenting is parenting where parents give as much freedom as possible to children to regulate themselves, children are not required to be responsible and not much control by parents.

Parenting neglect namely parenting parents of this type generally gives very little time and money to their children. When they are widely used for their personal needs, such as work, and also sometimes costs are saved for their children.

Media Literacy

The National Leadership Conference on Media Literacy (Baran, 2009) states that media literacy is the ability to access, analyze, evaluate, and communicate messages. While Rubin (in Baran, 2009) states that media literacy is an understanding of the sources and technologies of communication, the codes used, the messages produced, and the selection, interpretation, and consequences of these messages. Celot & Tornero suggest media literacy skills are individual capacities related to training certain skills (access, analysis, communication).

Baran identified four basic elements of media literacy. The elements of media literacy are:

An awareness of the consequences of the media. Writing and printing have helped change the world and the people in it. The mass media also do the same thing. If individuals reject the consequences of the media in their lives, avoiding the risks that will be obtained and carried during the change will be better than allowing the consequences to run rampant.

An understanding of the process of mass communication. If each individual knows the components of the mass communication process and how these components relate to each other, then that individual can form expectations about how these components can serve them.

Strategies for analyzing and discussing media messages. To consume media messages well, each individual needs a foundation as a basis for thinking and reflection. If an individual makes an understanding, then it must have a tool that can do it (for example, understanding the intentions and consequences of movies and videos such as camera angles and lighting, or strategies behind placing photos on a newspaper page).

An understanding of the contents of the media as a text that gives ideas into the culture and life of each individual.

Method

In its implementation there are several methods applied, namely:

1. Promotion of media literacy to parents.

2. Case studies in the Focussed Group Discussion are given in the hope that parents have initial experience in applying the knowledge gained during the seminar, in addition, by getting to know each other in the FGD forum it is hoped that parents in the future can share their thoughts and help each other in solving media literacy problems in their daily lives.

Psychoeducation Design

Dissemination of the implementation of media literacy workshops conducted in the form of distributing brochures and invitations to parents and communities of parents who have children at the age stage of early childhood development.

Implementation of media literacy workshops. This activity discusses the development of children related to media literacy, children’s mental health, and the importance of selective attitudes in determining content in the use of various media, both social media and mass media (television, newspapers, magazines, etc.). This promotion is provided with the aim that parents can screen appropriate content to consume according to their age, especially for their children. So that they are prepared to face the curiosity of the great child correctly.

Implementation of case studies in FGDs between parents. With the opening of a discussion forum and case studies in a group of parents, it is expected that they will be able to share their thoughts and help each other in solving media literacy problems in their daily lives.
Presentation of FGD results and case studies. The presentation of the results of the discussion and case study aims to share knowledge and the results of discussions between groups. In this presentation, there will also be many issues that occur in the world of media literacy, especially for children.

Evaluation of activities contains a reflection of all activities that have been carried out.

**Conclusion**

The conclusion of this study is that technology users have now touched children from an early age. There are various effects of the use of technology for early childhood. Of course as a parent must control the use of technology in children. Parents must get debriefing related to media literacy. The advice of this study is to implement the design of media literacy promotion for parents who have early childhood.

**Ethical Clearance** – Taken from faculty of Psychology, Airlangga University

**Source of Funding** - Self

**Conflict of Interest** - The author states that there is no conflict of interest with the parties involved in this research

**Reference**

Evaluation of the School Administrative Stressors’ Psychometrics Properties among Malaysian School Administrators

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Abstract

As school leaders, school administrators experience stress while leading their schools. At present, there are only two instruments developed that examine the school administrators’ stress while little attention is given to Malaysian’s schooling context. Thus, this study was conducted to examine the reliability and validity of the stressors that caused stress to the school administrators in Malaysian schools. Items were inspected on its’ reliability, validity and homogeneity. Through the conducted analyses, findings indicate that the items had a good consistency and reliability in measuring the school’s administrator’s stressor within Malaysian context of schooling.

Key words: school administrators, stressors, psychometric properties, Malaysia.

Introduction

Empirically, school administrators experienced stress which can be described as occupational stress in determining the smooth operation of their schools¹. In understanding the stress factors among the schools’ administrators, previous studies revealed several causes: high demands from stakeholders ², lack of power in decision making and the existence of organisational politics ³, isolation ⁴, escalating demands and workloads ⁵, and even equivocal understanding towards changes within the educational legislation and policy⁶. In studying the experience of stress within school administration profession, researchers ⁷; ⁸ believed that the experience of stress is an extremely serious issue which is capable of affecting school administrators’ health, well-being and even their performance which leads to weakness in their decision making capabilities⁹. According to Nhundu (1999)¹⁰ the occupational stress experienced by school administrators have affected their behaviours such as anxiety, angriness, fatigue even absentee from work, annoyance, or uneasiness ¹ and burnout ¹¹.

In measuring the school administrators’ experience of stress, Gmelch and Swent (1982)¹² have introduced the standard instrumentation or index called the Administrative Stress Index Questionnaire (ASIQ). The 30 items questionnaire was employed within various educational administration settings such as Australian schools ⁸ and Canadian schools ⁶. Within the 30 items, four factors of stress were identified: role-based stress (administrators’ perceptions and belief about their tasks), task-based stress (routine activities such as meetings, preparing reports), boundary spanning stress (negotiations and gaining public support) and lastly conflict mediating stress (resolving differences and conflicts, handling issues and problems). In addition, the ASIQ instrument was also tested within different administrative professions such as the higher education deans ¹³ and the administrators of the nursing faculty ¹⁴. Later, in 2007, Philips, Sen and McNamee (2007)¹⁵ developed an instrument with 14 items while studying the prevalence and causes of stress among United Kingdom’s head teachers.

Even though both instruments are relevant instrumentation in measuring school administrators from various educational system, there are several constraints in terms of the methodology within Malaysian school administrators’ context such as language barriers, educational structure and context and finally the element
of culture which are typically different from the US and UK schools. Admittedly, there is currently lack of published literature regarding the psychometrics that measure the occupational stress experienced by school administrators in Malaysian schools regardless whether it is from the primary or secondary settings.

Research aims

This study is purposely conducted to examine the reliability and validity of the school administrators' occupational stress in Malaysian schools. Specifically, we examined the internal consistency, validity and homogeneity of Malaysian school administrators' occupational stress.

Method

Participants

Respondents for this study were 195 school administrators from 45 schools who provided their feedbacks on their stressors. In terms of the school administrators’ genders, 105 (48.6 %) were males and 90 (41.7 %) were females school administrators. During the surveys’ distribution, 125 school administrators have the experience as school administrators between 1 to 5 years (57.9 %), 40 administrators between 6 to 10 years (18.5 %) and 30 school administrators have experienced more than 11 years (13.9 %). In this study, the school administrators were operationalised as school’s senior assistants and principals.

Instrumentation

For the quantitative data collection, a survey instrument that comprised of two main sections was used in this study. In section A, school administrators were asked to provide their reflections on the demographics factors such as their gender and years of experiences as school leaders. In section B, school administrators were asked to select the lists of managerial and leadership aspects that might be the source of their stress. Twelve translated items in section B, which were adopted from Phillips, Sen and McNamee (2007) [15] who studied the prevalence and causes of stress among head teachers throughout the United Kingdom’s schools. The section also requested the school administrators to select and indicate their stressors on a five-point Likert scale, anchored as highly stress = 4, moderately stress= 3, slight stress = 2, and no stress = 1. All items were shown and presented in a positive response and presented in the questionnaire using the Malay language which the school administrators considered as familiar.

Procedure and data analysis

Prior to data collection, permission in distributing the questionnaires was obtained from the State Department of Education. All fulltime school administrators were provided with the questionnaires. At the time of distribution, all school administrators were informed on the purpose of the study and their anonymity was guaranteed.

After all data were obtained, the reliability and their homogeneity were later analysed. In determining the reliability, the Cronbach’s Alpha coefficients values were used with suggested values of more than 0.70 was decided as an accepted value. As for determining the homogeneity of the items, the correlational matrix was employed and inter-items correlation values that ranged 0.20 to 0.70 were deemed good reliability [16,17].

The next phase was the factor analyses which comprised of the Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA). As for the EFA analysis, the items’ factor loadings, the extraction method, the number of factors to be extracted, and percent of variance will be inspected to ensure the underlying structure of the questionnaire. Items which have factor loading values below than 0.30 will be discarded as suggested by Hair et al (2012) [18]. Specifically, the Principal Component Analysis (PCA) procedure was selected as the extraction method. Factor solution was rotated using the Varimax rotation procedure. As continuation, the confirmatory factor analysis was performed using the AMOS software and maximum-likelihood estimation procedures, and considering the covariance matric as the input of the analysis. In determining the good evaluation on the measurement model, the fit statistics were also calculated. In this case, the Comparative Fit Index (CFI), the roots mean square error of approximation (RMSEA) which recommended by Hu and Bentler (1999) [19]. At the same time, the Chi-squared statistic to the degrees of freedom (χ²/df) was also calculated to ensure the acceptable fit for the measurement model.

Results

Reliability analysis

First, the Cronbach’s alphas values for the all 12 items were analysed and inspected based on respond
provided by Malaysian school administrators. Based on the descriptive analysis, the Cronbach’s alphas values were detected more than 0.70 values. The overall Cronbach’s alpha for 12 items measured at 0.843 and all 12 items have the Cronbach’s alphas values ranging 0.81 to 0.86. Specifically, the reliability analysis were based on reported 12 items: managing changes in schools (α = 86), inspectorate visit to school (α = 83), understanding curriculum changes (α = 82), improving teachers’ competencies (α = 82), ensuring students’ academic achievements (α = 81), solving teachers’ issues and conflicts (α = 82), solving students’ disciplinary issues (α = 82), lack of parental supports (α = 84), managing financial in schools (α = 83), leading instructional practices (α = 83), SDE/DOE visit to school (α = 83), and finally completing SDE/DOE tasks (α = 82).

Secondly, the inter-correlational matrix showed the homogeneity of the items which most correlational values were ranged between 0.20 to 0.60 values. The overall Cronbach’s alpha for 12 items measured at 0.843 and all 12 items have the Cronbach’s alphas values ranging 0.81 to 0.86. Specifically, the reliability analysis were based on reported 12 items: managing changes in schools (α = 86), inspectorate visit to school (α = 83), understanding curriculum changes (α = 82), improving teachers’ competencies (α = 82), ensuring students’ academic achievements (α = 81), solving teachers’ issues and conflicts (α = 82), solving students’ disciplinary issues (α = 82), lack of parental supports (α = 84), managing financial in schools (α = 83), leading instructional practices (α = 83), SDE/DOE visit to school (α = 83), and finally completing SDE/DOE tasks (α = 82).

Exploratory Factor Analysis (EFA)

In determining the factor structure of the administrator stressor items, the EFA analysis was executed. Before commencing with the EFA analysis, the Kaiser-Meyer-Olkin’s and Bartlett’s values were inspected to determine the reliable adequacy of the size of the sample. Based on the EFA analysis, the KMO values for sampling adequacy were measured at 0.864. The Bartlett’s test indicated significant values ($\text{Approx } \chi^2 = 897.165; df = 66; p < .0000$).

Table 1. Factor loadings from EFA and on the administrative stressors

<table>
<thead>
<tr>
<th>Administrative stressors</th>
<th>Factor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Items</td>
<td>1</td>
</tr>
<tr>
<td>(α = .81)</td>
<td></td>
</tr>
<tr>
<td>12 Completing SDE/DOE tasks</td>
<td></td>
</tr>
<tr>
<td>11 SDE/DOE visit</td>
<td></td>
</tr>
<tr>
<td>9 School financial</td>
<td></td>
</tr>
<tr>
<td>8 Lack of support from parents</td>
<td></td>
</tr>
<tr>
<td>7 Students disciplinary issues</td>
<td></td>
</tr>
<tr>
<td>10 Monitoring instructional practices</td>
<td></td>
</tr>
<tr>
<td>(α = .82)</td>
<td></td>
</tr>
<tr>
<td>4 Improving teachers’ competencies</td>
<td></td>
</tr>
<tr>
<td>5 Improving students’ academics</td>
<td></td>
</tr>
<tr>
<td>2 Inspectorate visit</td>
<td></td>
</tr>
<tr>
<td>3 Understanding curriculum changes in schools</td>
<td></td>
</tr>
<tr>
<td>6 Solving teachers problems, issues and conflicts</td>
<td></td>
</tr>
<tr>
<td>1 Managing changes in schools</td>
<td></td>
</tr>
</tbody>
</table>

Note: Factor loadings that shown are more than 0.5.

Through the Principal Component Analysis (PCA) using the Varimax rotation, two factors were identified. The first factor comprised of six items (item12, item11, item10, item8, item7, and item9) which can be classified as school administrators’ stressors to solve problems (SSSP) which being their stressors. The second group of items which also contained six items (item4, item5, item6, item1, item2 and item3) basically represented the school administrators’ stressors to improve the school performance (SSSP). Based on the percentage of variance, all 12 items contributed to 55.508 per cent of variance which considered as accepted values with factor 1 contributed 39.256 % and factor 2 contributed 16.252 percent.
**Confirmatory Factor Analysis (CFA)**

In this study, the CFA models were evaluated through the fit statistics on fitting the data. To compare, three models were evaluated through three phases of modification indices procedure in obtaining the suitable model that fit the data.

**Table 2 Fit statistics for the school administrators’ stressors**

<table>
<thead>
<tr>
<th>Model</th>
<th>$\chi^2$</th>
<th>df</th>
<th>$\chi^2$/df</th>
<th>NFI</th>
<th>GFI</th>
<th>CFI</th>
<th>RMSEA</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>137.865</td>
<td>53</td>
<td>2.601</td>
<td>.850</td>
<td>.895</td>
<td>.901</td>
<td>.091</td>
</tr>
<tr>
<td>II</td>
<td>88.642</td>
<td>49</td>
<td>1.809</td>
<td>.904</td>
<td>.930</td>
<td>.954</td>
<td>.065</td>
</tr>
<tr>
<td>III</td>
<td>74.945</td>
<td>47</td>
<td>1.595</td>
<td>.919</td>
<td>.940</td>
<td>.967</td>
<td>.055</td>
</tr>
<tr>
<td>IV</td>
<td>58.794</td>
<td>45</td>
<td>1.307</td>
<td>.936</td>
<td>.953</td>
<td>.984</td>
<td>.040</td>
</tr>
</tbody>
</table>

Based on Table 2, the first model (Model 1) that was evaluated and the model did not provide an acceptable fit to the data ($\chi^2$ (195) = 137.865; CFI = .895; RMSEA = .091) due to the RMSEA value which is higher than 0.050. Through the modification indices procedure, Model 2 and 3 was created. In model 2 and 3, even though the fit statistics able to provide an acceptable values which can fit to the data ($\chi^2$ (195) = 88.642; CFI = .954; RMSEA = .065), it did not provide an acceptable fit to the data ($\chi^2$ (195) = 74.945; CFI = .940; RMSEA = .055) based on the RMSEA value which is also higher than 0.50. Finally, the fourth model (Model IV) able to provide an acceptable and satisfactory fit to the data ($\chi^2$ (195) = 58.794 CFI = .984; RMSEA = .040) based on the RMSEA value which much lower than 0.50. The relationship between SSSP and SISP was $r = 0.56$ and all factor loadings exceeded the values 0.40 which shown in Figure 1 below the measurement model of school administrators’ stressors.

---

**Fig. 1. The CFA model (SSSP: Stress Solving School Problems; SISP: Stress in School Performance)**
**Discussion and Conclusion**

This study was an attempt to measure the psychometrics properties of school administrators’ stressors items which was adopted from Philips, Sen and McNamee (2007)’s [15] items and later improved for Malaysian school administrators’ stressors study. In obtaining the psychometrics properties on the stressors, the items were distributed to 195 school administrators in obtaining their self-perceptions and feedbacks on the stressors or causes of stress while leading their schools.

Statistically, all 12 items were evaluated through three rigorous tools in determining its’ reliability and validity through the Cronbach’s alpha values, the Exploratory Factor Analysis (EFA) and the Confirmatory Factor Analysis (CFA) in evaluating the internal consistencies of the items within the questionnaire. Through the Cronbach’s alphas analysis, data indicated on high reliability on the items studied which was more than 0.70. Further, items were analysed through the EFA analysis which two remaining purpose: clustering the items, extracted factors and percentage of variance that contributed to the items’ constructs. From the analysis, two factors were extracted which represented the clustering of stressors among the school administrators in Malaysian schooling context. The final phase of the analysis involved the development of the measurement model through the CFA analysis. Based on the CFA model, revised model IV that went through a few processes on model modifications have been chosen as the suitable revised model that represented the school administrators’ stressors with high and satisfactory values on fit statistics.

Admittedly, this study also has its’ limitation. Firstly, this study relatively used small sample size of 195 school administrators from Malaysian schools which can be replicate with much bigger sample size. Secondly, it is appropriate to use only one sample category in assessing this item due to the different preferences of stressors that contributed to their stress level. For instance, a study should only use all principals from primary or secondary schools. To consider, items on the school administrators’ stressors could be adopted and useful in examining the reliability and construct validity from other administrative positions such as the university and college’s dean, the head of departments and other relevance posts. As for future consideration, administrator’s gender and educational background should be considered in examining the stressors while leading or administrating their schools. In addition, future qualitative research through interviews with all school administrators could be used as sources for triangulation purpose.

**Funding:** This research is supported by a grant from the FRGS by the Ministry of Higher Education and Universiti Teknologi Malaysia (FRGS/2/2014/SS109/UTM/027).

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

**Ethical Clearance:** Done by Research Committee

**References**


Sustainable Impact of Iskandar Malaysia Ecolife Challenge (IMELC) on the Low Carbon Awareness and Practice among Students

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Abstract

Iskandar Malaysia Ecolife Challenge (IMELC) started in 2013 among Year 6 students (12 years old) to foster low carbon awareness and practice. In order to trace the sustainability of the low carbon awareness and practice, a survey was carried out in 2016 to determine if the students maintain the awareness and practice. A number of 4,439 secondary students from Form 1 until Form 4 participated in the survey. The questionnaire constructed has an acceptable level of reliability of 0.686 using Cronbach’s alpha analysis. Descriptive and inferential statistics were used to determine the differences between IMELC and NO IMELC group. The analysis shows that students who have undergone IMELC obtained higher mean scores in terms of the awareness and practice but lower in knowledge. Further analysis using t-test shows that the differences are significant. The discussion suggested that, the strength of IMELC is in changing the behavioral characteristic and have not yet capable for behavioral change.

Keywords: Environmental education, low carbon society, informal learning

Introduction

Environment sustainability is an ongoing effort to ensure that every human has the skills and attitudes about their action and the natural world. In Malaysia, EE is brought into the education in 1991¹ as a component across the curriculum. The interdisciplinary elements seen in EE however have its potential to be underrepresented as sustainable goal due to teachers’ lack of awareness regarding environmental issues². Thus, this explained why green movement can only be seen in non-formal education setting like co-curriculum activities or school clubs³. In this paper, it focuses on non-formal environmental education program known as IMELC and examine on how it become an empowerment to learning about environmental issues.

Literature Review

Low Carbon Society (LCS) is an initiative among many countries to reduce GHG emission without compromising economic and social development⁴. Most countries like Australia⁵, China⁶, Japan⁷, United Kingdom⁸ and Belgium⁹ initiated their study by focusing on changing the behavior of community practices and building the low carbon society. The initiative was driven with an intention to achieve low carbon society⁷, limit the rise of temperature⁹, sustainable urbanization⁶ and sustainable development⁸ through behavior and environmental understanding. Therefore the trends in EE are known for their mutual themes which are aimed to change individual understanding and behavior¹⁰.

The Iskandar Eco-Life Challenge Project (IMELC) is designed to allow students to participate with eco-
household accounting\textsuperscript{11}. The targeted audience, students of 6th grade are exposed with the idea of energy saving, the practices of energy saving and what is mean by energy saving. IMELC is listed as one of the significant educational program in Low Carbon Society Blueprint for Iskandar Malaysia 2025 under Action 6, Measure 6.1\textsuperscript{12}. The execution of IMELC in primary school is done through non-formal education setting where the activities are conducted as part of co-curriculum activities. The IMELC program is targeting energy consumption within home and students are given the chances to adopt the basic auditing. Following these activities, the level of awareness is expected to increase and eventually lead to behavioral change.

**Data Collection Method**

This study employed an explanatory research design by using a survey as a research method. The survey was intended to trace the sustainability of the low carbon awareness and practice. A number of 4,439 secondary students from Form 1 until Form 4 at secondary school in Johor participated in the survey. These students are identified as IMELC while for the rest of the students they are being analysed as NO IMELC. The participants had previously engaged with IMELC since 2013 when they were in primary school Year 6. Table 1 below provide an overview about students’ demography.

**Table 1: Demography of respondents**

<table>
<thead>
<tr>
<th>Form</th>
<th>Frequency IMELC</th>
<th>Frequency NO IMELC</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1,106</td>
<td>670</td>
</tr>
<tr>
<td>2</td>
<td>1,258</td>
<td>965</td>
</tr>
<tr>
<td>3</td>
<td>693</td>
<td>511</td>
</tr>
<tr>
<td>4</td>
<td>1,311</td>
<td>1,084</td>
</tr>
</tbody>
</table>

*Cases might not total up as there are missing persons*

From the analysis, the first two constructs were measured using a 3-point scale (1 - not agree, 2 - neutral, 3 - agree) while the knowledge construct used objective questions with multiple choice answers (refer Table 2).

The survey was developed to measure three constructs which are awareness, practices and knowledge of low carbon. The instrument was constructed with 64 items and tested for its reliability using Cronbach’s alpha analysis, which is 0.686. The reliability indicates that the instrument is good enough to measure the constructs because the value exceeds 0.6\textsuperscript{13}. There are 23 items used to measure awareness, 23 items for practices and 18 items that represent knowledge constructs. The scale construction is done using Rasch analysis during pilot study.

**Table 2: Examples of questions of the instrument**

<table>
<thead>
<tr>
<th>Constructs</th>
<th>Example of questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Awareness</td>
<td>3R activities (reduce, reuse, recycle) is beneficial to protect the environment.</td>
</tr>
<tr>
<td>Practice</td>
<td>I always switch off the lamp before I went to sleep.</td>
</tr>
<tr>
<td>Knowledge</td>
<td>From below, which one is not TRUE? Plastic can be recycled for many times. Glasses</td>
</tr>
<tr>
<td></td>
<td>that were sent for recycling can be turn into a glass container. A paper which is</td>
</tr>
<tr>
<td></td>
<td>contaminated by food waste is not possible to be recycled. A blue recycling bin is</td>
</tr>
<tr>
<td></td>
<td>used to recycle papers.</td>
</tr>
</tbody>
</table>

**Data Analysis**

The following data was analysed using SPSS 14.0. The comparison between these groups was made with an intention to understand the impact of IMELC on the students as social agency after they reached secondary school. How well these students are able to function as social agent after they had participated in IMELC program and how they might differ if compared to the NO IMELC group. Table 3 provides an illustration about the mean analysis for each construct for the two groups. The analysis showed that, generally students who participated in IMELC achieved higher means for awareness (2.0770) and practice (2.2329). Oppositely, for knowledge construct, the NO IMELC group showed slightly higher mean which is 0.2954 compared to IMELC group that obtain 0.2914. Although the differences of means between the groups are relatively small, yet the differences of means are worth to be further investigated using inferential statistic.
Table 3: Means and standard deviations of the students’ awareness, practice and knowledge

<table>
<thead>
<tr>
<th>Group</th>
<th>Awareness</th>
<th>Practice</th>
<th>Knowledge</th>
</tr>
</thead>
<tbody>
<tr>
<td>IMELC</td>
<td>Mean</td>
<td>2.0770</td>
<td>2.2329</td>
</tr>
<tr>
<td></td>
<td>Standard Deviation</td>
<td>0.16784</td>
<td>0.27612</td>
</tr>
<tr>
<td>NO IMELC</td>
<td>Mean</td>
<td>2.0648</td>
<td>2.2082</td>
</tr>
<tr>
<td></td>
<td>Standard Deviation</td>
<td>0.17414</td>
<td>0.28045</td>
</tr>
</tbody>
</table>

An independent sampled t-test was conducted and showed significant differences for both groups. From Table 4, the analysis indicates that the differences are significant with the p value .000 (p < 0.05). This measure also confirmed that for the knowledge construct, IMELC program does not provide many differences between the groups. This is explained by the higher mean obtained by the NO IMELC group in comparison to the IMELC group. Clearly IMELC has successfully sustained the change to cultivate awareness and practice among the participants. While these might represent the significance of IMELC, the knowledge construct however is identified as the barrier to this claim because the NO IMELC group has a higher mean value.

Table 4: Independent sampled t-test analysis result

<table>
<thead>
<tr>
<th>Group</th>
<th>Construct</th>
<th>t</th>
<th>df</th>
<th>Sig. (2-Tailed)</th>
</tr>
</thead>
<tbody>
<tr>
<td>IMELC</td>
<td>Awareness</td>
<td>347.605</td>
<td>788</td>
<td>0.000</td>
</tr>
<tr>
<td></td>
<td>Practice</td>
<td>226.864</td>
<td>786</td>
<td>0.000</td>
</tr>
<tr>
<td></td>
<td>Knowledge</td>
<td>70.508</td>
<td>789</td>
<td>0.000</td>
</tr>
<tr>
<td>NO IMELC</td>
<td>Awareness</td>
<td>680.832</td>
<td>3296</td>
<td>0.000</td>
</tr>
<tr>
<td></td>
<td>Practice</td>
<td>451.757</td>
<td>3291</td>
<td>0.000</td>
</tr>
<tr>
<td></td>
<td>Knowledge</td>
<td>141.835</td>
<td>3322</td>
<td>0.000</td>
</tr>
</tbody>
</table>

Following this, a correlation analysis was carried out to seek clarification of the relationships between the constructs. Referring to Table 5, Pearson correlation analysis was conducted and the result point out that all constructs have a significant positive relationship with p < 0.05.

Table 5: Pearson Correlation analysis result

<table>
<thead>
<tr>
<th>Group</th>
<th>Construct</th>
<th>Awareness</th>
<th>Practice</th>
<th>Knowledge</th>
</tr>
</thead>
<tbody>
<tr>
<td>IMELC</td>
<td>Awareness</td>
<td>1</td>
<td>0.267**</td>
<td>0.099**</td>
</tr>
<tr>
<td></td>
<td>Practice</td>
<td>0.267**</td>
<td>1</td>
<td>0.108**</td>
</tr>
<tr>
<td></td>
<td>Knowledge</td>
<td>0.099**</td>
<td>0.108**</td>
<td>1</td>
</tr>
<tr>
<td>NO IMELC</td>
<td>Awareness</td>
<td>1</td>
<td>0.270**</td>
<td>0.080’</td>
</tr>
<tr>
<td></td>
<td>Practice</td>
<td>0.270**</td>
<td>1</td>
<td>0.105**</td>
</tr>
<tr>
<td></td>
<td>Knowledge</td>
<td>0.080’</td>
<td>0.105**</td>
<td>1</td>
</tr>
</tbody>
</table>

**significant at p < 0.05

As seen, both IMELC and NO IMELC groups showed a significant relationship between the constructs. For this
measure, this study found that the value of relationship is weak because it falls within the range of 0.20 until 0.39 and below. Referring back to this study argument to explain the extent of IMELC impact to change students’ habitual practice, it showed a significant improvement according to different mean scores. However, the correlation between awareness and practice is higher compared to their relationships with knowledge. This shows that awareness and practice of low carbon may have very little link with knowledge. In other words, knowledge may not be the indicator of good practice and awareness on low carbon. Social transformation as aimed by IMELC is able to change students’ habitual practice.

**Discussion**

This paper is based on the analysis of means, t-test and correlation to determine the impact of IMELC program towards low carbon awareness, practice and knowledge among the participants. Activities in IMELC includes completing a workbook, carry out recycling, electricity and water saving projects at school and at home. IMELC provides an opportunity for the students to explore, discuss, and reflect their own practices and values toward the environment with a community wide focus. One of the particular concern about IMELC as EE program is to examine the extent to which this program can be claimed as instrumental for the behavioral change. This is following Tidbal and Krasny position that EE program which does not has focus on behavioral changes will eventually achieved only behavioral responses from the participant. However, this analysis was done without analysing the contribution made by the formal education which students received in school to differentiate between IMELC and NO IMELC groups. This is why the discussion is focused more weather the IMELC is instrumental for behavioral changes for students’ habitual practice as they entered secondary school.

In this study, the practice and awareness are identified as the variables that are potential to promote behavioral change among the participants through IMELC program due to slightly higher mean score. But, the analysis implies that both groups have significant mean differences. The findings suggest that it is difficult to claim that IMELC program is able to promote behavioral change as the NO IMELC group has significant result as well. But, what can be concluded is the IMELC program through the environmental activities is capable to affect behavioral responses. Following DiClemente and Prochaska, it can be said that IMELC only achieve either contemplation or preparation stage for behavioral change. This study however unable to claim toward what extent IMELC might cause behavioral changes. At contemplation stage, the students are aware of the problem and probably taking into consideration for an action. While at preparation stage, students are assumed to have an intention for behavioral change. Which this might explains on why there is only small mean difference between both groups. The IMELC is targeting at helping the students to become rationally competence to change their negative behavior when they are presented with the facts using the workbook. Students’ responses about their practice are directed to accepted norm practice known as habit at home rather than behavioral choice. This suggests that, by treating students as reacting to the environment, IMELC program is only beneficial to change the behavior with a routine character and the changes is only reach towards either contemplation or preparation stages. This showed that IMELC is gravitating with the outcome from theoretical framework of Moloney et al as it only capable with changing the social character.

This claim has also considered on why knowledge constructs has the highest mean yet showed a very weak correlation with the practice and awareness. The knowledge construct has the weakest relationship between the variable. The similar trend between the groups suggests a probability that the student’ awareness and practice are not driven by their knowledge about the environment. The implication from the analysis claimed that even with the right information that students acquire from IMELC, this however only lead to responsible behavior and not towards the behavioral changes. Thus the rational choice that students made are influenced by their awareness and practices gained from formal or non-formal EE. This is supported by the correlation analysis that showed a very weak correlation between knowledge and other constructs.

The implication of this finding suggests that the practice and awareness are achieved through moral persuasion and unlikely from their knowledge about environment. This is similar to the study of Wong and Phang where the level of knowledge among the primary students is relatively low compared to attitude and practice. With this limitation with the outcome
from IMELC, knowledge construct is essential to be comprehensively integrated to the development of strategies of IMELC. The knowledge can be regard as the gap which hindering the behavioral changes as intended by IMELC. More work is needed to study the causal relationship and impact of IMELC towards the students as they progress to secondary schools especially qualitative research to explore how the students gain awareness and practice of low carbon through IMELC.

**Conclusion**

Treating an EE program not as a cultural tool has constrained IMELC from becoming the tool that can guarantee behavioral changes in learning through discourse consciousness. The acknowledgement of the relevance to change the practical consciousness is a step forward that IMELC has greatly offered in their educational practice. IMELC is capable to seek for change in students’ practical consciousness like habit formation and routine through their awareness. This study concludes that a non-formal setting adopted through IMELC clearly is helpful to increase students’ awareness and practice in low carbon. When considered collectively about the theoretical perspective underline IMELC, the structure of IMELC require an improvement that can lead to the behavioral changes.

**Funding:** The authors would like to thank Universiti Teknologi Malaysia (UTM) for supporting this project through UTMSHINE Flagship Grant vot no. Q.J130000.2431.03G77 & TDR Grant vot no. Q.J130000.3553.07G37, to JICA R.J130000.7331.4B311 and the Ministry of Higher Education Malaysia through Knowledge Transfer Grant vot no. R.J130000.7831.4L518.

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

**Ethical Clearance:** Done by Research Committee

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Development and Validation of Behavioural and Health Sciences Research Instrument

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Abstract

Instruments development and validation are critical to research endeavour in social, behavioural and health sciences. This study provides a systematic review of published researches on instrument development, evaluate the current practice and limitations in the process. To achieve this objective published research works were search and selected in February, 2019 from four academic databases: PsycINFO, Scopus, Web of Science and Google scholar, with the search terms as ‘instrument development and validation’, ‘item development’ and ‘construction of questionnaire’ there was no restrictions at initial stage. At the end of the selection process, 25 published works between 2010 to 2019 were evaluated. The analysis of the reviewed studies was done based on the stated objective current practice and identified limitations. The results showed that, the item generation, theoretical analysis or item review and psychometric analysis were the common basic steps adopted by scholars when developing research instrument. With regards to the limitations in the process, the study identified three main limitations; sample characteristic related limitation, Methodological and psychometric limitations. In view of these findings, as significant number of the reviewed studies were reported to have methodological and sample related weaknesses. Thus, this systematic review can serve as an important reference point for scholars to ensure adequate attention are paid to the methodological elements when developing and validating research instruments adequate for making valid inferences to inform policy making and implementations.

Keywords: Instruments development, validation, psychometric analysis

Introduction

Instruments are an indication of latent construct; they assess attitudes, behaviours and theoretical circumstances we hope to exist because of our theoretical conception of the world, however can’t appraise directly¹. Instruments are ordinarily used to capture a feeling, behaviour, or an act that cannot be caught in a self-contained variable or item. The utilization of different items to gauge a fundamental latent variable can furthermore represent, and confine, item explicit estimation error, which prompts progressively precise study outcomes. A number of instruments or scales have been constructed that can assess a range of social, psychological and behavioural practice.

Instrument development is not, in any case, a conspicuous or a straight forward. There are numerous means to instrument development, there is vast terminology within these methods, the work can be costly and tedious, and statistical analysis frequently needed is sometimes complex. Further, numerous behaviour science degrees do ignore preparing students on scale development. In spite of the accessibility of a lot of specified literature on the instrument development, there are various fragmented instrument used to assess physical, mental and behavioural attitudes that are central research²,³.

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Measurement scales comprises of collections of item uncovering dimensions of hypothetical factors that cannot be directly observed. Several researchers have confirmed that, instrument development includes complex as well as systematic procedures that need hypothetical, operational and methodological rigor.

**Objective of the Study**

The objectives of this review are to review the: (i) current practices of the instrument development and (ii) main limitations in the instrument development.

**Instrument Development**

Instrument or scale development consists of different process usually complex because of the procedures and interrelationships between various latent constructs. The complex steps have been summarised into three main stages; Item generation, theoretical analysis and Psychometric analysis.

**Item Generation:** in this stage, the scholars give hypothetical support to the preliminary item pool. Strategies for the initial item generation can be considered as inductive, deductive or a mixture of the two. Deductive strategies include item generation base on a broad literature survey and previous scales. Then again, inductive strategies base item development on subjective information in regards to a construct acquired from opinions gathered from the target audience or population e.g., centre interviews, focus group discussions, exploratory research methods.

**Theoretical Analysis:** here, the investigator examines the content related validity of the new instrument, to make sure that the underlying item fool reflect an ideal intended construct to be measured. The content related validity assessment is required, since interpretations made depended on the items in the instrument. To guarantee the content validity, the researcher can employ experts or judges or target population to ensure that, the theory expounded in the investigation appropriately represent the construct under consideration.

**Psychometric Analysis:** in this stage, the instrument developer ought to appraise if the new instrument is reliable and have construct related validity. The construct validity is directly associated with the behaviour an instrument is actually measuring. This denotes to the extent to which decision can be justifiably made from the observed scores to the hypothetical constructs about which these observations are expected to contain data. The construct related validity can be measure using confirmatory factor analysis (CFA) Exploratory factor analysis (EFA) or with discriminant, criterion and convergent validity. Thusly, the score consistency is measure using reliability which is normally estimated by using any of the test-retest internal consistency, item-total correlation and split-half methods.

**Methodology**

To achieve the objective of this systematic review, the researchers search, identified and selected research-based article on instrument development from four popular databases i.e PsycINFO, Web of Science, Scopus and Google Scholar. During the search no restrictions were placed in the search of the published articles, the search was done in February 22, 2019 using search terms as “Instrument development”, Instrument Validation”, “Scale Development” and Developing Questionnaire”. During the initial stage, there were no limitations on searching relevant studies, all research papers, concept papers, conference and other technical or government reports. Hence, the search found a total of 577 papers which stated about instrument development. In the second phase the numbers of articles were reduced to 104 articles that were empirical studies on instrument development and validation, lastly 25 articles that satisfied the inclusion criteria of articles developing newly instruments excluding those for achievement test were included in the study. The selected articles were limited to those published from 2010 to 2019. The analysis was done in line with the objective of this review. The summary of selection steps is presented on a methodological flowchart represented in figure 1.
Results and Discussions

This study reviewed 25 articles selected after rigorous selection process, all the articles 100% were evaluated. The authors reviewed the selected articles in line with the study’s objectives.

Objective 1: Current practices of the instrument development

In addressing this objective, the findings were considered on the three main stages identified in the literature on instrument development in the preceding section. The results of the analysis as presented in Table 1, showed that;

In line with item generation, 50% (n = 8) of the studies revealed that, deductive technique exclusively in item generation, 13% (n = 2) revealed that, inductive technique was applied in item generation. However, 38% (n = 6) use a combination of inductive and deductive strategies in item writing. This finding means that, although a number of studies applied deductive methods exclusively, the majority such as used a combination of the inductive and deductive strategies. This mixture is in line with the recommended methods for developing new measuring instrument (1), the results obtained here disagree with the findings of similar systematic reviews that, many studies reported used deductive technique exclusively in the development and validation of instruments (17).

In line with theoretical analysis, majority of the studies 12(75%) used experts’ opinions in modifying their developed items. However, the rest of the 4(25%) resorted to using the target population to refine their items. This finding revealed that, panel of experts or judges are the most widely used in analysing the content validity of the instrument i.e (18)(16)(19)(20). Previous studies revealed that, experts’ opinion were the most prevailing qualitative techniques for reviewing the poor item in the instruments (17)(9). A survey of literature carried out stressed the significance of the judges or experts in the content validation of the initial items in the newly developed instrument (21).

In line with psychometric analysis, the results indicated that, only 1 (6%) of the studies used each of EFA, CFA and DV in assessing their construct validity. Two (12%) of the studies are reported to have used convergent validity. Most studies opted to combine EFA and CFA (30%, n = 3). Similarly, 6 (38%) of the studies...
reported shows that, they used both CFA and EFA in validating the constructs of their research. The review also led to the discovery among the studies that, 5 (31%) did not used any of the factor analysis or any statistical techniques to validate their studies. The studies reported internal consistency reliability with the test-retest as the second most employed technique in establishing instrument reliability. The results indicated that, 70% of the articles used one kind of factor analysis or the other, some of the studies that, used factor analyses such as CFA and EFA includes(12)(20).

Table 1: Common practice in instrument development

<table>
<thead>
<tr>
<th>SN</th>
<th>Study</th>
<th>Item Generation</th>
<th>Theoretical Analysis</th>
<th>Psychometric</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Shroff, Ting &amp; Lam, 2019</td>
<td>Deductive &amp; Inductive</td>
<td>Experts Opinion</td>
<td>EFA &amp; CFA</td>
</tr>
<tr>
<td>2</td>
<td>Kreijns &amp; Van-der Heijden 2016</td>
<td>Deductive</td>
<td>Experts Opinion</td>
<td>EFA &amp; CFA</td>
</tr>
<tr>
<td>3</td>
<td>Selamat, et al. 2018</td>
<td>Deductive</td>
<td>Experts Opinion</td>
<td>-</td>
</tr>
<tr>
<td>4</td>
<td>Kim et al. 2011</td>
<td>Deductive</td>
<td>Experts Opinion</td>
<td>EFA</td>
</tr>
<tr>
<td>5</td>
<td>Uzunboylu &amp; Ozdamli 2011</td>
<td>Deductive &amp; Inductive</td>
<td>Population</td>
<td>-</td>
</tr>
<tr>
<td>6</td>
<td>Nagy et al., 2014</td>
<td>Deductive</td>
<td>Experts Opinion</td>
<td>CFA</td>
</tr>
<tr>
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<td>Experts Opinion</td>
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<td>Morris, et. al 2017</td>
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**Objective 2: Main limitations in the instrument development**

The findings in this review led to identification of several shortcomings which can be classified into three main categories mostly associated with instrument development. The limitations are (a) Sample Characteristics noticed in about 75% of the articles; (b) Methodology related limitations, 60% and (iii) psychometric limitations, 45% (see Table 2).
Table 2: Limitations in instrument development

<table>
<thead>
<tr>
<th>SN</th>
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<th>Psychometrics</th>
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<tr>
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<td>17</td>
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<td>20</td>
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</table>

The sample characteristics limitations were recorded in two main ways or directions. First, is the issue related to the type of sample used in developing the instrument, the sample used in many studies is homogeneous in nature(22)(7)(23)(24)(19). Others used convenient sampling(25)(26). (18) maintained that, “the participants for all stages of the study were US consumers; therefore, this study cannot be generalized to other cultural contexts.” Or certainly, “convenience samples are weaknesses of this study, as they pose generalizability questions,” as stressed by(27).

Cross-sectional survey methods were the main methodological limitation as reported in most of the studies(19)(18)(7). Data gathered using cross-sectional design carries distinctive limitation attached to this type of research approach, which is failure to identify the determine the underlying correlation. Researchers such as(16)(18) acknowledged that, utilizing a research instrument at some point in time hinders the ability to evaluate the underlying relationship. Another methodological problem reported in some studies is the use of web-based surveys(28).

The major psychometric limitation was lack of rigorous demonstration of the construct validity and the reliability in most of the studies(22)(12) termed the lack of evident temporal stability such as test-retest reliability. Inaccurate psychometric techniques that most of the studies used during instrument development were likely to affect the results or outcome.
Conclusion and Recommendations

This study examined different studies that proposed instrument development processes and practice, identified and reported its main shortcoming. There are two principle limitations of this study. first relates to the limited number of studies used. It may be of interest to know that, review many articles may bring about different and much more improved findings. Secondly, the researchers reviewed higher quality articles and we consider that, had the less quality articles were reviewed several shortcomings may have been revealed. Furthermore, the facts might confirm that researchers attained all stages of instrument development but there was incomplete report by the researcher. The researchers are however, not in the position to control these limitations. Similar studies should also be conducted with a relatively large number of articles to reveal a number of issues that affect the validity of research instruments.

Conflict of Interest: Nil

Funding: Self-Source

Ethical Clearance: Obtained through Research Committee

References

State Estimation of a Stochastic Model for the Spread of HIV in a Mobile Heterosexual Population

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Abstract

This paper investigates the state estimation of a stochastic model for the spread of HIV in mobile heterosexual population. The transmission of HIV model with the force of infection in the multiple patches is investigated for the varying population. In this paper, we introduce a novel concept of the observer model like a transmission of HIV model to estimate the spread of HIV in mobile heterosexual population. The boundedness and the equilibrium points have been found for the error state of observer model and original model. The global stability properties are analyzed by the concept of Lyapunav function. The stochastic model is introduced for the examination of the stochastic stability of the positive equilibrium. The stochastic and deterministic models of the system are compared and analyzed. Finally numerical examples and corresponding diagrams are presented to support the results.

Keywords: HIV/AIDS, Mobility, Multiple patches, Synchronization, Epidemiology, Equilibrium points, Stochastic Stability, Lyapunov function.

Introduction

AIDS (Acquired Immune Deficiency Syndrome) is one of the diseases caused by Human Immuno Deficiency Virus transmitted through heterosexual and homosexual population. The first cases of AIDS were reported in 1981, and two years later the HIV was identified as the virus that causes AIDS¹. Nowadays all over the world, the number of HIV infected people and the AIDS death rate has been raised rapidly and the ratio of infected population level shows is found high between all developing countries². Mathematical models can help to predict the effectiveness of control measures on the spread of HIV and other sexually transmitted diseases³–⁵. The dynamics of transmission of HIV is quite complex and there is no other human infection which has the same epidemiological characteristics with a similar mode of transmission. The growth of migration among populations further increases the contact between individuals in different patches and consequently it might trigger more epidemics⁶–¹⁰. Heterosexual contact is the major mode of transmission of HIV between susceptible(males and females) and infected (males and females).

If the nonlinearity of the system is known, linear active control techniques can be easily designed according to the given conditions of the biological system to achieve control and synchronization globally. There are no derivatives in the controller or the Lyapunov exponents are not required for their execution and these characteristics gives an edge to the control techniques on other conventional control approaches. Various forms of HIV/AIDS have attracted the attention of mathematicians for the last two decades. It is now significant to synchronize the HIV/AIDS chaotic system for further research purposes in order to reduce the causes of mortality due to HIV in the future²¹.

Motivated by the above, the main goal of this paper is to employee the stabilization of HIV models and extend the work in randomness, boundedness and find the equilibrium points of the error state of dynamics in transmission of HIV/AIDS related epidemics on
theoretical ground. Based on the Lyapunov stability theory, the local and global stability properties of error state of the dynamical system of HIV transmission are analyzed and discussed. We consider the problem of the robustness of the model with respect to white noise stochastic perturbation around its positive endemic equilibrium. Numerical simulations and graphs will be furnished to show the efficiency and the performance of the proposed approach.

This paper is organized as follows. In section 2, the system description are discussed. In section 3, we discuss about the boundedness of solution and dynamical behaviour of boundary as well as interior equilibrium points of the deterministic model. In section 4, we introduce the stochastic model. In section 5, we analyze about its stability properties by means of Lyapunov function. In section 6, Numerical simulation and discussion. Finally in section 7, conclusion are discussed and results presented.

System Description

Let $x_1^{(r)}, x_2^{(r)}, y_1^{(r)}$ and $y_2^{(r)}$ denotes the number of the susceptible females, infected females, susceptible males and infected males in patch ‘r’ at time ‘t’ respectively, relative to a scaling parameter $V = \frac{2B}{\mu}$ for the varying population. The evolution of susceptible (Males and Females) and infective(Males and Females) among ‘r’ and ‘j’ patches for the varying population which is different population sizes among the patches. The dynamics of the spread of HIV in a mobile heterosexual population is

$$
\begin{align*}
\frac{dx_1^{(r)}}{dt} &= \frac{\mu}{2} - \sum_{j=1}^{r} \beta_{rj} \frac{y_2^{(j)}}{n_M} x_1^{(r)} - \mu x_1^{(r)} \\
\frac{dx_2^{(r)}}{dt} &= \sum_{j=1}^{r} \beta_{rj} \frac{y_2^{(j)}}{n_M} x_1^{(r)} - (\mu + \gamma) x_2^{(r)} \\
\frac{dy_1^{(r)}}{dt} &= \frac{\mu}{2} - \sum_{j=1}^{r} \beta_{rj} \frac{x_2^{(j)}}{n_F} y_1^{(r)} - \mu y_1^{(r)} \\
\frac{dy_2^{(r)}}{dt} &= \sum_{j=1}^{r} \beta_{rj} \frac{x_2^{(j)}}{n_F} y_1^{(r)} - (\mu + \gamma) y_2^{(r)}
\end{align*}
$$

where $n_F^{(r)} = x_1^{(r)} + x_2^{(r)}$, $n_M^{(r)} = y_1^{(r)} + y_2^{(r)}$ and $\beta_{rj}$ denotes the infection rate of susceptible(males and females) in patch ‘r’ by infected individuals from patch ‘j’. The force of infection in each patch ‘r’ is described by the term $\sum_{j=1}^{k} \beta_{rj} \frac{y_2^{(j)}}{n_M}$ for susceptible females and $\sum_{j=1}^{k} \beta_{rj} \frac{x_2^{(j)}}{n_F}$ for susceptible males. The natural death and death due to AIDS diseases are at the rate of $\mu$ and $\delta$ and the infected individuals develop AIDS at the rate of $\gamma$.

Figure 1: Flow Diagram for the spread of HIV in a mobile heterosexual population
Figure 1 depicts the flow diagram for the spread of HIV in a mobile heterosexual population.

The observer for the dynamics of spread of HIV in a mobile heterosexual population is

\[ \frac{dx_1(r)}{dt} = \frac{\mu}{2} - \sum_{j=1}^{r} \beta r_j \frac{y_2(j)}{n_M} x_1(r) - \mu x_1(r) \]

\[ \frac{dx_2(r)}{dt} = \sum_{j=1}^{r} \beta r_j \frac{y_2(j)}{n_M} x_1(r) - (\mu + \gamma) x_2(r) \]

\[ \frac{dy_1(r)}{dt} = \frac{\mu}{2} - \sum_{j=1}^{r} \beta r_j \frac{y_2(j)}{n_M} y_1(r) - \mu y_1(r) \]

\[ \frac{dy_2(r)}{dt} = \sum_{j=1}^{r} \beta r_j \frac{y_2(j)}{n_F} y_1(r) - (\mu + \gamma) y_2(r) \]

\[ (2) \]

The Estimation of state error dynamics can be obtained by

\[ e(t) = \hat{x}(t) - x(t); e_1 = \hat{x}_1(r) - x_1(r); e_2 = \hat{x}_2(r) - x_2(r) \]

\[ e_3 = \hat{y}_1(r) - y_1(r); e_4 = \hat{y}_2(r) - y_2(r); e_4^{(j)} = \hat{y}_2^{(j)} - y_2^{(j)} \]

\[ e_5^{(j)} = \hat{x}_2^{(j)} - x_2^{(j)}; e(t) = \hat{x}(t) - x(t); \hat{e}_1 = \hat{x}_1(r) - \hat{x}(r) \]

\[ \hat{e}_2 = \hat{x}_2(r) - \hat{x}_2(r); \hat{e}_3 = \hat{y}_1^{(r)} - y_1^{(r)}; \hat{e}_4 = \hat{y}_2^{(r)} - \hat{y}_2^{(r)} \]

which gives,

\[ \begin{align*}
\dot{e}_1 &= -\sum_{j=1}^{k} \beta r_j \frac{y_2(j)}{n_M} [y_2^{(j)} e_1 + x_1^{(r)} e_4^{(j)}] - \mu e_1 \\
\dot{e}_2 &= \sum_{j=1}^{k} \beta r_j \frac{y_2(j)}{n_M} [y_2^{(j)} e_1 + x_1^{(r)} e_4^{(j)}] - (\mu + \gamma) e_2 \\
\dot{e}_3 &= -\sum_{j=1}^{k} \beta r_j \frac{y_2(j)}{n_M} [y_2^{(j)} e_1 + x_1^{(r)} e_4^{(j)}] - \mu e_3 \\
\dot{e}_4 &= \sum_{j=1}^{k} \beta r_j \frac{y_2(j)}{n_F} [x_2^{(j)} e_3 + y_1^{(r)} e_5^{(j)}] - (\mu + \gamma) e_4 \\
\end{align*} \]

\[ (3) \]

**Boundedness, boundary equilibria and stability**

**Equilibrium Points:-**

The Error state model equation (3) has the following non-negative equilibria namely

\[ E_1 = (0,0,0,0); E_2 = (0, \sum_{j=1}^{k} \beta r_j \frac{y_2(j)}{n_M} e_1^{(j)}, 0,0); E_3 = (0,0,0, \sum_{j=1}^{k} \beta r_j \frac{y_2(j)}{n_F} e_3^{(j)} + y_1^{(r)} e_5^{(j)}) \]

The \( E_1 \) is free equilibrium point. In \( E_2 \), except infected female remaining states are free equilibrium state, it is called infected female equilibrium point. In \( E_3 \), except infected male remaining states are free equilibrium state, it is called infected male equilibrium point. The in-host state equilibrium points are
Global Stability Analysis

Theorem

If

\[ (e_1 - e_1^*) = \sum_{j=1}^{k} \frac{\beta_{rj}}{n_M^{(j)}} \left( \frac{\tilde{y}_2^{(j)} e_1 + x_1^{(r)} e_4^{(j)}}{e_1} \right) + \mu; (e_2 - e_2^*) \]

\[ = (\mu + \gamma) - \sum_{j=1}^{k} \frac{\beta_{rj}}{n_M^{(j)}} \left( \frac{\tilde{y}_2^{(j)} e_1 + x_1^{(r)} e_4^{(j)}}{e_2} \right) \]

\[ (e_3 - e_3^*) = \sum_{j=1}^{k} \frac{\beta_{rj}}{n_F^{(j)}} \left( \frac{\tilde{y}_1^{(r)} e_3 + x_2^{(j)} e_3^{(j)}}{e_3} \right) + \mu; (e_4 - e_4^*) \]

\[ = (\mu + \gamma) - \sum_{j=1}^{k} \frac{\beta_{rj}}{n_F^{(j)}} \left( \frac{\tilde{y}_2^{(j)} e_3 + e_5^{(j)} y_1^{(r)}}{e_4} \right) \]

then the in-host equilibrium point \( E^* \) is globally asymptotically stable.

