

ISSN-0976-0245 (Print) • ISSN-0976-5506 (Electronic)

Volume 11 / Number 05 / May 2020



# Indian Journal of Public Health Research & Development

An International Journal

Website:

[www.ijphrd.com](http://www.ijphrd.com)

# Indian Journal of Public Health Research & Development

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

**Indian Journal of Public Health Research & Development** is a double blind peer reviewed international journal. It deals with all aspects of Public Health including Community Medicine, Public Health, Epidemiology, Occupational Health, Environmental Hazards, Clinical Research, and Public Health Laws and covers all medical specialties concerned with research and development for the masses. The journal strongly encourages reports of research carried out within Indian continent and South East Asia.

The journal has been assigned International Standards Serial Number (ISSN) 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. The journal is now part of DST, CSIR, and UGC consortia.

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Logix Office Tower, Unit No. 1704, Logix City Centre Mall,  
Sector- 32, Noida - 201 301 (Uttar Pradesh)

## Printed, published and owned by

**Dr. R.K. Sharma**  
Institute of Medico-legal Publications  
Logix Office Tower, Unit No. 1704, Logix City Centre Mall,  
Sector- 32, Noida - 201 301 (Uttar Pradesh)

## Published at

**Institute of Medico-legal Publications**  
Logix Office Tower, Unit No. 1704, Logix City Centre Mall,  
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# Indian Journal of Public Health Research & Development

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# The Prescription Pattern Analysis of Tubercular Treatment in TB & Chest Department in Tertiary Care Teaching Hospital

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## Abstract

**Introduction:** In this study, 140 patients were taken under observation for the period of six months which were receiving treatment from the Revised National TB Control Program (RNTCP) center of Maharishi Markandeshwar Institute of Medical Science and Research.

**Methodology:** The present study is the counseling aimed at, assessing outcomes of Directly Observed Treatment Short course (DOTS) therapy by asking close ended questions with yes/no and the procedure assessment in DOTS centers.

**Results:** The most common age group to be effected with tuberculosis was found to be between 21-30 years with the percentage of 35.71%. Patients affected with tuberculosis were frequent in the weight group of 40-54kg (57.96%). Tuberculosis was found to be prevalent in male patients those are chronic smokers (57.15%) than in female patients (42.85%). On categorizing tuberculosis on the basis of tubercular type, study revealed that patients were prevalent to pulmonary tuberculosis in our area with percentage of 75.7% and extra pulmonary tuberculosis patients were found to be 24.3%. Study showed that tuberculosis exists predominantly with morbidities.

**Conclusion:** The concomitant illness to be occurring with tuberculosis in the highest prevalence was concluded to be hypertension (32%). Our study showed that the RNTCP center under observation was having 95% of patient compliance to treatment and patients were receiving direct observation and assistance in pill administration with adequate guidance and counseling. From the study, we concluded that prevalence of tuberculosis is higher in males (53.6%) than in females (46.4%).

**Keywords:** DOTS, TB & Chest, Prescription pattern analysis.

## Introduction

Prescription pattern analysis (PPA) is a tool for assessing the prescribing, dispensing and distribution of

medicine. The aim of the PPA is to facilitate rational use of medicines (RUM). The present study has been done to assess the effectiveness of PPA in promoting RUM of tubercular treatment<sup>1</sup>.

PPA is done to gain the information about the most appropriate routes of administration of Anti-tubercular drug and appropriate therapy duration for in-patients and out-patients. Average number of antibiotics is reviewed in PPA as antibiotic resistance is utmost care in Anti-tubercular treatment and it should be taken care before prescribing<sup>2</sup>.

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Our study aims to evaluate the prescription pattern of tubercular treatment and its adherence to the guidelines and therapy<sup>3</sup>. It helps health care systems in understanding, interpret and improve the prescribing, administration and use of medications. It provide physicians a feedback on their performance and prescribing behaviors as compared to pre-set criteria, accepted standards of practices or treatment protocols<sup>4</sup>. PPA information also allows for the compare and contrasting of health care providers in order to evaluate a particular provider's approach to treating tuberculosis. This study is useful in stimulating health care system to change their prescribing habits in an effort to improve care<sup>5</sup>.

The estimates obtained globally revealed that there were approximately 4.1% of new cases and 19% of formerly treated cases with Multi-drug-resistant tuberculosis (MDR-TB) or Rifampicin resistance tuberculosis (RR-TB). India solely acquires one-fifth of world's TB cases<sup>6</sup>. World Health Organization (WHO) treatment guidelines for drug resistant tuberculosis contains policy recommendation on priority area in the treatment of drug resistance tuberculosis and its main novelties are a shorter MDR-TB regimen is recommended; medicine used in the design conventional MDR-TB treatment regimen are now classified to reflect updates in the evidence on their effectiveness and safety; specific recommendation are made on the treatment of children with rifampicin resistance or MDR-TB based on a first ever individual patient data meta-analysis; recommendation on the role of surgery in MDR-TB case management<sup>4,6</sup>.

**Causative Organism:** Tuberculosis is an infection caused by *Mycobacterium Tuberculosis*, a rod shaped, non spore forming acid fast, aerobic bacterium measuring 0.5  $\mu\text{m}$  by 3  $\mu\text{m}$ <sup>7</sup>. The cell wall contains mycolic acid, a fatty acid which is covalently adhered to the peptidoglycan-attached polysaccharide arabinogalactan, a lipid barrier responsible for physiological characteristics like resistance or host defence system in tuberculosis. Lipoarabinomannan, an immunogenic structure helps mycobacterium to survive in macrophages<sup>8-9</sup>.

**Transmission:** *Mycobacterium tuberculosis* spreads by tiny droplets, originated from coughing, sneezing, or talking of person who is formerly or actively suffering from pulmonary/laryngeal tuberculosis<sup>8</sup>. The transmission is effected by multiple factors, spreading organism to other organs such as lymph system, pleura,

bones/joints, or meninges, causing extra-pulmonary tuberculosis<sup>10</sup>.