Proof:

Consider the Lyapunov function

\[ V = \sum_{i=1}^{4} \delta_i (e_i - e_i^*)^2 \log \left( \frac{e_i^*}{e_i} \right) \]

\[ \dot{V} = \delta_1 (e_1 - e_1^*) \left[ - \sum_{j=1}^{k} \frac{\beta_{rj}}{n_M^{(j)}} \left( \frac{\tilde{y}_2^{(j)} e_1 + x_1^{(r)} e_4^{(j)}}{e_1} \right) \right] - \mu \]

\[ + \delta_2 (e_2 - e_2^*) \left[ \sum_{j=1}^{k} \frac{\beta_{rj}}{n_M^{(j)}} \left( \frac{\tilde{y}_2^{(j)} e_1 + x_1^{(r)} e_4^{(j)}}{e_2} \right) \right] - (\mu + \gamma) \]

\[ + \delta_3 (e_3 - e_3^*) \left[ - \sum_{j=1}^{k} \frac{\beta_{rj}}{n_F^{(j)}} \left( \frac{\tilde{y}_1^{(r)} e_3 + x_2^{(j)} e_3^{(j)}}{e_3} \right) \right] - \mu \]

\[ + \delta_4 (e_4 - e_4^*) \left[ \sum_{j=1}^{k} \frac{\beta_{rj}}{n_F^{(j)}} \left( \frac{\tilde{y}_2^{(j)} e_3 + e_5^{(j)} y_1^{(r)}}{e_4} \right) \right] - (\mu + \gamma) \]

\[ \dot{V} = - \delta_1 (e_1 - e_1^*)^2 - \delta_2 (e_2 - e_2^*)^2 - \delta_3 (e_3 - e_3^*)^2 - \delta_4 (e_4 - e_4^*)^2 \]

which is negative definite function. Hence \( E^* \) is globally asymptotically stable by Lasalle’s invariance principle.

Stochastic Differential Equations

In this section, we allow stochastic perturbations of the variables \( e_1, e_2, e_3, e_4 \) around their values at the positive equilibriums \( E^* \) in the case when it is locally asymptotically stable. We consider the white noise stochastic perturbations which are proportional to the distance of \( e_1, e_2, e_3, e_4 \) from \( e_1^*, e_2^*, e_3^*, e_4^* \). So the stochastically perturbed system is given by
\[ \begin{align*}
de_1 &= -\left[ \sum_{j=1}^{k} \frac{\beta_{ij}}{n_{ij}^m} \phi_{ij}^{(j)} e_1 + x_1^{(r)} e_4^{(j)} \right] dt + \sigma_1 (e_1 - e_1^*) d\omega_t^1 \\
de_2 &= \left[ \sum_{j=1}^{k} \frac{\beta_{ij}}{n_{ij}^m} \phi_{ij}^{(j)} e_1 + x_1^{(r)} e_4^{(j)} \right] dt + \sigma_2 (e_2 - e_2^*) d\omega_t^2 \\
de_3 &= -\left[ \sum_{j=1}^{k} \frac{\beta_{ij}}{n_{ij}^m} \phi_{ij}^{(j)} e_3 + x_2^{(r)} e_3^{(j)} \right] dt + \sigma_3 (e_3 - e_3^*) d\omega_t^3 \\
de_4 &= \left[ \sum_{j=1}^{k} \frac{\beta_{ij}}{n_{ij}^m} (\hat{x}_2^{(j)} e_3 + y_1^{(r)} e_5^{(j)}) \right] dt + \sigma_4 (e_4 - e_4^*) d\omega_t^4 \\
\end{align*} \]

where \( \sigma_i, i = 1, 2, 3, 4 \) are real constants, \( \omega_i = \omega_i(t), i = 1, 2, 3, 4 \) are independent standard Wiener processes.

The stochastic differential equation (4) can be centered at its positive equilibrium \( E^* \) by change the variables,
\[ u_1 = e_1 - e_1^*; u_2 = e_2 - e_2^*; u_3 = e_3 - e_3^*; u_4 = e_4 - e_4^* \]

To analyze the stochastic stability of \( E^* \), we consider the linear system (5) of around \( E^* \) as follows:
\[ du(t) = f(u(t))dt + g(u(t))d\omega_t \]

where,

\[ u(t) = [u_1(t) \quad u_2(t) \quad u_3(t) \quad u_4(t)]^T \]

\[ f(u(t)) = \begin{bmatrix}
-\sum_{j=1}^{k} \frac{\beta_{ij}}{n_{ij}^m} \phi_{ij}^{(j)} + \mu & 0 & 0 & 0 \\
0 & -(\mu + \gamma) & 0 & 0 \\
0 & 0 & -\sum_{j=1}^{k} \frac{\beta_{ij}}{n_{ij}^m} \phi_{ij}^{(j)} + \mu & 0 \\
0 & 0 & 0 & -(\mu + \gamma)
\end{bmatrix} \]

\[ g(u(t)) = \begin{bmatrix}
\sigma_1 u_1 & 0 & 0 & 0 \\
0 & \sigma_2 u_2 & 0 & 0 \\
0 & 0 & \sigma_3 u_3 & 0 \\
0 & 0 & 0 & \sigma_4 u_4
\end{bmatrix} \]

In (5) the positive interior equilibrium \( E^* \) corresponds to the trival solution \( u(t) = 0 \).

Let \( U \) be the set \( U = (t \geq t_0) \times \mathbb{R}^n, t_0 \in \mathbb{R}^+ \). Hence \( V \in C^2_0(U) \) is a twice continuously differentiable function with respect to \( u \) and a continuous functions with respect to \( t \). With reference to [20], we have

\[ LV(t,u) = \frac{\partial V(t,u)}{\partial t} + f^T(u) \frac{\partial V(t,u)}{\partial u} \frac{1}{2} Trace[g^T(u) \frac{\partial^2 V(t,u)}{\partial u^2} g(u)] \]

where
\[ LV(t, u) = \frac{\partial V(t, u)}{\partial t} + f^T(u) \frac{\partial V(t, u)}{\partial u} \frac{1}{2} \text{Trace}[g^T(u) \frac{\partial^2 V(t, u)}{\partial u^2} g(u)] \] (6)

where

\[ \frac{\partial V}{\partial u} = \text{Col}\left( \frac{\partial V}{\partial u_1}, \frac{\partial V}{\partial u_2}, \frac{\partial V}{\partial u_3} \right); \]

\[ \frac{\partial^2 V(t, u)}{\partial u_2} = \left( \frac{\partial^2 V}{\partial u_j \partial u_i} \right), i, j = 1, 2, 3, 4 \]

**Theorem:** If there exists a function \( V(u, t) \in C^2(U) \) then it satisfying the following inequalities,

\[ K_1 |u|^p \leq V(t, u) \leq K_2 |u|^p, LV(t, u) \leq -K_3 |u|^p, K_1 > 0, p > 0. \] (7)

then the trival solution of (5) is exponentially p-stable for \( t \geq 0 \) and the trival solution of (5) is globally asymptotically stable when \( p = 2 \).

**Theorem:** Suppose that \( \sigma_i^2 < 2(\sum_{j=1}^{k} \frac{\beta_{rj}(j)}{\sigma_i^2}) \), \( \sigma_2^2 < 2(\mu + \gamma) \), \( \sigma_3^2 < 2(\sum_{j=1}^{k} \frac{\beta_{rj}(j)}{\sigma_i^2}) \) and \( \sigma_4^2 < 2(\mu + \gamma) \) then the free state solution of (5) is asymptotically mean square stable.

**Proof:**

Let us consider the Lyapunov function,

\[ V(u) = \frac{1}{2} \left[ w_1 u_1^2 + w_2 u_2^2 + w_3 u_3^2 + w_4 u_4^2 \right] \]

where \( w_i, i = 1, 2, 3, 4 \) are real positive constants to be chosen in the following. It is easy to check that inequalities (7) hold true with \( p = 2 \)

Now the Itô Process becomes,

\[ V(u) = w_1 \left[ -\left( \sum_{j=1}^{k} \frac{\beta_{rj}(j)}{n_p} y_2^{(j)} + \mu \right) u_1 \right] + w_2 \left[ -\left( \sum_{j=1}^{k} \frac{\beta_{rj}(j)}{n_p} x_2^{(j)} + \mu \right) u_2 \right] + \frac{1}{2} \text{Trace}[g^T(u) \frac{\partial^2 V(t, u)}{\partial u^2} g(u)] \]

\[ V(u) = -w_1 \left[ (\sum_{j=1}^{k} \frac{\beta_{rj}(j)}{n_p} y_2^{(j)} + \mu) u_1 \right] - w_2 \left[ (\sum_{j=1}^{k} \frac{\beta_{rj}(j)}{n_p} x_2^{(j)} + \mu) u_2 \right] + \frac{1}{2} w_1 \sigma_1^2 u_1^2 + \frac{1}{2} w_2 \sigma_2^2 u_2^2 + \frac{1}{2} w_3 \sigma_3^2 u_3^2 + \frac{1}{2} w_4 \sigma_4^2 u_4^2 \]

\[ V(u) = -w_1 \left[ (\sum_{j=1}^{k} \frac{\beta_{rj}(j)}{n_p} y_2^{(j)} - \frac{1}{2} \sigma_1^2) u_1^2 \right] - w_2 \left[ (\sum_{j=1}^{k} \frac{\beta_{rj}(j)}{n_p} x_2^{(j)} - \frac{1}{2} \sigma_2^2) u_2^2 \right] + \frac{1}{2} \text{Trace}[g^T(u) \frac{\partial^2 V(t, u)}{\partial u^2} g(u)] \]

which is asymptotically mean square stable.

**Numerical Simulation and Discussion**

In this paper “State estimation of a stochastic model for the spread of HIV in a mobile heterosexual population” is analyzed, where the total population is divided in to two groups, susceptible and infected. It is observed that the boundary equilibrium point E* is feasible. If the decreasing rate of susceptible females, males and infected females, males population remains a certain threshold value then the positive equilibrium is feasible. Moreover all the solutions are converges to the equilibrium point. It is observed that, if \( \sigma_1^2 < 2(\sum_{j=1}^{k} \frac{\beta_{rj}(j)}{n_p} y_2^{(j)}) \), \( \sigma_2^2 < 2(\mu + \gamma) \), \( \sigma_3^2 < 2(\sum_{j=1}^{k} \frac{\beta_{rj}(j)}{n_p} x_2^{(j)}) \), \( \sigma_4^2 < 2(\mu + \gamma) \) then the positive equilibrium is feasible.
\( \sigma_3^2 < 2(\sum_{j=1}^k \beta r_{ij} x_2^{(j)}) \) and \( \sigma_2^2 < 2(\mu + \gamma) \) then the stochastic perturbation model is asymptotically mean square stable. It is observed that the deterministic model is robust with respect to stochastic perturbation.

For the numerical simulation, the fourth order Runge kutta method is used to solve the system of transmission of HIV in a mobile heterosexual population differential equation. The parameter values are taken as \( \mu = 0.1 \), \( \gamma = 0.12 \) and \( r = 10 \) patches. The population in varying population and the initial densities are taken as susceptible females is 5877, infected females is 4515, susceptible males is 6357 and infected males is 2306. From this analysis, it is observed that for varying total population the “State estimation of a stochastic model for the spread of HIV in a mobile heterosexual population” is stabilized.

Figure (2)–(4) depict the estimation of susceptible females in spread of HIV mobile heterosexual population. When time span increasing, the observer \( \hat{x}_2 \) estimate the state \( (x_2) \) with different initial populations. Its means, the estimation error becomes zero. With the selection of random numbers, the number of observers and susceptible females were taken as 1624 and 9844, respectively.

Figure (5) and (6) depict the estimation of infected females in spread of HIV mobile heterosexual population. When time span increasing, the observer \( \hat{y}_2 \) estimate the state \( (y_2) \) with different initial population. With the selection of random numbers, the number of observers and infected females were taken as 6482 and 4515, respectively.

Figure (7) and (8) depict the estimation of susceptible males in spread of HIV mobile heterosexual population. When time span increasing, the observer \( \hat{x}_1 \) estimate the state \( (x_1) \) with different initial populations. With the selection of random numbers, the number of observers and susceptible males were taken as 3487 and 7665, respectively.

Figure (9) and (10) depict the estimation of infected males in spread of HIV mobile heterosexual population. When time span increasing, the observer \( \hat{y}_1 \) estimate the state \( (y_1) \) with different initial populations. With the selection of random numbers, the number of observers and infected males were taken as 8267 and 2306, respectively.

Table 1: Absolute values of the Error System

| t  | 5, 10, 15, 20 | 14 | 6 | 21 | 16 | 12 | 11 | 28 | 15 | 13 | 9 | 18 | 22 | 12 | 8 | 24 | 22 | 5 | 9 | 19 | 12 |
Numerical simulation has been carried out with observer values more than the corresponding initial values for the original system. Thus the following observer values have been taken: susceptible females-7896, infected females-6752, susceptible males-8765 and infected males-5623. The corresponding absolute values of the error system provided by equation (3) have been calculated with a multiplication factor of 1000 for the disturbance to the system = 0.1, 0.2, 0.3, 0.4 and 0.5 for \( t = 5, 10, 15 \) and 20, as presented in Table (1). Considering the sum of squares of errors for a given \( \theta \) and different values of \( t \), it is observed that the error is the least for \( \theta = 0.5 \). Maintaining the same initial values of the original system and slightly increasing each one of the observer values, the error is found to be the least for \( \theta = 0.4 \). From this result, it follows that the error system attains convergence for some value of \( \theta \in [0.4, 0.5] \). Thus our analysis provides a method of simulation to examine convergence of the error system.

Figure 2: Estimation of susceptible females in spread of HIV mobile heterosexual population

Figure 3: Observation for susceptible females in spread of HIV mobile heterosexual population
Figure 4: Estimation of susceptible females in spread of HIV mobile heterosexual population

Figure 5: Observation for infected females in spread of HIV mobile heterosexual population
Figure 6: Estimation infected females in spread of HIV mobile heterosexual population

Conclusion

In this Paper “State estimation of a stochastic model for the spread of HIV in a mobile heterosexual population” model is investigated. The boundedness and the equilibrium of the state estimation model has been found and identified. The in-host state equilibrium point of the state estimation model is global asymptotically stable by the constructing suitable Lyapunov function. The stochastic perturbations is also introduced to the system by using stochastic differential equations and It process. It is shown that the zero solution of this stochastic system is asymptotically mean square stable through the construction of the Lyapunov function. Finally, Numerical examples are analyzed and diagrams are presented which supports the results.

Conflict of Interest: Nil

Source of Funding: Self

Ethical Clearance: IJRISE Journal Reviewer Committee

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Effect of Electronic Cigarette Usage on Oral Health: 
A 6-Month Prospective Study

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Abstract

A growing trend towards a new type of alternative device where cigarette smokers use electronic cigarette (e-cigarette) to receive nicotine is a concern to global health. Questions have been raised about the safety of the prolonged used of e-cigarette as it claims as the system to substitute nicotine from tobacco. However, to date there has been little documented evidence regarding the oral health effects of e-cigarette users. The objective of this study was to evaluate the oral health status of e-cigarette users based on time effect. This observational, cohort study conducted at Kulliyyah of Dentistry, International Islamic University Malaysia, involved 45 participants. Oral health examination was conducted by a single trained examiner at baseline and 6-month according to the World Health Organization (WHO) criteria. Dental caries was evaluated using the DMFT index, while the periodontal parameters that were assessed used plaque, gingivitis, gingival bleeding, and calculus indices. The results were compared using Paired t-test, the outcomes of which were significant for Gingival Index (p=0.048), Calculus Index (p=0.034), and DMFT Index (p=0.002). In conclusion, e-cigarette posed a detrimental effect on oral health status with increased caries prevalence and poorer gingival health.

Keywords: Oral Health, E-cigarette, Caries, Periodontal Health

Introduction

Oral health is a part of healthy living as oral health is more essential than we recognize. Oral health is like a gate to our health status as it provides clues as to one’s overall health. Correspondingly, around the globe, smoking has been distinguished as a significant hazard factor for lung tumour, heart illnesses, fringle vascular sicknesses and respiratory ailments¹. Furthermore, smoking has various all encompassing consequences related to oral depression, for example, periodontal diseases, impaired wound healing, dental caries, precancerous lesion and is linked to oral carcinoma². In 2015 there are approximately 22.8%(4,991,458) smokers in the Malaysian population, age 15 and above³. Along with this growth of cigarette smokers that pertain to global health, there is an increasing concern about the impact of e-cigarette trends on society. Recently, there has been a growing trend that is a new type of alternative device where cigarette smokers use electronic cigarette (e-cigarette) to receive nicotine⁴. This has gained in popularity when it was introduced in the market⁵. The current, prevalent e-cigarette users among Malaysian adults are aged 18 and above, which is an estimated number of 602,122 users - 3.2% of the population⁶. Questions have been raised about the safety on the prolonged used of e-cigarette as there are no product standards that control the levels of dosage, contaminants, toxins or carcinogens in the liquid used in e-cigarette or the aerosols they produced⁷. E-cigarette are claims as the system to substitute nicotine from tobacco⁸. To date there has been little documented evidence regarding the oral health effects on e-cigarette used. A short observational study that has been conducted in 2011 has reported repercussions such as mouth irritation, sore throat, dry mouth, and mouth ulcers after 4 weeks of usage. The high levels of nicotine dosages suggest that these products may increase the risk of experiencing periodontal damage⁹. A cross-sectional, comparative study with non-smokers group conducted in 2017 reported that e-cigarette users...
exhibited poorer periodontal markers. However since oral disease is dynamic, the study lacks of explanation on the effect of e-cigarette usage over time. Although extensive research has been carried out on the effects of cigarette smoking on oral health, the study of e-cigarette on oral health are unclear and scattered. Hence, this study aimed to investigate the detrimental effects of cigarette usage on oral health in 6-month period.

Materials and Method

Sample size

This study was approved by IIUM Research Ethical Committee (IREC 556) and was conducted in accordance with Declaration of Helsinki 1964 and its later amendments. With reference, the sample size calculation was done using the OpenEpi software (version 3.01). Data from previous studies indicated that the occurrence of the outcome was 31% among the exposed groups. Based on this assumption, along with a Type 1 error of 95% and type 2 error of 80%, a sample size of 34 was required. However, after allocating for a 10% dropout rate, 38 participants were needed.

The dental examination was conducted at the Kulliyyah of Dentistry Specialist Clinic. During the visit, each participant was given a participant information sheet. Participation in this study were voluntarily and they can quit the study at any point of time. After being informed about the aims and nature of the study, participants will sign a consent form prior to starting the clinical dental examination.

Dental Examination

Dental examination was performed by a single, trained examiner using dental mirrors, dental explorers, periodontal probes, and light from the dental chair. All data were recorded in clinical forms. For intra examiner reliability, reliability was conducted prior to starting the research project. A coherence Kappa value of at least 0.6 indicated good reliability. The result was shown Cohen Kappa value of 0.86.

Dental Caries

The caries experience of the participants were assessed using the DMFT Index. The diagnosis of caries was made by visual and clinical examination with no radiographic assistance.

Periodontal Parameters

The periodontal health of the participants was measured using the Plaque Index, Gingival Index, Gingival Bleeding Index, and Calculus Index according to protocol by Loe.

Statistical Analysis

All data was analyzed using the Statistical Package for Social Sciences (SPSS) software (version 23.0) (SPSS Inc, Chicago, Ill., USA). The differences in the caries statuses and periodontal health between the e-cigarette users were compared using Paired Sample T-Test according to a normal data distribution. The level of statistical significance was set at 0.05.

Results

A total of 45 participants were included. The mean age for the e-cigarette users was 22.92 years. At 95.6% males were the predominant gender in the use of e-cigarettes. Besides this all the participants were Malays (100%); no other race was recruited into the study. As for the level of education, the majority of participants had secondary education (60.0%). Pertaining to monthly income, 80% of the e-cigarette users earned less than RM4999. Moreover, a majority of the participants were single (82.8%), employed (64.4%) and had been vaping for 1-5 years (100%). The summary of the demographic data is presented in Table 1.

A paired t-test was conducted to evaluate the oral health status of e-cigarette users at baseline and a 6-month follow-up as presented in Table 2. There was a statistically significant difference in Gingival Index ($p=0.048$), Calculus Index ($p=0.034$) and DMFT Index ($p=0.002$). The mean of Plaque Index is lower at baseline ($M=23.20$, $SD=20.71$) compared to the 6-month follow up ($M=23.82$, $SD=19.46$). Meanwhile, for Bleeding Index, the mean is higher in baseline ($M=25.35$, $SD=18.05$) compared to the 6-month follow up ($M=22.79$, $SD=16.78$) respectively. There were no significant differences in the other periodontal health parameters, as the $p$ values of the Plaque Index and Bleeding Index were 0.855 and 0.355 respectively.
Table 1: Summary of demographic characteristics of e-cigarette users.

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>n (%)</th>
<th>n=45</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean age (M ± SD)</td>
<td>22.92±2.91</td>
<td></td>
</tr>
<tr>
<td>18-20</td>
<td>10 (22.2)</td>
<td></td>
</tr>
<tr>
<td>20-29</td>
<td>32 (71.1)</td>
<td></td>
</tr>
<tr>
<td>30-39</td>
<td>3 (6.7)</td>
<td></td>
</tr>
<tr>
<td>40-49</td>
<td>0 (0.0)</td>
<td></td>
</tr>
<tr>
<td>50-59</td>
<td>0 (0.0)</td>
<td></td>
</tr>
<tr>
<td><strong>Gender</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>43 (95.6)</td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>2 (4.4)</td>
<td></td>
</tr>
<tr>
<td><strong>Race</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Malay</td>
<td>45 (100)</td>
<td></td>
</tr>
<tr>
<td>Indian</td>
<td>0 (0)</td>
<td></td>
</tr>
<tr>
<td>Chinese</td>
<td>0 (0)</td>
<td></td>
</tr>
<tr>
<td><strong>Education</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Primary</td>
<td>0 (0)</td>
<td></td>
</tr>
<tr>
<td>Secondary</td>
<td>27 (60.0)</td>
<td></td>
</tr>
<tr>
<td>Tertiary</td>
<td>18 (40.0)</td>
<td></td>
</tr>
<tr>
<td><strong>Income</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Below RM4999</td>
<td>36 (80.0)</td>
<td></td>
</tr>
<tr>
<td>RM2000-RM5000</td>
<td>9 (20.0)</td>
<td></td>
</tr>
<tr>
<td><strong>Marital status</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single</td>
<td>37 (82.8)</td>
<td></td>
</tr>
<tr>
<td>Married</td>
<td>8 (17.8)</td>
<td></td>
</tr>
<tr>
<td>Divorced</td>
<td>0 (0.0)</td>
<td></td>
</tr>
<tr>
<td><strong>Occupation</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Employed</td>
<td>29 (64.4)</td>
<td></td>
</tr>
<tr>
<td>Unemployed</td>
<td>16 (35.6)</td>
<td></td>
</tr>
<tr>
<td><strong>Period of vaping</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1-5 years</td>
<td>45 (100.0)</td>
<td></td>
</tr>
<tr>
<td>6-10 years</td>
<td>0 (0.0)</td>
<td></td>
</tr>
<tr>
<td>11-20 years</td>
<td>0 (0.0)</td>
<td></td>
</tr>
<tr>
<td>21-25 years</td>
<td>0 (0.0)</td>
<td></td>
</tr>
</tbody>
</table>
The present study evaluated and compared the oral health of the e-cigarette users. The ages of our participants were mostly young adults from age 20 to 29 years old, where the means was 22.92 years. These findings further supported the idea that the most e-cigarette users among those in age of 18 to 24 years

In this study, periodic follow-up was done on baseline and six-month follow-up to see the detrimental effect of e-cigarette use towards oral health. It was advisable to have a dental check-up at least once a year. Another key point on the frequency of dental check-up, study shows two dental cleanings a year gave huge advantages to individuals with at least one of the three hazard factors, while individuals with a few of the hazard components may require more than two cleanings per year. Since the effects of e-cigarette use on oral health are unknown, 6-month intervals of follow-ups can provide information on oral health status.

The connection amongst smoking and periodontal attachment loss has often been reported in epidemiological studies but not for e-cigarette usage. In cigarette, the gingival appearance in chronic smokers is known to be disease-masking as the gingiva bleeds less and appears hardened as compared to that of non-smokers. The vasoconstrictive properties of cigarette smoke reduce gingival inflammation. These findings further imply that those who use tobacco are at an increased risk of periodontitis, regardless of the type of tobacco. Furthermore, there is clear evidence by Adamopoulos, Van De Borne, & Argacha that vasoconstriction, which is promoted by nicotine, can cause peripheral vasoconstriction which lead to reduced blood supply. In this study, the significant findings in Gingival Index imply that while the e-cigarette does not contain tobacco, it does contain nicotine.

The Bleeding Index was not significant for e-cigarette users. It was reported that the usage of e-cigarettes that contain nicotine increased capillary perfusion to the buccal mucosa. In addition, previous animal studies have demonstrated enhancements in the muscular and intestinal blood flow, but reductions in the peripheral perfusion. However, in our study, it can be inferred that the oral mucosa blood flow in our participants was not affected by e-cigarettes usage.

Smoking has been linked with the increased incidences of dental caries. It has also been suggested that the increase in the development of caries is independently related to the level of tobacco consumption. Since, e-cigarette does not contain tobacco, the link between dental caries and e-cigarette usage is still ambiguous.

**Conclusion**

Very few studies have been conducted to assess the oral health status of e-cigarette users in the global and local context. This study is the first cohort that investigated the effect of e-cigarette usage on oral health. The results of our study can be a reference for the detrimental effects of e-cigarette towards oral health. Moreover, it has also explained the harmful effects of nicotine consumption on periodontal health.

### Table 2. Comparison of parameters at baseline and 6-month

<table>
<thead>
<tr>
<th>Variables</th>
<th>Baseline Mean Score (SD)</th>
<th>6-month follow up Mean Score (SD)</th>
<th>p value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Gingival Index</strong></td>
<td>23.83 (18.67)</td>
<td>29.51 (17.42)</td>
<td><strong>0.048</strong>*</td>
</tr>
<tr>
<td><strong>Plaque Index</strong></td>
<td>23.20 (20.71)</td>
<td>23.82 (19.46)</td>
<td>0.855</td>
</tr>
<tr>
<td><strong>Bleeding Index</strong></td>
<td>25.35 (18.05)</td>
<td>22.79 (16.78)</td>
<td>0.355</td>
</tr>
<tr>
<td><strong>Calculus Index</strong></td>
<td>17.60 (15.82)</td>
<td>12.50 (11.62)</td>
<td><strong>0.034</strong>*</td>
</tr>
<tr>
<td><strong>DMFT Index</strong></td>
<td>3.13 (1.70)</td>
<td>3.74 (2.23)</td>
<td><strong>0.002</strong>*</td>
</tr>
</tbody>
</table>

Paired t test,
*p<0.05 as significant 95% CI
Acknowledgement: This research was funded by IIUM Research Initiative Grant Scheme (RIGS15-043-0043) from International Islamic University Malaysia.

Conflict of Interest: Nil

Source of Funding: Self

Ethical Clearance: IJRISE Journal Reviewer Committee

References


Monitoring of Smart Systems Using Internet of Things in Healthcare

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Abstract

In healthcare domain significant advancements are taking place day by day. Exploration of technology overrules all traditional approaches used by the medical practitioners. Under healthcare, there is always a chance for uncertainty and imprecision under various aspects of medical diagnosis process. The recent survey shows tremendous rise in people who are at the diseased conditions irrespective of age factor. In such situations on the contrary doctors also need assistance for fast tracking ongoing number of patients. But at some point due to lack of medical facilities in emergency situations, there is always a need of smart devices and smart technology to assist doctors and even to the patients for better management of any kind of disease. It does strengthening of existing healthcare services. This paper surveys different existing approaches and procedures utilized for early analysis of heart disease which works like hazard alerts to spare human life.

Keywords: healthcare, Internet of things, monitoring devices, sensor network, smart devices

Introduction

The Internet of Things (IOT) is a major technological revolution in computing and transmission media. Whereas IOT is majorly a network associated with multiple objects which communicate with each other with unique ID using different technologies like RFID, NFC, Bluetooth etc. which follows standard communication protocols. Now-a-days researchers have been working hard on IOT to know different perspective of it.

According to IOT is a sophisticated network of things that is uniquely identified and where each of these objects connected to the server which provides necessary assistance. According to this, it is clear that every object has its own characteristics and which prominently play its important role namely in different situation.

This seduction draws our attention on IOT and all above; IOT is the most happening solution for healthcare industry. As in this approach, patients has integrity to work on his symptoms and able to manage himself in any of emergency situation. Even it is always possible to stay tune through mobile to the medical practitioners and to his family member because of unique ID. Some of the unending diseases like diabetes, heart disease, hypertension or any other severe diseases which required long lasting medical attention and hence healthcare domain is most important essential need of human life.
plays very critical role with the help of information technology and internet technology. The elements are interdependent on each other. All of them are acting as greatest support to each other. Following figure shows necessary components of IOT on e-Healthcare domain.

![Fig.2 Shows Components of IOT e-Healthcare](image)

This paper is structured as written in section II we will review research done in healthcare domain using internet of things. Section III focuses on results obtained through existing technologies and section IV addresses on conclusion and future scope.

**Literature Survey**

The bird eye view on healthcare domain shows that internet of things is worldwide technology used to give better opportunities and service to the disease survivors as there is rise in chronic illness. IOT technology right away provides superior and effective solution to remotely monitor the patients using sensor network which not only accumulates the data on cloud but also preprocess it using machine learning approach and finally demonstrates desirable outcome using smart devices.

Stephanie Baker et al.\(^5\) also expresses on healthcare as technologies, challenges and its opportunities. They proposed a standard model for healthcare systems. In this article they presented the state-of-art research relating to each of the model. It calculates their strengths, weaknesses and actual applicability for wearable IOT healthcare systems. Among different challenges of IOT, author also focused on security, privacy, wearability, less-power consumption is attempted. Here they placed focus on sensors for monitoring various health parameters, short and long range communications standards and cloud technology.

Siddesh Sonawdekar et al.\(^6\) proposes Smart hospital title using IOT. As the patient in intensive care unit needs continuous attention towards the critical situation. Problem may occur if in urgency patient doesn’t get proper care. Even if the real time parameters are not up to date, then also problem persists. So author implemented a solution which accumulates different information about through sensors network and then transfer this sensed data to internet server so that caretaker can continuously monitor patients’ health from remote location. In turn hospitals or any organization can able to save electricity component. This is happening due to global warming or due to burning of different fossil fuels. These fuels play important role in electricity generation. Author claimed that these IOT techniques gives much better platform for smart IOT hospital systems.

Bernald Vrijens et al.\(^7\) along with Vodafone presented adherence in healthcare by connecting the dots theory. He also addresses about why the patients are not seriously following up the treatment as it is the major important part of their life. Even what is the adherence factor which matters a lot. Every medical practitioner is looking for something new and better treatments for acute conditions for the patients. But if adherence has not been improved then it could harm in a massive portion to the patient and it even leads to developing a new medication at no cost. In this case, many smart appliances are there in the market which can sustain the patient to get out of it. But for this patient must adhere themselves at certain level to use smart packaging, smart pills, smart delivery or smart diaries also.

Higinio Mora et al.\(^8\) emphasis on remote healthcare monitoring of the patients in mobile environment using IOT framework. In this paper, a distributed framework is proposed based on IOT technology which continuously records human biomedical parameters involving physical activities. Major advantage is providing flexibility in computing the health application by using resources from available devices inside the body area network. This model is also proposed for the environment where intensive data collection and high data processing is required. It can able to predict the sudden death but also possible injuries if any. This solution has been monitoring especially data acquisition from athletes which could overflow the computing capabilities of the wearables and mobile devices. Here centralized system is proposed to do deeper analysis and takes advantage of big data technology on historical aggregated data. In this article main aim of the proposal is to optimize the use of biomedical sensors and computing resources for being able to provide advanced mobile applications.
to the user. Ms. Priti Satpute et al.10 also projected the health parameters measurement using microcontroller ATMEGA 328P programming which converts data and send it to LCD and other component. Later on this data is getting converted into digital form. Use of emergency switch is also provided in case of non-working condition of the system.

Amir Rehmani et al.9 explored e-health gateways using IOT under healthcare. They used fog computing approach. They emphasis on bridging point i.e. gateway is needed between sensor infrastructure network and the internet. This gateway is used to perform basic tasks such as translating between the protocols used in the web and sensor network. In this paper, author exploit the strategic positions of such gateways at the corner of the network to explore more services like data processing, local storage, embedded data mining etc. Hence it is called as smart e-gateways. Fog is acting between sensors and network. It not only reduces the burden of the sensor network but also resolves issues in the network. It enables massive implementation of ubiquitous health monitoring system in clinical environment. This system proved the enhancement in overall intelligence, energy efficiency, mobility, performance, interoperability, security and reliability.

Mostafa Haghi et al.11 proposed an research on wearable device under the domain internet of things. Wearable devices are heart of the bigger part of the exchanges held in IOT innovation. As there is dramatic increase in the number of elderly people who seeks attention in healthcare. In current years there is more improvement in the semiconductor technology, so sensors are cumulatively does its investigation to its full range of parameters closer to its realization. In today’s world time is precious; people who are working outside spend their most of time in doing various tasks which in turn ignore their health and fitness. Goal of the research paper is to audit the wearable human services gadgets both in scientific papers and commercial efforts.

**Analysis for existing healthcare systems**

After studying some of the existing healthcare systems which is used for continuous attention seekers to provide them better opportunity to self-manage their diseased attire and tackle with acute conditions. Under analysis of existing systems, following graphical presentation shows the exponential growth in use of IOT technology.

![Fig.3 Shows drastic increase in IOT technology](image)

**Conclusion**

Extensive literature of healthcare era is a major challenge. To fulfill the challenge up to some extent is possible due to innovation in internet of things. Here survey emphasis on different techniques which have been implemented like Zigbee, GSM technology or any microcontroller technology to acquire data, preprocess it and get the desired outcome for needy one. Wearable devices along with sensor network is used which gives more accurate results. Consolidating keen wearable sensors into routine care of patients is the major key point of this paper to follow the better care to the general human beings who are really in need of that.

**Conflict of Interest:** Nil

**Source of Funding:** Self

**Ethical Clearance:** IJRISER Journal Reviewer Committee

**References**


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Brain Tumor Levels Detection in Three Dimensional MRI using Machine Learning and MapReduce

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Abstract

The latest technological developments in medicinal data need accurate diagnosis which may demand corrective prediction using advanced machine learning algorithms. Brain tumor analysis is an emerging field in healthcare domain as lots of death occurs due to inaccurate and late detection of this disease. This paper focuses on real time detection of tumor levels in three dimensional MRI images. 3D MRI image in DICOM format is converted into JPEG format then denoising, grey scale and blurring techniques were applied on it to remove noise. Feature extraction algorithms were applied on each layer of 3D image to generate feature vectors and save these images on HDFS. Clustering techniques is used to identify region of interest in each and every layer of 3D image. Then classification algorithm is used on learning trained datasets to predict accurate level of brain tumor. To speed up diagnosis time and improve efficiency through parallel processing Hadoop’s MapReduce framework is used.

Keywords- Medical image processing; MRI images; feature extraction; clustering, Kmeans, classification, Map Reduce, HDFS.

Introduction

Nowadays, medical analysis shows that brain tumor is one of the major causes of death amongst adults and youngsters. It’s been observed that the majority of the western world that number of people who are suffering and dying from brain tumors continues to be exaggerated to three hundred a year throughout past few decades. As this variety is exaggerated, we’d like additional tools and ways to sight, extract the tumors and additionally to investigate their behavior. We should think about the category of tumor, the type of images to be used and relying there from the many approaches to use or develop efficient technique which can facilitate doctors to simply diagnost tumor levels. Brain tumor could be uncontrolled rapid growth of massive tissues within the brain¹. A tumor occurrence depends on a various causes like size, type, location, tumor level, and its affected area. Glioma¹ is primary level of brain tumor detected in adults. They rise from interstitial tissue cells and finally classified into four stages; stage three or four is that the top-grade Glioma. Stages one and two of may be used as inferior Gliomatums. Magnetic Resonance Imaging² is an imaging technique utilized by practitioners and radiologists to review the structure of the body. As tomography will represent a great deal of data regarding the soft tissue in the human body. These images help in the identification of the tumor. These tomography images are also accustomed to analyze and study the behavior of the brain. Concerning the nature and appearance of the brain tumors, only MRI technique is not sufficient for tumor segmentation including overall space. Following sections elaborates various methods to detect brain tumor levels and its accurate prediction.

Methods Used

Image Preprocessing

Preprocessing is a process of converting query image into a form which is best suitable for the system. MRI Images are available in custom file format known as DICOM (Digital Imaging and Communication in Medicine)³ which is not directly readable. These images are first convert to acceptable JPEG format. MRI images usually include additional tissues, lower brightness which reduces accuracy of diagnosis. Figure 1 (a) elaborates Image de-noising, blurring techniques which are applied on it to get smoothening of each layer of 3D⁴.
Feature Extraction

The feature extraction is responsible for extracting visual features from query images. This system extracts two types of features i.e. Color and Edges. Gray scale color extraction extracts gray scale color value for each pixel of the query image, and edge detection is used to detect major boundaries. Figure 1(b) depicts edge detection. Then generation of the feature vector for each layer is calculated. It combines two features i.e. color and edges then it generates the final feature vector for the inputted image. Generated result of feature vector is similar to the feature vectors stored in feature library. Figure 1(c) describes vector generation in Hadoop. Each image is stored on HDFS along with its feature vector.

Hadoop Distributed File System (HDFS)

It is a Hadoop Distributed File System that executes on top of the default file system available in operating system on every machine included in the cluster. HDFS makes it extremely portable. It provides built-in support for huge data files and fault tolerance. The HDFS is actually a distributed architecture where the NameNode is acting as master and the DataNode is working as slave. NameNode holds the metadata concerning the files stored in DataNodes. Images can be converted to bytes and store on HDFS.

MapReduce

MapReduce is a component of Hadoop framework which used for parallel processing of big datasets using a huge number of commodity hardware (nodes). A single Hadoop cluster comprises one master node, a secondary node (in case of master node failure) and many slave nodes which are acting as workers. JobTracker, NameNode, TaskTracker and DataNode are resides in master node. Slave node comprises of its own DataNode and TaskTracker, it may be possible to slave node to act as data-only slave nodes or compute-only slave nodes. MapReduce is responsible for work distribution for each and every node which is submitted by a client. It creates small parallelized map and reduce jobs which leads to faster execution.

i. Map: The master node takes job inputted by client, divides it into smaller subtasks, and each task is allocated to slave nodes. A slave node may further divide it again, in turn, leading to a multi-level tree hierarchy. The slave node processes the distributed chunk of tasks and passes the results back to its master node.

ii. Reduce: The master node then accumulates the results to all the subtasks and combines them in such a way that it frames output as the answer to the problem which was originally given to solve.
In our research MapReduce compares feature vector of inputted MRI image of patient with feature vectors of stored MRI images in a library. The result of the comparison is the difference of Euclidian distance between images.

**Clustering**

Clustering algorithm provides balanced data which is observed in all time under training phase. To predict levels of tumor accurately extraction of region of interest is needed. Segmentation is commonly thought of to be the primary step in image analysis that splits an image into significant layered regions, which might be useful in additional analysis. These small sections obtained related to the physical components or objects present in (3-D) scene described by the image (2-D).

Thresholding is employed to fetch interested object from its background by its intensity assignment value named as T (threshold) for every pixel in such a way that it is either an object point or a background point. Optimum thresholding chooses threshold value to minimize the variance obtained between classes of the thresholded black and white pixels.

Use of K-means algorithm in the threshold selection method is given as follows:

1. Initialize center of the clusters.
   \[ \mu_i = \text{position value, } i = 1 \ldots k \text{ i.e no of clusters} \]

2. Allocate the nearest cluster to each data point.
   \[ C_i = \{j: d(x_j, u_i) \leq d(x_j, u_l), l \neq i, j = 1, \ldots n\} \] (1)

3. Set the position of every cluster to the mean of all data points belongs to it.
   \[ u_i = \frac{1}{|C_i|} \sum_{j \in C_i} x_j \forall i \] (2)

4. Go to step 2 and 3 until the centroid positions remains unchanged.

5. Compute thresholds value which belongs to final partition.

Bi-level thresholding method depicts k=2, which is the tiniest and biggest grey levels within the image which are designated as the initial centroids. These threshold value T may be obtained by computing the average of the final obtained centroids.

**Classification**

This is Naïve Bayesian classifier algorithm is used for classification that worked on training image datasets of MRI. Stages of tumor are classified according to their percentage of tumor occupancy in clusters named as Stage4, Stage3, Stage2 and Stage1 respectively. Attributes consider for predictions are if percentage of occupancy is high then stage 4 type of tumor. Given image is matched with images stored on HDFS. Percentage of matching is considered. Accordingly prediction is done.

<table>
<thead>
<tr>
<th>Percentage</th>
<th>Type</th>
<th>Suggested Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>80% and above</td>
<td>Stage 4</td>
<td>Surgery</td>
</tr>
<tr>
<td>50% to 80%</td>
<td>Stage 3</td>
<td>Radiations</td>
</tr>
<tr>
<td>20% to 50%</td>
<td>Stage 2</td>
<td>Medications</td>
</tr>
<tr>
<td>Below 20%</td>
<td>Stage 1</td>
<td>Self-Care</td>
</tr>
</tbody>
</table>
As per Bayes theorem, \( P(X|y) \) defines the probability of “Occurrence of tumor” with the given conditions are “tumor is of stage 4”, percentage is “80% above” and suggested treatment is “self-care”. Where \( X = \) (stage 4, percentage 80% above,Self-care) and \( y = \) Yes (occurrence of tumor)

If two events \( X \) and \( Y \) are autonomous then
\[
P(X, Y) = P(X).P(Y)
\]

Here we reached to result:
\[
P((y|x_1, \ldots , x_n) = \frac{P(X_1|y)P(X_2|y)\ldots P(X_n|y)P(y)}{P(x_1)P(x_2)\ldots P(x_n)}
\]

After creating classifier model we get the probability of all possible values of the class variable \( y \) inputted and elite the output through extreme probability. It can be mathematically expressed as:
\[
y^* = \text{argmax}_y P(y) \prod_{i=1}^{n} P(x_i|y)
\]

Task of scheming \( P(y) \) and \( P(x_i|y) \) is leftover.\( P(y) \) is defined as class probability while \( P(x_i|y) \) is defined as conditional probability. We should try this by applying the above formula automatically on tumor datasets. Figure 2 depicts results gained after applying classification.

![Figure 2: Resultant Page after classification.](image_url)

**Algorithm**

Step 1. Take a 3D MRI Query image as input from client. Convert it in JPEG format. Consider \( n \) is total number of layers available in image.

For (\( i=0 \) to \( i=n-1 \))

Convert DICOM[i] image to JPEG[i]

Step 2. Apply Image Blurring techniques on every layer of inputted query image.

i. move through complete input image array.

ii. Scan individual pixel with color value (24-bit).
iii. Divide the color value into individual R, G and B 8-bit values.

iv. Calculate the average of RGB of neighboring pixels and allocate obtained average value to it.

v. go to step i to iv until each and every pixel is scanned.

vi. Save the newly obtained value at the same location in the output image.

Step 3. Apply edge detection algorithm to extract features from each layer of inputted query Image

Following are the steps to convert input image into gray scaled image.

i. move through complete image pixel by pixel.

ii. Identify each and every pixel and its neighboring pixels in the image, consider a window of 3x3 pixels and multiply it with the given template in the matrix. We have two template matrices.

For X axis

\[
G_X = \begin{bmatrix}
-1 & 0 & +1 \\
-2 & 0 & +2 \\
-1 & 0 & +1
\end{bmatrix}
\]

For Y axis

\[
G_Y = \begin{bmatrix}
+1 & +2 & +1 \\
0 & 0 & 0 \\
-1 & -2 & -1
\end{bmatrix}
\]

iii. Then we will calculate the G which is gradient of an image i.e. directional derivative estimate vector which is defined as density difference / distance to neighbor.

\[
|G| = \sqrt{G_X^2 + G_Y^2}
\]  

(6)

iv. Apply the templates on grey levels of each pixel to a 3x3 filter window. All values are grey levels from a1 to a9 for each pixel in filter window.

\[
\begin{array}{ccc}
a_1 & a_2 & a_3 \\
a_4 & a_5 & a_6 \\
a_7 & a_8 & a_9
\end{array}
\]

Value of X and Y are obtained after multiplication.

\[
Value \ of \ X = -1 \times a_1 + 1 \times a_3 - 2 \times a_4 + 2 \times a_6 - 1 \times a_7 + 1 \times a_9
\]  

(7)

\[
Value \ of \ Y = 1 \times a_1 + 2 \times a_2 + 1 \times a_3 - 1 \times a_7 - 2 \times a_8 - 1 \times a_9
\]  

(8)

\[
Sobel \ Gradient = \sqrt{(X \times X + Y \times Y)}
\]  

(9)

Step 4. Build Feature Vector of each image in layer upto n. We consider 8 bin buckets modulo operation is performed on color code value by 8 and we allocate value to bucket which is having value equal to reminder value obtained after applying the modulo operation.
Consider example for colorcode value given of specific pixel is 225. Perform modulo operation on it.

E.g. 225 % 8 = 1  hence we assign 225 value to bucket no.1

Sample feature vector generated = [654, 54, 354, 354, 87,735,354,325]

Store this feature vector on HDFS (with path of original image and its diagnosis) in order to generate feature library.

Step 5. Match this feature vector with feature library using MapReduce also calculates Euclidean distance between them.

Step 6. Apply k-means to find region of interest to detect tumor size in specific area.

Step 7. Arrange images in ascending orders depending upon thresholds and Euclidean distance. Maximum to minimum. Accordingly store different levels of tumor.

Step 8. Apply classification on set of images, if maximum stored images is representing brain tumor of Stage 4 and treatment as surgery then display diagnosis as

1. Stage 4: Brain tumor 80% above
2. Treatment: Surgery

Step 9. Apply classification algorithm on trained datasets to check accuracy of prediction of tumor levels.

Results and Analysis

Trained datasets of MRI images are evaluated as per defined parameters using MapReduce framework on Hadoop platform. Images are divided into 3 classes of datasets each contain 20 image set, 60 image set and 100 image set respectively. As shown in Figure 3, the graphs show precision and recall values obtained from retrieved images. Within the dataset of each 3D image consist of 22 layers which are compared with each layer of 3D image stored in HDFS.

Precision defined as ability of the system to extract only relevant images whereas Recall defined as ability to extract all relevant images. The Precision and The Recall can be computed using following:

\[
\text{Precision} = \frac{\text{number of relevant images retrieved}}{\text{total number of images retrieved}}
\]
\[
\text{Recall} = \frac{\text{number of relevant images retrieved}}{\text{total number of relevant images}}
\]

Figure 3. Graph for Precision and Recall
Conclusion

In this way a framework for implementation of brain tumor diagnosis in 3D MRI image data sets using the MapReduce is described here. Every patient MRI image is analyzed by greyscaling, edge detection and feature extraction to identify key points at variant scales. While Hadoop’s MapReduce is employed to compare extracted feature vector of each inputted image and HDFS supports storage of existing medical images within developed system. Clustering algorithm is useful for applying on each and every slice of 3D image while classification algorithm enhances accuracy in prediction of tumor levels. Given research work will certainly improve decision making time and assist doctors for accurate diagnosis.

Conflict of Interest: Nil

Source of Funding: Self

Ethical Clearance: IJRISE Journal Reviewer Committee

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Unsought Product Buying: Empirical Study on Determinants of Health Insurance Plan Buying

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Abstract

Purpose – The purpose of this paper is to identify and study various determinants that customers take into consideration for buying health insurance plans.

Design/methodology/approach – A total of 250 existing health insurance users were personally surveyed with a structured questionnaire. These respondents were from Gurugram city. Exploratory factor analysis and one sample t-test were used to assess the determinants of health insurance plan buying.

Findings – It was found that health insured considered Personal, Marketing, Product, Social and Security factors to be important while opting for health insurance plans. Among all these factors social factor was found on the customers’ mind followed by security, product, personal and marketing factor while buying health insurance plans.

Research limitations – This paper analyses the buying behavior of the existing insured with respect to health insurance plans and can be different from those of potential insured, who have not taken any health insurance plan till now. Also, study was conducted on limited geographical area of Gurugram city only and hence results cannot be generalized.

Practical implications – The results may help the health insurance providing companies to understand a diversified set of mind of the insured, so that they can come up with the strategies that are aligned with the customers’ expectations.

Keywords: Health insurance, Personal factors, Marketing factors, Product factors, Social factors and Security factors.

Introduction

Uncertainty is the only definition of life. This is what is the model of life insurance companies which cover individuals from these uncertainties and helps in planning the future. The pool fund being collected as premium form insured is the fund being utilized by the insurance companies. It we study various countries around the world we will find different policies prevailing for life insurance business. Talking about India general insurance is something which is mandatory while, health and life insurance are discretionary. Considering the above policy in India, various factors are being taken into account by customers while the planning to get the health/life insurance plans. It is important to mention here that there is quite a large percentage of Indians who do not have any health or life insurance plan till date and hence this sector has a lot of potential of growth. The Indian insurance sector which earlier was dominated by LIC only, now facing a tough competition from private players.

The present study is an attempt to find the major factors that influence the decision of buying health insurance plan, it is expected that the study will be helpful for life insurance companies to frame marketing strategies to attract the potential and present the customers.
Review of Literature

Studied various factors affecting the decisions to buy health insurance. The study found that the major reason of buying health insurance policy was to protect them against the loss of money they have to incur for healthcare. Also, insured who generally buy health insurance plan annually (i.e. to be renewed every year) and renewal depends on the deliverance of health insurance provider.

5 compared various med claim, ESIS and SEWA health insurance policies and found that customers usually decide their health insurance plan only after the comparison of the plan with the competitors. 6 in her study found that the major component of poor reach of health insurance plan among Indians was because of the problem of not making health insurance compulsory in India. The study advocated that government should put this on priority and measures should be taken to improve the level of awareness for the benefits of the health insurance plans. A comparative study of four different CBHIS in Gujarat was attempted by and and found similarity and differences among them.

2,3 studied various factors that affect the decision of buying health insurance plans with an household survey in Anand district of Gujrat and concluded that decision is being taken into two phases by the customers. First phases covers decision of buying health insurance plan in yes or no and if the decision is positive there were various factor like income , health expenditure of the family, perception of coverage of illness and health expenditure, knowledge about health plan affects the buying decision.

found that renewal of health insurance plan is directly proportional to the past experience of the customers. It the insurance provider has fulfilled all this promises, there are all great chances that the customers will buy or renew the same plan.

7 studied the impact of social or economic factors on purchase decisions of life insurance policy and reported income level , occupation and family size significant on the buying of various policies.

4 studied the reasons behind the preferences for a particular company for health and life insurance plans and found that more return, less premium level of awareness about the company, variety of plan, advertisement and ease of access were all the major reasons.

9 studied the awareness level and reasons for buying life insurance policies and found that there is a strong need of awareness among the respondent and life insurance is being taken as an investment channel, tool for tax saving and in very less cases meeting post retirement needs.

6 attempted to identify the preferences regarding insurance plan and purpose of buying and found that protection was the main purpose of buying an insurance policy and gathering the information about the company along with the policies of claim settlement was found the main factors while deciding for health plan.

After the review of literature, present study focuses on finding the answers of following research questions of identifying the determinants contributing to the buying of health insurance plans and to study the impact of identified factors on the buying of health insurance plans.

Research Methodology

This study is based on exploratory cum descriptive research design. Exploratory research design has been used to identify the factors that health insured relate to buying health insurance plans and descriptive design has been used to make the concept clearer. Because of limitation of time and financial resources, it was not possible to study the census. Therefore, a sample of 300 respondents has been taken form Gurgaon city. Out of 300 distributed questionnaires 270 responses were collected and 250 responses were found correct for further research. Correct data response rate was 92%. For the study, Purposive sample design has been used. Purposive sample design justified on the ground that only those respondents were taken who already have health insurance plans. Both primary and secondary data has been taken for the study. Primary data has been collected through questionnaire technique. Questionnaire framed under this study was divided into two parts. Part A covers the demographic information and Part B covers the 20 statements related to the health insurance plan buying based on a five-point Likert scale with scale anchors from “1” – strongly disagree to “5” – strongly agree. Secondary data has been collected through books, journals, articles, newspapers and web sites. Collected questionnaires were coded and entered in SPSS spreadsheet for analyzing the data. After entering the data exploratory factor analysis, one
sample t-test and mean were used for analyzing the data. Exploratory Factor analysis technique has been used for identifying the factor contributing to the buying of health insurance plans. Factor analysis is techniques through which variables that are correlated with one other but independent of other variables are combined into factors (Malhotra and Dash, 2016).

**Data Analysis**

Before applying factor analysis, appropriateness of factor analysis has been checked. For this purpose Kaiser- Meyer-Olkin measure of sample adequacy and Bartlett’s test of sphericity has been performed.

<table>
<thead>
<tr>
<th>Table 1: KMO and Bartlett’s Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kaiser-Meyer-Olkin Measure of Sampling Adequacy.</td>
</tr>
<tr>
<td>Bartlett’s Test of Sphericity</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

Higher the value of KMO and Bartlett greater will be the reliability of factor analysis. The value of KMO should be greater than 0.5 for applying factor analysis. In this study value of KMO comes 0.812, considered as excellent. It means our sample size was adequate and factor analysis can be used for reducing data.

<table>
<thead>
<tr>
<th>Table 2: Rotated Component Matrixa</th>
</tr>
</thead>
<tbody>
<tr>
<td>Component</td>
</tr>
<tr>
<td>1</td>
</tr>
<tr>
<td>S1</td>
</tr>
<tr>
<td>S2</td>
</tr>
<tr>
<td>S3</td>
</tr>
<tr>
<td>S4</td>
</tr>
<tr>
<td>S5</td>
</tr>
<tr>
<td>S6</td>
</tr>
<tr>
<td>S7</td>
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<td>S9</td>
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<td>S17</td>
</tr>
<tr>
<td>S18</td>
</tr>
<tr>
<td>S19</td>
</tr>
<tr>
<td>S20</td>
</tr>
</tbody>
</table>

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
a. Rotation converged in 5 iterations.

Rotated component matrix is also called Rotated Factor matrix in factor analysis. We used varimax method of rotation. Table 2 depicts the factor loading for each variable into each factor. Factor loading less than 0.5 is not shown in the table because we neglected those loadings.

Table 2 depicts that Factor 1(Personal Factor) includes S13-S17. Factor 2 (Marketing Factor) includes S1- S5 Variable. Factor 3 (Product Factor) included S6-S8, S10 variables Factor 4 (Social Factor) includes the variable S9, S11 & S12 and S18- S20 comes under fifth factor (Security Factor).
Table 3: Mean value of factors

<table>
<thead>
<tr>
<th>Constructs</th>
<th>Items</th>
<th>Loadings</th>
<th>Average</th>
<th>Construct Reliability</th>
</tr>
</thead>
<tbody>
<tr>
<td>F1</td>
<td>Personal Factor</td>
<td></td>
<td>4.012/5=0.802</td>
<td>0.877</td>
</tr>
<tr>
<td>PF1</td>
<td>Tax rebate is the reason of my health insurance plan buying</td>
<td>.820</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PF2</td>
<td>I buy health insurance plans under the pressure of my family or peer group</td>
<td>.845</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PF3</td>
<td>I prefer the companies which follow easy procedure of settlement of claim</td>
<td>.792</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PF4</td>
<td>I buy health plans because I am aware about its benefits</td>
<td>.837</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PF5</td>
<td>I buy health plans because I advise the same to others</td>
<td>.718</td>
<td></td>
<td></td>
</tr>
<tr>
<td>F 2</td>
<td>Marketing Factor</td>
<td></td>
<td>3.695/5=0.739</td>
<td>0.795</td>
</tr>
<tr>
<td>MF1</td>
<td>Emotional Ad campaign of health insurance plans motivate me to buy them</td>
<td>.573</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MF2</td>
<td>Persuasion by insurance agents results in health insurance plan buying</td>
<td>.781</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MF3</td>
<td>Wide variety of the plans choose from motivates me for taking health insurance plans</td>
<td>.767</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MF4</td>
<td>Promotional activities of the health insurance companies results into my buying</td>
<td>.830</td>
<td></td>
<td></td>
</tr>
<tr>
<td>MF5</td>
<td>Ease of availability of health insurance plans on online platform motivates me to buy</td>
<td>.744</td>
<td></td>
<td></td>
</tr>
<tr>
<td>F3</td>
<td>Product Factor</td>
<td></td>
<td>2.963/4=0.740</td>
<td>0.847</td>
</tr>
<tr>
<td>PDF1</td>
<td>Unique features of the health insurance plans motivates me to buy</td>
<td>.798</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PDF2</td>
<td>My selection of health insurance plan is largely dependent on comparison of competitors’ plans</td>
<td>.726</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PDF3</td>
<td>Positive word of mouth of any particular health insurance plan motivates me</td>
<td>.817</td>
<td></td>
<td></td>
</tr>
<tr>
<td>PDF4</td>
<td>Low premium health plans are reasons of my buying</td>
<td>.622</td>
<td></td>
<td></td>
</tr>
<tr>
<td>F 4</td>
<td>Social Factor</td>
<td></td>
<td>2.142/3=0.714</td>
<td>0.706</td>
</tr>
<tr>
<td>SF1</td>
<td>I buy health insurance plans keeping life style issues in mind</td>
<td>.693</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SF2</td>
<td>Increasing healthcare cost motivates me to get insured</td>
<td>.685</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SF3</td>
<td>I feel I will not be accepted into my social group if I am not insured</td>
<td>.764</td>
<td></td>
<td></td>
</tr>
<tr>
<td>F 5</td>
<td>Security Factor</td>
<td></td>
<td>2.177/3=0.725</td>
<td>0.590</td>
</tr>
<tr>
<td>SF1</td>
<td>Sense of security motivates me to buy health plans</td>
<td>.661</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SF2</td>
<td>I feel it is my duty to cover my family even in my absence</td>
<td>.844</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SF3</td>
<td>Health plans are also a tool of financial security</td>
<td>.672</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 3 shows the name of every factor and which variable comes under which factor with their scores. It can be clearly seen that average loading of each factor is more than 0.5 which is a good value and also cronbach’s Alpha value of each factor is nearly or more than 0.6 which indicates that the constructs are reliable. Also these factors collectively explain 65 percentage of the study.

Table 4: Analysis of significance of various factors of buying an health insurance plan on the basis of One Sample T test

<table>
<thead>
<tr>
<th>Test Value = 0</th>
<th>t</th>
<th>Df</th>
<th>Sig. (2-tailed)</th>
<th>Mean Difference</th>
<th>95% Confidence Interval of the Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Lower</td>
</tr>
<tr>
<td>Personal Factor</td>
<td>66.620</td>
<td>249</td>
<td>.000</td>
<td>3.16880</td>
<td>3.0751</td>
</tr>
<tr>
<td>Marketing Factor</td>
<td>57.591</td>
<td>249</td>
<td>.000</td>
<td>3.16500</td>
<td>3.0568</td>
</tr>
<tr>
<td>Product factor</td>
<td>60.672</td>
<td>249</td>
<td>.000</td>
<td>3.20133</td>
<td>3.0974</td>
</tr>
<tr>
<td>Social Factor</td>
<td>77.590</td>
<td>249</td>
<td>.000</td>
<td>3.80160</td>
<td>3.7051</td>
</tr>
<tr>
<td>Security Factor</td>
<td>63.353</td>
<td>249</td>
<td>.000</td>
<td>3.37333</td>
<td>3.2685</td>
</tr>
</tbody>
</table>

Above table 4 shows the results of one sample t-test. Observed t statistic for each factor is represented by “t” column in table. “df” column represents the degree of freedom. On the basis of one sample t test, it was found that all the factors Personal, Marketing, Product, Social and Security factor significantly influences the customers of health insurance plans.

Table 5 represents the values of mean and standard deviation of various factors of health insurance plans that existing customers found significant. Mean value depicts the level of significance and standard deviation represents the variations of responses. Social factor was found most contributing factor that influences the buying decision of existing health insurance users with mean value(\(\bar{x}\)) 3.8016 followed by Security factor(\(\bar{x}=3.3733\)), product factor (\(\bar{x}=3.2013\)) and personal factor (\(\bar{x}=3.1688\)). Marketing factor was least significant factor with mean value (\(\bar{x}\)) 3.1650.

Table 5: Mean value and Standard Deviation of various factors of health insurance plan buying

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Std. Error Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Personal Factor</td>
<td>250</td>
<td>3.1688</td>
<td>.75207</td>
<td>.04757</td>
</tr>
<tr>
<td>Marketing Factor</td>
<td>250</td>
<td>3.1650</td>
<td>.86893</td>
<td>.05496</td>
</tr>
<tr>
<td>Product factor</td>
<td>250</td>
<td>3.2013</td>
<td>.83428</td>
<td>.05276</td>
</tr>
<tr>
<td>Social Factor</td>
<td>250</td>
<td>3.8016</td>
<td>.77470</td>
<td>.04900</td>
</tr>
<tr>
<td>Security Factor</td>
<td>250</td>
<td>3.3733</td>
<td>.84190</td>
<td>.05325</td>
</tr>
</tbody>
</table>

Source: Primary data

Table 5 also shows that marketing factor has highest variations in the responses shown by the highest value of standard deviation i.e. 0.86893 followed by security factor (0.84190), product factor (0.83428) and social factor (.77470). Personal factor shows highest consistency in the responses with lowest standard deviation value 0.75207.

Conclusion

This study identified the factors that significantly
influence the health insurance plan buyers. It was found that customers considered Personal, Marketing, Product, Security, Social factors to be important while thinking of getting any health insurance plan. Among all these factors social factor was found on the customers’ mind followed by security, product, personal and marketing factor while buying health insurance plans. This study is not free from limitations. As this study was conducted on a limited geographical area of Gurgaon city only, so, it is difficult to generalize the result. Limited time and financial resources acted as a limitation for the study.

**Future Scope for the Study**

For further research, a comparative analysis of factors of potential and existing health insured customers can be performed. A comparison on the basis of demographics can also be done for future research. Further research can be conducted by considering other geographical area.

**Conflict of Interest:** Nil

**Source of Funding:** Self

**Ethical Clearance:** IJRISE Journal Reviewer Committee

**References**


Attitude of Undergraduate Students towards Use of Social Networking Sites in Relation to Emotional Maturity

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Abstract

Aim of this study was to find the attitude of undergraduate students towards use of social networking sites in relation to emotional maturity. Descriptive method of research was used. Stratified random sampling was used to select 300 undergraduate students from Kapurthala district of Punjab. Data was collected using Scale on Attitude towards Use of Social Networking Sites (2015) and Emotional Maturity Scale (2006). Data was analyzed using t-test and coefficient of correlation. It was found that female undergraduate students exhibit more favourable attitude towards using the social networking sites than male undergraduate students; Urban undergraduate students exhibit more favourable attitude towards using the social networking sites than rural undergraduate students; Male undergraduate students were more emotionally mature than female undergraduate students; Urban undergraduate students are more emotionally mature than rural undergraduate students; There is no relation between attitude towards using the social networking sites and emotional maturity of undergraduate students.

Keywords: Attitude, Social Networking Sites(SNSs), Emotional Maturity, Undergraduate Students.

Introduction

We are living in the 21st century, which is called as the digital age. Advancements in technology have made our life easy and comfortable. Information and communication technology (ICT) contributed a lot in this direction. Social networking sites are the means of ICT. Such sites are part and parcel of our day-to-day life. A layman uses these sites in order to establish and strengthen social relations. Social networking sites have their own importance in the field of teaching and learning. Teachers can use these sites to collaborate with other teachers and students for learning. Students utilize the sites to make their learning easy and convenient. Attitude of the students towards using these sites can play a vital role in their learning.

Emotions are the expression of our feelings. Are we able to control our emotions? Can we pay due regards to the emotions of others? The answer to these questions can be given by assessing the emotional maturity among students. Emotions are caught rather than taught. Thus, it is responsibility of the parents and teachers that they themselves should be well trained in controlling their emotions in adverse situations. Whatever we demonstrate in front of our wards or students, similar kind of reactions can be observed in their behaviour. Consequently, behaviour of students is being influenced by their parents, peers, teachers and the sites they use to interact with each other.

Social Networking Sites

A thing, place, person, or incident is being either favoured or disfavoured by an individual. This expression of favour or disfavour is termed as an attitude. Social networking websites are online sites through which users connect with other users. A social networking site is also called as a social website. Examples are: facebook, Whatsapp, Twitter, My space, Orkut, Google+ etc. Now a days these sites have become useful for study purpose because many school or undergraduate students use these networking sites for their study.
found that internet makes college students more creative and literate.\textsuperscript{1} suggested that self-personality and belongingness essentially anticipated addictive inclinations toward social networking websites (SNWS).\textsuperscript{2} concluded that social media is being used by females for relational purposes and females are more connected to their friends as compared to males.\textsuperscript{3} examined the popularity of social networking sites (SNSs) among youths. Results indicated that successive engagement in social networking sites is developing as an essential apparatus for youthful socialization.\textsuperscript{4} asserted that social networking sites are considered to assume an essential part in the strategies included in prosecuting common and criminal cases.\textsuperscript{5} concluded that students routinely post content using social networking sites.\textsuperscript{6} analysed that towards the use of Facebook, students have developed positive attitude. In a language classroom, Facebook can be used as a supplement. It was also found that learning language in a traditional classroom has not lost its importance. It acts as a backbone for providing language education.\textsuperscript{7} asserted “using of the social networking sites impacted the academic performance positively among Malaysia university students”.\textsuperscript{8} analyzed that regarding their schoolwork students were less comfortable to utilizing SNS than other online specialized instruments, and females felt more uncomfortable than guys utilizing such sites.\textsuperscript{9} found that a great number of students are addicted to social media. He suggested to use social media for educational purposes, SNSs should be expanded, used to enhance academic activities among students.\textsuperscript{10} conducted a study on the title “The Effect of Blended Learning and Social Media-Supported Learning on the Students’ Attitude and Self-Directed Learning Skills in Science Education”.\textsuperscript{11} A positive impact of social media was found on self-directed learning skills and attitude of the students. found that academic success and motivation is increased in a meaningful way by using blended learning than face-to-face learning; a positive impact of social media supported learning was found on motivation and academic success among students, academic success and motivation among students do not differ whether they learn with support of social media or through face-to-face learning.\textsuperscript{12} found that for English learning and for organizing online educational discussions, Facebook is an effective online platform. Facebook can be used as a meaningful and promising teaching tool by English language instructors and other educators. It will foster quality in providing online education.\textsuperscript{13}

### Emotional Maturity

Emotions are natural response of human being like when we feel sad, fearful or angry and joyful. All people different from each other in how to express their emotions and how much aware they are to their feelings. “Emotions are affective experience that one undergoes during an instinctive excitement” (McDougall).

The word ‘mature’ means ‘ripe’ or full development. Emotional maturity involves emotional control that emotionally matured person has on his feelings. A person who knows how to express his emotions according to situation in proper quality is called as emotionally matured person. Emotional maturity is a set of ability or capacity that people use to interact and communicate with others.

revealed negative correlation between emotional maturity and self-concept.\textsuperscript{14} suggested that in case of emotional stability, male students excel female students.\textsuperscript{15} confirmed that family type and age had an impact on emotional maturity of an individual.\textsuperscript{16} revealed that students attending the school are more emotionally mature than the kids engaged in child labour.\textsuperscript{17} explored “the final year undergraduate students were more emotionally mature as compared to first year students. Further, first year undergraduate students faced difficulty in adjusting both emotionally and socially. They also faced more academic difficulty as compared to final year students”.\textsuperscript{18} asserted “emotional maturity was very intimately related to the health, adjustment and behaviour of the individual. Thus, a student should have healthy emotional development”.\textsuperscript{19} found that day scholars and hosteller women students differ in decision making styles and emotional maturity.\textsuperscript{20} found that emotional maturity is not influenced by gender.\textsuperscript{21} found no relation between coping styles and emotional maturity among teacher trainees. Teacher trainees do not differ in coping styles and emotional maturity on the basis of gender.\textsuperscript{22} revealed that there exist gender related differences among adolescents in their level of emotional maturity and self-confidence.\textsuperscript{23} found that there is huge connection between emotional maturity and family relationship.\textsuperscript{24} revealed that adjustment and emotional maturity do not differ on basis of gender. Also, adjustment and emotional maturity are not related to each other.\textsuperscript{25} suggested that females are more emotionally mature than their counterparts males. Working and non-working adults do not differ in their social competence
level. Adults do not differ in their social competence level on the basis of gender.\textsuperscript{26} found that a large number of undergraduate students belong to normal range in emotional intelligence; these students were found to be extremely unstable in emotional maturity scale; there is a positive correlation between emotional maturity and emotional intelligence of undergraduate students.\textsuperscript{27} conducted a study to reveal that majority of students are users of online social networks and it has great influence on their emotional maturity. The students having high social network usage have less emotional maturity.\textsuperscript{28}

### Significance of the Study

An analysis of reviews reveals that social networking sites have greatly influenced the life of undergraduate students. Now a days student have more opportunities of using social networking sites because of new technologies. They are utilizing more resources as compared to past. SNSs have positive impact on the undergraduate students but we cannot deny the negative impacts also.

Social networking sites have brought a revolution in distance education and regular education or linking with the people. Students use these sites for facilitating their learning. This study focused on attitude of undergraduate students towards use of social networking sites in relation to their emotional maturity.

### Objectives

1. To find gender and locality related differences among undergraduate students in their attitude towards the use of social networking sites.

2. To analyze gender and locality related differences among undergraduate students in their emotional maturity.

3. To find relationship between attitude towards use of social networking sites and emotional maturity of undergraduate students.

### Hypotheses

Undergraduate students differ significantly in their attitude towards the use of social networking sites on the basis of gender.

Undergraduate students differ significantly in their attitude towards the use of social networking sites on the basis of locality.

Undergraduate students differ significantly in emotional maturity on the basis of gender.

Undergraduate students differ significantly in emotional maturity on the basis of locality.

There exists significant relationship between attitude towards use of social networking sites and emotional maturity of undergraduate students.

### Research Methodology

Descriptive survey method was used. A sample of 300 undergraduate students was drawn from Kapurthala district of Punjab. In order to draw a sample of 300 undergraduate students, stratified random sampling technique was used. Sample comprised of 150 male and 150 female undergraduate students, which in turn were divided into rural and urban undergraduate students.

### Tools Used

- Scale on Attitude Towards Use of Social Networking Sites (2014), developed by the investigator.
- Emotional Maturity Scale (2006) by Singh and Bhargava

### Statistical Techniques

- t-test
- coefficient of correlation.

### Results and Discussion

**Table 1: Results of t-ratio between Male and Female**

<table>
<thead>
<tr>
<th>Gender</th>
<th>N</th>
<th>M</th>
<th>SD</th>
<th>df</th>
<th>t-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attitude Towards Use of Social Networking Sites</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>150</td>
<td>80.68</td>
<td>6.88</td>
<td>298</td>
<td>2.01</td>
</tr>
<tr>
<td>Female</td>
<td>150</td>
<td>82.32</td>
<td>7.21</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Significant at .05 level
t-value (2.01) in table 1 is significant at 0.05 level. Mean score of female undergraduate students (82.32) is greater than mean score of male (80.68) students. Thus, it may be interpreted that female undergraduate students exhibit more favourable attitude towards use of social networking sites than their counterparts male undergraduate students. Therefore, hypothesis 1 was accepted. Similar results are found by Barker (2009).

**Table 2: Results of t-ratio between Rural and Urban Undergraduate Students in their Attitude Towards Using of the Social Networking Sites**

<table>
<thead>
<tr>
<th>Attitude Towards Use of Social Networking Sites</th>
<th>Locality</th>
<th>N</th>
<th>M</th>
<th>SD</th>
<th>df</th>
<th>t-value</th>
<th>Significant at .01 level</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Rural</td>
<td>150</td>
<td>80.16</td>
<td>7.69</td>
<td>298</td>
<td>3.24</td>
<td>Significant at .01 level</td>
</tr>
<tr>
<td></td>
<td>Urban</td>
<td>150</td>
<td>82.76</td>
<td>6.11</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

t-value in table 2 is 3.24. It is significant at 0.01 level. Further, mean score of urban undergraduate students (82.76) is greater than mean score of rural (80.16) students. Thus, it may be interpreted that urban undergraduate students exhibit more favourable attitude towards using of the social networking sites than rural undergraduate students. Hypothesis 2 was accepted. No study was found to support this result.

**Table 3: Results of t-ratio between Male and Female Undergraduate Students in Emotional Maturity**

<table>
<thead>
<tr>
<th>Emotional Maturity</th>
<th>Gender</th>
<th>N</th>
<th>M</th>
<th>SD</th>
<th>df</th>
<th>t-value</th>
<th>Significant at .05 level</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Male</td>
<td>150</td>
<td>120.24</td>
<td>18.86</td>
<td>298</td>
<td>2.01</td>
<td>Significant at .05 level</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>150</td>
<td>115.38</td>
<td>22.65</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

It may be analyzed from Table 3 that t-value is 2.01, which is significant at .05 level of significance. Mean score of male undergraduate students (120.24) is greater than mean score of female undergraduate students (115.38). Thus, male undergraduate students excel female students in emotional maturity. Hypothesis 3 was accepted. The result is opposite to the findings of Kaur (2013) and Nehra (2014), who found that emotional maturity do not differ on basis of gender. But this result is supported by Lal (2014), who found that there exist gender related differences among adolescents in their level of emotional maturity. Results of Aleem and Sheema (2005) are similar, in case of emotional stability, male students excel female students.

**Table 4: Results of t-ratio between Rural and Urban Undergraduate Students in Emotional Maturity**

<table>
<thead>
<tr>
<th>Emotional Maturity</th>
<th>Gender</th>
<th>N</th>
<th>M</th>
<th>SD</th>
<th>df</th>
<th>t-value</th>
<th>Significant at .01 level</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Rural</td>
<td>150</td>
<td>114.66</td>
<td>22.64</td>
<td>298</td>
<td>2.62</td>
<td>Significant at .01 level</td>
</tr>
<tr>
<td></td>
<td>Urban</td>
<td>150</td>
<td>120.96</td>
<td>18.66</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 4 indicates that t-value between rural and urban students is 2.62. It is significant at 0.01 level. Mean score of urban undergraduate students (120.96) is greater than mean score of rural undergraduate students (114.66). Thus, it may be interpreted that urban undergraduate students are more emotionally mature than their counterparts rural undergraduate students. Hypothesis 4 was accepted. No study was found to support this result.

Table 5: Co-efficient of Correlation between Attitude towards Use of the Social Networking Sites and Emotional Maturity of Undergraduate Students

<table>
<thead>
<tr>
<th>Variables</th>
<th>N</th>
<th>df</th>
<th>Co-efficient of Correlation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attitude of Students towards Use of the Social Networking Sites</td>
<td>300</td>
<td>298</td>
<td>-0.10 Not Significant</td>
</tr>
<tr>
<td>Emotional Maturity</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Co-efficient of correlation between attitude towards using of the social networking sites and emotional maturity of the undergraduate students is -0.10. It is not significant at .05 level. Thus, it may be interpreted that emotional maturity and attitude towards use of social networking sites of undergraduate students, is not related. Hypothesis 5 was rejected. No study was found to support this result.

Conclusions

Female undergraduate students exhibit more favourable attitude towards using of the social networking sites than male undergraduate students. Urban undergraduate students exhibit more favourable attitude towards using of the social networking sites than rural undergraduate students. Male undergraduate students are more emotionally mature than female undergraduate students. Urban undergraduate students are more emotionally mature than rural undergraduate students. Emotional maturity and attitude towards using of the social networking sites among undergraduate students are not related.

Conflict of Interest: Nil

Source of Funding: Self

Ethical Clearance: IJRISE Journal Reviewer Committee

References

11. Akgunduz, D., & Akinoglu, O.. The Effect of


Business Strategy and Performance of Traditional and Complementary Medicine (T&CM) Industry in Malaysia

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Abstract

The review of small business literature conclude the lack of study on the Traditional and Complementary Medicine (T&CM) in Malaysia. This article addressed the issue by examining the type of business strategy adopted by the industry and the performance of the T&CM entrepreneurs in Malaysia. Adopting the stratified sampling method the data was collected from 150 respondents. The findings clearly indicate that the business strategy adopted by the Traditional and complementary medicine (T&CM) entrepreneurs are specializing in product type strategy, specializing in customer type strategy, growth strategy, differentiation strategy, low-cost strategy, hold and maintain strategy. The performance of the industry improved annually, reflected by the increased in the volume of sale and the number of employees.

Keywords: Business strategy and Performance of T&CM

Introduction

The traditional medicine market is classified into two type of market dominance. Firstly the corporate players and secondly by small and medium sized entrepreneurs. Besides that the world market for herbal medicine appears to be highly competitive and also fragmented. The big players are expanding their market share in developing countries to benefit from cheaper raw material cost and cheaper direct labor compared to develop countries. These pioneer corporate players also market leaders in medicine, are putting more effort to switch from conventional medicine to medicinal herbs as their new profit opportunities. They also multiplying their research and development effort for new product and services development. With their innovative and technological know how they manage to improve the product quality which will push their market share and their market to continuously. Thus, the objectives of this study are examine the type of business strategy adopted by the T&CM entrepreneurs and to investigate the performance of the T&CM industry.

Literature Review

Malaysia natural tropical rain forest is a superior asset to the Nation. Besides as water catchment area the asset is also rich in natural and traditional resources of medicine. The Malaysia forest provides opportunities for traditional medical practitioners to fulfill their economic obligation as one of their income sources. Herbal medicine or “phytomedicine” is a medicinal system using a plant or animal materials such as seeds, roots, leaves, bark, flowers, oils and others for medicinal purposes. The market drivers for the global herbal medicine are expanding progressively. The current increase in population and also with the increase in aging population have created new market in herbal medicine and alternative medicine. Besides that most of the consumers are highly educated and with the assistance of internet they are very cautious in choosing the medicine available in the market. The competitive landscape for medication has changed tremendously. The increase in the number of non-government organizations have arouse the increase in consumer awareness for safe product to be consume with least or no side effect. Technological advancement and also the side effect of most conventional medicine have become the catalyst and motivators for new innovative product and services to be offered to the world market. The enforcement of legislative authority by the local authorities on current

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good manufacturing practices for food, drugs and medicine and the continuous increasing of prices of the food and medicine has caused consumers to tighten their budget. Consequently it offers consumers with alternatives medicines by using traditional medicine which is much cheaper and easily available. WHO predicted that global medicine market will grow 6% from 2016 to 2024.Figure 1 shows the current and forecasted revenue for global herbal supplement market from 2014-2022. It clearly indicates the growth is incremental and sustainable. It clearly shows that there are a lot of business opportunities in this herbal supplement market now and also in the near future.

Figure 1: Global Herbal Supplement Market 2014-2022
Source: Zion Market Research 2017

Figure 2 illustrate the current and forecasted global stevia Market. The growth for stevia market is also incremental and sustainable. Stevia is highly demanded by diabetic patient. Besides maintaining blood sugar level stevia also assist to reduce dependency on conventional glucose by diabetic patient.

Figure 2 Global Stevia Market 2014-2020Source: FMI Analysis 2015

Food from herbs is expected to reach US$ 111 billion by the end of 2023. This market is projected to grow at Compound Annual Growth Rate (CAGR) 7.2 % from 2017-2023.Figure 3 illustrates some of the sources and process of herbal medicine.
T&CM industry in Malaysia

Malaysian current herbal business performance

The Malaysian government emphasized several core strategies for the country’s economic growth to achieve the benchmark of a developed nation by 2020. The introduction of the twelve National Key Economic Area (NKEA), which include the potential of herbs to propel the business sustainability of the nation’s Bio-economy sector. Besides that, herbs industry was chosen as the firstEntryPoint Project (EPP1) for the nation’s Agriculture NKEA. At the earlier stage of the EPPI herbal industry was selected for the commercialization of five types of herbs with the aim of producing high-value products amounting RM2.2 billion of the Gross National Income (GNI). Previously five herbs identified are Tongkat Ali, Kacip Fatimah, Misai Kucing, Hempedu Bumi and Dukung Anak. At present, six more herb species have been added to the project: Mengkudu, Roselle, Ginger, Mas Cotek, Belalai Gajah and Pegaga. The government of Malaysia has forecasted that the herbs industry will grow over RM two Trillion (RM 2 Trillion) by the year 2020.

Malaysia Herb’s Classification by Product Groups

**Flavors & Fragrance**

a. Cosmetics
b. Perfumes
c. Oil for aroma
d. Essential oil
e. Beverages

**Pharmaceuticals/Herbal**

a. Remedies/Drugs
b. Vitamins/supplements

**Health/Functional Food**

a. Health food
b. Herbal teas
c. Herbal supplement

**Bio-pesticides**

a. Insect repellent
b. Crop pesticide
c. Household pesticide

Malaysia T&CM has three unique features.

i) Malaysia T&CM is highly diversified in terms of heritage, history, language, philosophy, ethnic origin,
ii) T&CM is associated to the culture and heritage of various ethnic group in Malaysia.

iii) The dominance of T&CM product and services in Malaysia is by private sector.

Malaysia has legalized the T&CM by introducing the T&CM Act 2016 which is known as Act 775. There are four main focus of T&CM development in the National Policy as listed below:-

i. Practices of T&CM

ii. Education and training

iii. Raw material and products

iv. Research

The T&CM industry in Malaysia appears to have grown steadily and continuously over recent years. Whilst there are limited data to define the size of the T&CM industry. However, there is clear evidence that size of the market is growing and its usage is being widespread. Its breadth and potential are reflected by the increased demand of its product and services. Based on the Ministry of Health (MOH) database, there are 16,050 T&CM registered members in Malaysia (MOH). However, it is believed that many more are unregistered practitioners available in the market. It is believed that there are 13,000 premises offering T&CM services in Malaysia. (Ministry of Health). Tradeliberations have given opportunities to players in the herbal industry to penetrate into new market opportunities available abroad. The consumers have many options and alternative to choose hence getting value for their money with high degree of efficiency to fulfill their needs and wants. In this industry monitoring fair network access by all suppliers is essential to allow the consumer to choose the supplier that offers the best price, quality and effect.

In Malaysia T&CM industry would have better opportunities to compete with other nations in term of manufacturing cost and production efficiency. Malaysia is in the middle of the India and China trade route. Consequently, it assists Malaysia to be more competitive in the T&CM world market.

**Issues and Challenges in practicing Traditional Medicines**

i. Difficulty to enforce Act 775 because of its complexity and diversity of T&CM industry includes lack of trained personnel and facilities and suitable mechanism to register T&CM industry without formal training programs.

ii. T&CM are not adequately regulated because of the current Act 775 does not regulate T&CM premises adequately.

iii. Lack of information to facilitate the formulation of policies.

iv. Lack of participation of T&CM in tertiary and health care

v. There is no action plan to integrate T&CM in the national health care system.

**Business strategies in Malaysian SMES**

Porter’s model of generic strategies has been found to be particularly useful to the Malaysian SMES. Malaysian SMES use Porter’s generic strategies because of the explicitness with which it captures the essence of the strategy formulation process. The changes of the political, economic and legal environment lately, forced the entrepreneurs to look for immediate solutions to remain in the competitive market.

Entrepreneurs must focus on their costing and pricing to enable them to remain competitive in the market. Some of the cost control measures that could be used by the entrepreneurs are reducing their waste, increase the efficiency of the machineries, multi-skilling workforce, and optimum amount of stock to be kept in the warehouse. Besides that, they can also generate more revenue by renting unutilized premise and also closing down the uneconomic production activities which are not competitive in the market. From the review of literature, the author found that entrepreneurs adapt and adopt six business strategies. For business and consumer market the strategies are harvest, build, cash out, niche, climber and continuity. There are four in industrial market such as low commitment, growth, maintenance and niche. Entrepreneurs should choose the right strategy that fit to their company. In addition, specializing customer type strategy emphasized on specializing in serving customers who are less price sensitive. Previous study have proven that most of
The entrepreneurs adapt and adopt business strategy in their decision making. Most of the empirical studies were conducted upon large firms previous research done by Hashim et al. and Ahmad, S; found that business strategy also influence the firm performance of small firms. The authors emphasized that in deciding which strategy to adopt or adapt, entrepreneurs must consider their competitive environment before choosing which strategy to be adapted or adopted.

Organizational Performance

Performance of an organization is the result of the competitive advantage achieved by converting a source advantage resulting from superior skills and resources into revenue. Ahmad, S et al; (2017) Ahmad, S, et al; 2016, and Ahmad, S at. al; (2017), pointed out that profitability is the most common measure of performance in Malaysian companies. Profit margin, return on assets, return on equity, return on sales are considered to be the common measures of financial profitability.

Definition of T&CM industry;

T&CM industry is being defined as “form of health-related practiced designed to prevent, treat, or manage ailment or illness, or preserve the mental and physical well-being of an individual and includes such practices as traditional Malay medicine(TMM), traditional Chinese medicine(TCM), traditional Indian medicine(TIM), Islamic medical practice, homeopathy, and complementary therapies but exclude medical and dental practices used by medical and dental practitioners respectively. (Act 775)

Research Methodology

Sampling

This study is confined to T&CM companies registered with Company Commission of Malaysia. The data was collected by mail survey from the top management of the 2000 participating firm. The outcome of returned questionnaires is 200. Only 150 were reusable and analyzed.

Questionnaires

The self-administered questionnaire was used to gather the data from the respondent. The questionnaires were mail to the respondents together with the self-addressed envelope and stem. The first section focused on the general characteristics of the T&CM entrepreneurs in Malaysia. These characteristics include information on the owners/managers, percentage of ownership, industry experience, size of capital, age, organization structure, employees. Following this, the second section of the questionnaire aimed to capture information on the types of business strategy adopted by the T&CM industry. This includes low-cost strategy, differentiation strategy, hold and maintain strategy, bare bone strategy, by product type strategy, and by customer-type strategy.

The final section of the questionnaire seeks information on the performance of T&CM industry in Malaysia. In this study performance was measured by number of employees at business startup, number of employees at the financial year, and also volume of business at start-up and the volume of business at financial year ends.

Results and Findings

Table 1 illustrates the respondent Ethnicity. Majority of the respondents that is 76% are Chinese, 20% are Malays and 4% are Indian. The respondent’s status of ownership. It clearly indicates that 28% of the respondents are founder to the business, 12% are cofounder, 4% inherit from their family while 56% others. The number of business owned. It clearly shows that majority of the respondents that is 46% did not owned any business, 44% own at least one business. While 10% owned more than 3 business. The respondent position in the company. It clearly shows that majority of the respondents that is 54% are Manager and 46% are CEO/MD of the company. Table 5 illustrates the business Strategy applied by herbs entrepreneurs. It shows that 30% of the respondents adopt Specializing by product type strategy, 20% of the respondents adopt specializing by customer type strategy, 14% Growth strategy, 10% Differentiation strategy, 12% Low cost strategy, 8% hold and maintain strategy. The respondent’s number of employees at business start-up. It shows that 28% of the respondent’s number of employees at business start-up is more than 100 employees. While 72% of the respondent’s number of employees at business start-up is 100 or less.
### Table 1: Demographic Information

<table>
<thead>
<tr>
<th>Ethnicity</th>
<th>Frequencies</th>
<th>Percentages</th>
<th>Respondent Position</th>
<th>Frequencies</th>
<th>Percentages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Malay</td>
<td>30</td>
<td>20</td>
<td>CEO/MD</td>
<td>69</td>
<td>46</td>
</tr>
<tr>
<td>Chinese</td>
<td>114</td>
<td>76</td>
<td>Manager</td>
<td>81</td>
<td>54</td>
</tr>
<tr>
<td>Indian</td>
<td>6</td>
<td>4</td>
<td>Total</td>
<td>150</td>
<td>100</td>
</tr>
<tr>
<td>Total</td>
<td>150</td>
<td>100</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Table 2: Number of employees at last fiscal year

<table>
<thead>
<tr>
<th>Employees</th>
<th>Frequencies</th>
<th>Percentages</th>
<th>No Employees</th>
<th>Frequencies</th>
<th>Percentages</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;50</td>
<td>48</td>
<td>32</td>
<td>&lt;50</td>
<td>12</td>
<td>8</td>
</tr>
<tr>
<td>51-100</td>
<td>60</td>
<td>40</td>
<td>51-100</td>
<td>30</td>
<td>20</td>
</tr>
<tr>
<td>101-150</td>
<td>12</td>
<td>8</td>
<td>101-150</td>
<td>18</td>
<td>12</td>
</tr>
<tr>
<td>151-200</td>
<td>6</td>
<td>4</td>
<td>151-200</td>
<td>15</td>
<td>10</td>
</tr>
<tr>
<td>200&lt;</td>
<td>24</td>
<td>16</td>
<td>200&lt;</td>
<td>75</td>
<td>50</td>
</tr>
<tr>
<td>Total</td>
<td>150</td>
<td>100</td>
<td>Total</td>
<td>150</td>
<td>100</td>
</tr>
</tbody>
</table>

Table 2 illustrates the respondent number of employees in last fiscal year. It shows that about 60% of the respondent number of employees in last fiscal year is more than 150 employees. While 40% of the respondent number of employees in last fiscal year is 150 or less.
Table 3 illustrates the respondent volume of business during start-up in (RM). It clearly shows that 80% of the respondents volume of business during start-up is 5,000,001-10,000,000 while 20% are <RM5,000,000.

**Table 3 Volume of business in last fiscal year**

<table>
<thead>
<tr>
<th>Volume of business at business start up</th>
<th>Volume of business in last fiscal year</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sale volume</td>
<td>Frequencies</td>
</tr>
<tr>
<td>&lt;5,000,000</td>
<td>30</td>
</tr>
<tr>
<td>5,001,000-10,000,000</td>
<td>120</td>
</tr>
<tr>
<td>Above 10,000,000</td>
<td>90</td>
</tr>
<tr>
<td>Total</td>
<td>150</td>
</tr>
</tbody>
</table>

Table 3 illustrates the respondent volume of business in the last fiscal year in Ringgit Malaysia (RM). It clearly shows that 60% of the respondents volume of business in last fiscal year is above 10,000,000, 30%, 5,000,001-10,000,000 while 10% are <RM 5,000,000.

**Conclusion**

The findings clearly indicates, the business strategy adopted by the T&CM industry are specializing by product type strategy, specializing by customer type strategy, growth strategy, differentiation strategy, low cost strategy, hold and maintain strategy. The performance of these T&CM industry was indicated by the number of employees and the volume of business which are increasing annually. Their performance are mainly depending on the nation’s economic growth and the regional economy as well as the world economic situation.

**Conflict of Interest:** Nil

**Source of Funding:** Self

**Ethical Clearance:** IJRISE Journal Reviewer Committee

**References**

8. FMI Analysis 2015
9. Ministry of Health Report 2018
Robotic Surgery: A Technovative Approach to Medical Surgeries

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Abstract

Purpose: Robotic surgery is a prominent technology that holds a significant contribution towards the perception of medical science in performing surgeries, often interpreted as the new revolution. The objective of the study is to evaluate the challenges encountered by surgeons to perform robotic surgeries among different patients.

Design/Methodology/Approach: Convenience sampling method was adopted to conduct the study with a sample size of 60 respondents, surgeons of various private hospitals based on the primary data collected from the respondents. ANOVA, Chi-square statistical tests were performed using Statistical Package for Social Science (SPSS). Age, Gender, Specialization area, Cost, Treatment, Perception, Comfort level, Experience, and Surgery were the variables considered.

Findings: Surgeons are more comfortable in treating different types of diseases implementing robotic surgery across the different patients irrespective of surgeon’s gender being significant at 0.05 per cent level at p (0.049), age group of surgeons at p (0.036). They can perform the surgery easily based on their expertise area while treating all types of diseases with a greater level of comfort which is significant at 0.01 per cent level.

Originality/Value: Robotic surgery has an exceptional significance in transforming the world of surgery with benefits like smaller incisions, better visualization, fewer scars, less pain, shorter hospital stay, fewer side effects, and faster recovery time. It also promotes the application of innovative technology in treating the most complicated diseases with ease.

Keywords: Robotically-Assisted-Surgery (RAS), Surgeon, and Arthrobot.

Introduction

Surgery is a medical process especially using operative manual and instrumental techniques on a patient to treat a pathological condition. This traditional process has challenges in terms of human error, timely diagnosis, not adapting innovative technology resulting in either death of patients or unsuccessful surgery. Robotic surgery has an exceptional significance in transforming the world of surgery with benefits like smaller incisions, better visualization, fewer scars, less pain, shorter hospital stays, fewer side effects, faster recovery time. It is based on the “minimally invasive” approach where miniature surgical instruments are inserted into the body of patients by the surgeons roughly of a quarter inch size through a large incision. Robotically –Assisted-Surgery (RAS) was developed to
enhance the capabilities of performing open surgeries based on two important methods:

**Direct telemanipulator:** A tele manipulator is a remote manipulator that allows the surgeons to perform the normal movements linked with the surgery while the robotic arms carry out those movements using end-effectors and manipulators to perform actual surgery on the patients.

**Computer Control:** In computer-controlled systems, the surgeons use a computer to control the robotic arms and its end-effectors, though these systems can also still use telemanipulator for their input. One of the advantages of using this computerized method is that the surgeon does not have to be present, but can be anywhere in the world, leading to the possibility for remote surgery.

**Conceptual Framework**

The first robot that came into the state of reality to assist surgery was ‘ARTHROBOT’ which was developed and used for the first time in Vancouver in 1983. Biomedical engineer Dr. James McEwen, Geof Auchinleck, a UBC engineering physics graduate, and Dr. Brian Day as well as the team of engineering students were closely associated with the development of ‘ARTHROBOT’. The robot was used in an orthopedic surgical procedure in 1984 at the UBC Hospital in Vancouver and over 60 plus arthroscopic surgical procedures were performed in the first 12 months. A surgical robot ‘SCRUB NURSE’ was developed and was able to handle operative instruments on voice command. SRI International and Intuitive Surgical an American corporation that develops manufactures and markets robotic products carried out the development of robotic systems by introducing Da Vinci Surgical System and computer motion with Automated Endoscopic System For Optimal Positioning (AESOP) and the Zeus Robotic Surgical System (ZRSS) robotic surgical system. The first robotic surgery took place under the direction of Robert E. Michler at Ohio State University Medical Center in Columbus. In 1998 ZEUS Robotic surgical system underwent various surgeries which include fallopian tube reconnection, a beating heart coronary artery bypass graft in 1999, and cholecystectomy performed remotely in 2001. The importance of this surgery is gaining popularity with marginal errors during the process.

**Literature Review**

Robotic-assisted surgery is equipped with a 3-dimensional camera which makes surgeons easy to operate and also there is a separate room where surgeons can operate without any help from another surgeon. The studies also show how robotic surgery will be overtaken by laparoscopic surgery. The surgeons are also worried about the cost associated with robotic surgery and longer functioning time. Computer-assisted surgical systems should be used by surgeons who have undergone through official training, not the surgeons who operate traditional surgery. In robotic-assisted surgery, traditional surgeons with lack of training have resulted in negative outcomes so a surgeon must undergo formal official training to eradicate such outcomes. This surgery is still in growing stage or can be also said to be in the initial stage and its niche has not yet well defined. Robotic surgery is a stirring visible technology which is taken by the surgical profession by more gale. The author examines that robotic devices seem to have more of a marketing role than a practical role. The authors also questions that the manufacturers of robots do not disclose the cons associated with it. The authors identified major findings that India is readily accepting this robotic surgical innovation, the use of which is on continuous rise and will cover entire market if cost factor is considered as it is second largest populated country in the world proving to be a huge market for inducing robotic surgery systems and demand from the patient’s side should not be overlooked. Occurrence but not important it wouldn’t be fair to say the image of recent past, is finally seen into the reality of today and of unmatched surgical a merit for tomorrow. Technological innovation must be tested and coined with affordability, accessibility, availability, appropriate and acceptable. As far as robotic surgery is concerned the above five things must be considered. The paper also examined the typical Indian mind set which takes a long time to accept new technologies and adopt it compared to western countries. The paper also states why robotic technology is not widely accepted in India and the reason behind it is a huge cost, the time required for setup, applicability in all the cases and the learning curve. There are other reasons as surgeons are untrained, unskilled to operate the robotic system.

**Statement of the Problem**

Robotic surgery is one of the most significant advances in recent years. It has scope in various areas
of surgeries like Urological Surgery, Gynecological Surgery, Cardio Thoracic Surgery, General Surgery and other surgeries safer with far superior results as compared to laparoscopic or open surgery. Hence the researcher has attempted to analyze the practical concerns encountered by patients and surgeons with special reference to robotic surgery being performed in hospitals.

**Objectives**

Evaluate the challenges faced by the patients and surgeons towards robotic surgery.

**Hypothesis**

Ho: There is no significant variance between the gender, an age of the surgeon, area of specialization, years of experience and the problems faced by the surgeon.

**Sampling**

Convenience sampling method has been adapted to survey 60 respondents which were collected from Hospitals in Bangalore city.

**Data Collection & Source**

Primary data forms the base for the study through a structured questionnaire duly filled by the surgeons belonging to different age groups and specialized areas.

**Variables & Statistical Tools Used**

Age, Gender, Specialization area, Cost, Treatment, Perception, Comfort level, Experience, and Surgery

**Limitations**

The study was confined only to the Hospitals in Bangalore city, sample size collected from urban Bangalore and also the time constraint.

**Results**

**Table 1: Gender & Challenge faced by the Surgeons**

<table>
<thead>
<tr>
<th>Challenges</th>
<th>Gender</th>
<th>Sum of Squares</th>
<th>Mean Square</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Treatment</td>
<td>Between groups</td>
<td>.006</td>
<td>.066</td>
<td>0.581</td>
</tr>
<tr>
<td></td>
<td>Within groups</td>
<td>12.534</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>12.600</td>
<td>.216</td>
<td></td>
</tr>
<tr>
<td>Comfortability</td>
<td>Between groups</td>
<td>1.025</td>
<td>1.025</td>
<td>(0.049)*</td>
</tr>
<tr>
<td></td>
<td>Within groups</td>
<td>14.709</td>
<td>.254</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>15.733</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Perception</td>
<td>Between groups</td>
<td>.797</td>
<td>.797</td>
<td>0.116</td>
</tr>
<tr>
<td></td>
<td>Within groups</td>
<td>18.186</td>
<td>.314</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>18.983</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Computed from primary data

A one-way ANOVA was conducted to compare the effect of gender among the surgeons in performing the robotic surgery by the surgeons under challenges encountered with treatment type, level of comfort, perception conditions. There is no significant effect of gender on challenges encountered by surgeons under the condition of treating all the diseases appropriately at the p >0.05 level with 0.581 and perception of the using the robots in surgery at p > 0.05 (0.116). However, there is a significant effect on the level of comfort in the application of technology in operations by the surgeons as the p < 0.05 with 0.049.
A one-way ANOVA was conducted to compare the effect of different age group in performing robotic surgery by the surgeons based on the treatment type, level of comfort, perception conditions. There is no significant effect of different age groups on challenges encountered by surgeons under the condition of treating all the diseases appropriately at the $p > 0.05$ level with 0.426 and perception of the using the robots in surgery at $p > 0.05$ (0.792) but there is a significant effect on the level of comfort in the application of technology in operations with respect to the age group of the surgeons as the $p < 0.05$ with 0.036.

### Table 2: Age & Challenges faced by the Surgeons

<table>
<thead>
<tr>
<th>Challenges</th>
<th>Age</th>
<th>Sum of Square</th>
<th>Mean Square</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Treatment</td>
<td>Between groups</td>
<td>0.371</td>
<td>0.186</td>
<td>0.426</td>
</tr>
<tr>
<td></td>
<td>Within groups</td>
<td>12.22</td>
<td>0.215</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>12.60</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Comfortability</td>
<td>Between groups</td>
<td>1.733</td>
<td>0.867</td>
<td>(0.036)*</td>
</tr>
<tr>
<td></td>
<td>Within groups</td>
<td>14.00</td>
<td>0.246</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>15.73</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Perception</td>
<td>Between groups</td>
<td>0.155</td>
<td>0.077</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Within groups</td>
<td>18.82</td>
<td>0.330</td>
<td>0.792</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>18.98</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Significant at 0.05 per cent level.
Source: Computed from Primary data

### Table 3: Surgeons Area of Specialization & Challenges faced by them

<table>
<thead>
<tr>
<th>Challenges</th>
<th>Area Of Specialization</th>
<th>Sum Of Squares</th>
<th>Mean Square</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Treatment</td>
<td>Between groups</td>
<td>6.179</td>
<td>.833</td>
<td>(0.000)**</td>
</tr>
<tr>
<td></td>
<td>Within groups</td>
<td>6.421</td>
<td>.123</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>12.600</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Comfortability</td>
<td>Between groups</td>
<td>6.122</td>
<td>.875</td>
<td>(0.000)**</td>
</tr>
<tr>
<td></td>
<td>Within groups</td>
<td>9.612</td>
<td>.185</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>15.733</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Perception</td>
<td>Between groups</td>
<td>2.729</td>
<td>.390</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Within groups</td>
<td>16.255</td>
<td>.313</td>
<td>0.295</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>18.983</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Significant at 0.01 per cent level.
Source: Computed from Primary data
Surgeons belong to different areas of expertise that facilitate them in performing the robotic surgery in treating the various diseases more effectively as it has significant effect on the surgery performed with \( p > 0.01 \) (0.000) and their level of comfort towards handling the system while performing the surgery with ease as it has significant effect on the surgeries performed with \( p > 0.01 \) (0.000). However, the perception towards the usage of the technology is not significant based on the area of expertise as the p-value < 0.05 (0.295).

Table 4: Experience in Surgery with Robotic System & Challenges faced by the Surgeons

<table>
<thead>
<tr>
<th>Challenges</th>
<th>Robotic System Experience</th>
<th>Sum Of Squares</th>
<th>Mean Square</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Treatment</td>
<td>Between groups</td>
<td>.789</td>
<td>.789</td>
<td>0.054</td>
</tr>
<tr>
<td></td>
<td>Within groups</td>
<td>11.811</td>
<td>.204</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>12.600</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Comfortability</td>
<td>Between groups</td>
<td>1.687</td>
<td>1.687</td>
<td>0.11</td>
</tr>
<tr>
<td></td>
<td>Within groups</td>
<td>14.047</td>
<td>.242</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>15.733</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Perception</td>
<td>Between groups</td>
<td>.102</td>
<td>.102</td>
<td>0.577</td>
</tr>
<tr>
<td></td>
<td>Within groups</td>
<td>18.881</td>
<td>.326</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>18.983</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Significant at 0.05 per cent level.
Source: Computed from Primary data

One way ANOVA resulted that there is no statistical significance when challenges faced by the surgeons on their level of comfort towards application of robotic system in performing surgeries across the patients based on the experience in handling the robotic systems with \( p < 0.05 \) (0.11), treating the different types of diseases as \( p > 0.05 \) (0.054) and their perception towards the application due to the fact p-value is less than 0.05 (0.577).