**Pathophysiology:** An inhaled infectious droplet gets settled into airways, majorly in the upper part which consist of mucus secreting goblet cells. Initially, defense mechanism activates and provides protection to individual exposed to tuberculosis by constantly increasing the production of mucus, thereby removing foreign particles entrapped on the cilia on surface of goblet cells<sup>11-12</sup>. Bacteria that circumvent mucociliary system get entrapped in alveolar macrophages<sup>10,11</sup>, which are present in alveolar spaces<sup>13</sup>. Macrophages are basically phagocytic cells that encounter pathogens<sup>14</sup>. The mycobacterial lipoarabinomannan acts as ligand for macrophage receptor<sup>15</sup>. The complement system and associated protein opsonize C3 binds to the cell wall, initiates recognition of foreign particle by macrophages<sup>16-17</sup>. The subsequent series of events include phagocytosis by macrophages and cause either control of disease, followed by latent tuberculosis, or advancement to tuberculosis called primary progressive tuberculosis<sup>11</sup>. The conclusion depends majorly on the host defense response and virulence of invading mycobacteria<sup>14,18</sup>. The mycobacterium starts multiplying inside macro phages, every 25 to 32 hours<sup>7,10</sup>, initiating production of proteolytic enzymes and cytokines to destroy the bacteria<sup>14-15</sup>. The cytokines bring cell mediated immunity to the site<sup>14</sup> and antigens presented on the surface of macrophages initial immune process for 2 to 12 weeks, microorganisms still progress and divide until they reach significant level where immune response can be determined by skin test<sup>7,11,14</sup>.

A person having active cell mediated immunity, production of granulomas around the *M tuberculosis* is a later step<sup>19</sup>. The aggregated mass of T-lymphocytes and macrophages form nodules which limits the growth of mycobacteria by necrosis<sup>11,15</sup>. In 2 to 3 weeks, necrotic environment develops which is marked by low oxygen, low pH and decreased nutrition, establishing latency<sup>20</sup>.

## Material and Method

The Study was conducted at the Department of Pulmonology of MMIMSR & hospital from November 2018 to May 2019. The patients with all the age group (14-80) and gender with tuberculosis were included in the study. The patients were scrutinized based on their present medical stage of Tuberculosis as well as the present medical history.

A total of 140 patients were included in the study and were followed for the duration of six months (i.e. November 2018- May 2019). . The quality of DOTS therapy includes - personal observation and administration of assigned drugs; documentation of doses received; restoration of patients with missed doses of DOTS. Moreover, during the study the patients suffering from tuberculosis were also counseled. The objective of the counseling aimed at, assessing outcomes by asking close ended questions with yes/no and the procedure assessment in DOTS centers.

The study outcomes were categorized as good (cured and treated) and poor (death and treatment failure). This study was approved by the Institutional Ethical Committee of Maharishi Markandeshwar (Deemed to be University). Permission from the university was taken and the participant’s written consent was taken. The study was evaluated on the basis of patient’s demographics as well as the outcome of the DOTS therapy.

**Method of Study:**

- Observation was carried to find out the scope of the study in TB & Chest ward.
- Relevant literature was collected and reviewed.
- Data collection form was designed.
- Patient consent form was designed.
- Data of the patient was collected and recorded in the patient profile form.

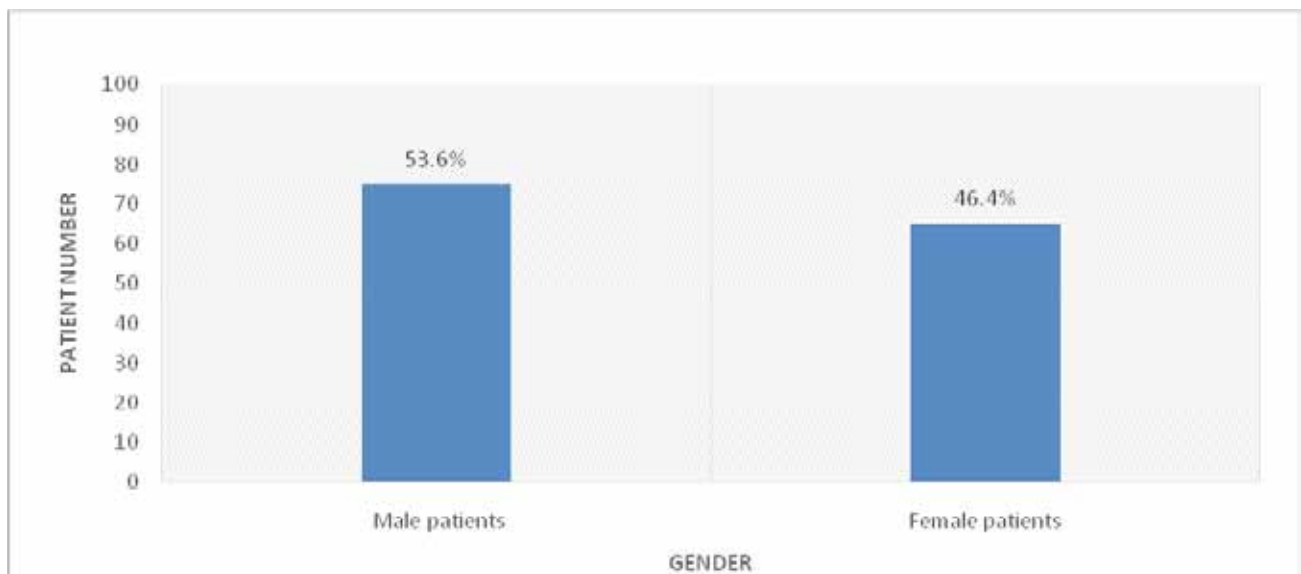
- According to the parameters of the study, data was analyzed.

**Ethical Considerations:** The current study did not enforce any financial liability to the participants. Informed and written consent was taken from the participants before conducting the study. Permission was taken from the Institutional Ethical Committee (IEC) before starting the study. No patient would be deprived of standard treatment during the duration of study.

**Statistical Analysis:** All variables from the outcome data are entered into Microsoft excel sheet. Data is summarized in the form of proportions and frequent tables for categorical variables.

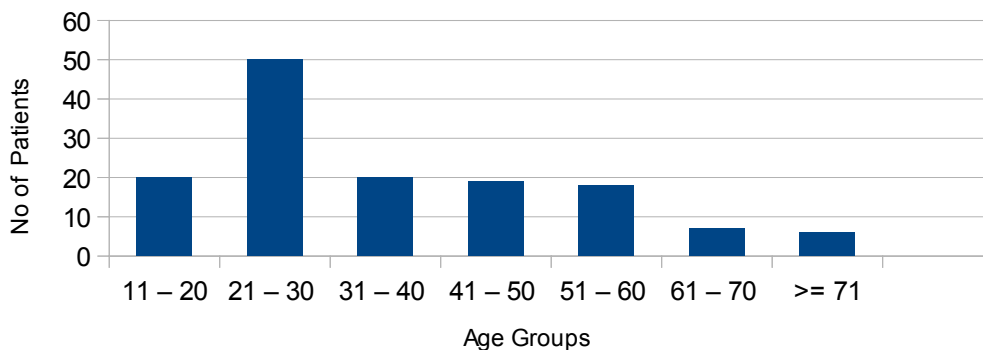
**Result**

This study is with the prescription pattern analysis and outcomes of the DOTS under RNTCP. The quality of DOTS therapy includes - personal observation and administration of assigned drugs; documentation of doses received; restoration of patients with missed doses of DOTS. Moreover, during the study the patients suffering from tuberculosis were also counseled. A total of 140 tubercular patients were included in the study giving an overview of the characteristics of the patients and prescriptions. Total number of male patients were found to be 75 and number of female patients were 65. Tuberculosis was observed to be more common in males (53.6%) than in females (46.4%).



**Figure No. 1: Distribution of patients on the basis of gender.**

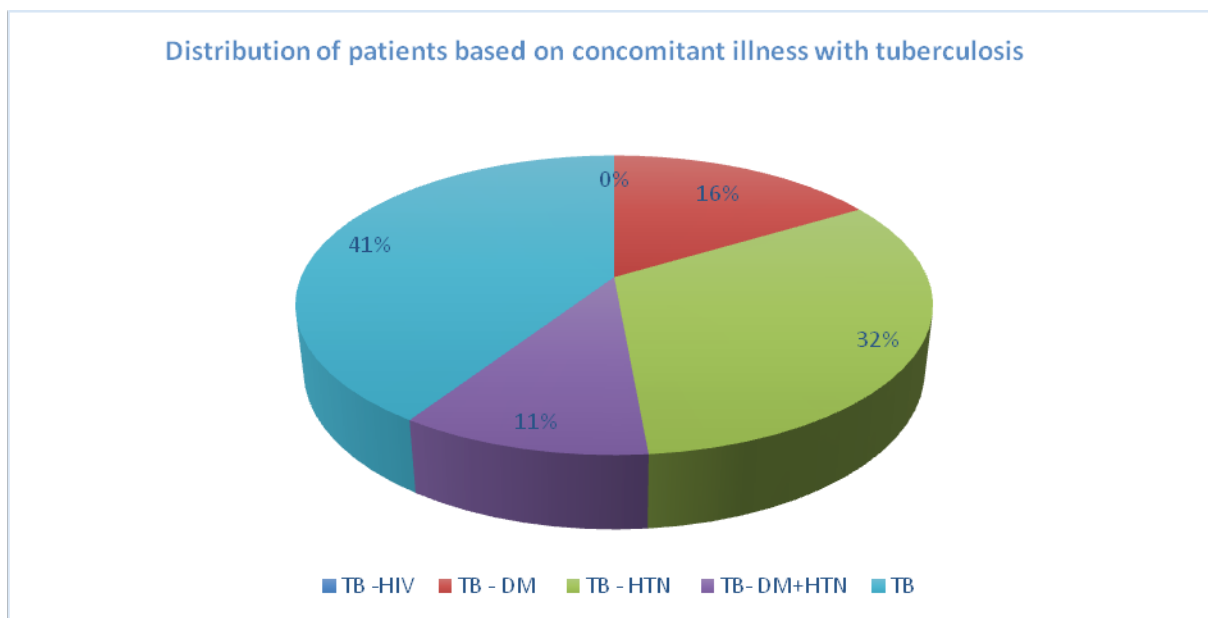
Patient with age group 11 – 20 years were 14.39%, 21-30 years were 35.71%, 31-40 years were 14.39%, 41-50 years were 13.6%, 51-60 years were 12.96%, 61-70 years were 5% and above 71 years were 4.39%. The most commonly age group was found between the age group of 21- 30 years.



**Figure No. 2: Distribution of patients on the basis of age.**

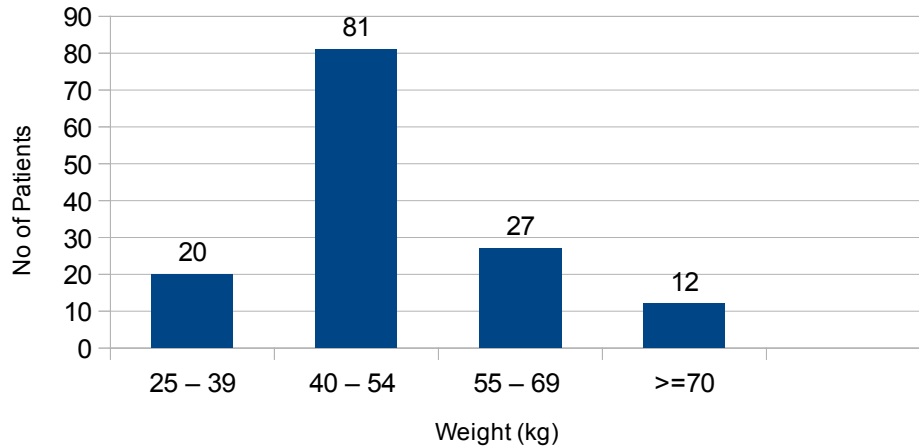
The tuberculosis patients with HIV was found to be 0%, with diabetes was found to be 16%, with hypertension was found to be 32%, with diabetes and hypertension was found to be 11% and without any

concomitant illness- tuberculosis was found to be 41%. The prevalence of tuberculosis with hypertension was more.



**Figure No. 3: Distribution of patients based on concomitant illness with tuberculosis**

Patient with weight group 25 – 39 Kg were 14.39%, 40 -54 Kg were 57.96%, 55 – 69 Kg were 19.39% and above 70 are 8.6%.. Tuberculosis was observed to be more in 40 – 54 Kg weight group (57.96%).



**Figure No. 4: Distribution of patients on the basis of body weight**

### Discussion

This study is with the prescription pattern analysis and outcomes of the DOTS under RNTCP. The quality of DOTS therapy includes - personal observation and administration of assigned drugs; documentation of doses received; restoration of patients with missed doses of DOTS. Moreover, during the study the patients suffering from tuberculosis were also counseled. The objective of the counseling aimed at, assessing outcomes by asking close ended questions with yes/no and the procedure assessment in DOTS centers. Gender-wise distribution of individuals in this study reveals that majority (53.6%) were male as compared to other study which showed male gender majority distribution<sup>21</sup>. Age wise distribution of study showed majority prevalence in age group between 21-30 years (35.71%) and compared to other studies<sup>22</sup>.

Total of 140 patients were taken for the study and patients were categorized according to their concomitant illness. The tuberculosis patients with HIV was found to be 0%, with diabetes was found to be 16%, with hypertension was found to be 32% and with diabetes and hypertension was found to be 11% and only tuberculosis was found to be 41%. The prevalence of tuberculosis

with hypertension was more and data from some comparable studies showed significant similarities<sup>23-24</sup>.

In this study, we found out that from 140 patients, only 7 patients were irregular to their therapy. Adherence outcome was categorized as good with 95% of compliance with was higher than other previous studies<sup>22</sup>. Only 5% of non-compliance was found in this study and can be due to various barriers like low literacy rate, economic burden and patient unawareness towards therapy which can be seen in other studies<sup>25-28</sup>.