Table 5: Age of Surgeon & Overall cost for a patient

<table>
<thead>
<tr>
<th>Surgeon’s Age</th>
<th>No of Surgeries</th>
<th>Overall cost (Rs)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>6-10 (Lakhs)</td>
<td>11-15(Lakhs)</td>
</tr>
<tr>
<td>31-40 yrs</td>
<td>Count</td>
<td>10</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>Per cent</td>
<td>40</td>
<td>60</td>
</tr>
<tr>
<td>41-50 yrs</td>
<td>Count</td>
<td>15</td>
<td>17</td>
</tr>
<tr>
<td></td>
<td>Per cent</td>
<td>46.9</td>
<td>53.10</td>
</tr>
<tr>
<td>51-60 yrs</td>
<td>Count</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Per cent</td>
<td>33.3</td>
<td>66.7</td>
</tr>
<tr>
<td>Total</td>
<td>Count</td>
<td>26</td>
<td>34</td>
</tr>
<tr>
<td></td>
<td>Per cent</td>
<td>43.3</td>
<td>56.7</td>
</tr>
</tbody>
</table>

Pearson Chi-square Value

| Sig. | 0.819 |

Source: Computed from Primary Data
Chi-square test was computed to compare the overall cost incurred by the patients based on the number of surgeries performed by the surgeons depending on their age groups. There is no statistical significance between the age group of surgeons and the overall cost incurred by the patients when they opt robotic surgery as the p-value is greater than 0.05 (0.819).

### Table 6: Number of Years of Experience with Robotic System & Overall Cost for a patient

<table>
<thead>
<tr>
<th>Experience</th>
<th>No of Surgeries</th>
<th>Overall cost (Rs)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>6-10 (Lakhs)</td>
<td>11-15(Lakhs)</td>
</tr>
<tr>
<td>2-5 yrs</td>
<td>Count</td>
<td>23</td>
<td>20</td>
</tr>
<tr>
<td></td>
<td>Per cent</td>
<td>53.5</td>
<td>46.5</td>
</tr>
<tr>
<td>6 yrs &amp; Above</td>
<td>Count</td>
<td>3</td>
<td>14</td>
</tr>
<tr>
<td></td>
<td>Per cent</td>
<td>17.6</td>
<td>82.4</td>
</tr>
<tr>
<td>Total</td>
<td>Count</td>
<td>26</td>
<td>34</td>
</tr>
<tr>
<td></td>
<td>Per cent</td>
<td>43.3</td>
<td>56.7</td>
</tr>
</tbody>
</table>

Pearson Chi-square Value: 6.374

Sig.: 0.12

Source: Computed from Primary Data

The results obtained from the chi-square shows that there is no statistical significance between the number of years of experience surgeons performing a surgery applying robotic system and its impact on the overall cost incurred by the patients as the “p” value is 0.12 (> 0.05).

### Table 7: Number of years of experience & Recovery time of a patient

<table>
<thead>
<tr>
<th>Robotic system Experience</th>
<th>No of Surgeries</th>
<th>Recovery Time</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Day 1</td>
<td>Day 2</td>
</tr>
<tr>
<td>2-5 yrs</td>
<td>Count</td>
<td>5</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>Per cent</td>
<td>11.6</td>
<td>16.3</td>
</tr>
<tr>
<td>6 yrs &amp; Above</td>
<td>Count</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Per cent</td>
<td>5.9</td>
<td>11.8</td>
</tr>
<tr>
<td>Total</td>
<td>Count</td>
<td>6</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>Per cent</td>
<td>10</td>
<td>15</td>
</tr>
</tbody>
</table>

Pearson Chi-square Value: 2.252

Sig.: 0.689

Source: Computed from Primary Data

There is a negative relationship between age of the surgeon and time period for recovery of a patient opting robotic surgery as the probability value is 0.689 for the surgeons experienced in robotic systems. Hence, the relationship is not statistically significant.

### Findings & Discussions

There is significant variance between the genders of surgeons in treating the different diseases based on their comfort level by the surgeons while performing the surgery through the robotic system but has no variance.
between the gender and the different diseases treated the perception of the surgeons towards the robotic surgeries. Surgeons are more comfortable in treating different types of diseases implementing robotic surgery across the different patients. There is no effect of an experienced surgeon who has been applying the robotic system in their surgeries among the patients on the challenges encountered by them. There exists a negative relationship between age of surgeon and overall cost for a patient opting for robotic surgery.

**Conclusion**

The integration of Artificial Intelligence and Augmented Reality has shown rapid improvement in healthcare. Robotic surgery is one example of such technology that may reduce hospital stay, operative morbidity and recovery period. Still the level of awareness among patients is comparatively low and also costs associated with robotic surgery is higher and as a result, certain category of people are covered under this type of surgeries. Also, hospitals should be made accountable if malfunctioning happens while operating robotic surgery.

**Conflict of Interest:** Nil

**Source of Funding:** Self

**Ethical Clearance:** IJRISE Journal Reviewer Committee

**References**

A Study on Impact of Nutrition Labeling on Buying Behavior

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Abstract

Health is a major source of living. Fast and irregular food habits and unhealthy practices of individuals, in modern days tax more on health. “You cannot buy your health; you through health living.”- Rightly said by Joel Fuhrman. The study investigates the impact of nutrition labeling on buying behavior. Structured questionnaire was employed and circulated to departmental shoppers in Chennai. Regression is employed to identified impact of the predominate factors of nutritional labeling which influencing the buying behavior of consumers. Result highlighted that trust on nutritional labeling; education level and nature of food habit of consumer impact the factors influencing the nutritional labeling. Buying behavior is impacted by mindful buyer and ignorant buyer positively and negatively.

The study concludes that nutritional labeling is attracted by the few buyers like healthy diet seekers, people in cure of unhealthy food practices and old age people.

Key words: Nutritional labeling, healthy food practices, healthy diet.

Introduction

India is a country for multi-dimension attributes especially in culture and food. The traditional methods of food habit and belief in health conscious make people unique and strong¹. The present food habit and quality less tasty food impulse the youth to scrawny and unhealthy. The changes in the environment and work nature make the people to skip the routine and traditional nourish habit. The health issues on diet have been increased intensely high in the last decades. Lot of health hazards and mortality rate reflects in the impact of wrong food habits which paw the way for risks like blood pressure, cardio disease and high body mass index. The malnutrition is becoming serious note to the growing nations. The need of the hour to trust the food packet to know the nutritional scale’s level. The promises of product make people to feel better and believe the corporate food product. Consequently, nutritional labeling has emerged as an important aspect of consumers’ food purchase decisions.

The nutritional content in food product is considered to be a credence attribute. However, if trustworthy nutritional labels are available, it could function as a search characteristic. Many developed countries has long recognized the potential of standardized on back nutrition information and has mandated the presence of nutritional labels on all processed food products. Growing literacy and technology paved a way to know the best of healthy foods and their sources. This made the corporate to more focus on the content and elements of food on food and other mandatory products. The study would like to identify one of the diverged metropolitan city Chennai residence preferences in nutritional labeling.

The study investigates the intension of the consumers buying behavior by considering the nutritional labeling. The consumer forum and brand power codes stimulate the buyer to more conscious in making choice of the product. The changing trend to become Ayurvedic and organic food consumption kindle to focus on the nutritional labeling. The study was under take with following questions: RQ1. Which resource gives them more awareness about nutritional labeling?, RQ2. Does the labeling significantly influence the buying behavior of the consumers? and RQ3. Does the demographic variable impact their buying behavior?
Review of Literature

The food labeling can impress the consumer or its target user that it is the product of his choice, which suits him / her according to needs. Thereby, the correct and required labeling undoubtedly promotes the sale of the product and attracts the customers. Food labeling serves as a primary link of communication between the manufactures of packer of the food and user or consumer on the other hand. every packets food articles for the domestic use has to be labeled in accordance to the related Indian Food law i.e. Food safety and standards (packaging and labeling) regulation, 2011 notified by Food safety and standards Authority of India (FSSAI) Food safety helpline.com (2013).

According to the FDA (1998) a label should clearly and minimally state the name of the product, the net weight, the nutrition facts, the name and address of the manufacturer and the brand name. These food labels have become increasingly complex, particularly as products move from the status of basic commodities to highly processed, value – added products (APO, 2002). The Indian consumers have been responding to changes in quality of food intake and are becoming more conscious about nutritional diet, health, and food safety issue4. According to Norhidayah Azman, Siti Zeleha Sahak (2014)7 study defining the use of nutritional label has a multi dimensional issue.

Now a day, customer is concerned not only on the appearance of the products but also on the nutritional information in the packaged food sold at retail outlets. By providing a nutritional label, it will assist customer in making healthier choice5. Consumers consulted labels mostly as assistance in purchase decisions for examples comparing price, expiry dates etc. but very few read information regarding certification mark from quality agencies like FPO, Agmark etc5. In recent days consumers are becoming more clear and aware and showing greater concern about what they eat. The recent controversy in Maggi, Coke, Pepsi and korkuray in India, which lead to aversion among the consumer still the ignorance and attractive advertisements make them to depend on the product. The main indention of the consumer is to transfer information from the produces to the consumers.

Objectives of the Study

To study the buying behavior on nutritional labeled products.

To study the awareness of the consumers regarding nutritional information on selected product

Identify the factors influence to buy the nutritional labeled product.

Research Methodology

The present study is analytical in nature and has adopted survey method for its findings. This study is based mainly on the primary data collected from the respondents residing in Chennai. The through a well-designed and well-structured questionnaire. However, efforts were also taken to collect information from all available published data, especially from websites, newspapers, magazines and journals.

Sampling Size and Design: Non-random convenient sampling method was adopted for collecting primary data. A total of 165 questionnaires were issued and the respondents were given sufficient time for filling the questionnaire. 165 of the issued questionnaire were received back from the respondents. On scrutiny of these 60 of them were found to be incomplete. So, they were rejected and the remaining 105 samples were taken for the study.

Questionnaire Design and Scaling Pattern: A questionnaire with three sections was finalized to collect information from the respondents. Section one deals with the various demographic profiles of the respondents. Section two contains with the consumer perception towards nutrition labeling and followed by rest of the section consist the consumer attitude towards nutrition labeling and it is measured through appropriate 5 point Likert scale. The test the reliability and consistency of the instrument the Cronbach’s Alpha reliability co-efficient were conducted and the value being 0.88 indicates that, the scale is more consistent and highly reliable in nature.

Statistical Software and Tools Selection: The data collected were subjected to analysis using PSPP Version 1.0.1 which is free alternative software for IBM SPSS Statistics. The statistical tools such as, percentage analysis, factor analysis and multiple regression analysis were used to draw meaningful answers to research objectives.
Results and Discussion

Demographic Profiles of the Respondents:
Percentage analysis has been applied to understand the demographic profiles of the respondents such as gender, age, educational qualification, occupational status, annual income, area of living, religion, nature of food habit and followed by consumer perception towards nutrition labeling such as, reading labeling information before purchase food product, source of information getting nutrition labeling and high price and the results are shown in table 1.

Table 1: Demographic Profile of the Respondents

<table>
<thead>
<tr>
<th>Demographic Characteristics (N = 105)</th>
<th>Frequency (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>54 (51)</td>
</tr>
<tr>
<td>Female</td>
<td>51 (49)</td>
</tr>
<tr>
<td>Age (In Years)</td>
<td></td>
</tr>
<tr>
<td>20 – 30 Years</td>
<td>30 (29)</td>
</tr>
<tr>
<td>31 – 40 Years</td>
<td>24 (23)</td>
</tr>
<tr>
<td>41 - 50 Years</td>
<td>22 (21)</td>
</tr>
<tr>
<td>51 – 60 Years</td>
<td>20 (19)</td>
</tr>
<tr>
<td>Above 60 Years</td>
<td>9 (8)</td>
</tr>
<tr>
<td>Educational Qualification</td>
<td></td>
</tr>
<tr>
<td>Below HSC</td>
<td>8 (8)</td>
</tr>
<tr>
<td>HSC</td>
<td>18 (17)</td>
</tr>
<tr>
<td>UG</td>
<td>40 (38)</td>
</tr>
<tr>
<td>PG</td>
<td>19 (18)</td>
</tr>
<tr>
<td>Professional</td>
<td>20 (19)</td>
</tr>
<tr>
<td>Occupational Status</td>
<td></td>
</tr>
<tr>
<td>Employee</td>
<td>39 (37)</td>
</tr>
<tr>
<td>Business</td>
<td>22 (21)</td>
</tr>
<tr>
<td>Home Maker</td>
<td>31 (29)</td>
</tr>
<tr>
<td>Others</td>
<td>13 (13)</td>
</tr>
<tr>
<td>Annual Income (In Rs.)</td>
<td></td>
</tr>
<tr>
<td>Below Rs. 1 lakh</td>
<td>12 (11)</td>
</tr>
<tr>
<td>Rs. 1 – Rs. 2 lakhs</td>
<td>36 (34)</td>
</tr>
<tr>
<td>Rs. 2 – Rs. 3 lakhs</td>
<td>23 (22)</td>
</tr>
<tr>
<td>Rs. 3 – Rs. 4 lakhs</td>
<td>21 (20)</td>
</tr>
<tr>
<td>Rs. 4 lakhs above</td>
<td>13 (12)</td>
</tr>
<tr>
<td>Region</td>
<td></td>
</tr>
<tr>
<td>Urban</td>
<td>50 (48)</td>
</tr>
<tr>
<td>Sub Urban</td>
<td>55 (52)</td>
</tr>
<tr>
<td>Religion</td>
<td></td>
</tr>
<tr>
<td>Hindu</td>
<td>66 (63)</td>
</tr>
<tr>
<td>Muslim</td>
<td>19 (18)</td>
</tr>
<tr>
<td>Christian</td>
<td>20 (19)</td>
</tr>
<tr>
<td>Nature of Food Habit</td>
<td></td>
</tr>
</tbody>
</table>

The study figure-outs that male and female were more or less equal in this sampling and their opinion is similar on nutritional labeled product. Major respondents fall under the category of 20-30 years of age group. Major respondents are non-vegetarian, sub urban and Hindu religious. The study highlights that irrespective of the respondent’s nature of occupation, living place, religion, nature of food habit and annual income are differing but their opinion on the nutritional labeling are comparable. This says that the respondents were look in to the nutritional labeling and reading the content all the time before they buy from the departmental stores. The major informers of awareness of nutritional labeling of products are television and followed by health professionals. The respondents agreed that that they are not ready to pay high price for the nutritional labeling. They believe it is part of their responsibility which packing and marketing the product. Most of the consumers reported that they read food labels, and check safety, and genuineness and quality the food labeling before buying pre-packaged food Sudershan R Vemula., et al (2013)^9.

Exploratory Factor Analysis: The factor analysis was applied for data reduction process and to identify predominant factors which influence the buying behavior of the customer on nutritional labeled products. Kaiser –Meyer – Olkin Measure of sampling Adequacy test reveled 84.8% of adequacy of data and initial Eigen values extraction on loading factors is 69% of the total variance. The factor analysis identified four factors that
influence the nutritional labeling on buying behavior. The factors were Mindful buyer, ignorant buyer, learners and unconcern buyers. The Cronbach’s reliability test also has been applied to identify the reliability of the data. The test acknowledged 88% of reliability of the data.

**Multiple Linear Regression:** Linear regression was employed to examine the relationship between the demographic variables with factors motivating the respondent on look in to nutritional labeling. The factors motivating the respondent on look in to nutritional labeling serve as predictors and the explain the variance in independent variable such as age, gender, region, monthly income, educational qualification, annual income, trust on Nutritional labeling, nature of food habit. Factors motivating NL variable influence only three on out of all independent variable. They are trust on NL, nature of food habit and education of the respondents. The test proves the correlation R=0.592, F and P value (F value = 15.056, P value =.000) shows at 5% level of significance there is strong relationship between factors motivating NL with trust on NL, nature of food habit and education of the respondents. The model is frames as Y= 42.05 – 5.06 X1 – 3.488 X2 + 1.213 X3

<table>
<thead>
<tr>
<th>Predictor variable</th>
<th>B Value</th>
<th>T value</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Factors Motivating NL (Constant)</td>
<td>42.050</td>
<td>12.050</td>
<td>.000</td>
</tr>
<tr>
<td>Trust on NL</td>
<td>-5.060</td>
<td>-4.112</td>
<td>.000</td>
</tr>
<tr>
<td>Nature of Food Habit</td>
<td>-3.488</td>
<td>-2.948</td>
<td>.004</td>
</tr>
<tr>
<td>Education Qualification</td>
<td>1.213</td>
<td>2.477</td>
<td>.015</td>
</tr>
</tbody>
</table>

R= .556, R^2=.31 , F value = 15.056, P value =.000

The linear regression was applied to examine the relationship and influence between of factors on buying behavior with buying behavior of respondent. Buying behavior play as predictor has dependent variable were has factors are independent variables. The below tables -2 shows the model summary and co efficient of regression by taking buying behavior of the respondent as a predictor variable to explain the relationship towards the independent variables of factors influence the nutritional labeling. Buying behavior of the respondent variable only influences the two factors namely, mindful buyer and ignorant buyer. The test proves the correlation R=0.744, F and P value (F value = 63.388, P value =.000) shows at 5% level of significance there is strong relationship between buying behavior of the respondent with factors influencing the nutrition labeling. The model is frames as Y = 17.670 +1.435 X1 -0.359 X2

<table>
<thead>
<tr>
<th>Predictor variable</th>
<th>B Value</th>
<th>T value</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Buying Behavior (constant)</td>
<td>17.670</td>
<td>8.078</td>
<td>.000</td>
</tr>
<tr>
<td>Mindful Buyer</td>
<td>1.435</td>
<td>9.920</td>
<td>.000</td>
</tr>
<tr>
<td>Ignorant Buyer</td>
<td>-0.359</td>
<td>-2.994</td>
<td>.003</td>
</tr>
</tbody>
</table>

R= .744, R^2=.55 , F value = 63.388, P value =.000
Consumers demand for detailed information regarding content and nutrition of packaged food products is amplifying in recent days. Regression test of table -1 highlights that encouraging factors of preferring nutritional labeling are influenced by trust on nutritional labeling. Shoppers of the departmental stores are almost learned and educated respondents. They really look into the details of the product on the packets such as ingredients, date of manufacture, price and type of nature like vegetarian or non-vegetarian. Most of the consumer seek canned food and they look more on ingredients, health claim, nutritional information, producers, country of origin, and net weight on the package. India is a country where the customs are very rigid and non-violatable. Many of the respondents are very particular about the contents of the food item like vegetarian or non-vegetarian based ingredients. Most of the vegetarians keen about the content of the food where as non-vegetarian or less in nature. Education level also play major role in the impact of buying motive of nutritional labeling because the more shoppers are business and employee based respondents are found more in departmental stores. The Indian consumers have been responding to change of intake and becoming more conscious about nutritional diet, health, and food safety issues. The buying behavior influenced by the major two factors such as mindful buyer and ignorant buyers. Both responders are extreme in their nature. Mindful buyer they are very conscious on their choice but ignorant are least bother about the nutritional labeling. They buy the product when it is discounted, may be language is unknown, very little print on pack and they are hurry to buy. Ignorant buyers they rarely look in to the labeling because of the language they may not follow, content letter may be little to read and understand, they buy product routine, and when it is in offer. The regression is negatively impact on the buying behavior of the respondent this is because only fast shoppers and offer sale buyer are not focus on the nutritional labeling. Though the respondents are well educated they may not look in to the details of the nutritional labeling when they purchase very faster. Sushil kumar and jabir Ali (2011) conclude that most of the lifestyle products such as breakfast cereals, readymade food etc. that would be used by people who have higher level of income and education would pay more attention to various kinds of labeling information.

Growing online sale influencing the behavior of the people to spotlight in all aspects. Especially big basket, Grofers, Amazon pantry, Bazaar car, etc. pulling the customer towards their commercial offers. May these sellers can focus on the high lighting the nutritional benefits through the labeling may attract many buyers. Health conscious of the people attract the new product with natures ingredience and benefits. Murali and Basisya (2007) triggered out that Indians check nutritional labels when purchasing a product for the first time, though consumer were concerned with nutritional information on food labels. Most of the Indian manufacture must give attention to nutritional labeling with proper standard to catch the attention of health conscious buyers. The study highlights that non-vegetarians are more conscious on nutritional labeling than vegetarians and majority of the respondent are reading the nutritional labeling before they buy. The changing habit of consuming good food will create good health and good thought.

Conflict of Interest: Nil

Source of Funding: Self

Ethical Clearance: IJRISE Journal Reviewer Committee.

References


Patient Satisfaction of BPJS Kesehatan Service after Three Years of Program Implementation

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Abstract

BPJS Kesehatan has had a large coverage in short period of time. The rapid expansion of health insurance coverage has created demand which cannot be met by current healthcare system and will disrupt the delivery service (Bredenkamp et al., 2015). The disruption of service, as a consequence, will influence the satisfaction. Patient satisfaction evaluation is important because it is not only as an important indicator to evaluate the achievement of the program but also it is important to improve treatment outcome. At present there is limited report on patients’ satisfaction to BPJS Kesehatan provider. This study is aiming to find out the satisfaction level of BPJS Kesehatan in Indonesia after 3 years of program implementation.

This study using questionnaires as survey instruments. Aiming to BPJS Kesehatan midair that pays monthly payment insurance in six hospitals in five big cities in Indonesia. Three hundred and twenty-eight questionnaires are eligible to be analyzed. Descriptive analyzed is done to evaluate the satisfaction rate. The result of the study shows that patients are satisfy with the interaction, support and services provided by BPJS Kesehatan patients, which is ninety-four per cent satisfaction. This study result is different with the pervious study which shows lower satisfaction rate. The explanation is that in this study majority of respondents come from private hospitals which known to have better service compares to public hospitals. To confirm the result of the study, further study which involved more balance public and private hospitals and big cities and small cities should be done to compare the satisfaction rate from each type of hospitals and cities. Further study to identify which variable of satisfactions are more influencing is also needed to identify are of improvement of BPJS Kesehatan services.

Keywords: BPJS Kesehatan, Satisfaction, Patient

Introduction

Everyone, regardless gender, ethnic and citizenship has the right to health. United Nations (UN) in its Universal Declaration of Human Right has stated in 1948, that “everyone has the right to a standard of living adequate for health and well-being of oneself and one’s family, including food, clothing, housing and medical care”. WHO (1978) declared that Health care is a fundamental right. Health is considered as one important factor which might affect the continuity of human well-being. Without health, people might jeopardize their productivity, loss their employment or lost their independency due to disability. Furthermore, healthcare expenditure can cause financial catastrophe. The healthcare expenditure has been known to increase the impoverishment in China (Liu et. al., 2003), Vietnam (Wagstaff & Doorslaer, 2001) and Kenya (Kimani et.al., 2016).

Indonesia is one of low and middle-income countries aiming to improve their health financing system and to implement universal health coverage (UHC). Starting just in January 2014, within less than 3 years, BPJS Kesehatan has successfully had a large coverage. In January 2017, BPJS Kesehatan has enrolled 172.97 million members according to BPJS official website. It is considered as the biggest single payer institution of Universal Health Coverage program in the world (Teh,
The rapid expansion of insurance coverage has created demand which cannot be met by current healthcare system (Bredenkamp et al., 2015). Furthermore, Bredempkamp et al., state that the sudden increase of demand will disrupt the delivery of service, especially in the public hospitals. As a consequence of disruption of service, the satisfaction level will be influenced. Currently, there is limited report on patients’ satisfaction to the service of BPJS Kesehatan. One study from Center for Health Economic and Policies Study from University of Indonesia shows that the satisfaction level to hospital service is 54% and the satisfaction level to doctor service is 44% (Thabrany, 2016). Dwidienawati & Abdinagoro (2017) in their small study also report similar result that the satisfaction rate is still below expectation. Only sixty per cent of respondent state that they are satisfy with BPJS Kesehatan service.

This study is aiming to find out the satisfaction level of BPJS Kesehatan in Indonesia after 3 years of program implementation.

**Literature Review**

Consumer satisfaction is seen by marketing literature originally as being an outcome resulting from the consumption experience. At present, the most dominant of the conceptual models of consumer satisfaction is disconfirmation. Satisfaction is defined as “the consumer’s fulfillment response”, a post-consumption judgment by the consumer that a service provides a pleasing level of consumption-related fulfillment, including under- or over-fulfillment (Oliver, 2015). Kashyap & Sivadas (2012) define satisfaction as consumer positive affective response to relationship exchange.

Newsome & Wright (1999) state that consumer satisfaction is at the very core of marketing theory and practice. Ramsaran-Fowdar (2008) further argue that retaining customers may be more profitable than attracting new ones, dissatisfied customers may lead to unfavorable behavior intentions such as negative word of mouth, doing less business or switching to alternative service provider.

In healthcare, Roberts & Reich (2002) argue that patients’ satisfaction is an important indicator to evaluate the achievement of public service system (Roberts & Reich, 2002). Investigating public satisfaction is the most common way to confirm public opinion and needs for policy innovation. However, it is demonstrated that there is link exist between satisfaction and patient compliance in areas such as appointment keeping, intentions to comply with recommended treatment and medication use. The high quality clinical outcome depends on compliance, which indirectly we can say it depends on patients satisfaction (Newsome & Wright, 1999). Therefore, patients’ satisfaction is also important to improve treatment outcome (Gill & White, 2013).

Patients’ satisfaction affects healthcare providers financially through referral and reimbursement. Patients’ satisfaction has also been linked to unsolicited complaints and medical malpractice lawsuits (Stelfox, Gandhi, Orav, & Gustafson, 2005).

**Method**

The population of this study is all BPJS Kesehatan Mandiri members, which total approximately 61 million. Data for statistical analysis were gathered through field survey to in April-July 2018. This survey was using questionnaire as instrument.

The survey was administered in five big cities on Java Island, Indonesia. The survey was designed to elicit the post-consumption judgement of BPJS Kesehatan providers (medical professionals and hospital staff). They were asked to self-rate the customer satisfaction from BPJS Provider services. Six hospitals in five big cities in Java Island were targeted. Six hundred and thirty-five questionnaires were distributed. Sample collection used the convenience sample collection method, due to time and resource limitations.

**Measures**

The survey explored respondents’ judgments of customer satisfaction. In the survey, respondents were asked to rate their level of agreement with particular items using a 6-point Likert scale anchored with strongly disagree and strongly agree. Mid-point is omitted to avoid social desirability bias.

Customer satisfaction was measured using three indicators modified from Carr (2007) and Kasyap & Sivadas (2012). The questionnaire was taping the respondent evaluation on satisfaction of interaction, support, and service.
Measurement model

Data from returned questionnaire was compiled and then analyse to find out the descriptive analysis of customer satisfaction. The measurement for latent variable customer satisfaction was analysed with LISREL.

Result

From six hundred and thirty-five questionnaires distributed, 100% questionnaires were returned. Since

<table>
<thead>
<tr>
<th>Category</th>
<th>No of Respondents</th>
<th>%</th>
<th>Accumulative %</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Hospitals</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. Public Hospital (1)</td>
<td>51</td>
<td>15.5</td>
<td>15.5</td>
</tr>
<tr>
<td>b. Private Hospital (5)</td>
<td>277</td>
<td>84.5</td>
<td>100</td>
</tr>
<tr>
<td>2. Occupation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. PNS/TNI/POLRI</td>
<td>19</td>
<td>5.8</td>
<td>5.8</td>
</tr>
<tr>
<td>b. State Owned Employees</td>
<td>13</td>
<td>4</td>
<td>9.8</td>
</tr>
<tr>
<td>c. Workers from Informal Sector</td>
<td>4</td>
<td>1.2</td>
<td>11.1</td>
</tr>
<tr>
<td>d. Private Sector Employees</td>
<td>116</td>
<td>35.4</td>
<td>46.5</td>
</tr>
<tr>
<td>e. Entrepreneurs</td>
<td>83</td>
<td>25.3</td>
<td>71.8</td>
</tr>
<tr>
<td>f. Others</td>
<td>90</td>
<td>27.4</td>
<td>99.2</td>
</tr>
<tr>
<td>g. No Answer</td>
<td>3</td>
<td>0.8</td>
<td>100</td>
</tr>
</tbody>
</table>

| 3. Usage of BPJS |                  |     |                |
| a. Often         | 265              | 80.8| 80.8           |
| b. Seldom        | 62               | 18.9| 99.7           |
| c. No Answer     | 1                | 0.3 | 100            |

| 4. Income        |                  |     |                |
| a. < 3 Million   | 117              | 35.7| 35.7           |
| b. 3 – 5 Million | 136              | 41.5| 77.2           |
| c. 5 – 10 Million | 59             | 18  | 95.2           |
| d. > 10 Million  | 16               | 4.8 | 100            |

| 5. Gender        |                  |     |                |
| a. Female        | 170              | 51.8| 51.8           |
| b. Male          | 157              | 47.9| 99.7           |
| c. No Answer     | 1                | 0.3 | 100            |

| 6. Education     |                  |     |                |
| a. SD/SMP        | 35               | 10.7| 10.7           |
| b. SMA and similar level | 158 | 48.2| 58.9           |
| c. Diploma       | 39               | 11.9| 70.8           |
| d. Bachelor      | 88               | 26.8| 97.6           |
| e. Master        | 6                | 1.8 | 99.4           |
| f. Doctor/PhD    | 0                | 0   | 99.4           |
| g. No Answer     | 2                | 0.6 | 100            |
Table 1 showed the respondent profile in this study. Eighty-nine three per cent was from high school and above. Seventy-seven per cent was from the middle class and above. Eighty-four per cent worked in private sector/informal and entrepreneurs.

Five out of six hospitals were private hospital. Only one hospital was public hospitals. Therefore, eighty-four per cent of respondents were from private hospitals.

Based on measurement analysis, three indicators of customer satisfaction

Table 2. Measurement Model Analysis of Customer Satisfaction

<table>
<thead>
<tr>
<th>CODE</th>
<th>Indicator</th>
<th>SFL &gt;0.5</th>
<th>t-value &gt;1.96</th>
<th>CR &gt;0.7</th>
<th>VE &gt;0.5</th>
<th>GOFI RMSEAm NNFI, CFI, IFI, SRMR, GFI, NormX²</th>
</tr>
</thead>
<tbody>
<tr>
<td>SAT 01</td>
<td>Customer is satisfied with the interaction</td>
<td>0.84</td>
<td>17.98</td>
<td></td>
<td></td>
<td>Model Fit is Perfect</td>
</tr>
<tr>
<td>SAT 02</td>
<td>Customer is satisfied with the support</td>
<td>0.93</td>
<td>20.63</td>
<td>0.9</td>
<td>0.75</td>
<td>Model Fit is Perfect</td>
</tr>
<tr>
<td>SAT 03</td>
<td>Customer is satisfied with the service</td>
<td>0.83</td>
<td>17.98</td>
<td></td>
<td></td>
<td>Model Fit is Perfect</td>
</tr>
</tbody>
</table>

Table 2 showed that 3 indicators used in this study to measure customer satisfaction were valid (SFL >0.5 and t-value >1.96), reliable (CR>0.7 and VE>0.5) and the model was in good fit (all GOFI criteria were met).

Table 3. Satisfaction Rate of each Indicator and Overall Satisfaction

<table>
<thead>
<tr>
<th></th>
<th>Customer is satisfied with the interaction</th>
<th>Customer is satisfied with the support</th>
<th>Customer is satisfied with the service</th>
</tr>
</thead>
<tbody>
<tr>
<td>Very much disagree</td>
<td>1%</td>
<td>1%</td>
<td>1%</td>
</tr>
<tr>
<td>Disagree</td>
<td>2%</td>
<td>1%</td>
<td>1%</td>
</tr>
<tr>
<td>Slightly disagree</td>
<td>4%</td>
<td>4%</td>
<td>3%</td>
</tr>
<tr>
<td>Slightly agree</td>
<td>12%</td>
<td>16%</td>
<td>14%</td>
</tr>
<tr>
<td>Agree</td>
<td>64%</td>
<td>63%</td>
<td>67%</td>
</tr>
<tr>
<td>Very much agree</td>
<td>18%</td>
<td>15%</td>
<td>14%</td>
</tr>
</tbody>
</table>

Almost all respondents agreed that they were satisfy with interaction (94%) with healthcare providers. Ninety-five per cent of respondents agreed that they were satisfy with the support given by the staff of healthcare providers. Regarding the service ninety-four per cent agreed that they were satisfy.

Discussion

Patients’ satisfaction is an important indicator to evaluate the achievement of public service system (Roberts & Reich, 2002). Investigating public satisfaction is the most common way to confirm public opinion and needs for policy innovation. However, patient satisfaction has another important role rather than just indicator of program achievement. Newsome & Wright (1999) stated that patient satisfaction will influence the compliance and participation to treatment. Therefore, patients’ satisfaction is also important to improve treatment outcome (Gill & White, 2013).

BPJS Kesehatan is a very important healthcare program for Indonesian. It give patients access to treatment without jeopardize their financial status. However, due to the rapid expansion, the service quality might not be able to catch up with the increasing number of patients. That will lead to lack of customer satisfaction.
The result of this study showed however, that the satisfaction level of BPJS service is quite good. More than ninety per cent respondents agreed that they are satisfied with interaction, support and service of healthcare provider. This result is different with showed by Thabrany (2016) and Dwidienawati & Abdinagoro (2017) that BPJS Kesehatan service is still not satisfying.

The reason behind the high rate of satisfaction is the profile of the hospitals. Table 1 showed that in this study only fifteen-point five percent respondents were from public hospitals, the rest were from private hospitals. When analyzed separately, it was shown that the satisfaction rate in the public hospitals was not as high as in the private hospitals. The satisfaction for interaction was only ninety per cent. As for satisfaction for support and service was only eighty-eight per cent.

Healthcare industry is a heavy regulated industry with so many procedures to follow. Especially in private hospitals which are very competitive. They have to set a good standard not only how to ensure the outcome of treatment but also how they treat their patients. The staff of the private hospitals have to act and communicate to patients in certain way. Healthcare staffs are well trained. How patients rate them is important. Some hospitals even implement the customer survey and use the rating result as part of performance appraisal. Therefore, the way they treat and communicate with patients can be expected as polite and respectful. The follow up interview conducted to BPJS patients confirmed that the reasons patients choose to go to private hospitals for BPJS service because the healthcare professional who treat them were polite and friendly.

**Conclusion**

This paper sought to explore the satisfaction rate of patients to BPJS Kesehatan service provider. Patient satisfaction evaluation is important because it is not only as an important indicator to evaluate the achievement of the program but also it is important to improve treatment outcome.

The result of the study showed that patients are satisfy with the interaction, support and services provided by BPJS Kesehatan pasien. This study result is different with the pervious study by Thabrany (2016) and Dwidienawati & Bramantoro (2018) which showed lower satisfaction rate. In this study satisfaction rate was ninety-four per cent. The explanation because of the different of hospitals profile. In this study eighty-five per cent of respondents are from private hospitals. Yet, due to competitive nature, private hospitals are known to have better standard compared to public hospitals.

To confirm the result of the study, further study which involved more balance public and private hospitals and big cities and small cities should be done to compare the satisfaction rate from each type of hospitals and cities. Further study to identify which variable of satisfactions are more influencing is also needed to identify are of improvement of BPJS Kesehatan services.

The managerial contribution will be giving the insight to BPJS Kesehatan that the current health care provider service especially from private hospitals is satisfying. With that insight, BPJS Kesehatan needs to put some effort to involve more private hospitals in giving services to BPJS Kesehatan patients. It will help increasing the access to treatment and helping government spends less build new public hospitals.

**Conflict of Interest:** Nil

**Source of Funding:** Self

**Ethical Clearance:** IJRISE Journal Reviewer Committee

**References**


Heat Transfer Model for Firefighter’s Burn Injury

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Abstract

Burn injury is a common injury that can occur in firefighting. Personal protective clothing is used for protection against fire hazards and burn injuries. The purpose of this study is to assess the effectiveness of firefighter’s personal protective clothing by utilizing heat transfer model in finite element analysis. The model used a 2 dimensional quarter circle geometry representing the human limb as it is the most common area for burn injury. The result shows skin temperature increases significantly with the heat flux intensity. Findings shows that the heat flux of 1200W/m² causes skin temperature to be at 38.3°C. The initial skin temperature will gradually rise at t = 0 second and approaches it’s steady at t = 198 seconds. The increment in air gap thickness reduces the heat stress effect. The reduction of 1 mm air gap thickness contributes to an increment of 0.2°C of the skin temperature.

Keywords: Firefighter; burn injury; heat transfer

Introduction

Thermal protective clothing is primarily designed to provide protection from thermal hazards which include exposure to high temperature radiant sources, flame impingement, hot liquids and gasses. Heat flux transmitted by thermal hazards ranges from 20 – 160 kW/m² and encountered during large fires and explosions¹. Existing protective clothing is capable of providing protection against thermal hazards and can sustain the heat flux intensities in the range of 5 to 20 seconds². Exposure to low-level radiation heat flux ranging from 5 kW/m² to 20 kW/m² has been found to be the most common thermal hazards that could cause skin burn injuries³.

There are many factors that influence burn injuries, such as heat flux, protective clothing material properties and the air gap thickness. Previous researchers utilized bench scale test¹¹ thermal manikin³ in order to exert flash fire to study the effect of skin temperature. The human limb is the most common part of the human body where injury occur among fire fighters⁵. To achieve a more accurate result, studies and experimentations need to be conducted on two dimensional quarter circle geometry that represent the human limb.

Air gap thickness has significant influence to skin burn¹⁰, ¹¹. The air gaps located between the human skin and the inner surface of the personal protective clothing formed a buffer region restricting heat transfer from the heat exposure to the human skin. When exposed to heat, the air gap acts as an insulator protecting from burn injuries. Psikuta et al. (2012) and Li et al. (2013) studied the effect of air gap thickness using body scanner on thermal manikin.

In this study, a new and practical approach is developed to assess the effects of heat flux intensity and air gap thickness on the human skin temperature in quarter circle geometry using finite element analysis.

Literature Review

Burn injury is a common injury that occur during fire fighting. The statistics show that more than 75,000 burn injuries and fatalities occurred annually in USA⁹, ¹². Considering that in the total amount of time spent for fire suppression, approximately 5-10% of this time involves exposure to extreme heat and flame, there is considerable risk of such injuries occurring ¹³. The material’s protective performance is most important in ensuring life saving capability and this depends on the fire and, type and characteristic of the personal protective
clothing. The evaluation on the potential protective characteristics of protective clothing material can be done through experimental study and mathematical model. The experimental study can be conducted using three methods. These methods are known as bench scale test, thermal manikin test and test method for wet sample. However, experimental methods are very exhaustive and time consuming. Currently there are numerous studies that have been carried out regarding mathematical model developed to evaluate the performance of personal protective clothing. There are two types of mathematical models that have been developed. The first type are those that consider heat transfer only. The second type are those that consider heat and moisture transfer.

Methodology/ Materials

The model is developed using finite element then validated using data and findings other researchers. A simplified two-dimensional model of multi-layer clothing materials is developed using ANSYS transient thermal finite element software as shown in Figure 1. The model also includes a human skin and air gap layers. The effects of the air gap thickness on the skin temperature, Table 1 shows the thickness of each layer.

Table 1. The model dimension

<table>
<thead>
<tr>
<th>Layers</th>
<th>Thickness (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Skin</td>
<td>2.08</td>
</tr>
<tr>
<td>Air gap</td>
<td>1.00</td>
</tr>
<tr>
<td>Moisture barrier</td>
<td>0.47</td>
</tr>
<tr>
<td>Thermal barrier</td>
<td>1.46</td>
</tr>
<tr>
<td>Outer Shell</td>
<td>0.50</td>
</tr>
</tbody>
</table>

Figure 2 shows the boundary condition prescribed on the model. The skin temperature 37°C is at the E-layer. Heat flux is placed at the outermost layer specifically at the layer D. The effects of heat flux on the skin temperature are evaluated based on five different intensities, they were 1200 W/m², 1000 W/m², 800 W/m², 600 W/m² and 400 W/m². The analysis considered the effect of radiation heat transfer by specifying emissivity values on each Layer A, B and C respectively as shown in Figure 2.

The development of the finite element model is in transient condition which is depending with time. The heat flux located at the outside of the fabric at D layer represents the real fire exposure during fire suppression. According to Onofrei et al. (2015) the textile structure for aramid fabrics hold amount of water regain in fiber is small approximately around 3-4% therefore the heat evaporation can be neglected. The type of material was prescribed as aramid since it has a high insulator thermal
protective performance fabric commonly used during fire suppression. The outer shell is made of polyurethane coated with 100% aramid, while the thermal barrier and moisture barrier are made of 100% aramid. The material properties for the protective clothing were given in Table 2.

### Table 2. Material Properties of Clothing Materials

<table>
<thead>
<tr>
<th>Layers</th>
<th>Moisture Barrier</th>
<th>Thermal Barrier</th>
<th>Outer Shell</th>
<th>Air</th>
<th>Skin</th>
</tr>
</thead>
<tbody>
<tr>
<td>Density (kg/m³)</td>
<td>489</td>
<td>67</td>
<td>418</td>
<td>1.184</td>
<td>1877</td>
</tr>
<tr>
<td>Emissivity</td>
<td>-</td>
<td>-</td>
<td>0.9</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Thermal conductivity (W/mK)</td>
<td>0.1154</td>
<td>0.0633</td>
<td>0.09</td>
<td>0.02551</td>
<td>0.293</td>
</tr>
<tr>
<td>Specific heat capacity (J/kg.K)</td>
<td>951</td>
<td>2113</td>
<td>1011</td>
<td>1007</td>
<td>0.95</td>
</tr>
</tbody>
</table>

The simulation is performed under transient condition for a duration of 1000 seconds. The initial ambient temperature is specified at 22°C as prescribed by the International Organization for Standardization.

### Results and Findings

Validation is done by comparing the simulated results of the model with the model developed by Onofrei et al. (2015). The model developed by Onofrei et al. (2015) was based on multiple layer model that solved heat transfer problem using numerical method. The aim of the study was to evaluate the effectiveness of the personal protective clothing material. The model used was a two dimensional plane geometry. This study explores the quarter circle geometry representing the human arm. Table 3 shows the result of skin temperature with variation heat flux obtained from this study and Onofrei et al. (2015) study. Table 4 shows that the percentage error increases when the heat flux continue to rise. The previous model reached second degree burn when the heat flux was at 1000W/m² and 1200W/m². The current study found that second degree burn did not occur as the skin temperature did not achieved 44°C.

### Table 3: Validation skin temperature with various heat flux at 1mm air gap thickness

<table>
<thead>
<tr>
<th>Heat flux (W/m²)</th>
<th>Skin Temperature (The Research Model) °C</th>
<th>Skin Temperature (Previous Study) °C</th>
<th>Error (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>400</td>
<td>37.17</td>
<td>39.00</td>
<td>4.69</td>
</tr>
<tr>
<td>600</td>
<td>37.49</td>
<td>41.00</td>
<td>8.56</td>
</tr>
<tr>
<td>800</td>
<td>37.79</td>
<td>43.00</td>
<td>12.12</td>
</tr>
<tr>
<td>1000</td>
<td>38.08</td>
<td>44.80</td>
<td>15.00</td>
</tr>
<tr>
<td>1200</td>
<td>38.35</td>
<td>47.00</td>
<td>18.40</td>
</tr>
</tbody>
</table>
Table 4 is the results of skin temperature with various air gap thickness and at constant heat flux of 1200 W/m². The percentage error increase when the air gap thickness increases. The results from Onofrei et al. (2015)²⁸ shows that the skin temperature reaches second degree burn at air gap of 3mm thickness which is at 44°C. However the current study found that it with the quarter circle geometry second skin burn did not occur at 3mm thickness air gap. The percentage error is less than 20%, according to American Society of Heating, Refrigerating and Air-Conditioning Engineers³³ it is acceptable and reliable for further analysis.

**Table 4: Validation skin temperature with various air gap thickness at heat flux 1200W/m²**

<table>
<thead>
<tr>
<th>Air gap thickness (mm)</th>
<th>Skin Temperature (The Research Model)</th>
<th>Skin Temperature (Previous Study)</th>
<th>Error (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>38.30</td>
<td>43.50</td>
<td>11.95</td>
</tr>
<tr>
<td>2</td>
<td>37.96</td>
<td>43.50</td>
<td>12.73</td>
</tr>
<tr>
<td>3</td>
<td>37.74</td>
<td>44.00</td>
<td>14.22</td>
</tr>
<tr>
<td>4</td>
<td>37.59</td>
<td>44.80</td>
<td>16.09</td>
</tr>
<tr>
<td>5</td>
<td>37.49</td>
<td>45.50</td>
<td>17.60</td>
</tr>
<tr>
<td>6</td>
<td>37.41</td>
<td>46.50</td>
<td>19.54</td>
</tr>
</tbody>
</table>

**Result and Discussion**

Figure 3 shows the plot of the skin temperature against time for various heat flux intensities. The skin temperature increases as the heat flux increases. The skin temperature rises gradually when the material of the personal protective clothing is exposed uniformly to the heat flux and it reaches stable condition at 198 seconds. The skin temperature remain constant and unchanged until the simulation ended at 1000 seconds. Weaver and Stoll (1967)³⁰ stated second degree burn is achieved when the skin temperature reaches 44°C. According to this results burn injury do not occur yet as the highest skin temperature recoded is 38.3°C. Therefore, skin burn injury may occur at heat flux higher than 1200W/m² exerted at the outer layer of the personal protective clothing.

Figure 4 shows the plot of skin temperature against time with the variation of air gap thickness. The heat flux exerted at the outer layer of the personal protective clothing is with the heat intensity 1200W/m². From Figure 6, it is observed that increase in air gap causes skin temperature to decrease. The air gaps affect the skin temperature distribution as well as the heat flux that comes from the heat source at the outer surface of the protective clothing. It indicates that the air gaps thickness can reduce skin temperature effectively. The thickness of the air gap between the garment and the body depends on its particular location on the human body. According to Song (2003)²³ and Song et al. (2004)³¹ the maximum air gaps occur at the leg, approximately around 15 to 22mm and the minimum air gap is at the shoulder at 1.6mm. However for this study air gap thickness is varied between 1mm to 6mm, consistent with the previous studies²⁷,²⁸,³².

Air gap has low thermal conductivity and specific heat, it acts as thermal resistance. It reduces the amount of heat transmitted from the heat source and becomes buffer that restricts heat transfer from the external heat. The air gaps become good insulator protecting human from skin burn injury. The factors influencing the air gap thickness are drapability, rigidity and weight of the protective clothing material¹⁰. Good draping material and less rigid garment have less air gap thickness, and most likely will contribute to skin burn injury as compared to more rigid material. Rigid material causes the fabric to be closer to the skin, thus air gap thickness is less and enhance heat to penetrate through the multiple layers of clothing material.
This model developed in this study could be used as an evaluation tool for assessing potential design of material for firefighter's personal protective clothing. The evaluation can be done at various thermal environments. The model is able to evaluate the thermal performance of the protective clothing under these relevant factors. Furthermore, this model can be employed to predict when the burn injury will occur under these relevant factors. Thus, minimum exposure time required to cause second degree can be predicted.

**Conclusion**

From this study it found that the heat flux intensity significantly increases the skin temperature. The heat flux of 1200W/m² causes the skin temperature to reach up to 38.3°C. The air gap thickness significantly reduces the skin temperature as 1mm reduction thickness leading to increment of 0.2°C of skin temperature. The air gap is found to be a good insulator for minimizing skin burn injury. It shows that the three layered material used for the personal protective clothing provides protection against heat as there is no skin burn occurring even when the heat flux is significantly high.

**Acknowledgement:** ThankstoUniversitiTeknologi Malaysia (UTM) for sponsoring the research. and KementerianPendidikan Malaysia (KPM) No. vot R.J1300000.7824.4F662 FundResearch Grant Scheme (FRGS)

**Conflict of Interest:** Nil

**Source of Funding:** Self

**Ethical Clearance:** IJRISE Journal Reviewer Committee

**References**


Novel Design the: - Real-time Assistance of Smart Stick for the Blind

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Abstract

Individuals who suffer from loss or running out of vision cannot be active without relying on others and in order to make them independent and rely on themselves in the movement and to move freely be through a smart assistant. Smart Assistant is a Muscovite stick that can be used by the blind to avoid obstacles such as barriers, drilling, locating the blind and the parking brake. This proposed new design for the blind sticks is characterized by the use of the detector distance of ultrasonic tones and places are different in severity whenever the defect or limits the user whether the barrier or barrier as easily as can detect obstacles, potholes can determine the location of the user by sending a message to specify its location in an emergency. Such animals are called Electronic Travel Aids (ETA). The new design consists of an ultrasonic sensor, Arduino, a GSM chip, a vibrator, buzzer and a chargeable battery and headphone. The aim of this project is to build a sightless man stick that can detect obstacles, potholes and thus facilitate the blind person travel independently. The intellect of the general system is to provide a depressed price and well-organized navigation aid for blind, which conveys a sense of artificial vision by providing information about the environmental situation of static and dynamic objects around them.

Keyword:- Electronic Travel Aid (ETA); Obstacle Detection; Arduino; ultrasonic sensor, GSM, Smart.

Introduction

The objective of this project is to help the blind people to depend on themselves and travel independently by the help of modern technology such smart stick. That provide more safety to the blind this smart cane detect the obstacles in the path this system using ultrasound sensor, programmable interrupt controller (PIC) contain an analog digital converter, buzzer, vibrator and power supply In addition hardware. In this paper, an overview of the Internet of Things for people with disabilities is provided. On October 6, 1964, a joint resolution of the Congress, HR 753, was signed into law authorizing the President of the United States of America to announce October 15th of each year as “White Cane Safety Day.” The resolution read, “Resolved by the Senate and House of Representatives that the President is hereby authorized to issue annually a declaration designating October 15th as White Cane Safety Day and calling upon the people of the United States of America to observe such a day with appropriate ceremonies and activities.” Within hours of passage of the congressional resolution, President Lyndon B. On October 15, 2000, President Bill Clinton again reminded us of the history of the white cane as a tool, and its purpose as a symbol of blindness: “With proper training, people using the white cane can enjoy greater mobility and safety by determining the location of curbs, steps, uneven pavement, and other physical obstacles in their path.

The proposed system provides the following features, Cheap mobility stick with total cost not exceeding $120, Light weight components integrated to the stick which makes it user friendly, Fast response of obstacles, Avoidance confusion by playing comprehensible speech message through an earphone, Detection of stairs and its direction (upward and downward) stairs, Low power consumption and battery life up to 14 hours before recharge. During the early 1960’s, several state systems and rehabilitation agencies serving the blind and visually impaired citizens of the United States urged Congress to proclaim October 15th of each year to be White Cane Safety Day in all fifty states. Its use has promoted courtesy and the opportunity for mobility of
the blind on our streets and highways.” During most years since 1964, the President has proclaimed October 15th as White Cane Safety Day. This paper reports the results of three experiments on tactile perception, spatial representation, and tactile display design for assistive mobility devices for blind, partially sighted, and deaf blind people. Today the Internet of Things (IoT) is the emerging technology that can provide people with special needs the support to achieve a better quality of life. In the first White Cane Proclamation, President Johnson commended blind people for the growing spirit of independence and the increased determination to be self-reliant and dignified.

**Materials and Method**

**System Design**

The implementation of the proposed design of the stick requires following hardware components: Ultrasonic sensors, Electrical sensor, Water sensor, GPS module, GSM module, Infrared sensor, Arduino UNO Microcontroller Board[3]. One ultrasonic sensor is stuck to the front of the joint to detect obstructions in front of the person, and the other two sensors are placed on either side of the joint to detect obstacles on the left and right of the person holding the stick. If the distance is below the given threshold the microcontroller will send a signal to the vibrator and buzzer which will warn the blind person that he/she is also close to an obstacle and need to alter the way of their course. The fig 1 block diagram of our proposed system show clearly the hardware parts required for our system and the way connect each other.

![Fig.1. Block diagram of the proposed system](image)

**Ultrasonic Sensor**

The length of the obstacle can be measured every bit,

\[
\text{Distance} = \frac{(\text{time} \times \text{speed of sound in air})}{2}
\]

**Pothole Sensor**

The maintenance cost of an Accelerometer Sensor is low Thus it would be ideal for pothole detection.

**C-WaterSensor**

At the time of the stick be in water the short circuit will be connected and the microcontroller will be on then the beep sound is produced to warn the person who held it.

**GSM module**

Blind person for any emergency will use the gsm by switching the system stick on which allow to other person to find him or help him for any emergency situation.

**Arduino**

One of the flexible Microcontroller which is used in different application because it has everything need to support the microcontroller with 14 digital input and output.

**Pulse Width Modulation**

Permits input Arduino and yield read information input sticks and have the capacity to take consistent estimations of the gathering (for example, data got from the sensor) Then again, beat width adjustment (abbreviated as PWM) has permit by Arduino for (and has extraordinary yield pins committed to). The voltage quickly changes from 0V to 5V relies upon the furious
Results and Discussion

The Smart Cane that have been compound with technology to better the living quality of the blind and visually impaired. This sample highpoint the resemblances and changes between the Smart Cane and other progressive canes on the market. In the Fig 4 the Ultra Cane, a cane industrialized and created by Sound Foresight Technology Ltd., is a technically improved white cane that uses ultrasonic waves to sense latent obstacles in the user’s path. Smart Cane in the handle, has two vibrating motors.

The vibrating motors deliver a haptic form of feedback, warning the user of the obstacle’s place and space from the user. Two ultrasonic sensors, together located on the handle, produce waves in three different methods: in forward-facing of the user crossways a long range space of 4 meters, in obverse of the user crossways a short range space of 2 meters, and absorbed at rising angle that can sense crossways 1.6 meters. Fig.5 shown the distance response difference between the pothole sensor and distance sensor.

The achievement of the Smart Cane project, numerous tests were directed to see how the cane would sense objects. In actual, these tests checker the discovery competences of the ultrasound specified the design and location of the cane. These tests are essential because they can deliver an sign of the circumstances in which the Smart Cane would do incompetently. As seen in fig 6 the first test examined how well the cane sensed stationary objects at variable distances as shown in fig 6. The cane was located in the similar way it would be if a visually reduced person were holding it. A direct evaluation was made by insertion objects at dissimilar distances from the cane and likening the experiential distances with the sensor distance readings outputted. The sensor was verified at distances reaching from 30 to 200 centimeters, with a regular percent error of 0.20% and a all-out error of 1 centimeter.
over the pothole for it to detect the pothole, this working can controlled by switch hand used ,whereas the normal used one sensor only this new technique can by this option. The second experiment investigated how well the stationary cane observed a moving object as shown in Fig.7. In the experiment, set at various distances away from the ultrasonic sensor in increments of 25 centimeters, so that recorded the response for each 25cm starting with 25cm from the object to 200cm .On the other hand the experiment for move object test done by, a small robotic car moved past the ultrasound sensor at 0.8 meters per second.

Fig.7 Stationary cane observed a moving object

The ultrasound would once in a while get certain articles and send PWM signs to the engine, causing arbitrary vibrations that would fill no need to the user—the client needs predictable vibration to respond to an adjacent object.4.3 Issues with Motors When programming the Arduino, it was hard to roll out the vibration force improvement such that the client would see a critical abatement (or increment) in separate. Finally, PWM itself was to a great degree hard to accomplish this issue overcome by Arduino Uno board, while in spite of a precise setup including a resistor, diode, transistor, and different pins from the Arduino, it was difficult to accomplish the essential PWM. This is unfortunate on the grounds that the clamor is diverting and it can befuddle the user—as expressed before, the rate of discrete vibrations means that vicinity to the identified protest, and impact may degrade the client’s capacity to comprehend the vibrations. Although there are some minor disparities when the stick is in movement, the discrete mapping of vibration forces unto separate esteems implies this blunder will have practically no impact on the vibration felt by the client so we enhance that by utilized two ultrasonic sensors yield into engine vibrator.

Conclusion

Utilizing the ultrasonic sensor for separation and pothole sensor, Arduino board, GSM, water sensor, an electrical sensor and vibration engine, the Smart Cane enormously expanded the question identification scope of the white stick, along these lines enhancing the lives of the visually impaired and outwardly disabled clients. The keen stick likewise encourages the visually impaired individual to make calls now and again of crisis. The water sensor, electrical sensor is utilized to keep the client from going the through the water waterway and electrical stunning. Finally, the Smart Stick’s utilization of novel strategy and ergonomic outline has essentially upgraded upon the savvy stick and has involved an awesome jump towards enhancing the lives of the outwardly debilitated.

Conflict of Interest: Nil

Source of Funding: Self

Ethical Clearance: IJRISE Journal Reviewer Committee

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Family Caregivers for Cancer Patients

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Abstract

Non formal, especially family caregivers are the most vital support for cancer patients in their healing process. However, caregivers are the least known, informed, and researched of all groups of people surrounding cancer patients. Ten family members are individually interviewed on their phenomenal experience in caring for cancer patients. Common themes that emerged from the interviews include financial, social, emotions, and physical challenges. Financial problems rooted from unemployment as caregivers have to spend time looking after their sick family members. Social emotional problems included perception from society on their unemployment and family relationship issues. Caregivers also experienced physical strains as they put aside their well being in caring for others. However, caregivers have their own coping skills which included positive outlook and family support. Understanding of caregivers experiences is important for mental health professionals, medical team attending to the patients, and the public at large. Results of this study suggests further assistance and guidance for caregivers in carrying their responsibilities.

Keywords: Family, Caregivers, Cancer Patients, Counselors.

Introduction

Cancer becomes a universally dreaded disease because it is considered chronic and it may change the life quality of patients². The Malaysian National Cancer Registry Report recorded a total number of 103,507 new cancer cases were diagnosed in Malaysia during the period of 2007 to 2011. In Malaysia, the number of chronic patients receiving informal treatment at home is high³. The inability of the patients and their need for proper and persistent care causes high dependence on the family¹. This reliance led the family to indirectly engage in the role of a caregiver. In meeting the needs of patients, family caregivers are oftentimes plagued with problems such as financial, physical, personnel, psychological and social⁴. As cancer requires extended time to heal, the life functionality of caregivers are also affected.

This study was conducted to draw attention to caregivers of cancer patients. To date, there has been a dearth of study on this population in Malaysia. The problems faced by the caregivers of family members with chronic illness has not been discussed thoroughly⁵. In other places, mental health effect studies of caregiving have shown higher levels of depression and physical health problems in caregivers when compared with noncaregivers⁶,⁷. In addition, cancer-related studies are more widely done in medical and nursing, but is still under-developed in psychological and social work areas where studies of life quality is needed. Therefore, this study aims to explore and understand the experiences of informal caregivers and to find basis of extending support for caregivers.

Literature Review

The diagnosis of cancer and its treatment has a major impact on both patients and their family caregivers⁸. In recent years, the caregiving of family members have slightly increased⁹,¹⁰. Caregivers are taking a huge responsibility for the care of the patients in ordinary living, hence, the number of caregivers is rising all over the world¹¹-¹³. Caregiving will become important in the future when the number of those who need this care increases, while government provided and private centers are no longer able to cope with the number of patients¹⁴.

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Caregivers duties include not only helping the patient with personal and instrumental daily living activities but it is far more complexed. Caregivers are also responsible in providing emotional support and overall supervision of the patients. Family caregivers such as spouse, children, or close friends of the patients are the backbone of services provided to surviving patients. Infact, caring for sick family members has always been seen as a family responsibility. Appraisal and measurement of burden experienced by caregivers can show positive, negative or neutral impact as caregivers estimate the amount of significance of caregiving by taking into consideration of the personal stress and the resources to cope with it.

Being too focused on caring for cancer patients causes caregivers often forget to think about their needs and emotions. A review by stated, factors that contribute to caregivers’ depression include burden of care, the caregiver’s medical illness, ethnicity of the caregiver and the caregiver’s level of mastery in providing care for the patient. These findings have been reaffirmed in a study whereby caregivers experienced additional stress as they have other responsibilities to attend such as managing their own household and maintaining their social life as usual. So that, all these will land the caregivers in a conflict and stress. Most caregivers also have their own regular work and this causes them to feel guilty because they feel like ignoring their role in the family. After their studies on caregivers of breast cancer, suggest in order to help caregivers maintain their well being, there should be a move towards providing easy access to mental health services, setting up respite care facilities to relieve caregivers from caregiving burden and having support groups for caregivers.

Methodology/ Materials

A semi structured interview protocol was prepared consisting of questions regarding background information, caregiving experiences and coping strategies. According to the use of partial structured interviews is more flexible and this allows the participants to describe their thoughts and feelings to researchers. During the interview, the researcher used probing methods to explore in-depth each individual participant phenomenal experiences.

Permission to conduct this study was obtained from the Medical Research & Ethics Committee, Ministry of Health, Malaysia. Researchers were given permission to meet with cancer patients and their families at the clinics and daycare wards (as part of a bigger research project) during patients hospital visits. Individual interviews with 7 participants was held at the National Cancer Institute, Kuala Lumpur Hospital and Pulau Pinang Hospital while the other 3 conducted at their offices and homes. All the interviews were audio recorded. Each interview session lasted between 1 to 1 and a half hours.

Gibbs, 2007 suggested various techniques to ensure researchers to obtain rich data. Observation technique is a research method used to examine the behavior of the participants. In this study, the researchers observed the participants’ behaviors and interactions with their sick family members. These observations allow the researcher to check the congruence of participants information and their nonverbal behaviors.

The data collected was transcribed and shown to the participants for confirmability called member checking. The researcher were able to meet the respondents again for member checking (process to validate the transcripts). The transcriptions were then analyzed and coded using Atlas.ti.8 to find the themes. As a result of this encoding, two major themes and five sub themes have emerged.

Results and Findings

Demographic data of respondents.

Table 1: Participant Biographical Data

<table>
<thead>
<tr>
<th>Respondent</th>
<th>Age</th>
<th>Marital Status</th>
<th>Career</th>
<th>Caring for</th>
<th>Type of Cancer</th>
</tr>
</thead>
<tbody>
<tr>
<td>PK 1</td>
<td>50</td>
<td>Married</td>
<td>Housewife</td>
<td>Husband</td>
<td>Colorectal</td>
</tr>
<tr>
<td>PK 2</td>
<td>49</td>
<td>Married</td>
<td>Businesswoman</td>
<td>Husband</td>
<td>Lung</td>
</tr>
<tr>
<td>PK 3</td>
<td>26</td>
<td>Single</td>
<td>Unemployed</td>
<td>Mother</td>
<td>Breast</td>
</tr>
</tbody>
</table>
Table 1 tabulated the participant biographical data. Participants for this study consisted of 10 caregivers (8 females and 2 males) who were family members of the patients. The ages of the caregivers ranged from 20 to 51 years old. Researchers have agreed that cancers are causing economic burden, as observed in the case of colorectal cancer which is likely to increase over time in Malaysia.

As a result of these studies, two major themes have been emerged; namely challenges and coping skills.

**Challenges**

Study from reported challenges that faced by the caregivers are physical disabilities and emotional issues. This study also found physical and social emotional issue but with an addition of financial challenges.

(i) **Social Emotional Issue**

Social emotional challenges come from various sources. These include disturbing perceptions from society. Disturbing perceptions from society concerning the patients conditions makes the participants feeling down and stress.

“Other people doesn’t know anything about our situation, but they simply talk bad about us to other people. This just make me feel so sad”

(PK6/55)

“Sometimes people that visit my father said that I can’t taking care my father properly. Its so unfair for me and I feel really stress”

(PK8/67)

(ii) **Physical Challenges.**

Caregiving can cause physical strain as fatigue, sleep disturbances and impaired cognitive function than noncaregivers. In this study, PK3 and PK10 shared that they felt bodily pains as they had to lift patients.

“My body feel so pain because I have to pick him up to the toilet everyday. Plus, I also sleep in a chair every night and this just make my back in a pain”

(PK10/77)

(iii) **Financial Issue**

Two caregivers became unemployed as they have to give full attention to their sick family members.

“I work in a boutique. But I stopped last year to take care of my mom.”

(PK3/71)

Some caregivers feel unsupported by family members.

“Siblings just come to show face. And my father never care if I have money or not”

(PK3/75)

“Auntie feel very sad. I have two sons and they have married but they doesn’t ask anything about auntie or uncle whether we have money or not? Are we comfortable or not? Are we okay or not? Because of that I feel very sad.”

(PK5/45)

PK4 argued that other grandchildren do not care much about their sick grandmother and that makes him feel irritated (PK4/38).

(PK4/38)
"I stopped working because I want to take care of her”  

(PK1/45)

For poor families, cancer has taken a toll on their financial stability. For PK10 who lived far away from the hospital, money is scarce for transport and hospital (PK10/46).

This issue were also faced other participants where money or financial issue is a major challenges for them in survived as a caregivers.

"It takes a lot of money when I have to taking care for my sister in the hospital.”  

(PK7/34)

“Eventhough I’m working, but I still have a financial issue when I have to care fo him.”  

(PK9/40)

Coping Skills

Despite many challenges faced by the caregivers, coping skills involves acceptance and social support help the caregivers to adapt the crisis.

i. Acceptance

In the context of this study, acceptance define when the participants apply religious teachings to accept their situations.

"I accept what He give to me. I know this is the best from Him and He knows that I can handle it with responsible”

(PK2/74)

PK7 took on the task of taking care of her sick youngersister because of his responsibilities as elder sister and the value of love for hersister.

"As an elder sister in family, I think this is one of my part or responsibilities to taking care of her”

(PK7/61)

They was always positive because they believed that cancer could be healed and therefore they looked after their sick family members lovingly in the hope that the patients would recover soon (PK8/138) (PK9/97).

Meanwhile, for PK5, his love as a wife is expressed by caring for the husband and making her husband a priority (PK5/49). PK5 also become more patience after caring for her sick husband (PK5/53).

ii. Social Support

Apart from the good personal quality that makes respondents capable of surviving the caregiver role, social support also plays a very important role. Having support groups for caregivers, 33 stated that social support that are needed by the caregivers are emotional and financial support either from their families, friends or their neighbors.

“I’m okay and happy because I know my family are there for me and my Mom.”

(PK1/85)

“With the support from other siblings, support from my husband, I can take all the stress and burden in a positive way.”

(PK6/93)

“I think my family support is the best cure for me and my dad.”

(PK8/81)

Conclusion

Findings showed that caregivers of cancer patients faced social emotional, physical and financial challenges as a result of doing their family responsibility. Findings also revealed that among coping strategies of caregivers are positively accepting their fate and appreciating social support. This information is important for medical staff as it would be beneficial for them to include family caregivers in the patients treatment plan. Educating family members of their role in caregiving of cancer patients may contribute to patients’ motivations towards wellness. This study showed that among Malaysians caregivers family support is of utmost importance. Knowing the needs of caregivers and building supportive relationship among family members could contribute towards meaningful journey for the cancer patients. To connect medical issue and community role there is a very important role played by mental health professional. Thus, there is a need for the mental health profession to prepare in the area of caregiving knowledge and skills in our effort to provide...
help for our community.

Acknowledgement: This research work is supported by the Skim Geran Penyelidikan Jangka Panjang (LRGS/2014/UKM-UKM/K/05).

Conflict of Interest: Nil

Source of Funding: Self

Ethical Clearance: IJRISE Journal Reviewer Committee

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The Modelling of DNA Splicing Systems with Two Non-Palindromic Restriction Enzymes

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Abstract

DNA splicing system is mathematically modelled by the process of recombinant DNA which focuses on the possible reaction of sets of restriction enzymes and a ligase. The restriction enzymes are known as endodeoxyribonucleases that allow DNA molecules to be cut and reass ociated. The cutting point of a restriction enzyme is determined by its cleavage pattern in the formation of a triple: left context, crossing and right context. The molecules resulting from DNA splicing systems are depicted as splicing languages. A palindrome is a sequence of strings that reads the same forward and backward. Researches on splicing languages in DNA splicing system involving palindromic sequences of restriction enzymes have been done previously. In this research, the splicing languages generated from DNA splicing systems with two non-palindromic restriction enzymes are generalised using Head’s splicing model. The generalisations of splicing languages for DNA splicing systems involving two non-palindromic restriction enzymes with same and different crossings are given as theorems, which are proved by induction and direct methods respectively. By using these theorems, the splicing languages from the DNA splicing systems are determined and demonstrated through some examples.

Keywords: DNA; splicing system; splicing language; non-palindromic; restriction enzyme

Introduction

Deoxyribonucleic acid (DNA) is the molecule that plays the important role in DNA computation. In 1959, the idea of DNA computation is started by Feynman involving the field of computer science, biology and mathematics. Much interest has been performed by DNA computing as it involves computation in molecular biology instead of the typical binary system in computer science. The contribution of Adleman’s experiment gives highest impact in the implementation of DNA computations by using two features, namely massive parallelism of DNA strands and Watson-Crick complementarity. In massive parallelism, computation on DNA is derivedas DNA-based mechanism for solving intractable problems where the DNA strand is a chain composed of nucleotides. The nucleotides may differ only in their bases: adenine (A), guanine (G), cytosine (C) and thymine (T). Watson-Crick complementarity is presented in the formation of double stranded DNA (dsDNA) which is generated from nitrogenous base pairings: adenine pairs with thymine, while cytosine pairs with guanine.

Throughout the years, several models of DNA computation have been developed including DNA splicing systems. The DNA splicing system is mathematically modelled and simulated by the process of recombinant DNA which focuses on the potential effect of sets of restriction enzymes and a ligase.

Literature Review

DNA splicing system was introduced by Head in 1987 as a study relating between formal language theory and informational macromolecules, where DNA molecules are cleaved and recombined with the presence of a ligase and restriction enzymes. The molecules resulting from DNA splicing systems are depicted as a splicing language using formal language theory. The formal language consists of a set of strings of symbols derived from an alphabet. In this research, the splicing

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languages are analysed using some notations in formal languages. For instance, $\lambda$, $+$, $*$ and $\{\}$ or () denote the empty string, union, star-closure and parentheses respectively.

Several years, Head's splicing model had been extended and followed by Paun's, Goode-Pixton's, and Yusof-Goode's splicing systems. The comparison between notations in Head's and these three splicing models were shown in. Moreover, Laun also developed a new splicing model known as a simple splicing system. In this research, Head's splicing model is used for modelling DNA splicing system with specific sequence of restriction enzymes.

Next, restriction enzymes are biologically known as endodeoxyribonucleases that act as catalyst for accelerating chemical reactions. Restriction enzymes cut the molecules based on the cleavage patterns in term of three parts: left context, crossing and right context. In fact, DNA molecule can read in two ways: forward and backward. Palindrome is a sequence that reads the same forward and backward. A palindromic string is a sequence of DNA molecule which is exactly the same in both directions. Head mentioned the concept of palindromic string in DNA splicing systems in his first paper on the splicing system. Yusof also proposed the definition of a palindromic string. Besides, palindromic and non-palindromic sequences can also be determined in the recognition sites of restriction enzymes. Research on the generalisations of splicing languages resulting from DNA splicing systems involving palindromic restriction enzymes has been done previously.

In this paper, the splicing languages from DNA splicing systems involving two non-palindromic restriction enzymes for same and different crossings are generalised and presented as theorems.

**Methodology**

In this research, the modelling of DNA splicing systems with two non-palindromic restriction enzymes is done using Head's splicing model. The definitions of Head's splicing system and splicing language are stated in the following.

**Definition 1 [5] Splicing System and Splicing Language**

A splicing system $S = (A, I, B, C)$ consists of a finite alphabet $A$, a finite set $I$ of initial strings in $A^*$, and finite sets $B$ and $C$ of triples $(c, x, d)$ with $c$, $x$ and $d$ in $A^*$. Each such triple in $B$ or $C$ is called a pattern. For each such triple the string $cx$ is called a site and the string $x$ is called a crossing. Patterns in $B$ are called left patterns and patterns in $C$ are called right patterns. The language $L = L(S)$ generated by $S$ consists of the strings in $I$ and all strings that can be obtained by adjoining ucxfq and pexdv whenever ucxdv and pexfq are in $L$ and $(c, x, d)$ and $(e, x, f)$ are patterns of the same hand. A language, $L$ is a splicing language if there exists a splicing system $S$ for which $L = L(S)$.

Next, the definition of a palindromic string is stated.

**Definition 2**

A string $I$ of a dsDNA is said to be palindromic if the sequence from the left to the right side of the upper single strand is equal to the sequence from the right to the left side of the lower single strand.

In this paper, generalisations of splicing languages in DNA splicing system are done involving non-palindromic sequence for restriction enzymes. For example, the enzyme AciI is a non-palindromic restriction enzyme because the upper single strand of enzyme AciI does not match with the lower single strand when read from backward, that is . The name and sequence for all restriction enzymes used in this research are taken from.

**Results and Findings**

In this research, the generalisations of splicing languages from DNA splicing systems with two non-palindromic restriction enzymes are determined and given as theorems, which are mathematically proved. Some examples of DNA splicing systems with two non-palindromic restriction enzymes are provided to determine the respective splicing languages using these theorems. The symbols ↓ and ↑ indicate the cutting sites of the restriction enzymes.

The splicing language generated from a DNA splicing system with two non-palindromic restriction enzymes for same crossing is generalised and presented as Theorem 1.
In this paper, generalisations of splicing languages in DNA splicing system are done involving non-palindromic sequence for restriction enzymes. For example, the enzyme AcI (5' - CCGC - 3') is a non-palindromic restriction enzyme because the upper single strand of enzyme AcI (5' - CCGC - 3'), does not match with the lower single strand when read from backward, that is 5' - GCGG - 3'. The name and sequence for all restriction enzymes used in this research are taken from the Indian Journal of Public Health Research & Development, June 2019, Vol. 10, No. 6.

Results and Findings
In this research, the generalisations of splicing languages from DNA splicing systems with two non-palindromic restriction enzymes are determined and given as theorems, which are mathematically proved. Some examples of DNA splicing systems with two non-palindromic restriction enzymes are provided to determine the respective splicing languages using these theorems. The symbols ↓ and ↑ indicate the cutting sites of the restriction enzymes.

The splicing language generated from a DNA splicing system with two non-palindromic restriction enzymes for same crossing is generalised and presented as Theorem 1.

Theorem 1
Given \( S = (A, I, B, C) \) is a DNA splicing system in which \( A = \{ A, C, G, T \} \) is the set of dsDNA symbols, \( I = \{ N_1 N_1 \ldots N_1 X_1 \ldots Y X_2 M \ldots M W_1 Z W_2 N_2 \ldots N_2 \} \) is the set consisting of an initial string with non-overlapping cutting sites of two non-palindromic restriction enzymes \( X_1 Y X_2 \) and \( W_1 Z W_2 \), set \( B = \{ (X_1 Y X_2), (W_1 Z W_2) \} \) is the set of cleavage pattern for restriction enzymes and set \( C \) is the empty set, the resulting splicing language consists of strings of the form

\[
N_1 N_1 \ldots N_1 X_1 \ldots Y X_2 M \ldots M W_1 Z W_2 N_2 \ldots N_2 \]

where \( n \in \mathbb{Z}^+ \), \( N_1, X_1, Y, X_2, M, W_1, Z, W_2, N_2 \) are complementaries for \( N_1, X_1, Y, X_2, M, W_1, Z, W_2, N_2 \) respectively, \( Y \) and \( Z \) are the crossing, and \( \{X_1 Y X_2, X_2 Y X_1, W_1 Z W_2, W_2 Z W_1\} \notin \{N_1 N_1 \ldots N_1 M M \ldots M N_2 N_2 \ldots N_2\} \)

\( \{N_1 N_1' \ldots N_1' M M' \ldots M' N_2 N_2 \ldots N_2\} \).

Proof.
Suppose the restriction enzyme is not palindromic, so the base sequences of enzymes are not the same backward and forward:

\[
X_1 Y X_2 \not= X_2 Y X_1
\]

and

\[
W_1 Z W_2 \not= W_2 Z W_1
\]

Then

\[
X_1 \not= X_2, Y \not= Y', X_2 \not= X_1' \quad \text{and} \quad W_2 \not= W_2', Z \not= Z', \quad \text{and} \quad W_1 \not= W_1'.
\]

Since the crossings are the same, \( Y = Y' \). Then, the initial string,

\[
N_1 N_1 \ldots N_1 X_1 Y X_2 M \ldots M W_1 Y W_2 N_2 \ldots N_2
\]

with the cutting site of the enzymes \( X_1 Y X_2 \) and \( W_1 Y W_2 \) is shown respectively in the following:
for the first cutting site and
\[ N_1 N_1 \ldots N_1 X_1 Y \quad X_2 \ M \ M \ldots M W_1 Y W_2 N_2 N_2 \ldots N_2 \] (2)
for the second cutting site.

The initial string can be written 180 degree wise as
\[ N_2 N_2 \ldots N_2 W_2 Z W_1 M \ M \ldots M X_1 Y X_1 N_1 N_1 \ldots N_1 \] (4)

Since \( X_1 \neq X_2 ', Y \neq Y ', X_1' \neq Z \) and \( W_2 \neq W_1 \), then there is no cutting site in (4).

When the enzymes \( X_1 Y X_2 \) and \( W_1 Y W_2 \) are added to the initial string, (2) combines
with (3) which gives
\[ N_1 N_1 \ldots N_1 X_1 Y W_2 N_2 N_2 \ldots N_2 \] (5)
and
\[ N_1 N_1 \ldots N_1 X_1 Y X_2 M \ M \ldots M W_1 Y X_2 M \ M \ldots M W_2 Y W_2 N_2 N_2 \ldots N_2 \]

By using induction, this theorem can be proved. For \( n = 1 \), string(1) is true since its stated as
string (5). Next, let \( n = k \in \mathbb{Z}^+ \), string (1) becomes
\[ N_1 N_1 \ldots N_1 X_1 (Y X_2 M M \ldots M W_1)^{k-1} Y W_2 N_2 N_2 \ldots N_2 \] (6)

By expanding string (6), the string can be written as
\[ N_1 N_1 \ldots N_1 X_1 (Y X_2 M M \ldots M W_1) (Y W_2 N_2 N_2 \ldots N_2) \] (7)

Then, the string (3) combines with (7) which produces new string
\[ N_1 N_1 \ldots N_1 X_1 Y X_2 M M \ldots M W_1 (Y X_2 M M \ldots M W_1)^{k-2} Y W_2 N_2 N_2 \ldots N_2 \] (8)

By simplifying string (8), the resulting strings are:
\[ N_1 N_1 \ldots N_1 X_1 (Y X_2 M M \ldots M W_1)^{(k+1)-1} Y W_2 N_2 N_2 \ldots N_2 \] (9)
\[ N_1 N_1 \ldots N_1 X_1 (Y X_2 M M \ldots M W_1)' Y W_2 N_2 N_2 \ldots N_2 \]

So, string (9) is true since it depicts string (1) when \( n = k + 1 \). Hence, Theorem 1 is proved.

Example 1

Given a DNA splicing system \( S = (A, I, B, C) \) where \( I = \{TTCAACACCGCG\} \) is the set of
initial string, set \( B = \{\begin{pmatrix} T & CG & A \\ A & GC & T \end{pmatrix}, \begin{pmatrix} C & CG & C \\ C & GC & G \end{pmatrix}\} \) is the set of cleavage pattern for the enzymes TaqI and AciI and set C is the empty set.

Solution

The enzymes TaqI, \( 5' - TCGA - 3' \) and AciI, \( 5' - CGCG - 3' \) are not palindromic
since the base sequence of enzymes TaqI and AciI do not read the same forward and backward.

The enzymes TaqI and AciI also have the same crossing, \( 5' - GC - 3' \)
The initial string $\overline{5'} - TT \downarrow CG$ AACAC $\downarrow CG$ GC GC $\overline{3'}$ has one cutting site each of the enzymes Taqland Acil. Thus, by using Theorem 1, the splicing language is

$$\overline{5'} - TT \ (CGAACAC)^{n-1} TGGCGC - 3'$$

$$3' - AA \ (GCTTTGCG) \ GCGGC - 5'$$

where $n \in \mathbb{Z}^+$. 

Next, Theorem 2 presents the generalisation of splicing language from a DNA splicing system with two non-palindromic restriction enzymes for different crossings.

**Theorem 2**

Given $S = (A, I, B, C)$ is a DNA splicing system in which $A = \{A, C, G, T\}$ is the set of dsDNA symbols, $I = \{N_1N_1 \ldots N_1X_1YX_2M' \ldots M'W_1'ZW_2'N_2'N_2 \ldots N_2\}$ is the set consisting of an initial string with non-overlapping cutting sites of two non-palindromic restriction enzymes $X_1YX_2$ and $W_1ZW_2$, and set $B = \{(X_1, Y, X_2), (W_1, Y, W_2)\}$ is the set of cleavage pattern for restriction enzymes and set $C$ is the empty set, the resulting splicing language consists of strings of the form

$$\begin{align*}
N_1N_1 \ldots N_1X_1YX_2M' \ldots M'W_1'ZW_2'N_2'N_2 \ldots N_2 \\
N_1'N_1' \ldots N_1'X_1'Y'X_2'M' \ldots M'W_1'Z'W_2'N_2'N_2 \ldots N_2
\end{align*}$$

where $N_1$, $X_1$, $Y$, $X_2$, $M'$, $W_1'$, $Z'$, $W_2'$ and $N_2'$ are complements for $N_1$, $X_1$, $Y$, $X_2$, $M$, $W_1$, $Z$, $W_2$, and $N_2$ respectively, $Y'$ and $Z'$ are the crossing, and

$$\begin{align*}
\{X_1YX_2 \ldots X_1Y'X_2' \ldots X_1YX_2, Y'X_2' \ldots Y'X_2, W_1 \ldots W_1'Z'W_2' \ldots W_2, W_1 \ldots W_1'Z'W_2' \ldots W_2, Z' \}
\end{align*}$$

is the set of cleavage pattern for restriction enzymes.

**Proof.**

Suppose the restriction enzyme is not palindromic, so the base sequences of enzymes are not the same backward and forward:

$$\begin{align*}
X_1YX_2 & \neq X_1'Y'X_1' \\
X_1'Y'X_1' & \neq X_2'Y'X_2'
\end{align*}$$

and

$$\begin{align*}
W_1 \ldots W_1'Z'W_2' & \neq W_1' \ldots W_1'Z'W_2' \\
W_1' \ldots W_1'Z'W_2' & \neq W_1' \ldots W_1'Z'W_2'.
\end{align*}$$

Then

$$\begin{align*}
X_1' \neq X_2', \quad Y \neq Y', \quad X_2' \neq X_1', \quad W_1' \neq W_1', \quad Z' \neq Z' \quad \text{and} \quad W_2 \neq W_2'.
\end{align*}$$

The initial string $\overline{N_1N_1 \ldots N_1X_1YX_2M' \ldots M'W_1'ZW_2'N_2'N_2 \ldots N_2}$ with the cutting site of the enzymes $X_1YX_2$ and $W_1ZW_2$ is shown respectively in the following:

$$\begin{align*}
N_1N_1 \ldots N_1X_1YX_2M' \ldots M'W_1'ZW_2'N_2'N_2 \ldots N_2 \\
N_1'N_1' \ldots N_1'X_1'Y'X_2'M' \ldots M'W_1'Z'W_2'N_2'N_2 \ldots N_2
\end{align*}$$

(10)

for the first cutting site and

$$\begin{align*}
N_1N_1 \ldots N_1X_1YX_2M' \ldots M'W_1 \downarrow Z \quad W_2N_2N_2 \ldots N_2 \\
N_1'N_1' \ldots N_1'X_1'Y'X_2'M' \ldots M'W_1' \downarrow Z' \quad W_2'N_2'N_2 \ldots N_2
\end{align*}$$

for the second cutting site.

The initial string can be written 180 degree wise as

$$\begin{align*}
N_2N_2' \ldots N_2'W_2'Z'W_2'M' \ldots M'X_1'Y'X_1'N_1'N_1' \ldots N_1' \\
N_2N_2 \ldots N_2W_2ZW_2M \ldots MX_2YX_1N_1N_1 \ldots N_1
\end{align*}$$

(11)

for the first cutting site and

$$\begin{align*}
N_2N_2' \ldots N_2'W_2'Z'W_2'M' \ldots M'X_1'Y'X_1'N_1'N_1' \ldots N_1' \\
N_2N_2 \ldots N_2W_2ZW_2M \ldots MX_2YX_1N_1N_1 \ldots N_1
\end{align*}$$

(11)

for the second cutting site.

Since $X_1' \neq X_2', Y' \neq Y', X_2' \neq X_1', W_1' \neq W_2', Z' \neq Z$ and $W_2' \neq W_1'$, then there is no cutting site in (11) and no new resulting molecule.
From (10) and (11), the resulting splicing language is the initial string:

\[ N_1N_1 \ldots N_1X_1 Y X_2 M M \ldots MW_1 ZW_2N_2 \ldots N_2 \]

\[ N_1'N_1' \ldots N_1'X_1' Y'X_2' M'M' \ldots M'W_1'Z'W_2'N_2' \ldots N_2'. \]

Hence, Theorem 2 is proved. □

Example 2 shows the splicing language from a DNA splicing system with two non-palindromic restriction enzymes for different crossings.

Example 2

Given a DNA splicing system \( S = (A, I, B, C) \) where \( I = \{\text{ATTAGCCAAGGCACGAGTTC}\} \) is the set of initial string, set \( B = \{(G, CCA, A, C, AGA, G, CGGTT, GCACGAGTTC}\} \) is the set of cleavage pattern for the enzymes HbaI and BssSI respectively and set \( C \) is the empty set.

Solution

The enzymes HbaI, \( 5' - GCCCAA - 3' \) and BssSI, \( 5' - CACGAG - 3' \) are not palindromic since the base sequence of enzymes HbaIand BssSI do not read the same forward and backward. The enzymes HbaI and BssSI have different crossing where crossing sites HbaI and BssSI are \( 5' - CCCA - 3' \) and \( 5' - TGCTC - 3' \) respectively.

The initial string \( 5' - ATTAGCCCAAGGCACGAGTTC - 3' \) has one cutting site each of the enzymes TaqI and AciI. Thus, by using Theorem 2, the splicing language is \( 5' - ATTAGCCAAGGCACGAGTTC - 3' \).

Conclusion

In this research, the generalisations of splicing languages in DNA splicing systems involving two non-palindromic restriction enzymes for the same and different crossings are presented as Theorem 1 and Theorem 2 respectively, which are mathematically proved using the induction and direct methods. The results from this research depict the language that consists of a set of double stranded DNA strings resulting from the corresponding DNA splicing systems. From the theorems, the resulting molecules from DNA splicing systems are determined without actual lab experiments. The contributions from the results of this research lead to the development of ideas in different splicing systems as well as for the revolution of recombinant DNA technologies.

Acknowledgement: This research work is supported by Ministry of Higher Education (MOHE) and Research Management Centre (RMC), UniversitiTeknologi Malaysia (UTM) through Research University Grant Vote No. 13H18.

Conflict of Interest: Nil

Source of Funding: Self

Ethical Clearance: IJRISE Journal Reviewer Committee

References


A Novel Mathematical Technique for Stability Analysis of Plasmodium Life Cycle in Hepatocyte

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Abstract

Present paper investigates the complexity and stability analysis of plasmodium life cycle model. The system of plasmodium life cycle in random noise has not been investigated so far. The present paper is a handout in this range over area. The existence of equilibrium point of the system are presented. Global stability properties of the model are investigated by constructing Lyapunov function. Also we introduce the stochastic perturbation and suggest the deterministic model is robust with respect to stochastic perturbation. The analysis leads to the equilibrium of the stochastic perturbation wherein the total number of plasmodium parasites remain stationary. Theoretical results are numerically supported and the diagrams are presented.

Keywords: Randomness, Lyapunov function, Stochastic perturbation, Inhost equilibrium point, Plasmodium.

Introduction

An mosquito borne disease is malaria which is transmitted by anopheles mosquito. Around the world, 2500 species of mosquitoes are there. Among that 300 species well known disease carriers. One of the most serious infectious diseases in tropical countries is malaria, which comes due to plasmodium parasite1, 2. This disease is spread by female Anopheles mosquito. About a half of the world is a ected by plasmodium parasite. Five plasmodium species infect human: Plasmodium falciparam, Plasmodium vivax, Plasmodium ovale, Plasmodium malariae, Plasmodium knowlesi3. The sporozoite travels from the Anopheles mosquito salivary gland to the human host while taking blood meal from the human host. The life cycle of malaria causing parasite circulates between human and mosquito host 4, 5, 6. In this paper, we describe how plasmodium goes through the different stages of its life cycle. There are several features of plasmodium life cycle which makes it complicated for diagnosis. Plasmodium can become invisible and undetectable in the hepatocyte, to avoid host defenses7. It mostly is in the hibernate stage and it will wait for a comfortable stage for infecting blood. The life cycle of plasmodium have several different stages between insect and vertebrate hosts8. The infected mosquitoes have sporozoite in their salivary gland. The sporozoite are injected through saliva while taking blood meal from vertebrate host. The sporozoite are mixed with blood streams and are traveled to the hepatocyte. In this stage, some species of plasmodium can form a hypnozoite which is a long-lived dormant stage9, 10. It can remain in the hepatocyte for many years. The parasites that become visible from infected hepatocyte stage are called merozoites11. Now it started to infect the red blood cells. Within the red blood cells, the merozoite rst developed to a ring-shaped form and then it becomes larger, at this stage the merozoite are called as trophozoite: The matured trophozoite formed at this stage are named as schizont. In this level, schizont reproduce to form new merozoite. The infected red blood cell bursts and the new merozoite enter into the blood stream to infect new red blood cells12. Most merozoite continue this replicative cycle however some merozoite, after infecting red blood cells differentiate into male or female sexual forms called gametocytes13. These gametocytes are taken up by the mosquito while taking blood meal from infected vertebrate host. The gametocytes travel along with the blood meal to the mosquitoes midgut. Here the gametocytes develop as a zygote, that is, where male and female gametes which
fertilize each other forming a zygote. The developed zygotes called as ookinetes, penetrates the wall of the midgut. Upon traversing the midgut wall, the ookinete embeds into the exterior membrane of gut and develops into an oocyst. In this stage, oocyst produce large numbers of small elongated sporozoite. These sporozoite migrate to the salivary glands of the mosquito. From here they are injected into the blood of the next host the mosquito bites, repeating the entire life cycle. The analysis of anopheles mosquito life cycle which was studied. Analyzed the stochastic perturbation for plasmodium life cycle. In the authors knowledge, no one has investigated the system of plasmodium with random noise which we have discussed in this work. A lot of work has been done to describe about the plasmodium life cycle, but the stochastic perturbation has not been investigated so far. This work is a novel contribution in this area. This paper is organized as follows, in section2, the mathematical model of plasmodium life cycle has been described with the assumption. In section 3, the analysis of global stability around the equilibrium point is discussed in detail. In section 4, the stochastic nature is analyzed. The diagrams which support theoretical part is presented in section 5 and the conclusion is given in section 6.

The Mathematical Model

The assumptions in mathematical model of plasmodium life cycle are given below:

- In human hepatocyte, the total population of plasmodium life cycle consists of ten states, such as Anopheles mosquito (x1), Sporozoite (x2), Hypnozoite(x3), Infected hepatocyte(x4), Hepatic schizont(x5), Ruptured schizont(x6), Merozoite(x7), Early trophozoite(x8), Late trophozoite(x9) and Gametocyte(x10) which are taken as a parameter in the described model.
- The natural death rate µ is considered to be uniform in each state.
- Let ‘b’ be considered as natural birth rate at adult mosquito stage the existing population is bN.

![Figure 1: Flow diagram of plasmodium life cycle](image-url)
The Mathematical model of plasmodium life cycle is given below:

\[
\begin{align*}
\frac{dx_1}{dt} &= bN + \alpha_1 x_1 x_10 - (\mu + \alpha_1) x_1 \\
\frac{dx_2}{dt} &= \alpha_2 x_1 - (\alpha_2 + \alpha_3 + \mu) x_2 \\
\frac{dx_3}{dt} &= \alpha_4 x_2 - (\alpha_4 + \mu) x_3 \\
\frac{dx_4}{dt} &= \alpha_5 x_3 + \alpha_5 x_4 - (\alpha_6 + \mu) x_5 \\
\frac{dx_5}{dt} &= \alpha_6 x_5 + \alpha_10 x_9 - (\alpha_7 + \alpha_11 + \mu) x_6 \\
\frac{dx_6}{dt} &= \alpha_7 x_6 - (\alpha_8 + \mu) x_7 \\
\frac{dx_7}{dt} &= \alpha_8 x_7 - (\alpha_9 + \mu) x_8 \\
\frac{dx_8}{dt} &= \alpha_9 x_8 - (\alpha_10 + \mu) x_9 \\
\frac{dx_9}{dt} &= \alpha_11 x_6 - (\alpha_12 + \mu) x_{10}
\end{align*}
\]  

where \( x_1 \) is the number of adult mosquitoes, \( x_2 \) is the number of sporozoites, \( x_3 \) is the number of hypnozoite , \( x_4 \) is the number of infected hepatocyte, \( x_5 \) is the number of hepatic schizont, \( x_6 \) is the number of ruptured schizont, \( x_7 \) is the number of merozoites, \( x_8 \) is the number of early trophozoite(Ring form), \( x_9 \) is the number of late trophozoite, \( x_{10} \) is the number of gametocyte, with respect to time. ‘b’ is the natural birth rate at initial stage, \( \alpha_1 \) is the rate of sporozoite from adult mosquito, \( \alpha_2 \) is the rate of sporozoite splited and one amount of them push to hypnozoite, \( \alpha_3 \) is the rate of remaining sporozoite push to infected hepatocyte, \( \alpha_4 \) is the rate of hypnozoite push to hepatic schizont, \( \alpha_5 \) is the rate of infected hepatocyte push to hepatic schizont, \( \alpha_6 \) is the rate of hepatic schizont push to ruptured schizont, \( \alpha_7 \) is the rate of ruptured schizont push to merozoite, \( \alpha_8 \) is the rate of merozoite to early trophozoite(Ring form), \( \alpha_9 \) is the rate of early trophozoite push to late trophozoite, \( \alpha_{10} \) is the rate of late trophozoite to ruptured schizont, \( \alpha_{11} \) is the rate of ruptured schizont to gametocyte, \( \alpha_{12} \) is the rate of gametocyte push to anopheles mosquito, is the normal death at all stages and \( N \) is the total population.

**Simplified Form of Plasmodium Life Cycle**

The simplified form of plasmodium life cycle is obtained by replacing the value

\[
A = \mu + \alpha_1, n = \alpha_2 + \alpha_3 + \mu, a = \alpha_4 + \mu, P = \alpha_5 + \mu, H = \alpha_6 + \mu, E = \alpha_7 + \alpha_{11} + \mu,
\]

\[
L = \alpha_8 + \mu, e = \alpha_9 + \mu, S = \alpha_{10} + \mu, M = \alpha_{12} + \mu \text{ in eqn.(1) , we get,}
\]

\[
\frac{dx_1}{dt} = bN + \alpha_{12} x_{10} - Ax_1
\]
\[ \frac{dx_2}{dt} = \alpha_1 x_1 - nx_2 \\
\frac{dx_3}{dt} = \alpha_2 x_2 - ax_3 \\
\frac{dx_4}{dt} = \alpha_3 x_2 - px_4 \\
\frac{dx_5}{dt} = \alpha_4 x_3 + \alpha_5 x_4 - Hx_5 \\
\frac{dx_6}{dt} = \alpha_6 x_5 + \alpha_{10} x_9 - Ex_6 \\
\frac{dx_7}{dt} = \alpha_7 x_5 - Lx_7 \\
\frac{dx_8}{dt} = \alpha_8 x_7 - ex_8 \\
\frac{dx_9}{dt} = \alpha_9 x_8 - sx_9 \\
\frac{dx_{10}}{dt} = \alpha_{11} x_6 - Mx_{10} \]  

(2)

### 3.1 Equilibrium and Interior equilibrium point

Let us discuss the equilibrium point and interior equilibrium point. The following equilibrium point and interior equilibrium point are obtained by equating the right hand side of the system (2) to zero, respectively. Then the equilibrium point is

\[ E = (x_1, x_2, x_3, x_4, x_5, x_6, x_7, x_8, x_9, x_{10}) \]

where,

\[ X_1 = \frac{bn + a_12x_{10}}{a}, \quad X_2 = \frac{a_1(bn + a_12x_{10})}{an}, \quad X_3 = \frac{a_201(bn + a_12x_{10})}{ana}, \quad X_4 = \frac{a_301(bn + a_12x_{10})}{anp} \]

\[ X_5 = \frac{a_1(bn + a_12x_{10})}{anH} \frac{a_42a_2}{a} + \frac{a_52a_3}{a}, \quad X_6 = \frac{a_1(bn + a_12x_{10})}{anHE} \frac{a_42a_2}{a} + \frac{a_52a_3}{a} + \frac{a_{10}a_9a_12Mx_{10}}{eS_{11}E} \]

\[ X_7 = \frac{a_7Mx_{10}}{a_{11}L}, \quad X_8 = \frac{a_8a_7Mx_{10}}{a_{11}e}, \quad X_9 = \frac{a_0a_7a_12Mx_{10}}{a_{11}e} \]

\[ X_{10} = \frac{a_1bn}{a_{12}} \]

and the interior equilibrium point is

\[ E^* = (x_1^*, x_2^*, x_3^*, x_4^*, x_5^*, x_6^*, x_7^*, x_8^*, x_9^*, x_{10}^*) \]

where,

\[ X_1^* = \frac{bn + a_12x_{10}^*}{a}, \quad X_2^* = \frac{a_1x_{10}^*}{n}, \quad X_3^* = \frac{a_2x_{10}^*}{a}, \quad X_4^* = \frac{a_3x_{10}^*}{p}, \quad X_5^* = \frac{a_4x_{10}^* + a_5x_{10}^*}{H}, \]

\[ X_6^* = \frac{a_6x_{10}^* + a_{10}x_{9}^*}{E}, \quad X_7^* = \frac{a_7x_{10}^*}{L}, \quad X_8^* = \frac{a_8x_{10}^*}{e}, \quad X_9^* = \frac{a_9x_{10}^*}{s}, \quad X_{10}^* = \frac{a_{11}x_{10}^*}{M} \]
Global Stability Analysis

**Theorem 1**: The interior equilibrium point \( E^* \) is globally stable

\[
\alpha_1 = \frac{-x_2 (x_2 - x_2^*) + nx_2}{x_1}, \quad \alpha_2 = \frac{-x_3 (x_3 - x_3^*) + ax_3}{x_2},
\]
\[
\alpha_3 = \frac{-x_4 (x_4 - x_4^*) + px_4}{x_2}, \quad \alpha_4 = \frac{-x_5 (x_5 - x_5^*) - ax_4 + Hx_5}{x_3},
\]
\[
\alpha_6 = \frac{-x_6 (x_6 - x_6^*) - a_{10}x_9 + Ex_6}{x_5}, \quad \alpha_7 = \frac{-x_7 (x_7 - x_7^*) + Lx_7}{x_6},
\]
\[
\alpha_8 = \frac{-x_8 (x_8 - x_8^*) + ex_8}{x_7}, \quad \alpha_9 = \frac{-x_9 (x_9 - x_9^*) + Sx_9}{x_8},
\]
\[
\alpha_{12} = \frac{-x_{10} (x_{10} - x_{10}^*) - bN + Ax_1}{x_{10}},
\]

if the above conditions holds.

**Proof**: By defining the Lyapunov function

\[
V(x_i) = \sum_{i=1}^{10} \beta_i \left[ (x_i - x_i^*) - x_i^* \ln \left( \frac{x_i}{x_i^*} \right) \right]
\]

where \( i = 1, 2, 3, \ldots, 10 \) are chosen as a positive constants. It is observed that \( V \) is a positive definite function in the region except at \( E^* \) where it is zero. Solving the rate of change of \( V \) along the solutions of the system (3), we get,

\[
\dot{V} = \sum_{i=1}^{10} \beta_i \left( \frac{x_i - x_i^*}{x_i} \right)
\]

\[
\dot{V} = \beta_1 (x_1 - x_1^*) \frac{bN + a_{12}x_{10} - Ax_1}{x_1} + \beta_2 (x_2 - x_2^*) \frac{a_{11}x_1 - nx_2 + ax_3}{x_2} + \beta_3 (x_3 - x_3^*) \frac{a_2x_2 - ax_3}{x_3} +
\]
\[
\beta_4 (x_4 - x_4^*) \frac{a_3x_2 - px_4}{x_4} + \beta_5 (x_5 - x_5^*) \frac{a_4x_3 + ax_4 - Hx_5}{x_5} + \beta_6 (x_6 - x_6^*) \frac{a_6x_5 + a_{10}x_9 - Ex_6}{x_6} +
\]
\[
\beta_7 (x_7 - x_7^*) \frac{a_7x_6 - Lx_7}{x_7} + \beta_8 (x_8 - x_8^*) \frac{a_8x_7 - ax_8}{x_8} + \beta_9 (x_9 - x_9^*) \frac{a_9x_8 - Sx_9}{x_9} +
\]
\[
\beta_{10} (x_{10} - x_{10}^*) \frac{a_{11}x_6 - Mx_{10}}{x_{10}}
\]

By applying the condition (3) in (6) will get the result as given below:

\[
\frac{dv}{dt} = -\beta_1 (x_1 - x_1^*)^2 - \beta_2 (x_2 - x_2^*)^2 - \beta_3 (x_3 - x_3^*)^2 - \beta_4 (x_4 - x_4^*)^2 - \beta_5 (x_5 - x_5^*)^2
\]
\[
- \beta_6 (x_6 - x_6^*)^2 - \beta_7 (x_7 - x_7^*)^2 - \beta_8 (x_8 - x_8^*)^2 - \beta_9 (x_9 - x_9^*)^2 - \beta_{10} (x_{10} - x_{10}^*)^2
\]
In this paper, the stochastic perturbations of the variables which are proportional to the distances of allowed and analyzed their values around the positive equilibrium point.

Stochastic Analysis of the Positive Equilibrium point for stability

Stochastic perturbations were introduced in the main parameters involved in the model. In this paper, the stochastic perturbations of the variables \( x_1, x_2, x_3, x_4, x_5, x_6, x_7, x_8, x_9, x_{10} \) are allowed and analyzed their values around the positive equilibrium \( E^* \) are also allowed.

Local stability of \( E^* \) is implied by the existence condition of \( E^* \). In eqn.(1), the Stochastic perturbations of the variables around their value at \( E^* \) are of white noise type, which are proportional to the distances of \( x_1, x_2, x_3, x_4, x_5, x_6, x_7, x_8, x_9, x_{10} \) from values \( x_1^*, x_2^*, x_3^*, x_4^*, x_5^*, x_6^*, x_7^*, x_8^*, x_9^*, x_{10}^* \).

\[
\begin{align*}
\dot{x}_1 &= [bN+\alpha_1 x_{10} - Ax_1]dt + \sigma_1[x_1-x_1^*]d\omega_t \\
\dot{x}_2 &= [\alpha_1 x_1 - \alpha x_2]dt + \sigma_2[x_2-x_2^*]d\omega_t \\
\dot{x}_3 &= [\alpha_2 x_2 - \alpha_3]dt + \sigma_3[x_3-x_3^*]d\omega_t \\
\dot{x}_4 &= [\alpha_3 x_2 - Px_4]dt + \sigma_4[x_4-x_4^*]d\omega_t \\
\dot{x}_5 &= [\alpha_4 x_3 + \alpha_5 x_4 - Hx_5]dt + \sigma_5[x_5-x_5^*]d\omega_t \\
\dot{x}_6 &= [\alpha_6 x_5 + \alpha_7 x_6 - Ex_6]dt + \sigma_6[x_6-x_6^*]d\omega_t \\
\dot{x}_7 &= [\alpha_7 x_6 - Lx_7]dt + \sigma_7[x_7-x_7^*]d\omega_t \\
\dot{x}_8 &= [\alpha_8 x_7 - Ex_8]dt + \sigma_8[x_8-x_8^*]d\omega_t \\
\dot{x}_9 &= [\alpha_9 x_8 - Sx_9]dt + \sigma_9[x_9-x_9^*]d\omega_t \\
\dot{x}_{10} &= [\alpha_{10} x_{10} - Mx_{10}]dt + \sigma_{10}[x_{10}-x_{10}^*]d\omega_t
\end{align*}
\]  
\tag{8}

where \( \sigma_i \)'s are real constants and \( \omega_t = \omega(t), i = 1,2,3,...,10 \) are independent from each other.