Total of 140 patients were taken for the study and patients were categorized according to their body weight. Patient with weight group 25–39 Kg were 14.39%, 40 -54 Kg were 57.96%, 55–69 Kg were 19.39% and above 70 are 8.6%. Tuberculosis was observed to be more in 40 – 54 Kg weight group (57.96%). Out of 140 patients in the study, 45% (63 patients) were chronic smoker and 55% (77 patients) were non smoker. Among those 63 smoker patients, 36 patients (57.15%) were male and 27 patients (42.85%) were female which is comparable to other studies<sup>29</sup>.

Among 140 patients, 24.3% were having extra pulmonary tuberculosis and 75.7% were having

pulmonary tuberculosis which is caused due to high smoking prevalence especially in male gender.

In this study, we observed that more than 87% of the patients were properly counseled about the TB disease, side effects and importance of treatment completion. Restoration of patient missing doses or tracking down the patient is important requirement for TB treatment compliance. Patients who missed their regular dosing should be retrieved and is recommended by RNTCP to track the patient within 1 day to 7 days of period. In this study, we observed that 7% of patients were irregular in taking DOTS therapy and were traced for continuing therapy by communication through telephonic call but patient compliance did not improved.

**Ethical Clearance:** Taken from Institute Ethical committee, IEC No; 1315 dated 19/12/2018.

**Source of Funding:** Self

**Conflict of Interest:** Nil

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# Prevalence of Achilles Tendinopathy Pain in Sub-Elite Badminton Players

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## Abstract

**Background:** Badminton game involves abrupt jerking movements and staccato footwork. Sudden starts and stops wear out the body and demand a lot of strength and motor skills for acceleration, deceleration and then immediate acceleration. Achilles Tendinopathy is common in sports that involve lots of jumping and quick changes in direction. Many studies have been done on ankle sprains, shoulder and wrist injuries but no study was conducted on this topic.

**Objectives:** To evaluate the clinical severity of pain in the Tendo-Achilles in sub-elite badminton players and to find if there is any association of Gender, Age and number of playing years with Tendinopathy

**Method:** The study group consisted of 90 sub-elite badminton players, 50 males and 40 females, both aged between 18-25 years who are playing badminton for 5 or more than 5 years and had suffered Achilles Tendinopathy. VISA-A questionnaire was used as the outcome tool to measure the severity of pain in the Achilles region. Each subject was given the questionnaire and according to the score they were further evaluated.

**Results:** The statistical analysis showed extremely significant relation between Achilles-tendon pain and sub-elite badminton players with p value <0.0001

**Conclusion:** The study showed that the players suffered from mild to moderate intensity pain Achilles Tendon during the game.

**Keywords:** *Badminton, Pain, Players Sub-elite, Tendo-Achilles region, Tendinopathy.*

## Introduction

Badminton is a sport that makes heavy demands on the players. The physical work is intermittent, involving

high-intensity activity and abrupt jerking movements and staccato footwork. The main function of Achilles tendon is strong plantar flexion of foot, at the ankle joint and gives the ability to push off during walking and therefore running and jumping.<sup>[1]</sup>

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Achilles tendinopathy is a common overuse injury caused by repetitive energy storage and release with excessive compression<sup>[2]</sup>. It is found more in individuals who participate in physical activities like running and jumping<sup>3</sup>. Pain, swelling and impaired physical function of Achilles tendon are the clinical symptoms common in sports and daily life.<sup>[3]</sup>

Risk factors of Achilles tendinopathy can be divided into intrinsic and extrinsic factors include varus deformity of forefoot, pes cavus and leg length discrepancy hyperpronation and extrinsic factors include excessive mechanical overload and training errors such as increased interval training, abrupt changes in scheduling, training on hard or sloping surfaces, poor shock absorption and increasing repetitive loading<sup>[4]</sup>

Management of individuals with Achilles tendinopathy is a challenge for both the clinicians and researchers. Exercise rehabilitation, specifically either eccentric or isotonic resistance training are effective.<sup>[5]</sup>

Most of the players have chosen badminton as their career. The assessment of severity of pain will help to decide the treatment protocol for the players and help improve their game. The purpose of this investigation was to describe the prevalence of Achilles tendinopathy pain in sub-elite badminton players.

## Methodology

An approval for the study was obtained from the Protocol committee and the Institutional Ethical Committee of KIMSUDU. An observational study was conducted for a duration of 6 months at Physiotherapy department of Krishna college of Physiotherapy. Individuals were approached and those fulfilling the inclusive criteria were selected.

**Study Design:** The study was an Cross-sectional study.

**Setting:** Study sessions were held at the Krishna College of physiotherapy, Karad and Shivaji stadium, Karad, where the subjects were assessed and data collection was done

**Participants:** All participants were selected by Convenient sampling method. Each of them were assessed for any injury or pain at the hip, knee and ankle joint.

Both male and female participants were included. The players were all sub-elite (played national and state level tournaments) between age group 18-25 years who had suffered Achilles Tendinopathy for greater than 3 months and players playing everyday for 4-5 hours for 5 or more than 5 years were only eligible for the study. Players who had any recent (past 3 months) injury to ankle, any other trauma to lower limbs (except Achilles tendinopathy), or playing any other sport,

except badminton did not fit into the eligibility criteria. Total 122 players were assessed and 22 were excluded, 12 had knee injury, 7 not willing to participate and 3 suffered ankle sprain in past 3 months. 90 participants were selected for the study. The procedure was explained and written informed consent were taken from the authorities of badminton stadiums, authorities of colleges the coaches and those willing to participate. The player was given the questionnaire after the game and according to the individual score of the participants they were evaluated.

**Variables:** Primary outcome measure used was Victorian Institute of Sport Assessment-Achilles (VISA-A) questionnaire. It is an easily self-administered questionnaire that evaluates symptoms and their effect on physical activity. The questionnaire contains eight questions, covering three necessary domains: 1) pain, 2) functional status and 3) activity (= three significant domains of dysfunction): Questions 1-3 are related to pain. (in this questionnaire the term "pain" refers specifically to pain in the Tendo-Achilles region). Questions 4-6 are related to function. Questions 7-8 are related to activity. Question 8 actually contains two questions: a) pain with activity and b) duration of activity. The first seven questions have a score out of 10 and question 8 scores a maximum of 30. The first six questions use a VAS so that the patient may report the magnitude of a continuum of subjective symptoms. The final two questions used a categorical rating scale. Answering question 8 is limited to A, B or C and relates to the reality of the patient. The patient automatically loses at least 10 of 20 points if he or she has pain during sports activity. The maximum score that can be achieved on the question is 100 and would be the score of person who is completely asymptomatic. A lower score indicates more symptoms and greater limitation of physical activity. The questionnaire is valid and reliable to measure the condition of the Tendo-Achilles. The individuals were explained about the purpose of the study. All the participants were educated and knew English. If any word or terminology in the questionnaire was not familiar to them, it was explained to them. Also, they were informed about the procedure. Each participant was given a questionnaire which they had to fill and the scores were calculated and the Data was recorded for the individual player. The VISA-A questionnaire has good test-retest ( $r=0.93$ ), intrarater (three tests,  $r=0.90$ ) and interrater ( $r=0.90$ ) reliability

**BIAS:** The study was not bias because the study

included players who only played badminton and had no recent (past 3 months) injury to hip, knee or ankle

**Study Size:**

The study size was 90

The study size was derived using the formula  $4pq/l^2$

Where,

p =32

q =68

l = 10

Therefore, 90 samples

**Statistical Analysis:** Statistical analysis was done using un-paired t test. The analysis were performed using the software SPSS (version 25.0, Chicago, USA). Arithmetic means & standard deviation was calculated for each outcome measure and Arithmetic mean was

derived from adding all the values together and dividing the total number of values. MS Excel was used for drawing various graphs with given frequencies and the various percentages that were calculated with the software.

Standard deviation (SD) was calculated according to the following formula

$$\rightarrow SD = \sqrt{\frac{\sum (X-X)^2}{N}}$$

Where,  $\sqrt{\quad}$  = Square root of all the calculations under this symbol.

X = the individual score.

$\bar{X}$  = the mean score.

$\sum$  = sum of all the calculations to the right.

N = the total number of frequency.

**Results**

• **Gender Distribution:**

**Table No. I: Association Between Gender And Pain**

Gender N = 90 (100%)	Pain		Unpaired t-Test	P -Value
	Mean	Standard Deviation		
50 Male Players (56%)	96.82	3.5	1.626	0.1075
40 Female Players (44%)	97.98	3.2	1.626	0.1075

**Interpretation:** The above table revealed that there was no significant association between gender and pain

• **Age Distribution:**

**Table No. II: Association Between Age And Pain**

Age Group	Pain		Unpaired t-Test	P -Value
	Mean	Standard Deviation		
18-20 Years – 44 Players (49%)	96.82	3.6	1.423	0.1583
21-25 Years – 46 Players (51%)	97.98	3.2	1.423	0.1583

**Interpretation:** The above table revealed that There was no significant association between age and pain amongst the players.

• **Percentage of Tendo-Achilles Pain**

**Table No. III**

Score	Pain In Tendo-Achilles	Number of Players	Percentage Of Players With Tendo-Achilles Pain
100	No Pain-Asymptomatic	50	56%
90-99	Mild pain aftergame	38	42%
80-89	Moderate pain after game	2	2%
< 80	Severe pain after game	0	0%

**Interpretation:** The above table shows that 56% of players had no pain after the game, 42% of players had mild pain after the game, 2% of players had moderate pain after the game and 0% of players had severe pain after the game.

• **Prevalence of Tendo-Achilles Pain In Sub-Elite Badminton Players**

**Table No. IV**

Total Number of Players	Pain		One Sample t-Test	P -Value
	Mean	Standard Deviation		
90 Players	97.33	3.37	273.29	<0.0001

**Interpretation:** The above table revealed that there was a significant relation between players and Tendo-Achilles pain.

• **Prevalence of Playing Years With Pain**

**Table No. V**

Playing since how many years	Number of players	Number of players who had Pain
5 years	21	5 (1.05%)
6 years	31	16 (51.61%)
7 years	30	14 (46.67%)
8 years	8	5 (62.5%)

**Interpretation:** The table shows that 5 players (1.05%) playing since 5 years had pain, 16 players (51.61%) playing since 6 years had pain, 14 players (46.67%) playing since 7 years had pain, 5 players (62.5%) playing since 8 years had pain

Our study showed 42% players with mild pain and 2% players with moderate pain and the results observed were statistically significant ( $p < 0.0001$ ). A study done by Martin Fahlström had 66 elite badminton players, showed 32% prevalence of pain in Achilles-Tendon region<sup>[6]</sup>.

**Discussion**

The purpose of this study was to find the prevalence of Achilles Tendinopathy Pain in sub-elite badminton players. Many studies have been conducted on ankle sprain, knee joint ligament injuries in badminton players but very few studies are conducted on clinical severity of Achilles tendinopathy pain in players who did suffered Achilles Tendinopathy.

Probable reason could be Elite players are trained on a very advanced levels for competition and their tendon get adapted for such high intensity of training than sub-elite players. A Descriptive statistics of Achilles Tendinopathy showed that 65% of male players had pain and 35% of female players had pain. In a study by Martin Fahlström in Denmark the frequency of Achilles injury was more in males than females<sup>[6]</sup>. The probable

reason would be the difference in body mass index and age. Some male players try to do extra training in order to achieve their goal in short time and so they try other intense physical training like gym, to achieve it.

A study by Muttalib, on recreational badminton players, 80% injuries were seen due to inadequate warm up and 20% due to overuse<sup>[7]</sup>. Probable reason for this difference could be a long duration or rest or inactivity in recreational players, whereas the sub-elite players in our study were continuously under training for years.

Our study included 90 subjects (50 males and 40 females), 56% males and 44% females. However the training intensities and hours were equal for both, when association between gender and tendinopathy was observed the results were not statistically significant ( $p=0.175$ ). A study done by Shariff A. H. on 112 badminton players showed no significant association ( $p=0.161$ )<sup>[8]</sup>.

This study had 49% players (age 18-20 years) and 51% players (age 21- 25 years). When association between age and tendinopathy was observed by unpaired-t test the outcome was not statistically significant ( $p=0.1583$ ). A study by K. Høy MD, used Abbreviated Injury Scale (AIS), according to which all the severe injuries (56%) were found in the oldest age group (>25 years),  $p=0.0001$ <sup>[9]</sup>. Probable reason for the difference could be that our study only focused on younger age group (18-25 years)

This study had 49% players (age 18-20 years) and 51% players (age 21- 25 years). When association between age and tendinopathy was observed by unpaired-t test the outcome was not statistically significant ( $p=0.1583$ ). A study by K. Høy MD, used Abbreviated Injury Scale (AIS), according to which all the severe injuries (56%) were found in the oldest age group (>25 years),  $p=0.0001$ <sup>[9]</sup>. Probable reason for the difference could be that our study only focused on younger age group (18-25 years)

A study done in Danish in 2015 stated that badminton was a frequent cause of Achilles Tendinopathy due to the combination of high loads applied rapidly with directional changes could overload and completely rupture that tendon<sup>[10]</sup>. Most players resumed badminton within one years, but some finished sports career mainly due to fear of a new injury. However in our study we did not report any severe kind of pain or injury to the players that might affect their game. Our study has

seen 5 players (1.05%) playing since 5 years had pain, 16 players (51.61%) playing since 6 years had pain, 14 players (46.67%) playing since 7 years had pain, 5 players (62.5%) playing since 8 years had pain. The observed results were not statistically significant ( $p=0.198$ ). Probable reason could be, with increasing years of advance training the tendon get adapted and so chances of tendinopathy and injury decreases. In our study the players played on different court surfaces with many different kinds of shoes and so probably after playing for many years they have suffered pain.