The dynamical behavior of equation (1) of the described model is robust with respect to such a kind of stochasticity by investigating the asymptotic stability behavior around the equilibrium point \( E^* \). This analysis is mainly to represent the dynamics of the system around the interior equilibrium point \( E^* \). For this purpose, the model is linearized by using the following perturbation method. That is, the stochastic differential equation of (8) can be centered at its positive equilibrium \( E^* \) by the change of variables

\[
u_i = x_i - x_i^*
\]  
\tag{9}

where \( i=1,2,3,...,10 \) are positive constants. The linearized SDE's around \( E^* \) take the form

\[
\dot{u}(t) = f(u(t))dt + g(u(t))dw(t)
\]  
\tag{10}

where
where
\[ u(t) = [u_1(t) \ u_2(t) \ u_3(t) \ u_4(t) \ u_5(t) \ u_6(t) \ u_7(t) \ u_8(t) \ u_9(t) \ u_{10}(t)]^T \]  \hfill (11)

and
\[
\mathbf{f}(\mathbf{u}(t)) = \begin{pmatrix} -A & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \alpha_1 \alpha_{12} \\ \alpha_1 & -n & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \alpha_2 & -a & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \alpha_3 & -p & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \alpha_4 & -H & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \alpha_5 & -E & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \alpha_6 & -L & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \alpha_7 & -S & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & -M \end{pmatrix} \hfill (12)
\]

\[
\mathbf{g}(\mathbf{u}(t)) = \begin{pmatrix} \sigma_1 u_1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & \sigma_2 u_2 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & \sigma_3 u_3 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & \sigma_4 u_4 & 0 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & \sigma_5 u_5 & 0 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & \sigma_6 u_6 & 0 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & \sigma_7 u_7 & 0 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & \sigma_8 u_8 & 0 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \sigma_9 u_9 & 0 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \sigma_{10} u_{10} \end{pmatrix} \hfill (13)
\]

In equation (10), the positive equilibrium \( E^* \) corresponds to the trivial solution \( u(t) = 0 \). Let \( U \) be the set
\[ U = \{ t \geq t_0 \} \times R^+ \]

Hence \( V \in C_b^2(U) \) is twice continuously differentiable function with respect to \( u \) and a continuous functions with respect to \( t \). Now the \( \text{Ito} \) stochastic differential equation is defined as
\[
\dot{V}(t) = \frac{\partial V(t, u)}{\partial t} + f^T(u(t)) \frac{\partial V(t, u)}{\partial t} + \frac{1}{2} \text{trace}[g^T(u(t)) \frac{\partial^2 V(t, u)}{\partial u^2} g(u(t))] \hfill (14)
\]

where
\[
\frac{\partial V(t, u)}{\partial u} = \begin{pmatrix} \frac{\partial \psi_{1}}{\partial u_1} & \frac{\partial \psi_{2}}{\partial u_1} & \frac{\partial \psi_{3}}{\partial u_1} & \frac{\partial \psi_{4}}{\partial u_1} & \frac{\partial \psi_{5}}{\partial u_1} & \frac{\partial \psi_{6}}{\partial u_1} \end{pmatrix}^T,
\]
\[
\frac{\partial^2 V(t, u)}{\partial u^2} = \text{col} \left( \frac{\partial^2 \psi_{i,j}}{\partial u_i \partial u_j} \right), \quad i, j = 1, 2, 3, \ldots, 10.
\]
Remark: Suppose there exists a function $V \in C^2_0(U)$ satisfying the inequalities

$$V(t, u) \leq K_2 |u|^p,$$

$$LV(t, u) \leq K_3 |u|^p, \quad K_i > 0, \rho > 0$$

Then the trivial solution of (10) is globally asymptotically mean square stable.

**Theorem 2:** The solution (14) is asymptotically mean square stable if the following condition holds,

$$\alpha_1 2u_1 u_1 + \alpha_1 2u_1 w_2 u_2 + \alpha_2 u_2 w_3 u_3 + \alpha_3 u_3 w_4 u_4 + w_5 (\alpha_4 u_4 u_4 + \alpha_4 u_4 u_4)$$

$$+ w_6 (\alpha_5 u_5 + \alpha_5 u_5 + \alpha_5 u_5) + \alpha_7 w_7 u_7 + \alpha_8 w_8 u_8 + \alpha_9 w_9 u_9 + \alpha_{11} w_{10} u_{10} = 0$$

(17)

**Proof:** Now consider the Ito process where $w_i$ are real positive constants to be chosen in the following. The inequalities (16) hold with $\rho = 2$.

Now the Ito process (14) becomes

$$\frac{1}{2} \text{trace}[g^T(u(t)) \frac{\partial^2 V(u(t))}{\partial u^2} g(u(t))]$$

(18)

Here

$$\frac{\partial^2 V}{\partial u^2} = 
\begin{pmatrix}
  w_1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
  0 & w_2 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
  0 & 0 & w_3 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
  0 & 0 & 0 & w_4 & 0 & 0 & 0 & 0 & 0 & 0 \\
  0 & 0 & 0 & 0 & w_5 & 0 & 0 & 0 & 0 & 0 \\
  0 & 0 & 0 & 0 & 0 & w_6 & 0 & 0 & 0 & 0 \\
  0 & 0 & 0 & 0 & 0 & 0 & w_7 & 0 & 0 & 0 \\
  0 & 0 & 0 & 0 & 0 & 0 & 0 & w_8 & 0 & 0 \\
  0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & w_9 & 0 \\
  0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & w_{10}
\end{pmatrix}$$

(19)

and

$$g^T(u(t)) \frac{\partial^2 V}{\partial u^2} g(u(t))$$

$$= 
\begin{pmatrix}
  w_1 \sigma^2_{u_1} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
  0 & w_2 \sigma^2_{u_2} & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
  0 & 0 & w_3 \sigma^2_{u_3} & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
  0 & 0 & 0 & w_4 \sigma^2_{u_4} & 0 & 0 & 0 & 0 & 0 & 0 \\
  0 & 0 & 0 & 0 & w_5 \sigma^2_{u_5} & 0 & 0 & 0 & 0 & 0 \\
  0 & 0 & 0 & 0 & 0 & w_6 \sigma^2_{u_6} & 0 & 0 & 0 & 0 \\
  0 & 0 & 0 & 0 & 0 & 0 & w_7 \sigma^2_{u_7} & 0 & 0 & 0 \\
  0 & 0 & 0 & 0 & 0 & 0 & 0 & w_8 \sigma^2_{u_8} & 0 & 0 \\
  0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & w_9 \sigma^2_{u_9} & 0 \\
  0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & w_{10} \sigma^2_{u_{10}}
\end{pmatrix}$$

(20)
with

\[
\frac{1}{2} \text{trace} \left[ g^T(u(t)) \frac{\partial^2 V(t,u)}{\partial u^2} g(u(t)) \right] = \frac{1}{2} \left[ w_1 \sigma_1^2 u_1^2 + w_2 \sigma_2^2 u_2^2 + w_3 \sigma_3^2 u_3^2 + w_4 \sigma_4^2 u_4^2 + w_5 \sigma_5^2 u_5^2 \\
+ w_6 \sigma_6^2 u_6^2 + w_7 \sigma_7^2 u_7^2 + w_8 \sigma_8^2 u_8^2 + w_9 \sigma_9^2 u_9^2 + w_{10} \sigma_{10}^2 u_{10}^2 \right]
\]

(21)

Use (17) and (21) along (18) we get

\[
LV(t,u) = -w_1 [A - \frac{1}{2} \sigma_1^2] u_1^2 - w_2 [n - \frac{1}{2} \sigma_2^2] u_2^2 - w_3 [a - \frac{1}{2} \sigma_3^2] u_3^2 - w_4 [P - \frac{1}{2} \sigma_4^2] u_4^2
\]

\[
- w_5 \left[ H - \frac{1}{2} \sigma_5^2 \right] u_5^2 - w_6 [E - \frac{1}{2} \sigma_6^2] u_6^2 - w_7 \left[ L - \frac{1}{2} \sigma_7^2 \right] u_7^2 - w_8 [e - \frac{1}{2} \sigma_8^2] u_8^2
\]

\[
- w_9 [S - \frac{1}{2} \sigma_9^2] u_9^2 - w_{10} [M - \frac{1}{2} \sigma_{10}^2] u_{10}^2
\]

which is negative definite and asymptotically mean square stable by Laselle’s principle.
In this paper, the complexity of plasmodium life cycle model is investigated. The boundedness and equilibrium points of the system have been found. By using Lyapunov function, global stability properties of the plasmodium life cycle model are investigated. The stochastic perturbation is introduced and suggested the plasmodium life cycle model is robust with respect to stochastic perturbation. By constructing suitable Lyapunov function, it showed that the interior equilibrium point of the plasmodium life cycle model is global asymptotically stable. Moreover all the solutions converge to the positive equilibrium. The stochastic perturbation is also introduced to the system by stochastic differential equations and Ito’ process. Through the construction of the Lyapunov function, it is showed that the zero solution of this stochastic system is asymptotically mean square stable. Finally numerical examples are given and respected diagrams are presented which support the result.

**Conflict of Interest:** Nil

**Source of Funding:** Self

**Ethical Clearance:** IJRISE Journal Reviewer Committee

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Plasmodium Life Cycle in Hepatocyte with Varying Population

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Abstract

This paper investigates the randomness of plasmodium life cycle model when initial population are introduced at each stage. The system of plasmodium life cycle in random noise has not been investigated so far. This paper is a contribution in this range over area. The existence of interior equilibrium points of the system are presented. Global stability properties of the model are analyzed by using Lyapunov function. Also we introduce the stochastic perturbations and suggest the deterministic model is robust with respect to stochastic perturbations. The analysis leads to the interior equilibrium of the stochastic perturbation wherein the total number of plasmodium parasites remain stable. Theoretical results are numerically supported and respected diagrams are presented.

Keywords and Phrases: Randomness, Lyapunov function, Stochastic perturbation, Equilibrium point, Plasmodium.

Introduction

In the world, humans are suffered a lot by biting of mosquitoes. On which perhaps 300 species are well known disease carriers¹. One of the most infectious disease carriers. One of the most infectious disease carrier is anopheles mosquitoes²,³. Moreover, malaria that affects other animals cannot be transferred to people. Only human malaria can affects human by some specific species which is known as anopheles mosquito that are capable of transmitting malaria⁴,⁵. This disease is caused by a protozoan of the plasmodium parasite. Plasmodium is more complex than many other parasites⁶,⁷. In plasmodium genus, only five of them which cause human malaria: Plasmodium falciparum, Plasmodium vivax, Plasmodium ovale, Plasmodium malariae, Plasmodium knowlesi⁸,⁹. While the biting of infected mosquito in human, the plasmodium parasites enter into the human blood and travel to the hepatocyte¹⁰. Within an hour, all the parasites have penetrated the hepatocyte, none remain in the circulating blood. After entered the protozoan multiply asexually that is, each protozoan divides into two identical copies of itself. They continue this reproduction for few weeks, after they invade red blood cells from the hepatocyte. By taking energy from human hemoglobin the parasites are grown well in the red blood cells and continue to reproduce asexually¹¹. Eventually they burst out of the red blood cells, rupturing them in the process. The matured parasites are released when the blood cells burst¹². The newly liberated parasites quickly infected new cells. This event repeats several times. At this time, the asexual stage of the malaria cycle comes to an end. Most of them reinvade the hepatocyte, where they may remain for a long time. Some of these newly emerged parasites, become sexually reproducing cells, called as gametocyte¹³. If an anopheles mosquito bites a person when these gametocytes are present in the human blood and picks up any of them the malarial life cycle continues into its sexually reproducing generation. When an anopheles mosquito swallows the gametocyte that it has obtained from an infected human blood each of the cells fuses with another in the mosquitoes midgut. These new cells penetrate the wall of the
mosquitoes intestine, called as ookinete. Upon traversing the midgut wall the ookinete embeds into the exterior membrane of gut and develops into an oocyst. In this stage, sporozoites are produced by oocyst. The sporozoites migrate to the mosquitoes salivary gland. When the mosquito bites a subsequent human, it injects the parasites into the human blood, repeating the entire life cycle\textsuperscript{14}.

By analysing the dynamics of anopheles mosquito life cycle which was referred\textsuperscript{15,16,17,18,19} and at each stage if varying population are presented then the analysis of stability is described. In the authors knowledge, no one has investigated the system of plasmodium life cycle with initial population are introduced at each stage with random noise which we have discussed in this present paper. Most of work has been done to describe about the plasmodium life cycle, but the stochastic perturbation has not been investigated so far. This work is a contribution in the above specified area.

This paper is organized as follows, In section 2, the mathematical model of plasmodium life cycle with initial population introduced at each stage has been presented. In section 3, the analysis of local and global stability around the equilibrium point are discussed in detail. In section 4, projects about the stochastic nature on this model. In section 5, the diagrams are presented and the conclusion is given in section 6.

The Mathematical model

The following are assumptions for modeling the Plasmodium life cycle by introducing varying population at each stage:

- In malaria infected human hepatocyte, the total population of plasmodium life cycle parasite consists of ten forms, such as Anopheles mosquito, Sporozoite, Hyphozoite, Infected hepatocyte, Hepatic schizont, Ruptured schizont, Merozoite, Early trophozoite, Late trophozoite and Gametocyte, which are taken as a parameter
- The initial population are taken at each stage in the described system.

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{plasmodium_diagram.png}
\caption{Flow diagram of plasmodium life cycle with varying population}
\end{figure}

Fig. 1 depicts the flow diagram of plasmodium life cycle.

The Mathematical model of varying population of plasmodium life cycle is given below:
\[
\frac{dx_1}{dt} = \lambda_1 x_1 + \alpha_{12} x_{10} - \alpha_1 x_1
\]
\[
\frac{dx_2}{dt} = \lambda_2 x_2 + \alpha_1 x_1 - (\alpha_2 + \alpha_3) x_2
\]
\[
\frac{dx_3}{dt} = \lambda_3 x_3 + \alpha_2 x_2 - \alpha_4 x_3
\]
\[
\frac{dx_4}{dt} = \lambda_4 x_4 + \alpha_3 x_2 - \alpha_5 x_4
\]
\[
\frac{dx_5}{dt} = \lambda_5 x_5 + \alpha_4 x_3 + \alpha_5 x_4 - \alpha_6 x_5
\]
\[
\frac{dx_6}{dt} = \lambda_6 x_6 + \alpha_6 x_5 + \alpha_{10} x_9 - (\alpha_7 + \alpha_{11}) x_6
\]
\[
\frac{dx_7}{dt} = \lambda_7 x_7 + \alpha_7 x_6 - \alpha_8 x_7
\]
\[
\frac{dx_8}{dt} = \lambda_8 x_8 + \alpha_8 x_7 - \alpha_9 x_8
\]
\[
\frac{dx_9}{dt} = \lambda_9 x_9 + \alpha_9 x_8 - \alpha_{10} x_9
\]
\[
\frac{dx_{10}}{dt} = \lambda_{10} x_{10} + \alpha_{11} x_6 - \alpha_{12} x_{10}
\]

where \( x_1 \) is the number of adult mosquitoes, \( x_2 \) is the number of sporozoite, \( x_3 \) is the number of Hypnozite, \( x_4 \) is the number of Infected hepatocyte, \( x_5 \) is the number of Hepatic schizont, \( x_6 \) is the number of Ruptured schizont, \( x_7 \) is the number of Merozoites, \( x_8 \) is the number of Early trophozoite (ring form), \( x_9 \) is the number of late trophozoite, \( x_{10} \) is the number of gametocyte. \( b \) is the natural birth rate at initial stage, \( \alpha_1 \) is the rate of sporozoite from adult mosquito, \( \alpha_2 \) is the rate of sporozoite spilted and one amount of them push to hypnozoite, \( \alpha_3 \) is the rate of remaining sporozoite turn to infected hepatocyte, \( \alpha_4 \) is the rate of hypnozoite push to hepatic schizont, \( \alpha_5 \) is the rate of infected hepatocyte push to hepatic schizont, \( \alpha_6 \) is the rate of hepatic schizont turn to ruptured schizont, \( \alpha_7 \) is the rate of ruptured schizont turn to merozoite, \( \alpha_8 \) is the rate of merozoite to early trophozoite (ring form), \( \alpha_9 \) is the rate of early trophozoite turn to late trophozoite, \( \alpha_{10} \) is the rate of late trophozoite to ruptured schizont, \( \alpha_{11} \) is the rate of ruptured schizont to gametocyte, \( \alpha_{12} \) is the rate of gametocyte push to anopheles mosquito and \( \lambda_i x_i \) is the initial population at all stages in the described system, where \( i = 1, 2, 3, ..., 10 \).

**The simplified form of the mathematical model of plasmodium life cycle with varying population**

By replacing the values of \( V = \alpha_1 - \lambda_1, A = \alpha_2 + \alpha_3 - \lambda_2, R = \alpha_4 - \lambda_3, Y = \)
\[ a_5 - \lambda_4, \]

\[ I = a_6 - \lambda_5, \quad N = a_7 + a_{11} - \lambda_6, \quad G = a_8 - \lambda_7, \quad C = a_9 - \lambda_8, \quad T = a_{10} - \lambda_9, \quad L = a_{12} - \lambda_{10} \]

in eqn.(1) we obtained the modified system of plasmodium life cycle with varying population are given below:

\[
\begin{align*}
\frac{dx_1}{dt} &= a_{12}x_10 - Vx_1 \\
\frac{dx_2}{dt} &= a_1x_1 - Ax_2 \\
\frac{dx_3}{dt} &= a_2x_2 - Rx_3 \\
\frac{dx_4}{dt} &= a_3x_2 - Yx_4 \\
\frac{dx_5}{dt} &= a_4x_3 + a_5x_4 - Ix_5 \\
\frac{dx_6}{dt} &= a_6x_5 + a_{10}x_9 - Nx_6 \\
\frac{dx_7}{dt} &= a_7x_6 - Gx_7 \\
\frac{dx_8}{dt} &= a_8x_7 - Cx_8 \\
\frac{dx_9}{dt} &= a_9x_8 - Tx_9 \\
\frac{dx_{10}}{dt} &= a_{11}x_6 - Lx_{10}
\end{align*}
\]
Analysis of Equilibrium point

This section is analyzed the equilibrium point and interior equilibrium point. The following equilibrium point and interior equilibrium point are obtained by equating the right hand side of the system (2) to zero respectively.

That is,

\[ E = (x_1, x_2, x_3, x_4, x_5, x_6, x_7, x_8, x_9, x_{10}) \]

where,

\[ x_1 = \alpha_1 x_1^* \]
\[ x_2 = \alpha_2 x_2^* / A \]
\[ x_3 = \alpha_3 x_3^* / R \]
\[ x_4 = \alpha_4 x_4^* / Y \]
\[ x_5 = \alpha_5 x_5^* + \alpha_6 x_6^* / I \]
\[ x_6 = \alpha_7 x_6^* + \alpha_8 x_7^* / N \]
\[ x_7 = \alpha_9 x_7^* / G \]
\[ x_8 = \alpha_9 x_8^* / C \]
\[ x_9 = \alpha_9 x_9^* / T \]
\[ x_{10} = \alpha_{10} x_{10}^* / L \]

and the interior equilibrium point is

\[ E^* = (x_1^*, x_2^*, x_3^*, x_4^*, x_5^*, x_6^*, x_7^*, x_8^*, x_9^*, x_{10}^*) \]

where,

\[ x_1^* = \frac{\alpha_2 x_2^*}{A} \]
\[ x_2^* = \frac{\alpha_3 x_3^*}{R} \]
\[ x_3^* = \frac{\alpha_4 x_4^*}{Y} \]
\[ x_4^* = \frac{\alpha_5 x_5^*}{I} \]
\[ x_5^* = \frac{\alpha_6 x_6^*}{N} \]
\[ x_6^* = \frac{\alpha_7 x_7^*}{G} \]
\[ x_7^* = \frac{\alpha_8 x_8^*}{C} \]
\[ x_8^* = \frac{\alpha_9 x_9^*}{T} \]
\[ x_{10}^* = \frac{\alpha_{11} x_{10}^*}{L} \]

Global Stability Analysis

**Theorem 1:** The interior equilibrium point \( E^* \) is globally asymptotically stable

\[ \alpha_1 = \frac{-x_2 (x_2 - x_2^* + Ax_2)}{x_1} \]
\[ \alpha_2 = \frac{-x_3 (x_3 - x_3^* + Rx_3)}{x_2} \]
\[ \alpha_3 = \frac{-x_4 (x_4 - x_4^* + Yx_4)}{x_2} \]
\[ \alpha_4 = \frac{-x_5 (x_5 - x_5^*) - \alpha_5 x_4 + Ix_5}{x_5} \]
\[ \alpha_5 = \frac{-x_6 (x_6 - x_6^*) - \alpha_6 x_9 + Nx_6}{x_5} \]
\[ \alpha_6 = \frac{-x_7 (x_7 - x_7^*) + Gx_7}{x_6} \]
\[ \alpha_7 = \frac{-x_8 (x_8 - x_8^*) + Cx_8}{x_7} \]
\[ \alpha_8 = \frac{-x_9 (x_9 - x_9^*) + Tx_9}{x_8} \]
\[ \alpha_9 = \frac{-x_{10} (x_{10} - x_{10}^*) + Lx_{10}}{x_8} \]
\[ \alpha_{10} = \frac{-x_{11} (x_{11} - x_{11}^*) + Vx_{11}}{x_{10}} \]

If the above condition holds good.

**Proof:** Define the Lyapunov function

\[ V(x_i) = \sum_{i=1}^{10} \beta_i \left[ (x_i - x_i^*) - x_i^* \ln \left( \frac{x_i}{x_i^*} \right) \right] \]
where \( i = 1, 2, 3, \ldots, 10 \) are chosen as positive constants. It is observed \( V \) is a positive definite function in the region except at \( E^* \) where it is zero. Solving the rate of change of \( V \) along the solutions of the system (3), we get,

\[
\dot{V} = \sum_{i=1}^{10} \beta_i \frac{x_i}{x_i^*} (x_i - x_i^*) \tag{5}
\]

\[
\dot{V} = \beta_1 (x_1 - x_1^*) \frac{a_{12} x_{10} - V x_1}{x_1} + \beta_2 (x_2 - x_2^*) \frac{a_{1} x_1 - A x_2}{x_2} + \]
\[
\beta_3 (x_3 - 3) \frac{a_{2} x_2 - R x_3}{x_3} + \]
\[
\beta_4 (x_4 - x_4^*) \frac{a_{3} x_2 - Y x_4}{x_4} + \beta_5 (x_5 - x_5^*) \frac{a_4 x_3 + a_5 x_4 - l x_5}{x_5} + \]
\[
\beta_6 (x_6 - x_6^*) \frac{a_6 x_5 + a_{10} x_9 - N x_6}{x_6} + \beta_7 (x_7 - x_7^*) \frac{a_7 x_6 - G x_7}{x_7} + \beta_8 (x_8 - x_8^*) \frac{a_8 x_7 - C x_8}{x_8} + \beta_9 (x_9 - x_9^*) \frac{a_9 x_8 - T x_9}{x_9} + \beta_{10} (x_{10} - x_{10}^*) \frac{a_{11} x_6 + L x_{10}}{x_{10}} \tag{6}
\]

\[
\dot{V} = \beta_1 (x_1 - x_1) (\frac{a_{12} x_{10} - V x_1}{x_1}) + \beta_2 (x_2 - x_2^*) (\frac{a_1 x_1 - A x_2}{x_2}) + \]
\[
\beta_3 (x_3 - 3) (\frac{a_2 x_2 - R x_3}{x_3}) + \]
\[
\beta_4 (x_4 - x_4^*) (\frac{a_3 x_2 - Y x_4}{x_4}) + \beta_5 (x_5 - x_5^*) (\frac{a_4 x_3 + a_5 x_4 - l x_5}{x_5}) + \]
\[
\beta_6 (x_6 - x_6^*) (\frac{a_6 x_5 + a_{10} x_9 - N x_6}{x_6}) + \beta_7 (x_7 - x_7^*) (\frac{a_7 x_6 - G x_7}{x_7}) + \]
\[
\beta_8 (x_8 - x_8^*) (\frac{a_8 x_7 - C x_8}{x_8}) + \beta_9 (x_9 - x_9^*) (\frac{a_9 x_8 - T x_9}{x_9}) + \beta_{10} (x_{10} - x_{10}^*) (\frac{a_{11} x_6 + L x_{10}}{x_{10}}) \tag{7}
\]

Now choosing (3) to (7), we get
\[
\frac{dV}{dt} = -\beta_1 (x_1 - x_1)^2 - \beta_2 (x_2 - x_2)^2 - \beta_3 (x_3 - x_3)^2 - \beta_4 (x_4 - x_4)^2 \\
- \beta_5 (x_5 - x_5)^2 - \beta_6 (x_6 - x_6)^2 - \beta_7 (x_7 - x_7)^2 - \beta_8 (x_8 - x_8)^2 \\
- \beta_9 (x_9 - x_9)^2 - \beta_{10} (x_{10} - x_{10})^2
\] (8)

and hence \( \dot{V} \) is negative definite.

Therefore, \( E^* \) is globally asymptotically mean square stable, by Laselle’s invariance principle.

**Stochastic Analysis of the Positive Equilibrium Point for Stability**

Stochastic perturbations were introduced in some of the main parameters involved in the model. In this paper, the stochastic perturbations of the variables \( x_1, x_2, x_3, x_4, x_5, x_6, x_7, x_8, x_9, x_{10} \) are allowed and their values are allowed around the positive equilibrium \( E^* \). In this case when it is feasible and locally asymptotically stable. Local stability of \( E^* \) is implied by the existence condition of \( E^* \). In Model(1), the Stochastic perturbations of the variables around their value at \( E^* \) are of white noise type, which are proportional to the distances of \( x_1, x_2, x_3, x_4, x_5, x_6, x_7, x_8, x_9, x_{10} \) from values \( x_1^*, x_2^*, x_3^*, x_4^*, x_5^*, x_6^*, x_7^*, x_8^*, x_9^*, x_{10}^* \).

\[
\begin{align*}
\frac{dx_1}{dt} &= [\alpha_{12}x_{10} - Vx_1]dt + \sigma_1[x_1 - x_1^*]d\omega_1 \\
\frac{dx_2}{dt} &= [\alpha_1x_1 - Ax_2]dt + \sigma_2[x_2 - x_2^*]d\omega_2 \\
\frac{dx_3}{dt} &= [\alpha_2x_2 - Rx_3]dt + \sigma_3[x_3 - x_3^*]d\omega_3 \\
\frac{dx_4}{dt} &= [\alpha_3x_2 - Yx_4]dt + \sigma_4[x_4 - x_4^*]d\omega_4 \\
\frac{dx_5}{dt} &= [\alpha_4x_3 + \alpha_5x_4 - lx_5]dt + \sigma_5[x_5 - x_5^*]d\omega_5 \\
\frac{dx_6}{dt} &= [\alpha_6x_5 + \alpha_{10}x_9 - Nx_6]dt + \sigma_6[x_6 - x_6^*]d\omega_6 \\
\frac{dx_7}{dt} &= [\alpha_7x_6 - Gx_7]dt + \sigma_7[x_7 - x_7^*]d\omega_7 \\
\frac{dx_8}{dt} &= [\alpha_8x_7 - Cx_8]dt + \sigma_8[x_8 - x_8^*]d\omega_8 \\
\frac{dx_9}{dt} &= [\alpha_9x_8 - Tx_9]dt + \sigma_9[x_9 - x_9^*]d\omega_9 \\
\frac{dx_{10}}{dt} &= [\alpha_{11}x_6 - Lx_{10}]dt + \sigma_{10}[x_{10} - x_{10}^*]d\omega_{10}
\end{align*}
\] (9)

Where \( \sigma_i, i = 1, 2, 3, 4, 5, 6, 7, 8, 9, 10 \) are real constants, \( \omega t_i = \omega_i(t), i = 1, 2, 3, 4, 5, 6, 7, 8, 9, 10 \) are independent from each other standard Wiener process. The dynamical behavior of model(1) is robust with respect to such a kind of stochasticity by investigating the asymptotic stability behavior of the equilibrium \( E^* \). This analysis is mainly to represent the dynamics of the system around the interior equilibrium point \( E^* \). For this purpose, we linearize the model using the following perturbation method, that is the stochastic differential
system of (9) can be centred at its positive equilibrium $E^*$ by the change
of variables

$$u_i = x_i - x_i^*$$

(10)

where $i=1,2,3,...,10$ are positive constants. The linearized SDEs around $E^*$ take the form

$$du(t) = f(u(t))dt + g(u(t))dw(t)$$

(11)

where

$$u(t) = [u_1(t) u_2(t) u_3(t) u_4(t) u_5(t) u_6(t) u_7(t) u_8(t) u_9(t) u_{10}(t)]^T$$

(12)

and

$$f(u(t)) = \begin{pmatrix}
-V & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \alpha_{12} \\
\alpha_1 & -A & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & \alpha_2 & -R & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & \alpha_3 & 0 & -Y & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & \alpha_4 & \alpha_5 & -I & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & \alpha_6 & -N & 0 & 0 & \alpha_{10} \\
0 & 0 & 0 & 0 & 0 & \alpha_7 & -G & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & \alpha_8 & -C & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & \alpha_9 & -T \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & -L
\end{pmatrix}$$

(13)

$$g(u(t)) = \begin{pmatrix}
\sigma_1 u_1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & \sigma_2 u_2 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & \sigma_3 u_3 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & \sigma_4 u_4 & 0 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & \sigma_5 u_5 & 0 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & \sigma_6 u_6 & 0 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & \sigma_7 u_7 & 0 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & \sigma_8 u_8 & 0 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \sigma_9 u_9 & 0 \\
0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & \sigma_{10} u_{10}
\end{pmatrix}$$

(14)
In (11) the positive equilibrium $E^*$ corresponds to the trivial solution $u(t) = 0$. Let $U$ be the set

$$U = (t \geq t_0) \times R^+.$$ 

Hence $V \in C^0_2(U)$ is twice continuously differentiable function with respect to $u$ and a continuous functions with respect to $t$. Now the Itô stochastic differential is defined as

$$dV(t) = \frac{\partial V(t,u)}{\partial t} + f^T u(t) \frac{\partial V(t,u)}{\partial t} + \frac{1}{2} \text{trace}[g^T(u(t)) \frac{\partial^2 V(t,u)}{\partial u^2} g(u(t))]$$

(14)

where $\frac{\partial V}{\partial u} = \left[ \frac{\partial V}{\partial u_1}, \frac{\partial V}{\partial u_2}, \frac{\partial V}{\partial u_3}, \frac{\partial V}{\partial u_4}, \frac{\partial V}{\partial u_5}, \frac{\partial V}{\partial u_6}, \frac{\partial V}{\partial u_7}, \frac{\partial V}{\partial u_8}, \frac{\partial V}{\partial u_9}, \frac{\partial V}{\partial u_{10}} \right]^T$,

$$\frac{\partial^2 V(t,u)}{\partial u^2} = \text{col} \left( \frac{\partial^2 V}{\partial w_i \partial u_j} \right), \text{ i, } j = 1, 2, 3, ..., 10.$$

**Remark:** Suppose there exists a function $V \in C^0_2(U)$ satisfying the inequalities

$$V(t,u) \leq K_2 \vert u \vert^\rho,$$

(15)

$$LV(t,u) \leq K_3 \vert u \vert^\rho, K_i > 0, \rho > 0$$

(16)

Then the trivial solution of (9) is globally asymptotically mean square stable in probability.

**Theorem 2:** The population free solution (14) is asymptotically mean square stable when

$$\alpha_{12} u_{10} u_1 + \alpha_{11} u_1 w_1 + \alpha_{22} w_5 u_5 + \alpha_{21} w_4 u_4 + \alpha_{32} w_5 u_6 + \alpha_{31} w_4 u_6 + \alpha_{42} w_5 u_8 + \alpha_{41} w_4 u_8 + \alpha_{52} w_5 u_{10} + \alpha_{51} w_4 u_{10} = 0$$

(17)
**Proof:** Now consider the Ito process where $w_i$ are real positive constants to be chosen in the following. The inequalities (16) hold with $\rho = 2$.

Now the Ito process (14) becomes

$$
\frac{1}{2} \text{trace} [g^T(u(t)) \frac{\partial^2 V(t,u)}{\partial u^2} g(u(t))] 
$$

Here

$$
\frac{\partial^2 V}{\partial u^2} = \begin{pmatrix}
    w_1 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
    0 & w_2 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
    0 & 0 & w_3 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
    0 & 0 & 0 & w_4 & 0 & 0 & 0 & 0 & 0 & 0 \\
    0 & 0 & 0 & 0 & w_5 & 0 & 0 & 0 & 0 & 0 \\
    0 & 0 & 0 & 0 & 0 & w_6 & 0 & 0 & 0 & 0 \\
    0 & 0 & 0 & 0 & 0 & 0 & w_7 & 0 & 0 & 0 \\
    0 & 0 & 0 & 0 & 0 & 0 & 0 & w_8 & 0 & 0 \\
    0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & w_9 & 0 \\
    0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & w_{10}
\end{pmatrix}
$$

(19)

and

$$
g^T(u(t)) \frac{\partial^2 V}{\partial u^2} g(u(t)) = \begin{pmatrix}
    w_1 \sigma_1 u_1^2 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
    0 & w_2 \sigma_2 u_2^2 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
    0 & 0 & w_3 \sigma_3 u_3^2 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \\
    0 & 0 & 0 & w_4 \sigma_4 u_4^2 & 0 & 0 & 0 & 0 & 0 & 0 \\
    0 & 0 & 0 & 0 & w_5 \sigma_5 u_5^2 & 0 & 0 & 0 & 0 & 0 \\
    0 & 0 & 0 & 0 & 0 & w_6 \sigma_6 u_6^2 & 0 & 0 & 0 & 0 \\
    0 & 0 & 0 & 0 & 0 & 0 & w_7 \sigma_7 u_7^2 & 0 & 0 & 0 \\
    0 & 0 & 0 & 0 & 0 & 0 & 0 & w_8 \sigma_8 u_8^2 & 0 & 0 \\
    0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & w_9 \sigma_9 u_9^2 & 0 \\
    0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 & w_{10} \sigma_{10} u_{10}^2
\end{pmatrix}
$$

(20)

With
\[
\frac{1}{2} \text{trace} \left[ g^T(u(t)) \frac{\partial^2 V(t, u)}{\partial u^2} g(u(t)) \right] = \frac{1}{2} \left[ w_1 \sigma_1^2 u_1^2 + w_2 \sigma_2^2 u_2^2 + w_3 \sigma_3^2 u_3^2 + w_4 \sigma_4^2 u_4^2 + w_5 [\sigma_5^2] u_5^2 + w_6 \sigma_6^2 u_6^2 + w_7 [\sigma_7^2] u_7^2 + w_8 \sigma_8^2 u_8^2 + w_9 \sigma_9^2 u_9^2 + w_{10} \sigma_{10}^2 u_{10}^2 \right]
\]

(21)

Use (21) along (18) we get

\[
L V(t, u) = -w_1 \left[ V - \frac{1}{2} \sigma_1^2 \right] u_1^2 - w_2 \left[ A - \frac{1}{2} \sigma_2^2 \right] u_2^2
\]

\[
- w_3 \left[ R - \frac{1}{2} \sigma_3^2 \right] u_3^2 - w_4 \left[ Y - \frac{1}{2} \sigma_4^2 \right] u_4^2
\]

\[
- w_5 \left[ I - \frac{1}{2} \sigma_5^2 \right] u_5^2 - w_6 \left[ N - \frac{1}{2} \sigma_6^2 \right] u_6^2
\]

\[
- w_7 \left[ G - \frac{1}{2} \sigma_7^2 \right] u_7^2 - w_8 \left[ C - \frac{1}{2} \sigma_8^2 \right] u_8^2
\]

\[
- w_9 \left[ T - \frac{1}{2} \sigma_9^2 \right] u_9^2 - w_{10} \left[ L - \frac{1}{2} \sigma_{10}^2 \right] u_{10}^2
\]

Which is negative definite and asymptotically mean square stable.

**Numerical Simulation and Discussion**

In this paper, the complexity of plasmodium life cycle model with varying population are introduced at all stage is investigated and it is observed that the equilibrium point E* of the plasmodium life cycle with varying population model is feasible. Moreover all the solution converges to the positive equilibrium. It is observed that the stochastic perturbation of the deterministic model is robust. It is observed from this analysis that for varying population, the complexity of varying population introduced in plasmodium life cycle model is stabilized. It is to be noted that when \( x_1, x_2, x_3, x_4, x_5, x_6, x_7, x_8, x_9, x_{10} \) increases, the asymptotic mean square stability property is achieved.

For the numerical simulations, the fourth order Runge-kutta method is used to solve the system of varying population introduced in plasmodium life cycle differential equation. The parameter values are taken as \( a=0.341, b=0.567, \)
c=0.197, d=0.741, e=0.904, f=0.432, g=0.169, h=0.228, i=0.753, j=0.896, k=0.732, l=0.907, \sigma=10 and the initial densities are taken as \(x_1=0.124, x_2=0.324, x_3=0.654, x_4=0.342, x_5=-0.0553, x_6=-0.019398, x_7=0.281, x_8=0.555, x_9=0.444, x_{10}=0.333\). While the increasing of time span all the stages are stable for all values of initial population.

Figure 2 depicts the stability of deterministic of plasmodium life cycle model. When some random noise occur at all stages around interior equilibrium point then it stabilized at equilibrium point. Figure 3 depicts the equilibrium point of stochastic of plasmodium model.

![Figure 2: Stability of deterministic plasmodium life cycle model](image1)

![Figure 3: Equilibrium point of stochastic of plasmodium life cycle model](image2)
Conclusion

In this paper, the complexity of plasmodium life cycle model with initial population are introduced at all stage is investigated. The boundedness and equilibrium points of the system have been found. By using Lyapunov function, global stability properties of the plasmodium life cycle model are investigated. The stochastic perturbation is introduced and suggested the plasmodium life cycle model is robust with respect to stochastic perturbation. By constructing suitable Lyapunov function, it showed that the interior equilibrium point of the plasmodium life cycle model is global asymptotically stable. Moreover all the solutions converge to the positive equilibrium. The stochastic perturbation is also introduced to the system by stochastic differential equations and Itô process. Through the construction of the Lyapunov function, it is showed that the zero solution of this stochastic system is asymptotically mean square stable. Finally numerical examples are given and respected diagrams are presented which support the result.

Conflict of Interest: Nil

Source of Funding: Self

Ethical Clearance: IJRISE Journal Reviewer Committee

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Genotypes of *Orientia Tsutsugamushi* from Patients with Scrub Typhus in Kolar, Karnataka

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Abstract

O. tsutsugamushi is a causative agent of scrub typhus that is widespread in Asia-Pacific region and it shows a high degree of antigenic variation. This study was done to find the circulating genotypes of circulating genotypes of O. tsutsugamushi from patients with scrub typhus in Kolar district. A total of 197 patients with symptoms were included in the study and Scrub typhus in patients was confirmed by performing Scrub typhus IgM ELISA and Weil-Felix test. All sero-positive samples were subjected to standard PCR and DNA sequencing performed for PCR positive samples. Out of 67 seropositive samples, 22 samples were positive for OT 56kDa type specific antigen gene. Of these 22 amplified samples, 17 DNA sequences yielded good results. Phylogenetic analysis of 17 sequences showed 10 (58.8%) clustered with Karp-like strain, 6 (35.2%) with Boryang-like and one with Orientia chuto Dubai strain. This study shows there is a great genetic diversity among the O. tsutsugamushi. These circulating genotypes would be helpful in the development of vaccines and rapid diagnostic tests.

Key Words: O. tsutsugamushi, Scrub typhus, 56 kDa Type specific antigen, PCR, DNA sequencing.

Introduction

Scrub typhus is a zoonotic disease caused by obligate intracellular bacteria *Orientia tsutsugamushi* and transmitted by trombiculid (chigger mites)¹. This disease is of public health concern to the population over the geographical area covering from northern Japan in the east to Pakistan and Afghanistan in the west and northern Australia in the south with an estimation of one million cases per year²,³. Scrub typhus has been reported from the state of Karnataka and neighbouring states, as well as from the sub-Himalayan states ⁴,⁵,⁶,⁷,⁸. Common clinical manifestations of infected patients are fever, headache, lymphadenopathy, hepatosplenomegaly, rash and an eschar. The severity of the infection ranges from a mild, self-limiting disease to fatal illness in untreated cases. Antigenic diversity among the strains of *O.tsutsugamushi* have been reported and also interstrain variability has been connected with virulence of the disease resulting in mild disease or fatal disease among humans as well as in rodents⁹. 56 kDa type specific antigen is a unique transmembrane protein in *O.tsutsugamushi*, probably involved in the adherence and to invade the target cells. It is highly variable as well as highly antigenic. By performing genetic sequence analysis, the strain differentiation within the genus can be detected.¹⁰,¹¹. Till date more than 20 antigenic variants of *O.tsutsugamushi* such as Japanese Gilliam, Japanese Karp, Kawasaki, Kuroki, and Shimokoshi, included previously identified prototype strains Karp, Gilliam and Kato¹²,¹³,¹⁴. Even though reemergence of Scrub typhus has been reported, the circulating strains and their origin have not been documented. This study was conducted to identify the circulating 56 kDa antigen genotypes in patients from scrub typhus suspected in the Kolar region.

Materials and Method

This study was conducted in the Department of Microbiology, Sri Devaraj Urs Medical College from December 2014 to January 2016. The blood samples were collected from RL Jalappa hospital, Kolar and SNR District Hospital. A total of 197 patients with symptoms fever of one week duration with or without eschar or rash was included in the study. Patients diagnosed with dengue, malaria, typhoid and other febrile illness were excluded. Written informed consent was obtained
from the patient before collecting blood samples. Scrub typhus in patients was confirmed by performing Scrub typhus IgM ELISA (In Bios International) and Weil-Felix test (Plasmatec)\textsuperscript{15,16}. All sero-positive samples were subjected to standard PCR and DNA sequencing performed for PCR positive samples. This study was approved by the Institutional Ethical Committee.

**DNA Extraction and Amplification**

The DNA was extracted from the Blood samples using the QIAamp Blood DNA Mini Kit (QIAGEN GmbH, Hilden, Germany) according to the manufacturer’s instructions. Conventional PCR, targeting the 56 kDa type specific genes were performed according to our previous study\textsuperscript{25}.

**Purification of amplified products and Sequence Analysis:**

PCR amplified products were purified by using the Gene JET Gel Extraction Kit (Thermo Fisher Scientific) according to the manufacturer’s instructions and were subjected to a sequencing reaction using the BigDye Terminator Mix (Applied Biosystems, Foster City, CA) and sequencing reactions subjected to automatic sequencer using the ABI 3500 Genetic Analyzer (Applied Biosystems). The sequences obtained were compared with sequences available in GenBank by using BLAST (http://blast.ncbi.nlm.nih.gov). The sequences obtained were submitted to GenBank (Accession nos. KY497018, KY497020, KY305482, MG930463-70, MH260083-85). Phylogenetic analysis of sequences was performed using Mega 7 software.\textsuperscript{18}

**Results**

Among 197 samples tested, 48.11% (81) were from male patients and 58.88% (116) were from female patients. The average mean age was 31.13. Among 197 samples tested for scrub typhus, 6.09% (67) were positive by both Weil-Felix test and IgM ELISA. Out of 67 seropositive samples, 22 samples were positive for OT 56kDa TSA gene by conventional PCR (fig:1). Of the 22 amplified samples, 17 DNA sequences yielded good results.

**NCBI blast analysis**

BLAST analysis of the 17 sequenced data revealed, 35.2% (6) of the DNA sequences had closest homology to strains reported from India, 29.4% (5) were originating from Taiwan followed by 17.6.4 % (3) strains in Cambodia, 11.7% (2) strain from Vietnam and a single sequence to Thailand (5.88%). The nucleotide similarity ranged from 73-100%. The number of sequences having homology to other strains of other endemic regions has been described in the fig:1

**Phylogenetic analysis**

To understand evolutionary trends, phylogenetic analysis was performed with 17 good sequences in this study with reference strains taken from NCBI database. The strains obtained from this study were grouped into three clusters, namely; Karp, Boryang and Orientia chuto-like Ten (58.8%) strains clustered under Karp strain. Six (35.2%) strains clustered under Boryang strain followed by 1 (5.8%) strain clustered under Orientia chuto Dubai strain.

**Discussion**

Scrub typhus is an acute febrile-illness caused by *O. tsutsugamushi* and cause mortality as high as in 30-50% in untreated cases\textsuperscript{3}. Prevalence of scrub typhus has been reported from all over the India. Genotyping of *O. tsutsugamushi* strains would be useful in development of rapid diagnostic tests and vaccines. In spite of knowing the genotypes in endemic regions in India, there is a paucity of information on genotypes prevalent from Karnataka. We targeted 56kDa type specific antigen protein gene for genotyping, as it is the most abundant transmembrane protein in *O. tsutsugamushi* and it contains both group specific and type specific antigenic sites\textsuperscript{10}.

In this study, there was a high percentage of the Karp-like strains a (58.8%), followed by Boryang-like (35.2%) and Orientia Chuto-like (5.8%). Karp-like strains were similar to strains reported from India,
Taiwan, Cambodia and Thailand. Boryang-like strains seen in our study were similar to the strains previously found in humans and chigger mites from Taiwan, Vietnam and Cambodia. A recent study by Kelly et al., reported that strains phylogenetically similar to Karp-like constituted almost 40% of all genotypes followed by JG-like genotypes. In the recent past, studies from southeast Asian countries reported an increase in prevalence of Karp-like strains. Varghese et al., from Vellore, South India reported the occurrence of two prototypes Kato and Karp. A study conducted by the same team analysed samples from scrub typhus endemic regions of South, North and North East India and they reported Kato-like, Karp-like, Gilliam-like, Ikeda and Neimeng-65 strains. A study from the state of Andhra Pradesh, reported their strains were similar to Gilliam type. A recent case study from Manipal, Karnataka, reported a strain similar to Ikeda. Mahajan et al., reported the occurrence of two new genotypes, IHS1 and IHS2 from the state of Himachal Pradesh. Out of 17 sequences performed, only one sequence was under the Orientia Chuto Dubai cluster, which is a novel species isolated from patient in Dubai. Interestingly, that sequence was from a patient who hailed from the area where the same strain was isolated from domestic rodent as reported in our previous study.

Conclusion

Molecular characterization of O.tsutsugamushi showed great antigenic diversities among the O. tsutsugamushi strains isolated in south India. Thirty five percent of the DNA sequences of O. tsutsugamushi in our study had highest homology to the strains from India followed by Taiwan (29.4%), Cambodia (17.6%) and Vietnam (11.7%). A similar observation was made by Varghese et al. from the Tamilnadu indicating there may be similar circulating genotypes in both the southern states.

Karp-like circulating strains of O.tsutsugamushi in the Kolar region, Karnataka is found to be predominant, followed by Boryang-like and one strain is similar to the O. Chuto Dubai strain which is a novel Orientia species. This study reveals there is an extent genetic diversity among the O. tsutsugamushi within the Karnataka. The presence of genetic variability of O.tsutsugamushi will influence the use of diagnostic methods and vaccine development.

Acknowledgment: The authors acknowledge Mrs. Deepa Rajesh, Research Assistant and Mrs. Divya Bose for their help in DNA sequencing.

Conflict of Interest: Nil

Source of Funding: Self

Ethical Clearance: IJRISE Journal Reviewer Committee

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Randomness, Boundedness and Stability Analysis of HIV Spread in a Mobile Heterosexual Population

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Abstract

The model of HIV in a mobile heterosexual population with random noise has not been investigated so far. The purpose of this paper is to present the randomness, boundedness and the stability analysis for the spread of HIV in a mobile heterosexual population. The boundedness and equilibrium points of the model have been determined. By the construction of a Lyapunov function, the global stability properties are analyzed. By comparison to stochastic perturbation, the deterministic model is found to be robust. The analysis leads to the equilibrium of the stochastic perturbation wherein the total number of population is varying. Finally, numerical examples are furnished and diagrams are presented which support the findings.

Keywords: HIV/AIDS, Mobility, Multiple patches, Epidemiology, Equilibrium points, Stochastic Stability, Lyapunov function.

2000 Mathematics Subject Classification: 34D23, 34D20, 37C75, 26A18.

Introduction

A major epidemic disease of serious concern in recent times has been AIDS (Acquired Immune Deficiency Syndrome) caused by the Human Immuno Deficiency Virus which is transmitted through mobile heterosexual population. The mobility of the population infected by HIV is a crucial aspect leading to the dynamic transmission of the disease. Nowadays, HIV affected population has been registering rapid growth in all the developing nations. If statistics in India are considered, wide variation in the ratio of infected population level is observed between states, districts and even between urban and rural areas. The policy makers in India are worried with the occurrence of a series of epidemic diseases with their own attributes and dynamics. It is often seen that the dynamic transmission of HIV is quite complex to be investigated. Health personnel find that the period of incubation after infection with HIV is extremely long and has to be measured in years. During this period, the individuals affected by HIV are unknowingly transmitting their HIV to others through several means such as sexual transmission, sharing infected syringes with others, pregnant women affecting the babies etc. The movement among populations has been a crucial factor which augments the contact between individuals in different patches, thereby leading to more epidemics. Consequently the migration of people among different subgroups has many worrisome impacts for the outcome of the epidemic spread.

It is of paramount importance to understand how the disease spreads among people. Towards this objective, mathematical models based on the transmission mechanism of HIV will be handy to the medical and social community. With the development of a mathematical model, it is feasible to a certain extent to understand how the infection spreads in different populations which would facilitate the evaluation of the effectiveness of various approaches for placing the epidemic under control. In this process, the rapid scale of the spread of HIV can be minimized. Ever since the recognition of the first few cases of HIV/AIDS epidemic, extensive studies have been undertaken by various researchers by constructing mathematical models for the spread of this disease 4-7, 9, 16. In a majority of such works, the attention has been paid only on a single population of constant size. Some researches have pointed out that studies of the epidemic dynamics on population with variable size would be necessary for better understanding of the disease 11, 14, 15, 21. The models dealt with by many previous authors have focused only on a single homosexual
The model for the spread of infection is concerned with the patches grouped as susceptible males (resp. females) and infected females (resp. males) with constant and varying population. In this model, the author has considered the transmission of HIV between the susceptible male/ female and the infected male/ female within a varying population. In another work, the authors have investigated and discussed the stability properties, equilibrium points and stochastic stability properties of the force of the infection. They have considered the problem of the robustness of the model in the matter of white noise stochastic perturbation in the neighbourhood of its positive endemic equilibrium.

The following is the outline of the presentation of the contents of this paper. In section 2, a detailed description of the system is provided. In section 3, the boundedness of the solution and the dynamical behaviour of the boundary together with the interior equilibrium points of the deterministic model are dealt with. In section 4, the stochastic model is introduced. In section 5, the stability properties are analyzed by means of a Lyapunov function. In section 6, results arising out of numerical simulation are discussed. In section 7, the findings and conclusion are presented.

The flow diagram for HIV spread in a mobile heterosexual population is provided in Figure 1.