This study will be beneficial for the players who play for a long duration and have a high intensity of training. Limitations of this study was, Small sample size and the age group was very specific and so the results cannot be extrapolated to other age groups.

## Conclusion

In this study, after analysing the data, it was found that there is a prevalence of moderate pain in Achilles tendon in sub-elite badminton players. There were no players with severe pain after game, 2 players with moderate pain, 38 players with mild pain and 50 players were asymptomatic. Prevalence of Achilles tendon Pain is 44% in the study.

When the association between pain and other factors like age, gender, number of playing years was observed then there was no significance

**Conflict of Interests:** There were no conflict of interests in this study

**Ethical Clearance:** Ethical clearance was taken from institutional ethical committee of Krishna institute of medical sciences, Deemed to be university, Karad.

**Funding:** No funding.

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# Database Recognition/Journal Indexing Services for Physical Therapist

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## Abstract

A “database” is a platform of information recruited in a planned and systematic pattern, configured to a program called as “Database Management System” which interacts with end users, applications and database itself. In other words, database captures and analyzes data, making it accessible electronically via desktop, laptop, tablet or mobile phone etc for serving transformation purpose of past and current acquaintance and advancements along with synthesis of information to develop latest methodologies in advancements. Physical Therapy is a branch of health science which comprise of assessment, rehabilitation through exercise and electrotherapy, manipulation, mobilization, research focused and future advancements through evidence based practice<sup>7</sup> and lifestyle modifications to treat conditions related to Orthopedics, Sports, Neurology, Pediatric, Cardio-thoracic, Obstetrics and Gynecology, Community Based and Hand Rehabilitation, Biomechanics and hence improve the overall quality of life. As the author has mentioned in the beginning regarding various database available for healthcare professionally, in the current article the author intends to focus on database for publications from perspective of a Physical therapist/Physiotherapist.

**Keywords:** Physical therapist, Database, Publication, Peer-review, Rehabilitation, Medicine.

## Introduction

A “database” is a platform of information recruited in a planned and systematic pattern, configured to a program called as “Database Management System” which interacts with end users, applications and database itself. In other words, database captures and analyzes data, making it accessible electronically via desktop, laptop, tablet or mobile phone etc for serving

transformation purpose of past and current acquaintance and advancements along with synthesis of information to develop latest methodologies in advancements. In today’s world sufficient database are available for healthcare professionals specializing in varied streams of Medicine, Epidemiology, Clinical & Para-clinical and Interdisciplinary Sciences etc. Databases are classified according to their nature of interest, intent and specifications. Physical Therapy is a branch of health science which comprise of assessment, rehabilitation<sup>1,2</sup> through exercise and electrotherapy<sup>3,4</sup>, manipulation<sup>5</sup>, mobilization<sup>6</sup>, research focused and future advancements through evidence based practice<sup>7</sup> and lifestyle modifications<sup>8</sup> to treat conditions related to Orthopedics<sup>9</sup>, Sports, Neurology, Pediatric, Cardio-thoracic<sup>10</sup>, Obstetrics and Gynecology<sup>11,12</sup>, Community Based and Hand Rehabilitation, Biomechanics<sup>13</sup> and

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hence improve the overall quality of life. Scholar and researchers working indifferent settings on completion, intend to publish their work as Original articles (Randomized controlled trials, Epidemiological studies and Descriptive observational), Knowledge, Attitude and Practice (KAP) studies, Innovations, Audits, Systematic and Meta analysis, Short and Special communications, Research reports, Educational research, Healthcare analysis, Survey reports, View point, Psychological impacts, Diagnostic studies, View point, Case reports and series, Letter to the editor and Editorial etc. As the author has mentioned in the beginning regarding various database available for healthcare professionally, in the current article the author intends to focus on database for publications from perspective of a Physical therapist/ Physiotherapist.

**The databases are as followed:**

1. PubMed/MEDLINE
2. PEDro
3. Scopus
4. Web of Science
5. Google Scholar
6. SPORTDiscus
7. Eric on EBSCOhost
8. CINAHL
9. Cochrane Library
10. LILACUS
11. Trip
12. REHABDATA NARIC
13. Pro Quest

**1. PubMed/MEDLINE:** PubMed is a free<sup>14</sup> primer source of electronic database service rendered through United States National Library of Medicine's (NLM) which consists of journals focusing in domains of Physical therapy<sup>15</sup>, Medicine, Rehabilitation sciences, Nursing, Dentistry and public Health. It provides accessibility to nearly 30 million citations from a wide period expanding from 1951 to till date. It provides access in the form of abstracts/articles/both<sup>16</sup>. It consists of both, paid and free journals. PubMed is constantly involved in updating its database on daily basis by keeping a check on all journals listed under them

via certain parameters set for consideration<sup>17,18</sup>. Articles undergo the plagiarism policy as a general rule before being considered for publication. This constant monitoring in return helps to maintain the quality of standard of the journals with a peer review policy in action before considering articles to be published hence maintaining the overall quality of the journal.

- 2. PEDro (Physiotherapy Evidence Database):** It is a database focusing nearly on Physical therapy/ Physiotherapy with 44,000 published articles under its umbrella falling in the category of Randomised trials<sup>12</sup> for evaluating Physical therapy interventions, Clinical Practice, Guidelines in Physical therapy and Systematic reviews<sup>19</sup>. Since its focal point is on Evidence-Based-Physiotherapy, it is a choice for scholars and researchers from the Physical therapy and Rehabilitation field to publish their respective articles in journals slated with PEDro. For the benefit of mankind and spreading health to all this database provides links to full text.
- 3. Scopus:** It is Elsevier's database launched in 2004 consisting of journals which follow a peer-review strategy for article publication. The peer-review strategy analyses research papers regarding their originality, methodology and application of research<sup>20</sup>. Both abstracts and full-text articles are provided by Scopus to researchers (the autonomy with the journal). Scopus consists of nearly 22,794 active and 13,583 inactive titles from roughly 11,670 publishers' with 49 million records, out of which 78 percent with abstracts and also a collection of 5.3 million conference papers<sup>21</sup>.
- 4. Web of Science (Wo S):** This e-database is provided by Clarivate Analytics. It is the world's leading scientific platform and citation search consisting of nearly 8,700 high impact journals from Science, Social science, Arts and Humanities where a significant number are linked to full text articles<sup>22</sup>. For a clear and efficient functioning, Wo S categorized its content/publications as either in Journals, Books and Conference Proceedings<sup>23</sup>. The core collection of journals consist of:
  - a. Science Citation Index Expanded (SCIE)
  - b. Social Science Citation Index (SSCI)
  - c. Arts & Humanities Citation Index (AHCI)
  - d. Emerging Sources Citation Index (ESCI)

Along with the core collection, Wo S also has Book Citation Index (BKCI) which consist of books and Conference Proceedings Citation Index (CPCI) which deals with conference proceedings of high repute. Any journal listed with Wo S is listed in either if the above core collection, wherein Science Citation Index (SCI) being the cream of all, is been followed by SSCI, AHCI and ESCI respectively. Physical therapy scholars can select any of the core collection depending on the nature, population and type of their study. Journals with high quality publications and citations migrate from SCIE to SCI. In addition to the above collection, Wo S also contains Biological Abstracts, Biosis Previews, Biosis Reviews Reports & Meetings and Zoological records under which journals with their respective theme are attached accordingly<sup>18</sup>.

5. **Google Scholar:** It is free (only an internet connection is required), most widely and easily approachable database for Physical and Rehabilitation therapist, scholars and scientists. It can be searched for content in relation with Original articles, Systematic reviews, Meta-analysis, Case report and series, Short and special communication, Editorial, Letter to the editor, Thesis, Dissertations, Abstracts and books. Google scholar maintains associations with academic publishers, professional societies, research governmental and private organizations and universities. This multidimensional feature of Google scholar makes it a choice for Physical Therapy researchers, scientist and students. It provides access to abstracts and full text articles<sup>24</sup>.
6. **SPORT Discus:** This database consist of around 300,000 content in the form of abstracts and full text articles on Original, Review, Systematic, Meta-analysis, Special and short communication, Case report and series etc on topics and issues in context to Physical Therapy, Exercise Science, Sports Medicine, Fitness, Sports related discipline administration, Sports law, Legislation, Sports with disabled, School sport, Drugs, Doping, Biomechanics, Nutrition and Occupational health. It covers data back from 1892 to till date. It's another peculiarity is that it provides reference to articles of around 60 different languages<sup>12</sup>.
7. **Eric on EBSCO host:** It is the world's largest database in relation to education wherein education being mainly focused on all health topic to serve for betterment of mankind. It comprises nearly 20,000 thesis and dissertations along with incorporation of around of around 680 full text journals. It is published by the United States Department of Education with all journals enlisted with this database are graduated regularly with high impact factor, enormous citations and supreme repute in nature. Articles related to investigation, recommendation and implementation of new concepts in Physical therapy related to conventional and teaching and curriculum achievements and setbacks should be prioritized to be published in journals integrated with this database.
8. **CINAHL (Cumulative Index of Nursing and Allied Health Literature):** This database covers literature related to Randomised trials of Physical therapy interventions. Articles related to prevalence, Incidence, Epidemiology, treatment interventional studies performed in small or large sized population can be published in journals under the net of this database. It consists of articles from 1961 to till date.
9. **Cochrane Library:** It is designated with highest standard in quantity and quality towards promotion of Evidence Based Healthcare. It concentrates on systematic reviews of Randomised Controlled Trials<sup>25</sup> wherein studies dealing with healthcare interventions and meta-analysis of supreme quality on human health<sup>26</sup>. Articles published in journals associated with Cochrane Library are weighted to the extent that these independent evidences are used for making healthcare decision making. While it is a one click free access in low and middle income countries, it is a chargeable for articles for researchers from any domain belonging to high income group countries. Cochrane Systematic Reviews recognize impact of therapeutic interventions in disease prevention, treatment and rehabilitation strategies<sup>27</sup>.
10. **LILACS (Latino Americana em Ciencias da Saude):** This database includes more than 600 journals from the medical fraternity publishing from Latin American and Caribbean countries<sup>28</sup>. Journals associated with this database pritorize systematic reviews and Clinical practice<sup>29</sup>. Along with English it is also interface in Spanish and Portuguese. Journals indexed with LILACS are not indexed in any other database. Mostly articles can be downloaded for free.
11. **Trip (Turning Research Into Practice):** This database started in late nineties with the aim to

simplify the search method for high quality, clinically relevant health aspects and evidence based information in the form of systematic review, instant and future Clinical guidelines, calculators and answers along with evidence based proposals. It works on a 4s approach to identify the most relevant evidence of studies, synthesis, synopsis and system<sup>30</sup>. It is greatly used by health care professionals mainly General Physicians as Clinicians, Clinical Physical therapist and students willing to search articles on evidence based practice for present and future enhancement and deployment of new treatment strategies<sup>31</sup>.

**12. REHABDATA (NARIC):** This database comprise of abstracts related with topics of physical, mental and psychiatric impairments and disabilities and rehabilitation method. It presents with material from 1956 to till date.

**13. ProQuest:** This database consists of journals dealing with fields forming Allied Health domains. These comprise of full text journals, e-books, thesis, dissertations etc. This database can also be used for searching articles on been worked on by researchers and selection of journals for publishing their articles in context with the journal focusing on.

### Conclusion

Physical therapist working in Out Patient Department/Universities/Public and Private Organizations etc should wisely select respective database comprising of multidimensional journals to choose from. All therapists should focus on publishing their articles in journals of high repute for both, national and international recognition and serve the humanity by imparting high quality healthcare.

**Conflict of Interest:** Nil

**Source of Funding:** Nil

**Ethical Clearance:** Not applicable

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# Assessment of Prevalence of Internet Addiction and its Relation to Sleep Quality among Undergraduate Students of Saveetha Medical College, Chennai

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## Abstract

**Background:** Internet is being used extensively throughout the world as it serves as multipurpose tool for education, research, information, entertainment, social networking etc. The excessive undisciplined use by individuals has led to the emergence of the concept of Internet addiction which may have negative effects on sleep quality. Sleep quality affects the academic performance and interpersonal relationship of students and predisposes them to mental illness.

**Objectives:** To assess the prevalence of Internet addiction and its relationship to sleep quality among medical students of Saveetha Medical College and Hospital.

**Materials and Method:** A cross-sectional study was carried out among undergraduate students of Saveetha Medical College and Hospital using 20-item Young's Internet Addiction Scale and Pittsburgh Sleep Quality Index (PQSI). 300 subjects were studied by simple random sampling. Chi Square test was used to test the significance ( $P < 0.05$ ).

**Results:** Total prevalence of Internet addiction was calculated to be 24.7% with moderate and severe addiction being 22.3% and 2.4% respectively. From this study, it has been found that individuals with Internet addiction have 20.3% risk of poor sleep quality. P value is statistically significant.