![Flow Diagram for HIV spread in a mobile heterosexual population](image)

**Boundedness, boundary equilibria and stability**

### Equilibrium Points:

\[
\begin{align*}
\frac{dx_1^{(r)}}{dt} & = \frac{\mu}{2} - \sum_{j=1}^{k} \frac{\beta_{rj}}{n_m} y_2^{(j)} - \mu x_1^{(r)} \\
\frac{dx_2^{(r)}}{dt} & = \sum_{j=1}^{k} \frac{\beta_{rj}}{n_m} n_M^{(j)} - (\mu + \gamma) x_2^{(r)} \\
\frac{dy_1^{(r)}}{dt} & = \frac{\mu}{2} - \sum_{j=1}^{k} \frac{\beta_{rj}}{n_f} y_1^{(j)} - \mu y_1^{(r)} \\
\frac{dy_2^{(r)}}{dt} & = \sum_{j=1}^{k} \frac{\beta_{rj}}{n_f} n_F^{(j)} - (\mu + \gamma) y_2^{(r)}
\end{align*}
\]

where \( n_M^{(r)} = x_1^{(r)} + x_2^{(r)} \), \( n_F^{(r)} = y_1^{(r)} + y_2^{(r)} \) and \( \beta_{rj} \) denotes the infection rate of susceptible (males and females) in patch 'r' by infected individuals from patch 'j'. The force of infection in each patch 'r' is contributed by the term \( \sum_{j=1}^{k} \frac{\beta_{rj}}{n_m} y_2^{(j)} \) for the susceptible females and \( \sum_{j=1}^{k} \frac{\beta_{rj}}{n_f} n_F^{(j)} \) for the susceptible males. The natural death and death due to AIDS disease are assumed to be at the rate of \( \mu \) and \( \delta \) and the infected individuals develop AIDS at the rate of \( \gamma \).

The flow diagram for HIV spread in a mobile heterosexual population is provided in Figure 1.
It is seen that the model equation ((1)) has the following non-negative equilibria:

\[ E_1 = \left( \frac{1}{2}, 0, 0, 0 \right), E_2 = (0, 0, 0, 0) \]

\[ E_3 = (0, 0, \frac{1}{2}, 0) \]

**Interior Equilibrium Points:**

The interior equilibrium point is \( E^*(x_1^{(r)}(r)^*, x_2^{(r)}(r)^*, y_1^{(r)}(r)^*, y_2^{(r)}(r)^*) \) with

\[
\begin{align*}
    y_2^{(r)^*} &= \sum_{j=1}^{k} \frac{\beta_{rj} x_2^{(j)}(r)^*}{n_F^{(j)}} = \frac{\mu}{2 \sum_{j=1}^{k} \beta_{rj} n_F^{(j)}} - \mu \\
    x_2^{(r)^*} &= \sum_{j=1}^{k} \frac{\beta_{rj} y_2^{(j)}(r)^*}{n_M^{(j)}} = \frac{\mu}{2 \sum_{j=1}^{k} \beta_{rj} n_M^{(j)}} - \mu 
\end{align*}
\]

Concerning the stability of the interior equilibrium point of (2.1), we have the following

**Theorem**

The interior equilibrium point \( E^* \) is globally asymptotically stable, if

\[
\begin{align*}
    (x_1^{(r)} - x_1^{*(r)}) &= \sum_{j=1}^{k} \beta_{rj} y_2^{(j)} x_2^{(j)} - \mu(1 - 2x_1^{(r)}) (y_1^{(r)} - y_1^{*(r)}) = \sum_{j=1}^{k} \beta_{rj} \frac{x_2^{(j)} (r)}{n_F^{(j)}} - \mu(1 - 2y_1^{(r)}) \\
    (x_2^{(r)} - x_2^{*(r)}) &= \sum_{j=1}^{k} \beta_{rj} y_2^{(j)} x_2^{(j)} - (\mu + \gamma) (y_2^{(r)} - y_2^{*(r)}) = \sum_{j=1}^{k} \beta_{rj} \frac{x_2^{(j)} (r)}{n_F^{(j)}} - (\mu + \gamma)
\end{align*}
\]

Proof:

Let us employ the Lyapunav function

\[
\begin{align*}
    V &= \beta_1 (x_1^{(r)} - x_1^{*(r)}) - x_1^{*(r)} \ln \frac{x_1^{(r)}}{x_1^{*(r)}} + \beta_2 (x_2^{(r)} - x_2^{*(r)} - x_2^{*(r)} \ln \frac{x_2^{(r)}}{x_2^{*(r)}}) + \beta_3 (y_1^{(r)} - y_1^{*(r)}) - y_1^{*(r)} \ln \frac{y_1^{(r)}}{y_1^{*(r)}} + \beta_4 (y_2^{(r)} - y_2^{*(r)} - y_2^{*(r)} \ln \frac{y_2^{(r)}}{y_2^{*(r)}}).
\end{align*}
\]

From this we obtain

\[
\begin{align*}
    \dot{V} &= \beta_1 (x_1^{(r)} - x_1^{*(r)}) \frac{x_1^{(r)}}{x_1^{*(r)}} + \beta_2 (x_2^{(r)} - x_2^{*(r)} - x_2^{*(r)} \ln \frac{x_2^{(r)}}{x_2^{*(r)}}) + \beta_3 (y_1^{(r)} - y_1^{*(r)}) \frac{y_1^{(r)}}{y_1^{*(r)}} + \beta_4 (y_2^{(r)} - y_2^{*(r)} - y_2^{*(r)} \ln \frac{y_2^{(r)}}{y_2^{*(r)}}) \\
    &+ s \beta_4 (y_2^{(r)} - y_2^{*(r)} - y_2^{*(r)} \ln \frac{y_2^{(r)}}{y_2^{*(r)}})
\end{align*}
\]

A few steps of simplification lead to
\[ \dot{V} = \beta_1(x_1^{(r)} - x_1^{(r)*})^2 + \beta_2(x_2^{(r)} - x_2^{(r)*})^2 + \beta_3(y_1^{(r)} - y_1^{(r)*})^2 + \beta_4(y_2^{(r)} - y_2^{(r)*})^2 \]

As a result, we get
\[ \dot{V} = -\beta_1(x_1^{(r)} - x_1^{(r)*})^2 - \beta_2(x_2^{(r)} - x_2^{(r)*})^2 - \beta_3(y_1^{(r)} - y_1^{(r)*})^2 - \beta_4(y_2^{(r)} - y_2^{(r)*})^2 \]

Consequently, it turns out that \( \dot{V} \) is negative. Considering this result in the background of the invariance principle of LaSalle, it follows that \( E^* \) is globally asymptotically stable.

**Stochastic Model**

In the present work, stochastic perturbations are introduced in some of the main parameters involved in the model equations. We allow stochastic perturbations of the variables \( x_1^{(r)}, x_2^{(r)}, y_1^{(r)}, y_2^{(r)} \) around their values at the positive equilibrium \( E^* \) in the case when it is feasible and locally asymptotically stable. Local stability of \( E^* \) is implied by the existence conditions of \( E^* \). So in the model (1) we assume that stochastic perturbations of the variables around their values at \( E^* \) are of white noise type, which are proportional to the distances of \( x_1^{(r)}, x_2^{(r)}, y_1^{(r)}, y_2^{(r)} \) from the values \( x_1^{(r)*}, x_2^{(r)*}, y_1^{(r)*}, y_2^{(r)*} \).

The stochastic differential equation of the HIV is
\[ \begin{align*}
\dot{x}_1^{(r)} &= \left[ \mu - \sum_{j=1}^{k} \beta_{jr} \frac{y_2^{(j)}}{n_F} x_1^{(r)} - \mu x_1^{(r)} \right] dt + \sigma_1 [x_1^{(r)} - x_1^{(r)*}] dw_1(t) \\
\dot{x}_2^{(r)} &= \left[ \sum_{j=1}^{k} \beta_{jr} \frac{y_2^{(j)}}{n_F} x_1^{(r)} - (\mu + \gamma) x_2^{(r)} \right] dt + \sigma_2 [x_2^{(r)} - x_2^{(r)*}] dw_2(t) \\
\dot{y}_1^{(r)} &= \left[ \mu - \sum_{j=1}^{k} \beta_{jr} \frac{y_2^{(j)}}{n_M} y_1^{(r)} - \mu y_1^{(r)} \right] dt + \sigma_3 [y_1^{(r)} - y_1^{(r)*}] dw_3(t) \\
\dot{y}_2^{(r)} &= \left[ \sum_{j=1}^{k} \beta_{jr} \frac{y_2^{(j)}}{n_F} y_1^{(r)} - (\mu + \gamma) y_2^{(r)} \right] dt + \sigma_4 [y_2^{(r)} - y_2^{(r)*}] dw_4(t)
\end{align*} \]

where \( \sigma_i, i = 1, 2, 3, 4 \) are real constants and \( w_i(t), i = 1, 2, 3, 4 \) are independent from each other standard Wiener processes. A question that arises naturally is whether the dynamical behaviour of the model (1) is robust with respect to such a kind of stochasticity. This makes it necessary to
investigate the asymptotic stability behaviour of the equilibrium $E^*$ for (2) and compare the results with those obtained for (1).

**Stochastic stability of the positive equilibrium**

The stochastic differential system (2) can be centered at its positive equilibrium $E^*$ by the change of variables

$$
\begin{align*}
    u_1 &= x_1^{(r)} - x_1^{*\,(r)} , \\
    u_2 &= x_2^{(r)} - x_2^{*\,(r)} , \\
    u_3 &= y_1^{(r)} - y_1^{*\,(r)} , \\
    u_4 &= y_2^{(r)} - y_2^{*\,(r)}
\end{align*}
$$

(3)

On the basis of the method described in ?, it is seen that the linearized stochastic differential equations around $E^*$ take the form

$$
\frac{du(t)}{dt} = f(u(t)) \ dt + g(u(t)) \ dw(t)
$$

(4)

where

$$
u(t) = [u_1(t) \quad u_2(t) \quad u_3(t) \quad u_4(t)]^T
$$

From equation (2), we obtain the matrix equations

$$
f(u(t)) =
\begin{bmatrix}
- \sum_{j=1}^{k} \beta r_j \frac{x_2^{(j)}}{n_M} - \mu & 0 & 0 & 0 \\
\sum_{j=1}^{k} \beta r_j \frac{y_2^{(j)}}{n_M} & -(\mu + \gamma) & 0 & 0 \\
0 & 0 & - \sum_{j=1}^{k} \beta r_j \frac{x_2^{(j)}}{n_F} - \mu & 0 \\
0 & 0 & \sum_{j=1}^{k} \beta r_j \frac{y_2^{(j)}}{n_F} & -(\mu + \gamma)
\end{bmatrix} u(t)
$$

(5)

and

$$
g(u(t)) =
\begin{bmatrix}
\sigma_1 u_1 & 0 & 0 & 0 \\
0 & \sigma_2 u_2 & 0 & 0 \\
0 & 0 & \sigma_3 u_3 & 0 \\
0 & 0 & 0 & \sigma_4 u_4
\end{bmatrix}
$$

(6)

The positive interior equilibrium $E^*$ in (4) corresponds to the trivial solution $u(t) = 0$.

Let us consider the set $U = (t \geq t_0) \times \mathbb{R}^n, t_0 \in \mathbb{R}^+$. Then $V \in C_0^2(U)$ is a twice continuously differentiable function with respect to $u$ and a continuous function with respect to $t$.

From $V$, the Itō Stochastic differential is obtained as
\[ LV(t, u) = \frac{\partial V(t, u)}{\partial t} + f^T(u) \frac{\partial V(t, u)}{\partial u} + \frac{1}{2} Tr[g^T(u) \frac{\partial^2 V(t, u)}{\partial u^2} g(u)] \] (7)

where

\[ \frac{\partial V}{\partial u} = \left( \frac{\partial V}{\partial u_1}, \frac{\partial V}{\partial u_2}, \frac{\partial V}{\partial u_3} \right)^T \]

\[ \frac{\partial^2 V(t, u)}{\partial u_2} = \left( \frac{\partial^2 V}{\partial u_j \partial u_i} \right), i, j = 1, 2, 3, 4 \]

**Remarks**

Suppose there exist a function \( V \in C_0^2(U) \) with the following properties are satisfied:

\[ K_1 |u|^p \leq LV(t, u) \leq K_2 |u|^p, \quad (8) \]

\[ LV(t, u) \leq -K_3 |u|^p, \quad K_1 > 0, \ p > 0. \quad (9) \]

Considering these inequalities from the perspective of stability in (5), it is seen that the trival solution of (4) is exponentially p-stable for \( t \geq 0 \); When \( p = 2 \), the trival solution of (4) is found to be globally asymptotically stable in probability.

Now we examine the asymptotically mean square stability of the stochastic system. In this aspect, we have the following

**Theorem**

Provided the condition

\[ (x_1^{(r)} - x_1^{* (r)})(x_2^{(r)} - x_2^{* (r)}) = \frac{w_1}{w_2} y_1^{(r)} y_2^{(r)} (y_1^{* (r)} - y_1^{* (r)})(y_2^{* (r)} - y_2^{* (r)}) \] is satisfied, then the zero solution of (4) is asymptotically mean square stable.

**Proof:**

Let us consider the Lyapunov function,

\[ V(u) = \frac{1}{2} \left[ w_1 u_1^2 + w_2 u_2^2 + w_3 u_3^2 + w_4 u_4^2 \right] \]

where \( w_i, \ i = 1, 2, 3, 4 \) are real positive constants to be selected. One can check that the inequalities (8) hold when \( p = 2 \). Now the Itô process leads to

\[ V(u) = w_1 \left[ ( - \sum_{j=1}^k \beta_{rj} \frac{y_{(j)}^{(j)}}{n_M} - \mu) u_1 \right] + w_2 \left[ \sum_{j=1}^k \beta_{rj} \frac{y_{(j)}^{(j)}}{n_M} u_1 - (\mu + \gamma) u_2 \right] + w_3 \left[ ( - \sum_{j=1}^k \beta_{rj} \frac{x_{(j)}^{(j)}}{n_P} - \mu) u_3 \right] + w_4 \left[ \sum_{j=1}^k \beta_{rj} \frac{x_{(j)}^{(j)}}{n_P} u_3 - (\mu + \gamma) u_4 \right] + \frac{1}{2} Tr[g^T(u) \frac{\partial^2 V(t, u)}{\partial u^2} g(u)] \]

A reference to (5.5) implies that
\[ V(u) = w_1\left( -\sum_{j=1}^{k} \beta_{rj} \frac{y_2^{(j)}}{n_M} + \mu \right) u_2^2 - w_2(\mu + \gamma) u_2^2 - w_3(\Sigma_{j=1}^{k} \beta_{rj} \frac{x_2^{(j)}}{n_M} u_1 u_2) + w_4(\Sigma_{j=1}^{k} \beta_{rj} \frac{x_2^{(j)}}{n_F} u_3 u_4) + \frac{1}{2} w_1 \sigma_1^2 u_1^2 + \frac{1}{2} w_2 \sigma_2^2 u_2^2 + \frac{1}{2} w_3 \sigma_3^2 u_3^2 + \frac{1}{2} w_4 \sigma_4^2 u_4^2 \]

\[ = -w_1(\Sigma_{j=1}^{k} \beta_{rj} \frac{y_2^{(j)}}{n_M} + \mu - \frac{1}{2} \sigma_1^2) u_1^2 - w_2(\mu + \gamma - \frac{1}{2} \sigma_2^2) u_2^2 + w_3(\Sigma_{j=1}^{k} \beta_{rj} \frac{x_2^{(j)}}{n_M} u_1 u_2) + w_4(\Sigma_{j=1}^{k} \beta_{rj} \frac{x_2^{(j)}}{n_F} u_3 u_4) \]

\[ = -w_1(\Sigma_{j=1}^{k} \beta_{rj} \frac{y_2^{(j)}}{n_M} + \mu - \frac{1}{2} \sigma_1^2) u_1^2 - w_2(\mu + \gamma - \frac{1}{2} \sigma_2^2) u_2^2 - w_3(\Sigma_{j=1}^{k} \beta_{rj} \frac{x_2^{(j)}}{n_M} u_1 u_2) - w_4(\mu + \gamma - \frac{1}{2} \sigma_4^2) u_4^2 + \sum_{j=1}^{k} \beta_{rj}[w_2\frac{x_2^{(j)}}{n_M}(x_1^{(r)} - x_1^{*(r)})(x_2^{(r)} - x_2^{*(r)})]
\]

Thus we obtain

\[ V(u) = -w_1(\Sigma_{j=1}^{k} \beta_{rj} \frac{y_2^{(j)}}{n_M} + \mu - \frac{1}{2} \sigma_1^2) u_1^2 - w_2(\mu + \gamma - \frac{1}{2} \sigma_2^2) u_2^2 - w_3(\Sigma_{j=1}^{k} \beta_{rj} \frac{x_2^{(j)}}{n_M} u_1 u_2) - w_4(\mu + \gamma - \frac{1}{2} \sigma_4^2) u_4^2 \]

**Numerical Simulation and Discussion**

The objective of this paper is to analyze the randomness, boundedness and stability of the spread of HIV in a mobile heterosexual population. For this purpose, the total population is divided into two groups namely, susceptible and infected. It is observed that the boundary equilibrium point \( E^* \) is feasible. If the decreasing rate of susceptible females, males and infected females, males population remains at a certain threshold value, then the positive equilibrium is feasible. Moreover all the solutions are converge at the equilibrium point.

It is observed that, if \( \frac{w_2 y_2^{(j)} n_F}{w_4 x_2^{(j)} n_M} = \frac{(y_1^{(r)} - y_1^{*(r)})(y_2^{(r)} - y_2^{*(r)})}{(x_1^{(r)} - x_1^{*(r)})(x_2^{(r)} - x_2^{*(r)})} \) then the stochastic perturbation model is asymptotically mean square stable. It is seen that the deterministic model is robust with respect to stochastic perturbation.

In order to carry out the numerical simulation for the transmission of HIV in a mobile
heterosexual population, the fourth order Runge Kutta method is used to solve the system of differential equations. The parameter values are taken as $\mu = 0.1$, $\gamma = 0.12$ and $r = 10$ patches. The subjects in varying population and the initial densities are taken randomly as susceptible females 2389, infected females 2499, susceptible males 6357 and infected males 3432.

As a result of this simulation process for varying total population, it is observed that the spread of HIV in a mobile heterosexual population in different cases is stabilized as follows.

![Figure 2: Deterministic model for the spread of HIV in a mobile heterosexual population](image)
Figure 3: Equilibrium points for the spread of HIV in a mobile heterosexual population

Figure 4: Stochastic model for the spread of HIV in a mobile heterosexual population
Figure 2 depicts the deterministic model for the spread of HIV in a mobile heterosexual population.
Figure 3 depicts the equilibrium points for the spread of HIV in a mobile heterosexual population.
Figure 4 depicts the stochastic perturbation for the spread of HIV in a mobile heterosexual population.

When the time span is increasing, the susceptible females \((x_1)\) and susceptible males \((y_1)\) in the deterministic model are stabilized at the equilibrium points \(E_1(\frac{1}{2}, 0, 0,0)\) and \(E_2(0, 0, \frac{1}{2}, 0)\).

The equilibrium points at which the system is stabilized are \(E_1(\frac{1}{2}, 0, 0,0)\), \(E_2(0, 0, \frac{1}{2}, 0)\) and \(E_3(0, 0, 0,0)\).

When the randomness occurs in all the stages (susceptible male \((y_1)\), female \((x_1)\) and infected female \((x_2)\) and male \((y_2)\)), the susceptible males and females are stabilized at the equilibrium points \(E_3(\frac{1}{2}, 0, 0,0)\) and \(E_4(0, 0, \frac{1}{2}, 0)\).

### Conclusion

In this paper, Randomness, boundedness and stability analysis for the spread of HIV in a mobile heterosexual population model has been investigated. The boundedness of the model has been determined and the equilibrium points of the system have been identified. Global stability properties of the model have been investigated by employing Lyapunov function. The stochastic perturbation has been introduced and the deterministic model is found to be robust with respect to stochastic perturbation. With the construction of a suitable Lyapunov function, it emerges that the interior equilibrium point of the spread of HIV between susceptible females (resp. males) and infected males (resp. females) model is global asymptotically stable. Moreover all the solutions converge to the positive equilibrium. Furthermore, the stochastic perturbation has been introduced to the system by using stochastic differential equations and Itô Process. Through the construction of the Lyapunov function, it is shown that the zero solution of this stochastic system is asymptotically mean square stable. Finally, numerical examples are provided and diagrams are presented which support the findings.

**Conflict of Interest:** Nil

**Source of Funding:** Self

**Ethical Clearance:** IJRISE Journal Reviewer Committee

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Patient Satisfaction of BPJS Kesehatan Service after Three Years of Program Implementation

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¹Doctor of Research Program, Bina Nusantara University (BINUS)

Abstract

BPJS Kesehatan has had a large coverage in short period of time. The rapid expansion of health insurance coverage has created demand which cannot be met by current healthcare system and will disrupt the delivery service¹. The disruption of service, as a consequence, will influence the satisfaction. Patient satisfaction evaluation is important because it is not only as an important indicator to evaluate the achievement of the program but also it is important to improve treatment outcome. At present there is limited report on patients’ satisfaction to BPJS Kesehatan provider. This study is aiming to find out the satisfaction level of BPJS Kesehatan in Indonesia after 3 years of program implementation.

This study using questionnaires as survey instruments. Aiming to BPJS Kesehatan midair that pays monthly payment insurance in six hospitals in five big cities in Indonesia. Three hundred and twenty-eight questionnaires are eligible to be analyzed. Descriptive analyzed is done to evaluate the satisfaction rate. The result of the study shows that patients are satisfy with the interaction, support and services provided by BPJS Kesehatan patients, which is ninety-four per cent satisfaction. This study result is different with the pervious study which shows lower satisfaction rate. The explanation is that in this study majority of respondents come from private hospitals which known to have better service compares to public hospitals. To confirm the result of the study, further study which involved more balance public and private hospitals and big cities and small cities should be done to compare the satisfaction rate from each type of hospitals and cities. Further study to identify which variable of satisfactions are more influencing is also needed to identify are of improvement of BPJS Kesehatan services.

Keywords: BPJS Kesehatan, Satisfaction, Patient

Introduction

Everyone, regardless gender, ethnic and citizenship has the right to health. United Nations (UN) in its Universal Declaration of Human Right has stated in 1948, that “everyone has the right to a standard of living adequate for health and well-being of oneself and one’s family, including food, clothing, housing and medical care”. WHO (1978) declared that Heath care is a fundamental right. Health is considered as one important factor which might affect the continuity of human well-being. Without health, people might jeopardize their productivity, loss their employment or lost their independency due to disability. Furthermore, healthcare expenditure can cause financial catastrophe. The healthcare expenditure has been known to increase the impoverishment in China⁵, Vietnam¹⁵ and Kenya⁵.

Indonesia is one of low and middle-income countries aiming to improve their health financing system and to implement universal health coverage (UHC). Starting just in January 2014, within less than 3 years, BPJS Kesehatan has successfully had a large coverage. In January 2017, BPJS Kesehatan has enrolled 172.97 million members according to BPJS official website. It is considered as the biggest single payer institution of Universal Health Coverage program in the world¹². The target is to reach 100% coverage in 2019⁸.

The rapid expansion of insurance coverage has created demand which cannot be met by current
healthcare system. Furthermore, Bredempkamp et al., state that the sudden increase of demand will disrupt the delivery of service, especially in the public hospitals. As consequence of disruption of service, the satisfaction level will be influenced. Currently, there is limited report on patients’ satisfaction to the service of BPJS Kesehatan. One study from Center for Health Economic and Policies Study from University of Indonesia shows that the satisfaction level to hospital service is 54% and the satisfaction level to doctor service is 44%. Dwidienawati & Abdinagoro (2017) in their small study also report similar result that the satisfaction rate is still below expectation. Only sixty per cent of respondent state that they are satisfy with BPJS Kesehatan service.

This study is aiming to find out the satisfaction level of BPJS Kesehatan in Indonesia after 3 years of program implementation.

**Literature Review**

Consumer satisfaction is seen by marketing literature originally as being an outcome resulting from the consumption experience. At present, the most dominant of the conceptual models of consumer satisfaction is disconfirmation. Satisfaction is defined as “the consumer’s fulfilment response”, a post consumption judgment by the consumer that a service provides a pleasing level of consumption-related fulfilment, including under- or over-fulfilment (Oliver, 2015). Kashyap & Sivadas (2012) define satisfaction as consumer positive affective response to relationship exchange.

Newsome & Wright (1999) state that consumer satisfaction is at the very core of marketing theory and practice. Ramsaran-Fowdar (2008) further argue that retaining customers may be more profitable than attracting new ones, dissatisfied customers may lead to unfavorable behavior intentions such as negative word of mouth, doing less business or switching to alternative service provider

In healthcare, Roberts & Reich (2002) argue that patients’ satisfaction is an important indicator to evaluate the achievement of public service system. Investigating public satisfaction is the most common way to confirm public opinion and needs for policy innovation. However, it is demonstrated that there is link exist between satisfaction and patient compliance in areas such as appointment keeping, intentions to comply with recommended treatment and medication use. The high quality clinical outcome depends on compliance, which indirectly we can say it depends on patients satisfaction. Therefore, patients’ satisfaction is also important to improve treatment outcome.

Patients’ satisfaction affects healthcare providers financially through referral and reimbursement. Patients’ satisfaction has also been linked to unsolicited complaints and medical malpractice lawsuits.

**Method**

The population of this study is all BPJS Kesehatan Mandiri members, which total approximately 61 million. Data for statistical analysis were gathered through field survey to in April-July 2018. This survey was using questionnaire as instrument.

The survey was administered in five big cities on Java Island, Indonesia. The survey was designed to elicit the post-consumption judgement of BPJS Kesehatan providers (medical professionals and hospital staff). They were asked to self-rate the customer satisfaction from BPJS Provider services. Six hospitals in five big cities in Java Island were targeted. Six hundred and thirty-five questionnaires were distributed. Sample collection used the convenience sample collection method, due to time and resource limitations.

**Measures**

The survey explored respondents’ judgments of customer satisfaction. In the survey, respondents were asked to rate their level of agreement with particular items using a 6-point Likert scale anchored with strongly disagree and strongly agree. Mid-point is omitted to avoid social desirability bias.

Customer satisfaction was measured using three indicators modified from Carr (2007) and Kasyap & Sivadas (2012). The questionnaire was taping the respondent evaluation on satisfaction of interaction, support, and service.

**Measurement model**

Data from returned questionnaire was compiled and then analyse to find out the descriptive analysis of customer satisfaction. The measurement for latent variable customer satisfaction was analysed with LISREL.
Result

From six hundred and thirty-five questionnaires distributed, 100% questionnaires were returned. Since the evaluation is about post-consumption judgment of satisfaction, therefore all questionnaires returned underwent first screen which is that they confirm that they have min 3 interactions with BPJS Kesahatan provider and second screening is about missing data. From screening result there were three hundred twenty-eight questionnaires were included into the analysis. In other words, we can say that the sample size is three hundred twenty-eight.

### Table 1. Respondent Profile

<table>
<thead>
<tr>
<th>Category</th>
<th>No of Respondents</th>
<th>%</th>
<th>Accumulative %</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Hospitals</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. Public Hospital (1)</td>
<td>51</td>
<td>15.5</td>
<td>15.5</td>
</tr>
<tr>
<td>b. Private Hospital (5)</td>
<td>277</td>
<td>84.5</td>
<td>100</td>
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<td>2. Occupation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>a. PNS/TNI/POLRI</td>
<td>19</td>
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<td>5.8</td>
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<td>b. State Owned Employees</td>
<td>13</td>
<td>4</td>
<td>9.8</td>
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<td>c. Workers from Informal Sector</td>
<td>4</td>
<td>1.2</td>
<td>11.1</td>
</tr>
<tr>
<td>d. Private Sector Employees</td>
<td>116</td>
<td>35.4</td>
<td>46.5</td>
</tr>
<tr>
<td>e. Entrepreneurs</td>
<td>83</td>
<td>25.3</td>
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<tr>
<td>f. Others</td>
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<tr>
<td>g. No Answer</td>
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<td>100</td>
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<tr>
<td>3. Usage of BPJS</td>
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<td></td>
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<td>a. Often</td>
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<td>80.8</td>
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<td>b. Seldom</td>
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<td>18.9</td>
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<td>4. Income</td>
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<td>b. 3 – 5 Million</td>
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<td>59</td>
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<td>d. &gt; 10 Million</td>
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<td>5. Gender</td>
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<td>51.8</td>
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<tr>
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<td>0.3</td>
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<td>6. Education</td>
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</tr>
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<td>10.7</td>
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<td>b. SMA and similar level</td>
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<tr>
<td>d. Bachelor</td>
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<tr>
<td>e. Master</td>
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<td>0</td>
<td>99.4</td>
</tr>
<tr>
<td>g. No Answer</td>
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<td>0.6</td>
<td>100</td>
</tr>
</tbody>
</table>

Table 1 showed the respondent profile in this study. Eighty-nine three per cent was from high school and above. Seventy-seven per cent was from the middle class and above. Eighty-four per cent worked in private sector/informal and entrepreneurs.

Five out of six hospitals were private hospital. Only one hospital was public hospitals. Therefore, eighty-four per cent of respondents were from private hospitals.

Based on measurement analysis, three indicators of customer satisfaction
Table 2. Measurement Model Analysis of Customer Satisfaction

<table>
<thead>
<tr>
<th>CODE</th>
<th>Indicator</th>
<th>SFL</th>
<th>t-value</th>
<th>CR</th>
<th>VE</th>
<th>GOFI RMSEA, NNFI, CFI, IFI, SRMR, GFI, NormX²</th>
</tr>
</thead>
<tbody>
<tr>
<td>SAT 01</td>
<td>Customer is satisfied with the interaction</td>
<td>0.84</td>
<td>17.98</td>
<td></td>
<td></td>
<td>Model Fit is Perfect</td>
</tr>
<tr>
<td>SAT 02</td>
<td>Customer is satisfied with the support</td>
<td>0.93</td>
<td>20.63</td>
<td>0.9</td>
<td>0.75</td>
<td></td>
</tr>
<tr>
<td>SAT 03</td>
<td>Customer is satisfied with the service</td>
<td>0.83</td>
<td>17.98</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 2 showed that 3 indicators used in this study to measure customer satisfaction were valid (SFL >0.5 and t-value >1.96), reliable (CR>0.7 and VE>0.5) and the model was in good fit (all GOFI criteria were met).

Table 3. Satisfaction Rate of each Indicator and Overall Satisfaction

Almost all respondents agreed that they were satisfy with interaction (94%) with healthcare providers. Ninety-five per cent of respondents agreed that they were satisfy with the support given by the staff of healthcare providers. Regarding the service ninety-four per cent agreed that they were satisfy.

**Discussion**

Patients’ satisfaction is an important indicator to evaluate the achievement of public service system\(^9\). Investigating public satisfaction is the most common way to confirm public opinion and needs for policy innovation. However, patient satisfaction has another important role rather than just indicator of program achievement. Newsome & Wright (1999)\(^7\) stated that patient satisfaction will influence the compliance and participation to treatment. Therefore, patients’ satisfaction is also important to improve treatment outcome\(^3\).

BPJS Kesehatan is a very important healthcare program for Indonesian. It give patients access to treatment without jeopardize their financial status. However, due to the rapid expansion, the service quality might not be able to catch up with the increasing number of patients. That will lead to lack of customer satisfaction.

The result of this study showed however, that the satisfaction level of BPJS service is quite good. More than ninety per cent respondents agreed that they are satisfy with interaction, support and service of healthcare provider. This result is different with showed by Thabrany (2016)\(^13\) and Dwidienawati & Abdinagoro (2017)\(^2\) that BPJS Kesehatan service is still not satisfying.

The reason behind the high rate of satisfaction is the profile of the hospitals. Table 1 showed that in this study only fifteen-point five percent respondents were from public hospitals, the rest were from private hospitals. When analyzed separately, it was shown that the satisfaction rate in the public hospitals was not as high as in the private hospitals. The satisfaction for interaction was only ninety per cent. As for satisfaction for support and service was only eighty-eight per cent.

Healthcare industry is a heavy regulated industry with so many procedures to follow. Especially in private hospitals which are very competitive. They have to set a good standard not only how to ensure the outcome of treatment but also how they treat their patients. The staff of the private hospitals have to act and communicate to patients in certain way. Healthcare staffs are well trained. How patients rate them is important. Some hospitals even implement the customer survey and use the rating result as part of performance appraisal. Therefore, the way they treat and communicate with patients can be expected as polite and respectful. The follow up interview conducted to BPJS patients confirmed that the reasons patients choose to go to private hospitals for BPJS service because the healthcare professional who treat them were polite and friendly.

**Conclusion**

This paper sought to explore the satisfaction rate of patients to BPJS Kesehatan service provider. Patient satisfaction evaluation is important because it is not only
as an important indicator to evaluate the achievement of the program but also it is important to improve treatment outcome.

The result of the study showed that patients are satisfy with the interaction, support and services provided by BPJS Kesehatan pasien. This study result is different with the pervious study by Thabrany (2016) and Dwidienawati & Bramantoro (2018) which showed lower satisfaction rate. In this study satisfaction rate was ninety-four per cent. The explanation because of the different of hospitals profile. In this study eighty-five per cent of respondents are from private hospitals. Yet, due to competitive nature, private hospitals are known to have better standard compared to public hospitals.

To confirm the result of the study, further study which involved more balance public and private hospitals and big cities and small cities should be done to compare the satisfaction rate from each type of hospitals and cities. Further study to identify which variable of satisfactions are more influencing is also needed to identify are of improvement of BPJS Kesehatan services.

The managerial contribution will be giving the insight to BPJS Kesehatan that the current health care provider service especially from private hospitals is satisfying. With that insight, BPJS Kesehatan needs to put some effort to involve more private hospitals in giving services to BPJS Kesehatan patients. It will help increasing the access to treatment and helping government spends less build new public hospitals.

Conflict of Interest: Nil

Source of Funding: Self

Ethical Clearance: IJRISE Journal Reviewer Committee

References


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Abstract

“Social competence refers to the abilities to understand others’ perception, emotions, feelings and attain social cues, understand other people goals and motivation and complex situation and resolve the social conflicts” (Osman, 2001). “Parenting refers to “the perceptions of the individual (perceived parenting) on one’s own feeling as to how one is brought up by one’s parents. It refers to the role of mothering, fathering and parenting as a whole” (Bhardwaj, 1998). The present study was undertaken to find out social competence of secondary school students and to analyze its relationship with their parenting. The study included 200 secondary school students (100 students from each type of school i.e. Government and Private schools, out of 100 students (50 male students and 50 female students). The study revealed that male and female students possessed similar social competence and had similar parenting. Significant positive relationship was found between social competence of secondary school students with parenting.

Keywords: social competence, parenting, secondary school students

Introduction

Social development has been acknowledged as a crucial factor for the holistic development of an individual. The first social experiences are lived and gained by the child in the family. From the interaction within the family, child learns how to behave with people around, how to cope with the varied situations and problems that are likely to come across. The significance of social interactions in human development has been acknowledged by various developmental theories since early twentieth century with the dawn of formal study of social competence. Several researches reported that social competence was associated with children’s mental health and adjustment in future, while social incompetence in childhood was associated to maladaptive outcomes in adulthood. In fact the kind of experiences gained in the childhood period unfolds itself during the later stages of development. A socially competent person proves a valuable asset not only to himself/herself but also to the society. Social competence can be protective against abnormal behaviours, depression and behavioural disorders among adolescents. Social competence is critical for success in life as it enables an individual to know about ‘what’ and ‘how’ of varied situations and thereby enables him/her to make right choices.

Social Competence

Social Competence, though an elusive concept, in simple words, means to be able to get along with other people i.e. one’s ability to establish, sustain and develop constructive social relationships with other people. Indeed, “how well an individual interacts with others can be looked at in terms of his or her social competence”. Bandura pinpointed that “individuals can choose to apply a variety of problem solving skills and strategies in problematic social situations”. He stated “social competence as the effectiveness or adequacy with which an individual is capable of responding to various problematic situations which confront him”. In 1977, according to Bandura, “social competence is the ability to emit both positively reinforcing behaviour towards others and to avoid emitting behaviour that involves punishment.” In the words of social competence is an “effective response
of the individual to specific life situations.” Gresham in 1981 acknowledged “adaptive behaviour”, “social skills” and “peer acceptance” as sub-domains of social competence. According to “social competence includes both verbal and nonverbal behaviour that are socially valued, so social competence includes children’s social skills, self-confidence, social awareness and it also refers to the abilities to understand others perception, emotions, feelings and attain the social cues, understand other people goals and motivation and complex situation and resolve the social conflicts”.

Social competence is an assemblage of knowledge, understanding, skills and emotional responses present within the individual in diverging degrees and that interact differently as per the demand of the situation. “Social competence, comprises of six categories of behaviour, viz. social values, self-identity, interpersonal skills, self-regulation, and planning, organizing and decision-making and cultural competence”. According to “social competence can be seen as protective factor against loneliness in children”. found that affectionate, respectful home environment as vital for inter communication skills and social competence developmentin gifted students. found higher social competence among adolescent girls whose mothers possessed authoritative and permissive parenting style, while supportive role of mothers was found more effective for social competence performance. Furthermore, various researches suggested that social incompetence in children in certain areas of social knowledge and skills can be improved through coaching or training.

Parenting

Family is a fundamental psychosocial environment, where through interaction with parents, family members, caregivers that an individual gradually acquires social skills. In the words of “family is the first social environment and one of the main social institutions that affects development of self-esteem and internal control in an individual”. found that adolescent’s social competence is derived from their experience of close relationships within their family. According to Chan (n.d.), “parenting is not only limited to the concerned couple but all the family members since the birth of a child affects the whole family” further Chan also pinpointed that “parenting has become a choice in life due to the advancement in medical knowledge and technology; it is a life-long commitment and involves responsibility of providing good care to children”. Parents play a significant role in assisting youngsters identify and cultivate satisfying relationships and live a well-adjusted life in society. defined “parenting as the process or the state of being a parent”. defined “parenting as the process of developing and utilising the knowledge and skills appropriate to planning for, creating, giving birth to, rearing and/or providing care for offspring.” “Parenting is the style of child upbringing, refers to a privilege of responsibility of mother and father, together or independently to prepare the child for society and culture, which provides ample opportunity to a child to find roots, continuity and a sense of belonging and also serves as an effective agent of socialization”. Parenting refers to “the perceptions of the individual (perceived parenting) on one’s own feeling as to how one is brought up by one’s parents. It refers to the role of mothering, fathering and parenting as a whole. The two distinctive roles of parents include both mothering and fathering. A child bestows on both mother and father together independently, the responsibility of upbringing him/her. reported maternal parenting as predictor of child’s emotional adjustment, and parental parenting as predictor of child’s academic achievement. While Forehand and suggested that since fathers are less available and less involved as compared to mothers, so fathers parenting is more importance to children. found that perceived paternal parenting had significant impact on social competence of children. Baumrind, in series of studies in (1967, 1971, 1978, 1989, 1991), identified “three approaches to parenting, viz. Authoritative, Authoritarian and Permissive”. Further these approaches consisted of varied combinations of responsiveness, demanding-ness and autonomy granting, and were useful in understanding the behaviours of caregivers and how it related to children’s outcomes. Later, the initial description of parenting styles by that is “authoritative”, “authoritarian” and “permissive” was reconceptualised and a fourth parenting style, ‘rejecting-neglecting’ was added, introduced two key elements of parenting, “parental responsiveness” and “parental demandingness”. reported a model of parent–child socialization and focused on three roles taken on by parents, viz. “child’s interactive partner”, “a direct instructor”, and “a provider of opportunities for the child”. Through these varied roles the parents assist the child to begin and sustain social relationships; educate and guide the child with respect to social, cultural and moral norms and dealing varied social situations; and
deal and regulate the child’s social experiences beyond the family also.

Despite much debate and discussion regarding the conceptualization of parenting, now in the light of various researches, it has been emphasised whether these parenting styles in actuality capture the contextual and group variations, and these concerns has led to the creation of “domain specific models”, more flexible and situation specific. Several researchers have reported that supportive parental interactions and practices develop social skills, like emotion recognition, self-regulation, more self-esteem and social behaviours in adolescents that contribute in social competence. Research outcomes show that parenting style play a vital role in developing social competence in children associated higher parental monitoring and parent–child closeness and caring with being more socially competent. Several researches have reported that supportive parental interactions and practices develop social skills, like emotion recognition, self-regulation, more self-esteem and social behaviours in adolescents that contribute in social competence. Several researchers have reported that supportive parental interactions and practices develop social skills, like emotion recognition, self-regulation, more self-esteem and social behaviours in adolescents that contribute in social competence. Research outcomes show that parenting style play a vital role in developing social competence in children associated higher parental monitoring and parent–child closeness and caring with being more socially competent. Reported that children exhibited more prosocial behaviour, whose mothers showed authoritative parenting as compared to those whose mothers showed permissive parenting. found that involvement of parents plays an important role in student’s academic and social success. Several researchers have reported that effectiveness of parenting varies with culture and society. claimed authoritative parenting to be most favourable for both children as well as adolescents across cultures and contexts. In European American context, authoritative parenting aids teenagers to develop greater social competence. On the contrary, found permissive parenting to be associated with greater social competence. However, few research studies by pinpointed mixed findings, where both authoritative and authoritarian parenting in Asian American context were found to be related to lesser depressive signs and behaviour problems. Similarly, a few researches in the Asian context linked authoritative parenting with better development of social competence. So in order to substantiate the research findings, it is imperative to discern how parenting can influence social competence. Thus, present study was undertaken to fulfill the below given objectives.

**Objectives**

1. To explore the social competence and parenting of secondary school students.

2. To compare of male and female secondary school students with respect to social competence and parenting.

3. To find out the relationship between social competence of secondary students and their parenting.

**Hypotheses**

1. There exists no significant difference in social competence of male and female secondary school students.

2. There exists no significant difference in parenting of male and female secondary school students.

3. There exists no relationship of social competence of secondary school students with their parenting.

**Method and Procedure**

The present study employed descriptive survey method. The collection of data was done from male and female students studying in four schools (two Government and two Private) of Jalandhar district of Punjab, by using the technique of simple random sampling. A sample of 200 secondary school students (100 students from each type of school, i.e. Government and Private, out of 100 students, 50 male students and 50 female students) were selected randomly. For the collection of data, two psychological tests were used, one was “social competence scale” and the second tool, “parenting scale” by R.L. Bhardwaj. In order to find out the current status in terms of social competence and parenting of school students, Mean and standard deviation were calculated, while for testing significance of difference between means of social competence and parenting, t-test was applied. Further to analyse relationship between social competence of school students with parenting, correlation was calculated.

**Results and Discussion**

Results relating difference between mean scores of male students and female students in social competence

...
TABLE1: MEAN SCORES OF SOCIAL COMPETENCE OF MALE AND FEMALE STUDENTS

<table>
<thead>
<tr>
<th>Variable</th>
<th>Gender</th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
<th>t-value</th>
<th>Level of Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Social competence</td>
<td>Male</td>
<td>100</td>
<td>176.8</td>
<td>27.12</td>
<td>0.261</td>
<td>Insignificant</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>100</td>
<td>177.7</td>
<td>21.25</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

A look at the above Table 1 reflects mean scores and standard deviation of social competence of male students and female students. Further, t-value calculated with regard to social competence of male and female students was found to be insignificant. It can further be explained that male and female students possessed similar social competence. Keeping in view above findings, hypothesis no.1 i.e. “there exists no significant difference in social competence of male and female secondary school students” is thus accepted.

Results relating difference between mean scores of male students and female students in parenting

TABLE2: MEAN SCORES OF PARENTING OF MALE AND FEMALE STUDENTS

<table>
<thead>
<tr>
<th>Variable</th>
<th>Gender</th>
<th>N</th>
<th>Mean</th>
<th>SD</th>
<th>t-value</th>
<th>Level of Significance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parenting</td>
<td>Male</td>
<td>100</td>
<td>750.8</td>
<td>79.64</td>
<td>1.728</td>
<td>Insignificant</td>
</tr>
<tr>
<td></td>
<td>Female</td>
<td>100</td>
<td>732.0</td>
<td>74.29</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

A look at the above Table 2 reflects mean scores and standard deviation of parenting of male and female secondary school students. Further, the t-value calculated with regard to parenting of male and female students was found to be insignificant. It can further be explained that male and female students had similar parenting. Keeping in view above findings, hypothesis no.2 i.e. “there exists no significant difference in parenting of male and female secondary school students.” is thus accepted.

Results pertaining to relationship of social competence of secondary school students with their parenting

TABLE3: SOCIAL COMPETENCE OF SECONDARY SCHOOL STUDENTS WITH THEIR PARENTING

<table>
<thead>
<tr>
<th>Variables</th>
<th>Social Competence (N=200)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Parenting</td>
<td>0.716</td>
</tr>
</tbody>
</table>

The above Table 3 exhibits the relationship of social competence of secondary school students with their parenting. The result showed that the calculated value of correlation of social competence of students with parenting is positive. This indicates that if secondary school students have better parenting as whole, then students are likely to show better social competence. Thus, there exists a positive relationship of social competence with parenting. Keeping in view the above findings, hypothesis 3, namely, “there exists no relationship of social competence of secondary school students with their parenting pattern.” is thus rejected.

Conflict of Interest: Nil

Source of Funding: Self

Ethical Clearance: IJRISE Journal Reviewer Committee

Conclusions

Male and female secondary school students did not differ significantly with respect to social competence. Male and female secondary students possessed similar social competence.

Male and female secondary school students did not differ significantly with respect to parenting. Male and female secondary students had similar parenting.

Significant positive relationship was found between social competence of secondary school students with
If secondary school students have better parenting as whole, then students are likely to show better social competence.

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Approach to Design Cardiac, Blood Pressure Body Temperature Monitoring Analyzer

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Abstract

This paper describes the development of a system capable of biometric recognition health monitoring was design and implementation. The body Temperature, Pressure and Heart Beat was prepared as an information resource for person. A basic understanding of the thermal sciences is necessary for the Heat Transfer, Pressure and Humidity. The paper consists of sensors which measures heartbeat and body temperature of a patient which is controlled by the microcontroller. The information provide a foundation for applying engineering concepts. This knowledge will help personnel more fully understand the impact that their actions may have on the safe and reliable operation of facility components and systems.

Keywords: Body temperature, Biometric, Cardiac, Humidity

Introduction

Since the dawning of the age of electronics, countless attempts have been made to convince the medical profession of the advantage of amplifying hearts sounds with the idea that if the sound level could be increased a greater diagnostic capability might be achieved. The heart sound heard by the physician through his conventional stethoscope occurs at the time of closure of major valves in the heart. In an abnormal heart additional hearts sounds. Murmurs are heard between the normal sounds. Murmurs are generally caused either by improper opening of the vales or by opening in the septum, which separates the left and the right side of the heart. Different physicians may hear the same sound but interpret them differently. This could lead to faulty diagnosis¹.

In addition high fidelity equipment would be able to reproduce the entire fidelity equipment would be able to reproduce the entire frequency range much of which is missed by the ordinary stethoscope. The instrument that has been developed in order to utilize the entire sound spectrum with high fidelity is the digital stethoscope from heart by means of suitable hardware. The extracted signal is feed to computer to detect for abnormalities of the heart if any².

Physical Characteristic of heart sounds and murmurs:-

A normal hearts produces four separate heart sounds that occur during the sequence of one complete cardiac cycle called, second, third and fourth sound. Practically all hearts sounds and murmurs are made up of frequency between 10 and 1000 Hz.

Normal hearts sounds are quite short in duration, approximately one tenth of second for each while murmurs usually extend between the normal sounds. Murmurs are distinguished from the normal sound as they have high frequency component up to 1000Hz³.

Early detection of heart disease is very important area of research and several diagnostic methods have developed. In this article, low cost diagnostic tools which analyses the digitized sound of the heart beat is presented this could be used to detect abnormalities such as aortic and mitral stenosis and aortic regulation and rheumatic Valvular lesions. The instrument displays the heart sound and also maintains long term records of a patient for future use⁴.

Temperature:- Temperature is a measure of the molecular activity of a substance. The greater the movement of molecules, the higher the temperature. It is a relative measure of how “hot” or “cold” a substance is and can be used to predict the direction of heat transfer.
For an overview and comparison of these sensors, “Temperature-Sensing Technologies”, of these technologies, the platinum RTD temperature sensing element is the most accurate and stable over time and temperature. RTD element technologies are constantly improving, further enhancing the quality of the temperature measurement (see Figure 1). Typically, a data acquisition system conditions the analog signal from the RTD sensor, making the analog translation of the temperature usable in the digital domain.

This application note focuses on circuit solutions that use platinum RTDs in their design. Initially, the RTD temperature-sensing element will be compared to the negative temperature coefficient (NTC) thermistor, which is also a resistive temperature-sensing element. In this forum, the linearity of the RTD will be presented along with calibration formulas that can be used to improve the off-the-shelf linearity of the element. For additional information concerning the thermistor temperature sensor, refer to Microchip’s AN685, “Thermistors” in Single Supply Temperature Sensing Circuits. Finally, the signal conditioning path for the RTD system will be covered with application circuits from sensor to microcontroller.

Pressure:- Pressure is a measure of the force exerted per unit area on the boundaries of a substance (or system). It is caused by the collisions of the molecules of the substance with the boundaries of the system. As molecules hit the walls, they exert forces that try to push the walls outward. The forces resulting from all of these collisions cause the pressure exerted by a system on its surroundings. Pressure is frequently measured in units of lbf/in² (psi). A major application of operational amplifiers (op amps) is converting and conditioning signals from transducers into signals that other devices such as analog-to-digital converters (ADCs) can use. Conversion and conditioning are usually necessary because the transducer and ADC ranges and offsets are rarely the same. Op amp circuits are also useful in signal filtering for compatibility with ADC circuits. This article shows how to use a bridge-type transducer for measuring gas or liquid pressure, and for measuring strain in mechanical elements. A basic understanding of active and passive analog devices and their use is helpful to use this article to complete a design.

**TEMPERATURE SENSOR CIRCUIT**

**Working**

**TEMPERATURE SENSOR CIRCUIT**

**FIGURE 1:-Temperature sensing circuit**

**Temptrature Working**

The key component is the Dallas Semiconductor’s DS1621 temperature sensor. This tiny 8 pin IC needs only +5 volts to measure the temperature and to send it out via its IIC bus output. Since many IIC bus devices can be connected in parallel, three address inputs (A0, A1, A2) are provided to select one out 8 addresses the device will respond on. This way, up to 8 sensors can be connected in parallel. I have set the internal temperature sensor to address 0 and the external one to address 1. If you plan to use only one sensor connect it as address 0. Interfacing the IIC bus to the RS232 com port is a matter of adapting levels. IIC works on 0.5V signals, RS232 uses -12V .. +12V. The trick here is that, although specified for -12V .. +12V, almost all PC com port I know work equally well with 0..5V signals. This eliminates the need to raise the IIC output to RS232 levels, and the SDA data line connects directly to the PC CTS line. On the opposite way, the RS232 signals can damage the IIC inputs, so I placed voltage limiters (R1, DZ2, R2, DZ1) on the SCL clock input and SDA data input. (note that SDA is bidirectional: receives from the DTR line and transmits to the CTS line).

Since the circuit draws very little current, there is no need to add an external power supply. The +12V from the RS232 lines are conveyed to the regulator by diodes D1, D2, filtered by C1 and regulated to +5V by the LM2936-Z5. Don’t replace it with an ordinary 78L05 regulator unless you want to add an external 9V battery: the LM2936 is capable to regulate even with input voltages near to 6V, as is the case of many serial ports.
WORKING BLOOD PRESSURE

1) Transducer:
   The sound signals from the heart are converted to analog electrical signals using a condenser microphone fastened to conventional physician’s stethoscope. This is directly coupled to the chest wall of the person whose heart sound is to be recorded. The microphone presents a higher impedance, high sensitivity, low noise, weight and operates with a battery.

2) Pre-Amplifier:
   The ac voltage output of the microphone is only of the order of few mill volts and is not sufficient amplitude for signal analysis. Hence a pre-amplifier shown in the Fig-2 acts as the next stage. An amplification of about 1000 is provided in two stages. The first stage has an amplification of about 20 while the second stage has an amplification of about 50. Continuous variation the gain can be achieved through a 22 Kilo ohm potentiometer.

3) Low pass Filter:
   A second order Butterworth low pass, filter with a cut of frequency of 2 kHz is used since the frequencies interest (both abnormal and normal) file within 2 kHz. The circuit indicates the filter that has been used. The cut of frequency of the filter is given by \( f = \frac{1}{2 \times 3.14 \times R \times C} \).

Medical Applications Of Digital Stethoscope

Digital stethoscope can be used in the diagnosis of many coronary artery diseases like

Rheumatic Valvular Lesions :

Rheumatic fever is an autoimmune disease in which the heart valves are likely to be damaged or destroyed. This can be detected.

Murmur of Aortic Stenosis :

In aortic stenosis, the blood is ejected from the left ventricle through a small opening which increases the pressure to 350 mm of Hg. This causes turbulent flow which can be detected by the instrument.

Murmur of Aortic Regurgitation :

This is caused due to the damage of the valves. The sound causes a blowing murmur, which is not as high as that of aortic stenosis.

Murmur of Mitral Regurgitation :

In this case the blood flows backwards through the mitral valve during systole which produces unnecessary sounds.

Murmur of Mitral Stenosis :

The blood passes with difficulty from the left atrium into the left ventricle due to pressure difference. It produces murmur which is very weak.
Software has also been developed along with this instrument. The software can be broadly classified into three segments.

1. Acquisition routine
2. Line display.
3. Materializing user friendly interfaces.

The first major segment is the acquisition routine which digitizes and converts analog heart sounds to digital values. The algorithm involved in the data acquisition is indicated.
The second is the display segment, which does the on-line display of the heart sound. The processor displays the on-line recording as well as signals recorded earlier. In case of retrieval of recorded signal, system displays the name, age and other information of the patient stored by the user at the time of recording. In case of live signals, the system displays the name and age and information prompts the user to enter any other information to be stored along with the signal data. The third segment makes the instrument very user friendly. The interface enables three methods of configuring a signal. In the default Configuration, it enables the user to record the signal on-line and store it in a database and also retrieval of the recorded signal. In the second, standard configuration, expansion in the ratio of 1:2 and 1:4 is possible and a compression of 2:1 and 4:1 is possible. In the third, non-standard configuration, the user is free to choose the ratio to any desired value. There is no limit for compression or expansion and hence a ratio like 1:10 may produce best results particularly for analysis of abnormal signals. The heart sound of normal and abnormal subjects record using the designed digital stethoscope. Capturing Printer for Windows provides several ways to read and write to parallel ports. The most direct way is reading and writing to the port registers. Most programming languages included this ability, or at least allow you to add it. Windows also has API calls for accessing LPT ports, and 16-bit programs can use BIOS software interrupts for LPT access. In C, you can access a parallel port with the in and out functions.

This writes AAh to a Data port at 378h:

```c
unsigned Data Address=0x378;
    into Data Port;
DataPort=outp(DataAddress,0xAA);
return 0;
```

This display the value of a Status port at 378h:

```c
unsignedStatusAddress=0x379;
    intStatusPort;
StatusPort=inp(StatusAddress);
    printf("Status port = %Xh\n",StatusPort);
return 0;
```

**Applications**

1. **Multiplexing the ECG**:

   The instrument can be extended by placing the electrodes on the limbs so that ECG can also be simultaneously displayed as well as analyzed. In this method the result would be more accurate, reliable and efficient.

2. **Telephone cardiograph**:

   The most recent advancement of biomedicine, namely telemedicine, in which the digitized heart sound can be transmitted from a remote to a central hospital for consultation.

3. **Hearing the heart beat at remote place**:

   A built in speaker may be conveniently provided with the instrument, which when placed near the mouth piece of the telephone may be heard at the other end by the doctor from which he may analyses the exact condition of the heart.

**Advantages**

1. Long term recorded of the state of the heart can be maintained as a database.

2. Cost is very low

3. Easy to handle
4. Portable
5. Correct reading
6. Easy to me measurement the parameter

**Conflict of Interest:** Nil

**Source of Funding:** Self

**Ethical Clearance:** IJRISE Journal Reviewer Committee

**References**


Academic Resilience in Relation to Educational Aspirations among International Students

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Abstract

The present study aimed to explore the relationship of Academic Resilience of International students with their Educational Aspirations. The study was conducted on the sample of 500 International students studying in Universities of Punjab and Chandigarh mainly. Students of five different countries namely Nigeria, Bhutan, Afghanistan, Nepal and Tanzania were taken into consideration. The results of the study highlighted significant relationship (strong positive correlation) between Academic Resilience and Educational Aspirations among International students. In terms of students belonging to different countries as well, a strong positive correlation was found between Academic Resilience and Educational Aspirations.

Keywords: Academic Resilience, Educational Aspirations

Introduction

In the past few years India has witnessed developments in many areas like industry, politics, Information technology, media and education. Although as a result of these changes every area has undergone through the process of transformation. One of the areas where this enormous change is evident is none other than Education sector. From pre-independence era to till date education sector in India has evolved to a great extent. This development in Indian education sector is evident from the fact that earlier as per the trend only Indian students used to visit foreign lands to pursue further studies, although even today this practice is in continuation but time has transformed and nowadays there are thousands of International students who visit India with a dream to pursue their education.

Academic Resilience:

Resilience in academic context is identified as student’s capability to successfully tackle with impediments, pressure and challenges in the school settings. Student face multiple problems at academic as well as social front. Those challenges and pressure may weaken their achievement and lead to dropout development in education but despite obstacles and difficult circumstance, there are student who are able to adjust with difficulties and attain high level of academic achievement and success, because they believe that successful learning is the outcome of undying efforts and positive thinking. Such type of students are termed as academically resilient students. Hence, academic resilience denotes towards the capacity to handle academic challenges, problems or failures at school and pressure out of excessive work load.

Resilient students do come across negative circumstances but they are able to overcome their opposing influence. Although this is an inbuilt strength, it can be greatly enhanced by social supports, especially the one which is provided by the teacher who while narrating any story promotes the development of coping mechanisms. These social supports help the students in their adjustment.

Educational Aspirations:

Considering the prevailing conditions in the contemporary world, education has turned into a necessity nowadays. Resultantly, gradually it has acquired an imperative place in the lives of people especially future generation. In the journey of education, people acquire essential skills and proficiencies in order to become capable of performing in a better manner in different tasks especially in the field of competition. As being highly educated, open avenues for lucrative job, provides a more respectful career, leads towards less
probability of unemployment which ultimately results into better well-being.

For the promotion as well as sustainability of economic growth and technological development, education is considered as a key element. The good remuneration and the better career are the significant economic motivation behind education. This scenario is prevalent in every culture and society therefore, the educational aspirations are integral part of every society. On the contrary, in societies with low socio-economic background, people do not support education that much. Because of increased awareness among masses, nowadays people aspire to get higher education. It is believed that student’s educational and career aspirations are the most relevant factors which determine their educational attainment in future.  

Objectives

1. To study the relationship of Academic Resilience with Educational Aspirations of International students.

   (a) To study the relationship of Academic Resilience with Educational Aspirations of International students from Nigeria.

   (b) To study the relationship of Academic Resilience with Educational Aspirations of International students from Bhutan.

   (c) To study the relationship of Academic Resilience with Educational Aspirations of International students from Afghanistan.

   (d) To study the relationship of Academic Resilience with Educational Aspirations of International students from Nepal.

   (e) To study the relationship of Academic Resilience with Educational Aspirations of International students from Tanzania.

Operational Definitions of the Terms Used:

Academic Resilience

Academic resilience is the capacity on the part of students to deal with adversities which are termed as major challenges in educational processes.

Educational Aspirations

Educational aspirations refer to condition which motivates an individual to make efforts to excel in educational field. In other words, it is a strong desire to achieve something at academic front.

Sample:

In the present study, data was collected from 500 International students from Nigeria, Bhutan, Afghanistan, Nepal and Tanzania. From each country sample of 100 students was taken.

Research Method:

As per the nature of the study, descriptive survey method was applied in the present study. In the present study null hypotheses were framed and results were verified as well as interpreted in the light of that only.

Tools:

1. Academic Resilience Scale constructed and standardized by supervisor and investigator (2017)

2. Educational Aspirations Scale (Form V) by Sharma and Gupta (1987) revalidated by investigator in 2017

Results

The variable of academic resilience consists of five dimensions namely confidence, coordination, control, composure and commitment. The analysis of correlation of academic resilience (in total as well as dimension wise) with educational aspirations for total sample has been given in the undermentioned table 1.1.
Hypothesis 1: There exists no significant relationship between Academic Resilience and Educational Aspirations of International Students

From table 1.1, it is clearly evident that the correlation value of academic resilience and educational aspirations of International students came out as .675 which shows strong positive correlation between concerned variables. The p-value .000 is found significant at 0.01 level. In addition to this, the table value for the same was found out to be 0.088 and 0.115 at 0.05 and 0.01 level of significance, hence the hypothesis i.e. there exists no significant relationship between academic resilience and educational aspirations of International students is not retained. Hence it can be concluded that there exists a significant relationship between academic resilience and educational aspirations among International students. Positive correlation between the both variables reveal that those students who have high academic resilience have higher educational aspirations as well and vice versa. It can be inferred that generally those students who have high educational aspirations, somehow manage to face academic adversity also. High educational aspirations do not let students deviate from their educational targets even in case of academic adversities. Their high aspirations instill in them a capacity to overcome or avoid any academic setback.
Somewhat similar association has been explored in a study conducted by Chinwe (2008) in which it was highlighted that educational aspirations is significant, positive predictors of academic self-efficacy among African American male High School students.

Hypothesis 1 (a): There exists no significant relationship between Academic Resilience and Educational Aspirations of International Students from Nigeria

Table 1.1 indicates that the correlation value regarding relationship between academic resilience and educational aspirations among International students from Nigeria came out to be .632 indicating a very strong positive correlation between variables. The p-value came out as .000 which stands significant at .01 level, whereas the table value for the same was found out to be 0.195 and 0.254 at 0.05 and 0.01 level of significance. Hence the hypothesis that there exists no significant correlation between academic resilience and educational aspirations of International students from Nigeria is not retained. It therefore, becomes appropriate to mention that there is a significant relationship between academic resilience as well as educational aspirations among International students from Nigeria. It discloses that International students from Nigeria possesses high academic resilience and educational aspirations as well.

Table 1.1 further reveals that the correlation of academic resilience with educational aspirations among International students from Nigeria came out as \( r = 0.289, p = 0.004 \) \( r = 0.411, p = 0.000 \), \( r = 0.438, p = 0.000 \), \( r = 0.401, p = 0.000 \) and \( r = 0.524, p = 0.000 \) respectively for confidence, coordination, control, composure and commitment dimension of academic resilience. All these values are significant at .01 level of significance. Further all these ‘r’ values are greater than table values, which are found as .195 and .254 at 0.05 and 0.01 level of significance. It is evident from correlation values that there exists a positive correlation between dimensions of academic resilience and educational aspirations among International students from Nigeria. The correlation between confidence and educational aspirations is weak positive correlation. It can be said that such weak positive relation may be because of the reason that at times there are certain students who because of their over confidence turn less careful towards educational plans in near future, whereas coordination, control and composure share a moderate positive correlation with educational aspirations among International students from Nigeria. Only commitment dimension of academic resilience has strong positive correlation with educational aspirations. The anticipated reason behind such result may be that Nigerian student’s diligent efforts in educational field save them from getting derailed from their academic path.

Hypothesis 1 (b): There exists no significant relationship between Academic Resilience and Educational Aspirations of International Students from Bhutan

Table 1.1 points out towards the value of correlation between academic resilience and educational aspirations among International students from Bhutan. The ‘r’ value came out to be .777 (strong positive correlation). The p-value is .000 which stands significant at .01 level. On the other hand, the table values for the same found out to be 0.195 and 0.254 at 0.05 and 0.01 level of significance. Hence the hypothesis that there exists no significant correlation between academic resilience and educational aspirations of International students from Bhutan is not retained. Therefore, it indicates towards a significant relationship between academic resilience and educational aspirations among International students from Bhutan. The probable reason behind such results may be that in case of Bhutanese International students, their high educational vision in life, enables them to confront any academic challenge. Table 5.8 further supports that the correlation of academic resilience with educational aspirations among International students from Bhutan which came out as \( r = 0.569, p = 0.000 \), \( r = 0.526, p = 0.000 \), \( r = 0.625, p = 0.000 \), \( r = 0.599, p = 0.000 \) and \( r = 0.560, p = 0.000 \) respectively for confidence, coordination, control, composure and commitment dimension of academic resilience. All these values stand significant at .01 level. Further all these ‘r’ values are greater than table values, which are found as .195 and .254 at 0.05 and 0.01 level of significance. Correlation values indicates towards a strong positive correlation between various dimensions of academic resilience and educational aspirations among International students from Bhutan.

Hypothesis 1 (c): There exists no significant relationship between Academic Resilience and Educational Aspirations of International Students from Afghanistan
Table 1.1 depicts the correlation value of academic resilience and educational aspirations among International students from Afghanistan which comes out to be .559. This ‘r’ value exhibits a very strong positive correlation between the mentioned variables. The p-value for the same came out as .000 which stands significant at .01 level, whereas, the table values for the same is 0.195 and 0.254 at 0.05 and 0.01 level of significance. Therefore, the hypothesis that there exists no significant correlation between academic resilience and educational aspirations of International students from Afghanistan is not retained which indicate towards a significant relationship between academic resilience and educational aspirations among International students from Afghanistan. It is anticipated that such result may be because of the reason that high educational aspirations do not let students give up their efforts even during academically challenging situations as well. A close look at table 5.8 further indicates that the correlation of academic resilience with educational aspirations among International students from Afghanistan came out as (.217, p=.000), (r=.360, p=.000), (r=.564, p=.000), (r=.367, p=.000) and (r=.386, p=.000) respectively for confidence, coordination, control, composure and commitment dimension of academic resilience. All these values stand significant at .01 level. All these ‘r’ values are greater than table values, which came out to be .195 and .254 at 0.05 and 0.01 level of significance. Therefore, correlation values indicate towards a positive correlation between dimensions of academic resilience and educational aspirations among International students from Afghanistan.

The correlation between confidence and educational aspirations is weak positive correlation. This indicates that although most of the time confidence leads to developing high aspirations in students but being a psychological construct, it may fluctuate over a period of time corresponding to changing circumstances which ultimately affects competence in educational field, whereas control dimension of academic resilience has strong positive correlation with educational aspirations which shows that resilient students remain focused in their academics. Coordination, composure and commitment share a moderate positive correlation with educational aspirations among International students. Therefore, it can be inferred that planning and continuous efforts remain vital ingredients for achieving high academic resilience.11

Hypothesis 1 (d): There exists no significant relationship between Academic Resilience and Educational Aspirations of International Students from Nepal.

Table 1.1 points out that the value regarding correlation between academic resilience and educational aspirations among International students from Nepal came out to be .747 (strong positive correlation). The corresponding p-value came out as .000 which stands significant at .01 level. In addition to this, this ‘r’ value (.747) is greater than the table values which came out to be 0.195 and 0.254 at 0.05 and 0.01 level of significance. Hence, the hypothesis that there exists no significant correlation between academic resilience and educational aspirations of International students from Nepal is not retained indicating towards a significant relationship between academic resilience and educational aspirations among International students from Nepal. It can be inferred that high educational aspirations make International students from Nepal, academically resilient as well. Table 5.8 further supports that the correlation of academic resilience with educational aspirations among International students from Nepal which was found out to be (.625, p=.000), (r=.461, p=.000), (r=.518, p=.000), (r=.652, p=.000) and (r=.591, p=.000) respectively for confidence, coordination, control, composure and commitment dimension of academic resilience. All these values fall significant at .01 level. All these ‘r’ values are greater than table values, which came out to be .195 and .254 at 0.05 and 0.01 level of significance.

Correlation values predicts a strong positive correlation between dimensions of academic resilience and educational aspirations among International students from Nepal. It makes it comprehensible that believing in one capability, getting less effected by anxiety, remaining focussed and diligent efforts are major components for making someone academically resilient. Only coordination dimension of academic resilience has moderate positive correlation with educational aspirations. It indicates that at times International students from Nepal, may not be that efficient in educational planning which ultimately affects their academic resilience and vice versa.

Hypothesis 1 (e): There exists no significant relationship between Academic Resilience and Educational Aspirations of International Students from Tanzania.
Table 1.1 indicates that the value of correlation between academic resilience and educational aspirations among International students from Tanzania which came out to be .679 (strong positive correlation), whereas the p-value for the same, came out as .000 and found significant at .01 level of significance. In addition to this, this ‘r’ value (.679) is greater than the table values which came out to be 0.195 and 0.254 at 0.05 and 0.01 level of significance. Hence the hypothesis that there exists no significant correlation between academic resilience and educational aspirations of International students from Tanzania is not retained, indicating towards a significant relationship between academic resilience and educational aspirations among International students from Tanzania. It shows that academically resilient students have high level of aspirations in education as well. Table 5.8 further supports that the correlation values of various dimensions of academic resilience with educational aspirations among International students from Tanzania, which came out to be (r=.574, p=.000),(r=.482, p=.000) (r=.579, p=.000),(r=.516,p=.000) and (r=.481, p=.000) respectively for confidence, coordination, control, composure and commitment dimension of academic resilience. All these values are significant at .01 level. Here it is also worth mentioning that all these ‘r’ values are found to be greater than table values, which is .195 and .254 at 0.05 and 0.01 level of significance.

Conclusions

Findings of the study in hand helps to conclude that those students who have high educational aspirations, somehow manage to face academic adversity also. High educational aspirations do not let students deviate from their educational targets even in case of academic adversities. Their high aspirations instill in them a capacity to overcome or avoid any academic setback. It is assumed from results of the study that having confidence in one’s abilities, being strategy oriented and remaining academically committed helps in making students, academically resilient. In case of sample of Nigerian students, weak positive relationship was found between confidence dimension and educational aspirations. It can be said that at times there are certain students who because of their over confidence turn less careful towards educational plans in near future. In case of International students of Bhutan, high positive relationship was found between academic resilience and educational aspirations. The probable reason behind such results may be that in case of Bhutanese International students, their high educational vision in life, enables them to confront any academic challenge. Similarly, as per the results of International students from Afghanistan it was found that planning and continuous efforts are vital ingredients for achieving high academic resilience.

Conflict of Interest: Nil

Source of Funding: Self

Ethical Clearance: IJRISE Journal Reviewer Committee.

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The Impact of Emotional Intelligence Competencies on Self-Esteem among Public Servants

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Abstract

Emotional intelligence is now increasingly concentrated and a place in psychology studies. Emotional intelligence is also detected can affect the self-esteem of employees in an organization. In this study, workplace issues refer to emotional intelligence and self-esteem of employees. The specific purpose of this study is to examine the impact of emotional intelligence competencies on self-esteem among employees. A total of 196 civil servants in local authorities (PBTs) was selected as the respondents. Measuring tools used in the data collection are Emotional Intelligence Self-Description Inventory (EISDI), and Rosenberg Self-Esteem Scale (RSES). The data were analysed using regression analysis. The findings show that emotional intelligence competencies have an impact on the self-esteem of employees. The most important findings are that emotional intelligence among the employees is more relevant to the more positive of self-esteem increased.

Keywords: Impact; Emotional Intelligence; Self-Esteem; Public Servant;

Introduction

Employee as a human resource is a valuable asset to every organization. The longer the service of an employee in an organization, the greater the value of the employee’s experience and expertise to the organization. The entity contributes greatly to the impactiveness of an organization as it seeks to achieve its objectives, vision and mission with excellence. Excellent organization requires excellent employees and is able to put organizations at a more flexible level of transformation. Excellent employees are high-quality and committed workers. Employees are not only expected to carry out their duties with full commitment, but also have pure values and positive behaviours and are willing to sacrifice for the organization.

Quite clearly to achieve greater glory in the public sector, it is of course the organization has a transformation for every implementation. The effort is towards a renewal application based on prioritization as a more strategic goal. Civil servants including those in PBT who are among the frontline of human resource management are required to stay close to the community and conduct more efficiently in their duties, as they become the symbol of the quality of government services. Emphasis should be placed on aspects of behavior, emotion and commitment within organizations that respond to the environment as it becomes a must in any organization. The use of human resources efficiently and impactively can increase organizational productivity and vice versa.

Ashkanasy et al., (2002) then compared the negative emotional impression to the negative, and they pay attention to positive aspects of mood closely related to the high commitment in work and for better performance. Emotion is also a factor in organizational success in the process of an employee in decision-making, transparent and open communication, ensuring customer loyalty, and teamwork. Afzaal and Taha (2012) highlighted the importance of finding new channels in implementing human resource management policies more impactively and requiring close association with the new dimensions.
Problem Statement

This study focuses on civil servants as workers in Malaysian PBT. They are also the human capital of the organization, especially because the frequency they interact with the community and the services rendered are directly and indirectly. Although various policies, systems and transformative are introduced and implemented in achieving quality of work, but there is still a gap which affects the image of the public sector.

The public sector is often faced with pressure from the community to work more proactively in improving performance and service delivery systems, including the role of the local authorities i.e. PBT. The increase made the public wonder how far civil servants can change the flaw and transformed them with the strengths that could raise the image of the organization. Previous studies also explore the impacts of emotional intelligence on self-esteem as tested in that dimensions of emotional intelligence such as dimension of Perception and Appraisal of Emotion, dimension Facilitating Thinking with Emotion dimension of understanding emotion, and dimension of Regulation and Management of Emotion able to give impact to the self-esteem of employees. This problem statement also addresses the question of the need for emotional intelligence affecting self-esteem.

This study employs the theory of Emotional Intelligence Mayer and Salovey (1990) through the Model Four Branch Emotional Intelligence Mayer and Salovey (1997); and Rosenberg’s Self-Esteem theory (1965); as the basis of the overall study. This study does not cover other emotional intelligence competencies, other self-esteem and other variables that are beyond the theory and model.

In summary, the researcher focus on this study is to examine the impact of emotional intelligence through these four competencies on the self-esteem of the PBT employees, based on the scenario and the context of the public sector in Malaysia. Therefore, based on several established theories, this study is conducted to look at the phenomena of the public sector in this country that is relevant to the current local situation.

Research Hypothesis

3.1 There is a significant impact of emotional intelligence (Perception and Appraisal of Emotion) on self-esteem.

3.2 There is a significant impact of emotional intelligence (Facilitating Thinking with Emotion) on self-esteem.

3.3 There is a significant impact of emotional intelligence (Understanding Emotion) on self-esteem.

3.4 There is a significant impact of emotional intelligence (Regulation and Management of Emotion) on self-esteem.

Hifsa (2013) in his study also found that there was a significant relationship and impact of emotional management competence on the self-esteem of respondents in Pakistan. Past studies have shown that there are significant relationships and impacts of some emotional intelligence competencies over the self-esteem of respondents. Neerpal and Renu (2009) studies found significant positive relationship between emotional intelligence and self-esteem. With the examples of the findings above, the researcher builds a hypothesis to test how far the competence of emotional intelligence can affect the self-esteem of employees.

Methodology

Research Design

This study is a type of non-experimental study and it is a field-based and descriptive study with the use of regression statistics. Field research is somewhat relevant to be used in this study because of its reliability, while the cost of consumption is relatively low. The needs of this study are for the descriptive and hypothesis testing.
Research Location and Subject

The limitation of the respondents' survey was focused on the category of grade 22 workers up to grade 44 who were civil servants at the Local Authorities, namely the City Council covering the southern zones of Peninsular Malaysia namely in Johor Bahru and Melaka. Researcher only selected two city councils from 12 city councils in Malaysia. Since this study requires a variety of costs, the cost of the present day is high, so researcher only selects the study location in the southern zone of Peninsular Malaysia. Logistics factors can be more cost-impactive, time and energy. The focus of the study is on the state city council. The city hall, the local municipal council and the local district council are excluded as a PBT sample in this study.

Research Instrument

The Emotional Intelligence Self-Description Inventory was used to measure employee emotional intelligence at work in this study. The reliability of this instrument is .915. While the Rosenberg Self-Esteem Scale Survey is to measure the self-esteem of employees and the reliability of the instrument for this study is .794. The reliability of these two surveys has a relatively high reliability value and can be believed to be used to obtain quality research results.

This study was conducted using a questionnaire to obtain the information needed by the researcher. Thus, researcher can measure the emotional intelligence and the self-esteem among respondents. The accuracy and reliability of this study are dependent on the accuracy and reliability of the instruments used, noting all the instruments used by the researcher in this study are instruments that are already well-established and used by other researcher as well as their earlier construction are from theoretical experts.12,13

Research Result

Table 1 shows the results of the study on the impact of Perception and Appraisal of Emotion on self-esteem. The findings from the linear regression analysis show that Perception and Appraisal of Emotion statistically significant give a significant impact \[F (1, 160) = 30.413, p<.005\] to self-esteem. Perception and Appraisal of Emotion contributed 16.0% variance in self-esteem with \(R^2 = .160\). This means that Perception and Appraisal of Emotion can be regarded as a significant predictor of self-esteem and acceptance of the hypothesis of this study. It also explains that Perception and Appraisal of Emotion are significant in helping to improve and improve the self-esteem level of employees in the workplace.

Table 1: The Impact of Perception and Appraisal of Emotion on Self-Esteem

<table>
<thead>
<tr>
<th>Variable</th>
<th>Self-Esteem</th>
</tr>
</thead>
<tbody>
<tr>
<td>Perception and Appraisal of Emotion</td>
<td>(R^2)</td>
</tr>
<tr>
<td></td>
<td>.160</td>
</tr>
</tbody>
</table>

\(p = \text{significant at the level } < 0.005\)

Table 2 shows the results of the study on the impact of Facilitating Thinking with Emotion to self-esteem. The findings from linear regression analysis have found that Facilitating Thinking with Emotion statistically significant impacts \[F (1, 160) = 26.850, p<.005\] to self-esteem. Facilitating Thinking with Emotion contributing 14.4% variance in self-esteem with \(R^2 = .144\). This means that Facilitating Thinking with Emotion can be considered as a significant predictor of self-esteem, thus making the results of this analysis accept the hypothesis of this study. It also explains that emotional intelligence competencies which is Facilitating Thinking with Emotion are significant in helping to increase positively self-esteem of employees at the workplace.

Table 2: The Impact of Facilitating Thinking with Emotion on Self-Esteem

<table>
<thead>
<tr>
<th>Variable</th>
<th>Self-Esteem</th>
</tr>
</thead>
<tbody>
<tr>
<td>Facilitating Thinking with Emotion</td>
<td>(R^2)</td>
</tr>
<tr>
<td></td>
<td>.144</td>
</tr>
</tbody>
</table>

\(p = \text{significant at the level } < 0.005\)

The results of the study on the impact of Understanding Emotion on self-esteem are shown in table 3. Linear regression analysis shows that the competence dimensions of Understanding Emotion statistically give a significant impact \[F (1, 160) = 27.525, p < .005\] to self-esteem. Emotional understanding contributes as much as 14.7% of variance in self-esteem with \(R^2 = \)
Therefore, Understanding Emotion can be regarded as a significant predictor of self-esteem, as well as the result of this analysis can accept the hypothesis of the study because Understanding Emotion is an important and significant in helping to increase self-esteem of employees at the workplace.

Table 3: The Impact of Understanding Emotion on Self-Esteem

<table>
<thead>
<tr>
<th>Variable</th>
<th>Self-Esteem</th>
</tr>
</thead>
<tbody>
<tr>
<td>Understanding Emotion</td>
<td>R^2  F Value</td>
</tr>
<tr>
<td></td>
<td>.147</td>
</tr>
</tbody>
</table>

p = significant at the level < 0.005

The results of linear regression analysis (table 4) found that statistically significant Regulation and Management of Emotion had significant impact [F (1, 160) = 47.124, p < .005] to self-esteem. Regulation and Management of Emotion contributed 22.8% of variance in self-esteem with R^2 = .228. This means that Regulation and Management of Emotion can be regarded as a significant predictor of self-esteem as well as accepting the hypothesis of this study. It can also be explained that employee Regulation and Management of Emotion is significant in helping to increase self-esteem of employees at the workplace.

Table 4: The Impact of Regulation and Management of Emotion on Self-Esteem

<table>
<thead>
<tr>
<th>Variable</th>
<th>Self-Esteem</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regulation and Management of Emotion</td>
<td>R^2  F Value</td>
</tr>
<tr>
<td></td>
<td>.228</td>
</tr>
</tbody>
</table>

p = significant at the level < 0.005

**Discussions**

Several past studies agree that emotional intelligence has significant positive relationships and impacts on self-esteem among workers\(^1\,^2\,^8\,^15\). While some previous studies have also focused on certain emotional intelligence competencies in evaluating their impact on self-esteem of employees toward the organization\(^9\,^20\). The results show that the ability to control and manage their own emotions and others also enables employees to be more positive in viewing and accepting their own deficiencies and advantages as well as others. Even workers are aware of uncontrolled emotional impacts that may cause their self-esteem to be negative. The ability of employees to regulate and manage their emotions can also help strengthen their estimates when employees can reduce their negative emotions and improve their positive emotions\(^3\).

When viewed from the impact of the influence of emotional intelligence through these four competencies on the self-esteem of the workers, it appears that these four competencies also show a significant impact on self-esteem at the workplace. The four competencies were Perception and Appraisal of Emotion (R^2 = .160, p < .005) with the contribution of variance in the self-esteem of employees by 16%. Facilitating Thinking with Emotion (R^2 = .144, p < .005) with the contribution of variance in self-esteem of employees is 14.4%. The amount of this variance also illustrates this contribution also plays an important role in influencing self-esteem of employees. Third competence is an Understanding Emotion (R^2 = .147, p < .005), with the contribution of variance in self-esteem of employees by 14.7%. While the last competence was Regulation and Management of Emotion (R^2 = .288, p < .005) with the contribution of variance in self-esteem of employees by 22.8%. For this fourth competency decision it was found that it was in line with the findings of Shohreh’s (2012) study, when his study also found a significant impact of the dimensions of social skills comprising emotion control and management, to the self-esteem of employees at the workplace\(^20\).

Positive emotions are closely related to self-esteem as it involves the way employees see and evaluate themselves based on other people’s judgments and past experiences. The benefits are not only focused on individual workers, but also provide positive waves for organizations where positive employees can provide motivation and inspiration to their friends and are able to handle conflicts in the organization. A combination of positive emotional intelligence and self-esteem leads to dynamic work behaviours in the workplace. This is in line as well with what James (1994) said that humans should always be interested in helping themselves and the people around to share their own high estimate when respecting fellow human beings created a more
Conclusion

It can be concluded that employees with high emotional intelligence are capable of consistently in a positive mood and achieve a high self-esteem as they can understand and control emotional influences rather than negative situations\textsuperscript{12,13}. It needs to be helped with the strength in emotional intelligence competencies involves the high self-esteem. Emotional intelligence should also be tailored to the needs of the function as an employee in order to make the employees more emotionally stable and positive, thus making the work better in quality. Plus, there is a significant self-esteem function in the organization. In summary, emotional intelligence is found to be able to influence the level of self-esteem among employees.

Conflict of Interest: Nil

Source of Funding: Self

Ethical Clearance: IJRise Journal Reviewer Committee

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Definitions of Disruptive Behaviour by Secondary School Teachers of Brunei Darussalam

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Abstract

This paper reports on an investigation into teachers’ definitions of disruptive behaviour among young adolescents in Brunei Darussalam. A qualitative approach was applied in this study. By utilizing purposeful sampling method, a total of six teachers teaching Year 8 and Year 9 of three different public secondary schools were selected. A semi-structured interview guide was conducted for individual teachers to elicit information on the definitions of this phenomenon. The findings revealed that this particular group of teachers (in these three different schools) defined disruptive behaviour as shouting, drumming, singing, sleeping, not doing the work, inattentiveness, not following rules, disturbing other students and being aggressive. The implications of the findings of this study for teachers, researchers and further research are discussed.

Keywords: Disruptive Behaviour; Teachers’ Definition; Secondary School; Young Adolescents; Qualitative Study.

Introduction

Teachers daily face challenges in managing the young adolescents’ behaviour that exist in contemporary classrooms despite the efforts to create a conducive learning environment for all. Disruptive behaviour among young adolescents in secondary schools is a major issue across the globe and occurs at all levels of schooling. In most countries the concern of disruptive behaviour and research focus is mainly on secondary schools as none other than this level of schooling has experienced more and major rise in disruptive behaviour. Although this phenomenon is experienced by nations, the types of behaviour and the prevalence of it vary as each nation differs in terms of their social and cultural environment.

Most existing research on teachers’ perceptions on disruptive behaviour in secondary schools are from Western and European societies, such as Scotland, United Kingdom, Spain, Greece, Australia, New Zealand and the United States of America. The extent and nature of student disruptive behaviour may be different in these countries compared to Brunei Darussalam, an Islamic nation with a small population. The aim of this paper is to explore the definitions of disruptive behaviour among young adolescents as perceived by secondary school teachers in Brunei Darussalam.

The term “disruptive behaviour” was used in this study as any behaviour that is sufficiently off-task in the classroom, as to distract the teacher and / or class peers from on-task objectives.

Literature Review

There is an array of literature on disruptive behaviour among students in secondary schools. In the literature, different terminologies have been used to refer to disruptive behaviour of students. For example, misbehaviour, challenging behaviour, inappropriate behaviour, aggressive behaviour and so on. Nevertheless, all these terms encompass students’ unacceptable behaviours that distract the teaching and learning process.

In the study of disruptive behaviour by Lawrence, Steed, and Young (1984), it was found that for one respondent the disruptive child was simply “the one who does not follow the rules of the school and its order… it (disruptive behaviour) includes pupils who lack
understanding or acceptance of the norms of behaviour towards teachers or other pupils, who disregard printed and unprinted rules”. Another respondent identified three victims: the disrupter himself, the teacher and other pupils. The study revealed that there was good agreement on the definition of disruptive behaviour - it depends on perception; it departs from the norm and it has bad consequences.

Merrett and Wheldall (1984) defined disruptive classroom behaviour as an activity that interferes significantly with a student’s own learning, interferes with another student’s learning or responses, interferes with the teacher’s ability to operate effectively, or any combination of these. It is interesting to note that these three have been identified as the victims of disruptive behaviour in Lawrence et al., (1984) study. In a study conducted by Grieve, (2009) showed that there were discrepancies between what teachers in the various schools considered to be inappropriate behavioural issues. Behaviours described included violence and lower level of disruptive behaviour that occurs on a day-to-day basis, such as talking out of turn, lack of attending to tasks, or failing to follow instructions.

It is clearly known from the literature review that teachers commonly report talking out of turn, as the most problematic and most frequent disruptive behaviours. It seems that research focused on student behaviour problems has consistently found that, generally most of the behaviours that teachers find difficult are relatively minor, but high in frequency which makes classrooms disruptive. Teachers frequently report high levels of concern for student behaviour, although there is often high variability between research findings. Arbuckle and little, (2004) study showed that teachers’ main concerns were related to distractibility, student on-task behaviour, and adherence to classroom rules. Another study conducted in Hong Kong by Sun & Shek (2012b) on Chinese schools’ teachers’ defined “problem behaviours” as doing something in private, talking out of turn, verbal aggression, disrespecting teachers, nonattentiveness / daydreaming / idleness, sleeping, habitual failure in submitting assignments, and out of seat.

The behavioural problems may lead to aggression and students may become hostile to teachers or their peers. In Shireen and Malik (2015) study, it was found that students taunt, argue and pass rude comments to teachers. Boys use abusive and foul language, make groups or “Gangs” and there are clashes between these groups of students. Similarly, Verbal aggression (including attacking classmates, quarrelling with classmates, speaking foul language, teasing classmates, and gossiping) and physical aggression (including striking, attacking and pushing classmates, and destroying things) were also reported in Sun & Shek (2012a, 2012b) studies as problem behaviours.

**Methodology / Materials**

A qualitative approach was adopted for this study to find answers for the research questions because qualitative methodology is a means for exploring and understanding the meaning individuals or groups ascribe to a social or human problem (Creswell, 2014).

**Participants**

Purposeful sampling method was utilized for both selecting schools and teachers. Three public secondary schools were selected based on the prevalence of disruptive behaviour issues in these schools. In each school, two teachers (local Bruneians) who had experiences of teaching and presently teaching to Year 8 and Year 9 were selected as participants. In total, six teachers (two males and four females) participated in this study. All the teachers were coded T1-T6, respectively.

**Instruments**

A semi-structured interview guide (self-constructed) was used for each participant. In the interview guide as well as during the interview, further questions, prompts and probes were done to explore the participants definitions. The participants were asked to define “disruptive behaviour” based on their understanding and perception of these behaviours. The question was:

1. Based on your understanding and experiences, can you please define “disruptive behaviour”?

**Data Analysis**

Data was analysed using qualitative analysis techniques as a step by step process. The interview transcripts were read many times to get the whole idea of what it conveys. After reading, the six transcripts were compared to identify the similar words and phrases that formed meaningful text segments. These segments were assigned with many codes, these codes were reduced
by grouping the similar ones. The similar codes were aggregated together to form four major themes. The four major themes derived from the data are presented in the following section.

**Results and Findings**

The four themes that emerged were; (1) Preventing other students from learning (2) Behaviours that disrupt the class (3) Not following rules and (4) Verbal & physical aggression towards teachers, students and school property.

*Prevent Other Students from Learning*

Most of the teachers defined disruptive behaviour as when a student does a behaviour to deviate the rest of the students in carrying out their assigned tasks. As T1 illustrated:

“…when we are doing group and everything then one student…steer away…friends from the discussion and then talk about something else” (T1).

She further explained by giving an example:

“…I had one student…while writing...we were doing work then she started shouting and singing…disturbing their friends…every time” (T1).

Another two teachers remarked:

“being winding, move around, disturbing others, speaking up loud…” (T2).

“… the student will continuously do the same behaviour every day and disturbing their friends…” (T3).

*Behaviours that Disrupt Class*

One teacher stated a list of varied behaviours in the following narrative:

“…they are disrupting to class, they make noise, they walk around the class while we are teaching…they are shouting, they are drumming, they are singing…what else? they are screaming, they stand on the bench and jump to another bench” (T4).

Another teacher described the phenomenon as “inattentive ones”.

“…the inattentive ones, example for the one that are sleeping in class…that gives no attention in class. I mean they play around and then talking around”, (T5).

Another teacher talked about a lot of noises made by students.

“… they make a lot of noises in the class; they don’t want to learn…” (T3).

*Not Following Rules*

Teachers described that not following the teachers rule or the instructions define disruptive behaviour in a simpler way.

“In general, for me, is someone who cannot follow my rule not according to what I want. It could be kind of student that does not listen to what I want or listen to what I instruct them to do. That’s it”.

Similarly, another two teachers mentioned that:

“when the teacher warns them…scolds them…give them advice, the student will not listen to the teacher” (T3).

“…students not doing their work…given the time…” (T2).

*Verbal and Physical Aggression Towards Teachers, Students and School Property*

Teachers reported students exhibiting verbal and physical aggression and damaging school property as disruptive behaviours.

T3 described that:

“from my understanding it’s aggressive, the students are aggressive…they will damage the tables, the school properties and their friend’s belongings…then fighting of course, they have a gang, they have a group and then when they are having a fight over a small misunderstanding, they will bring all their group, their gang then together they have a fight”.

Another teacher commented that:

“saying vulgar, using vulgar language and they certainly would just be aggressive way aggressive towards other students even to myself,” (T2).

**Discussion**

This study aimed to find out the definitions of disruptive behaviour among young adolescents in Brunei
Darussalam from a group of secondary school teachers. As an act of behaviour which prevented others from learning included distracting others from their work by singing, shouting, talking about something else (not related to the discussion) and disturbing other students. Similar findings were revealed in Wheldall et al., (1988) study where disturbing or hindering other students were identified as one of the most troublesome behaviour problems. Furthermore, these behaviours demonstrated that not only the student who exhibit these behaviours are affected but other students are also involved directly or indirectly in these disruptive situations and impact not only the students but the teachers as well (Gasa, 2012; Lawrence et al., 1984). Different types of classroom behaviours were mentioned by the teachers as behaviours that disrupt the class including making a lot of noises, walking / playing around the class, drumming, screaming, stand on the bench and jump to another bench, sleeping, speaking up loud and inattentiveness. Most of these disruptive behaviours identified are similar to those reported in previous studies. Such as inattentiveness and sleeping in study 34.

Students not following the rules, be it classroom or school rules were a concern of teachers and identified as a disruptive behaviour. Teachers described students not listening to what the teacher instruct them to do, not doing their work and not listening to the teacher as not abiding by the classroom rules3,15. This showed that teachers would like to be in control of the classroom and to have order and discipline to create a good climate within the classroom by managing the students to pave way for effective learning to take place.

This study showed that verbal & physical aggression is disruptive in classrooms as well as within the school premises as a whole. These two types of aggressions exhibited by students have been found in other similar studies conducted in Western as well as in Asian contexts. Teachers reported students using vulgar or foul language towards teachers and other students as verbal aggressions. It was found that students showed physical aggression towards teachers. It was also found that damaging students belongings, the tables and school properties and incidence of gang fights occur in school premises. These disruptive behaviours identified in the definitions indicate that teachers have expressed what they have observed and experienced this phenomenon individually and differently in their teaching career that hinders the teaching and learning process.

**Conclusion**

This study investigated six secondary school teachers’ definitions of disruptive behaviour among young adolescents in three public secondary schools of Brunei Darussalam. The findings revealed how this particular group of secondary school teachers defined disruptive behaviour. The results of this study are similar to the existing studies on disruptive behaviour. The findings have implications for teachers, both in-service and pre-service teachers in understanding the existence of this phenomenon in the secondary schools so that they may be well prepared with effective strategies to deal with such behaviours. For researchers, it is important to look into disruptive behaviour in secondary schools from different perspectives as social reality is fluid in nature. Therefore, it is vital for future research to further explore students’ perceptions of disruptive behaviour in schools of Brunei Darussalam so that it would help to provide a more complete picture of disruptive behaviour that may reveal the student-teacher relationship which is a crucial component in creating a conducive learning environment for both teacher and students. It is important to understand the nature of these behaviours and the impact on the teaching and learning process in the classroom. It is vital for those who are keen and concerned with disruptive behaviour to discover one another’s explanations to benefit from shared knowledge so that the practices in the schools could be improved.

**Conflict of Interest:** Nil

**Source of Funding:** Self

**Ethical Clearance:** IJRISE Journal Reviewer Committee

**References**


3. Browne, K. Challenging behaviour in secondary school students: Classroom strategies for increasing


Obesity and Its Effect in the Mode of Delivery

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ABSTRACT

Introduction: Obesity is the most common health problem in reproductive age women. The obesity is a heterogeneous illness in which multiple factors interact to produce a state of positive energy balance, which leads to the increase in body weight.

Objective: To assess the effect of obesity on the mode of delivery and infant birth weight

Material and Method: A cross sectional study was conducted in the Department of OBG, Babylon Teaching hospital for Maternity and child complex from the 1st of Jun 2017 to the end of May 2018.

Results: mean age of the respondents was (27.2 ± 9.1) years. (40.4%) of the women were primigravida and (59.6%) were multigravida. (46.5%) were with NVD and (53.5%) delivered by cesarean section. 1108 of the infant were delivered with birth weight ≥4 kg and those who mother with morbidly obese were the main group (29.9%). The caesarean section is increased as the BMI was increased (18.6% for normal to 44.7 for morbidly obese). Birth weight ≥4 kg was increased as the BMI was increased.

Conclusion: Caesarean section and infant birth weight ≥4 kg were increased as the BMI of the women were increased.

Keywords: Obesity, NVD, BMI, primigravida, multigravida

Introduction

In the developed world they noticed that Obesity is hurriedly becoming one of the main health problems. Issued evaluations of obesity among women is vary from the age between 18 to 25 %.(1) World Health Organization defines obesity, in women not pregnant, depending on the index of body mass. This index is calculated from size and weight (Kg/m2) and is considered a value normal between 18.5 and 24.9. The overweight is defined as a BMI between 25 and 29.9, is considered obesity moderate (class I) between 30 and 34.9, severe (class II) between 35 and 39.9 and morbid (class III) greater than or equal to 40. Obesity can reduce the life expectancy of a person up to 10 years. (2)

It is also known that is associated with certain pathologies such as hypertension, heart disease, diabetes mellitus type 2, thromboembolisms, osteoarthritis, respiratory problems, dyslipidemia, psychosocial problems and certain cancers in addition to having a negative impact on reproductive health and during the gestational period of the woman. (3) The etiopathogenesis of obesity is complex and intervene by many factors that justify it. The progressive acquisition of Western lifestyles favors on the one hand, sedentary lifestyle; and the absence of interest in participating in some type of physical activity and the high number of hours spent sitting at work they are significant factors of obesity. For another side, both the intake and the composition of the diet play a important role in the pathogenesis of said disease. A high diet in fat, the frequent consumption of fast food and a decrease in the frequency between meals can be associated with an increase of weight. So, these bad dietary habits together with sedentary lifestyle are two of the main responsible increase in obesity in the past 20-30 years. (3)

Pregnancy is one of the periods of greater nutritional vulnerability, estimating an incidence of obesity from 6 to 28% in this era. Faced with a health problem in the pregnancy as emergent as this one, the objective set for this review is to determine in what way affects maternal obesity the course of delivery. Obesity is
associated with a series of complications in childbirth, such as pre-eclampsia (4,5) or caesarean section (5,6). As well as thrombo-embolism, congenital malformations, fetal macrosomia, maternal, fetal and neonatal death. Also premature births, hemorrhages and problems of postpartum infection are some of the many dangers that a pregnant woman with obesity runs. An excessive weight gain in the pregnant woman can lead to a delivery with complications, so the limits of this increase must be established according to the BMI before pregnancy. (7)

The different studies have described that the perception of motherhood and the birth of a child will be very different according to the course of pregnancy, the type of delivery and prenatal care and education. (8) When labor is long or becomes instrumental, the experience of women can be comparable to the recovery of a disease and can lead to difficulties in their ability to be emotionally linked to the child. (9)

Weight During Pregnancy: Pregnancy is a state of modifications Physiological causes of pregnancy and lactation and the intense growth and development of the fetus. Weight gain total currently recommended during pregnancy and according to the BMI before of pregnancy, it is suggested that it be 11 to 19 kg in twin pregnancy. Pregnant women usually win~ 1 to 2 kg in the first trimester. According the new recommended values, the normal weight women should increase ~ 0.4 kg per week in the second and third trimesters of pregnancy. Women with low weight should earn a little more (~ 0.5 kg per week) and overweight women a little less (~ 0.3 kg per week). Obese women should earn ~ 0.2 kg per week.

Prevention: It is recognized that prevention of Obesity in women of reproductive age is very important for mother health and the health of her offspring. The interventions of weight control, including pharmacological treatment in pregnant women who are obese or overweight have not had enough impact on pregnancy outcomes and childbirth, suggesting that the focus of intervention must be in the periods preconception or postpartum. (10)

Aim of the study: To assess the effect of obesity on the mode of delivery and infant birth weight.

Material and Method

A cross sectional study was conducted in the Department of OBG, Babylon Teaching hospital for Maternity and child complex for 2 years duration from the 1st of Jan 2015 to the end of Dec 2017. All pregnant women on deliveries who agreed to participate were included and BMI of them were measured.

Results

13245 deliveries were included in the current study, with mean age of (27.2 ± 9.1) years. 5357 (40.4%) of the women were primigravida and 7888(59.6%) were multigravida. The main group was in overweight in both primigravida and multigravida (table 1).

Table 1: BMI and mode of delivery according to gravida of the respondents

<table>
<thead>
<tr>
<th>Variable</th>
<th>Total</th>
<th>Primigravida</th>
<th>Multigravida</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No.</td>
<td>%</td>
<td>No.</td>
</tr>
<tr>
<td><strong>BMI group</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Normal (20-24.9)</td>
<td>521</td>
<td>3.9</td>
<td>284</td>
</tr>
<tr>
<td>Overweight (25-29.9)</td>
<td>6812</td>
<td>51.4</td>
<td>2674</td>
</tr>
<tr>
<td>Obese (30-34.9)</td>
<td>4422</td>
<td>33.4</td>
<td>1853</td>
</tr>
<tr>
<td>Morbidly obese ≥35</td>
<td>1490</td>
<td>11.3</td>
<td>546</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>13245</td>
<td>100.0</td>
<td>5357</td>
</tr>
<tr>
<td><strong>Mode of delivery</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Normal vaginal delivery</td>
<td>8022</td>
<td>60.0</td>
<td>2488</td>
</tr>
<tr>
<td>Cs</td>
<td>5223</td>
<td>39.4</td>
<td>2869</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>13245</td>
<td>100.0</td>
<td>5357</td>
</tr>
</tbody>
</table>

Table 2 shows that 5357 of the women were primigravida, 2488(46.5%) were with NVD and 2869(53.5%) delivered by cesarean section. 1108 of the infant were delivered with birth weight ≥4 kg and those who mother with morbidly obese were the main group (29.9%).
For those with multigravida it has been found that normal vaginal delivery were decreased as the BMI of the women was increased (81.4% of those with normal BMI with normal vaginal delivery and this decrease to 55.3% for those with morbidly obese). And the caesarean section is increased as the BMI was increased (18.6% for normal to 44.7 for morbidly obese). Birth weight ≥4 kg was increased as the BMI was increased (Table 3).

Table 2: distribution of the studied sample BMI according to mode of delivery and birth weight in primigravida

<table>
<thead>
<tr>
<th>Variable</th>
<th>Total</th>
<th>NVD</th>
<th>Cs</th>
<th>Birth weight ≥4 kg</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Normal (20-24.9)</td>
<td>284</td>
<td>140</td>
<td>144</td>
<td>30</td>
</tr>
<tr>
<td>Overweight (25-29.9)</td>
<td>2674</td>
<td>1292</td>
<td>1382</td>
<td>528</td>
</tr>
<tr>
<td>Obese (30-34.9)</td>
<td>1853</td>
<td>845</td>
<td>1008</td>
<td>387</td>
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<tr>
<td>Morbidly obese ≥35</td>
<td>546</td>
<td>211</td>
<td>335</td>
<td>163</td>
</tr>
<tr>
<td>Total</td>
<td>5357</td>
<td>2488</td>
<td>2869</td>
<td>1108</td>
</tr>
</tbody>
</table>

Table 3: Distribution of the studied sample BMI, according to mode of delivery and birth weight in multigravida

<table>
<thead>
<tr>
<th>Variable</th>
<th>Total</th>
<th>NVD</th>
<th>Cs</th>
<th>Birth weight ≥4 kg</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Normal (20-24.9)</td>
<td>237</td>
<td>193</td>
<td>44</td>
<td>45</td>
</tr>
<tr>
<td>Overweight (25-29.9)</td>
<td>4138</td>
<td>3251</td>
<td>887</td>
<td>871</td>
</tr>
<tr>
<td>Obese (30-34.9)</td>
<td>2569</td>
<td>1568</td>
<td>1001</td>
<td>922</td>
</tr>
<tr>
<td>Morbidly obese ≥35</td>
<td>944</td>
<td>522</td>
<td>422</td>
<td>257</td>
</tr>
<tr>
<td>Total</td>
<td>7888</td>
<td>5534</td>
<td>2354</td>
<td>2095</td>
</tr>
</tbody>
</table>

Discussion

Many previous studies have noted higher rates of labor induction and induction failure in obese women, and therefore, extremely high rates of cesarean delivery. The results of present study support these previous findings. In fact, the rate of cesarean delivery in our study for women undergoing labor induction was (39.4%), which is in agreement to that found in Subramaniam A et al, (18) (2014).

The current study revealed that as the BMI were increases from normal weight, so the increase in the possibility of a caesarian section for both primigravid and multigravid women were reported. This is same that found by Lynch C et al, (1) (2008). The primi women with morbidly obesity, we noticed that rate was 65.0% for the Cs delivery compared with 51.1% for those of normal weight prim gravid women. The equivalent figures for multigravid women were 44.7% for those who were morbidly obese and 18.6% for those of normal weight.

To our knowledge, this is the first study to have outlined the prevalence of obesity and its effect on the mode of delivery in Iraqi obstetric population. In this study, 51.4% of women were overweight, 33.4% were obese, and 11.3% morbidly obese, resulting in a figure of 84.8% of women being overweight or obese. These figures are actually more than that published rates by McCarthy S et al, study (2002) on obesity within the general Irish population. This prevalence of obesity is higher than that reported internationally.

Conclusion

Caesarean section and infant birth weight ≥4 kg were increased as the BMI of the women were increased.

Conflict of Interest: no conflict of interest

Source of Funding: Self

Ethical Clearance: was taken from the Iraqi scientific committee of the Ministry of health.
REFERENCES


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