**Conclusion:** The significant relationship was found between internet addiction and poor sleep quality that could affect academic performance, so preventive measures should be taken to promote appropriate internet use among medical students.

**Keywords:** *Internet Addiction, Sleep Quality, Young's Internet Addiction Scale, PQSI, Medical Students.*

## Introduction

Internet addiction commonly refers to an individual's inability to control his or her use of the internet, which eventually causes one's marked distress and functional impairment in daily life<sup>(1)</sup>. Today the Internet has become an important element in people's lives. It is used for entertainment, communication and education. Despite its advantages the side effects of Internet overuse have been emerging progressively<sup>(2)</sup>. Heavy internet use has many associations, with depression, poor sleep quality<sup>(3)</sup>, mood changes and poor health outcomes such

as obesity and low self-esteem<sup>(4)</sup>. Younger internet users (ie between 18 and 24 yrs old) were more at risk of becoming internet addicts than older users<sup>(5)</sup>.

Sleep is an essential need of humankind, important for quality of life and health at all ages. Quality sleep has been associated with multiple factors including environmental factors, social life and general health status<sup>(6,7)</sup>. Guidelines advocate 8.5 – 9.5 hours of sleep per night for adolescents 10 to 17 years old, while young adults, over 18 years, need 7 – 9 hours of sleep<sup>(8)</sup>. Sleep has been found to be fundamental for memory

consolidation, learning, critical thinking and decision making<sup>(9,10)</sup>.

Researchers have linked the influence of Internet addiction to sleep disturbances and insomnia: a higher rate of insomnia – up to 3% – was found among heavy Internet users<sup>(11)</sup>.

Students who use Internet excessively have a higher chance of experiencing sleep problems<sup>(12)</sup>. Many studies indicate that the relationship between sleep quality and level of Internet addiction is somewhat complex and needs to be studied well. There are limited studies carried out in India on this emerging public health issue.

**Objective:** To assess the prevalence of Internet addiction and to investigate the relationship between sleep quality and the level of Internet addiction among medical students of Saveetha Medical College.

### Methodology

A cross sectional study was conducted among undergraduate students of Saveetha Medical College selected by simple random sampling. Based on a study conducted by Sachin Gedam et al, 23.3% of students were reported to have Internet addiction, with 5% allowable error and using formula  $4pq/d^2$  the sample size derived were 300. The study was conducted after obtaining approval from the Institutional Ethical committee. Written informed consent was obtained from all the study participants before eliciting the desired information. The duration taken for the study was 3 months.

The subjects were evaluated with questionnaire by using 20-item Young's Internet Addiction Test and Pittsburgh Sleep Quality Index which is reliable measure of addictive use of Internet and Sleep Quality.

The Internet Addiction Test is a 20-item 5-point likert scale that measures the severity of self-reported compulsive use of the Internet. The marking for this questionnaire ranges from 20-100. Based on the scoring the students were divided into normal internet users

(<50), moderate internet addict (50-69) and severe internet addict (>70).

The Pittsburgh Sleep Quality Index is a self-report questionnaire that assesses sleep quality over a 1-month time interval. The measure consists of 19 individual items, creating 7 components that produce one global score. A total score of 5 or greater is suggestive of poor sleep quality and score of <5 indicates good sleep quality.

Data management and analysis was done by using Microsoft Excel and SPSS software. Chi Square was used to test the significance and p value <0.05 was considered significant.

### Results

A total of 300 students were studied of which 104(35%) were males and 196(65%) were females. The overall prevalence of Internet addiction was calculated to be 24.7% with moderate and severe addiction being 22.3% and 2.4% respectively. Majority were in the age of 17-19 years, almost 69% of total participants. In this age group mild internet addicts (31%) and moderate internet addicts (13%) are more in number and severe internet addicts (0.7%) are less compared to the age group of 20-22 years where severe internet addicts are 1.7% and mild and moderate internet addicts are 18% and 9.3% respectively (Table 1). Males are severely addicted(1.7%) to internet usage compared to females (0.7%). P value is significant.

Out of 300 subjects, 203(67.7%) participants are having poor sleep quality with majority being in the age 17-19 years and 97(32.3%) subjects with good sleep quality. Majority of females (45.4%) have poor sleep quality compared males (22.3%) (Table 2). P value is insignificant. In this study, it has found that individuals with Internet addiction have poor sleep quality of 20.3% compared to individuals with less Internet addiction (Table 3). It has been found that the severity of internet addiction have preponderance to poor sleep quality. P value is significant.

**Table 1: Association of age and sex with Internet Addiction among students**

Categories	Internet Addiction Range				X <sup>2</sup> (Chi Square)	P Value
	Normal N(%)	Mild N(%)	Moderate N(%)	Severe N(%)		
<b>Age (Years)</b>						
17-19	54(18.0%)	93(31.0%)	39(13.0%)	2(0.7%)	6.562	0.363
20-22	24(8.0%)	54(18.0%)	28(9.3%)	5(1.7%)		
≥23	0 (0.0%)	1 (0.3%)	0 (0.0%)	0 (0.0%)		
<b>Sex</b>						
Male	18(6.0%)	56(18.7%)	25(8.3%)	5(1.7%)	9.967	0.022
Female	60(20.0%)	92(30.7%)	42(14.0%)	2(0.7%)		

**Table 2: Association of age and sex with Sleep Quality among students**

Categories	Sleep Quality Range		X <sup>2</sup> (Chi Square)	P Value
	Good N(%)	Poor N(%)		
<b>Age (Years)</b>				
17-19	57(19.0%)	131(43.7%)	1.522	0.467
20-22	40(13.3%)	71(23.7%)		
≥23	0 (0.0%)	1 (0.3%)		
<b>Sex</b>				
Male	37(12.3%)	67(22.3%)	0.765	0.382
Female	60(20.0%)	136(45.3%)		

**Table 3: Association of Internet Addiction and Sleep Quality among students**

Sleep Quality Range	Internet Addiction Range				X <sup>2</sup> (Chi Square)	P Value
	Normal N(%)	Mild N(%)	Moderate N(%)	Severe N(%)		
Good	42(14.0%)	42(14.0%)	12(4.0%)	1(0.3%)	24.970	0.000
Poor	36(12.0%)	106(35.3%)	55(18.3%)	6(2.0%)		

**Discussion**

In the present study prevalence of Internet addiction was found to be 24.7% (moderate 22.3% and severe 2.4%) among medical students where as in other study by Gedam et al<sup>13</sup> was about 23.3%. The results showed more number of males show severe level of addiction compared to females (X<sup>2</sup>=9.967, P value=0.022). Many studies on internet addiction among adolescents reported similar result of male preponderance. It may be explained by the fact that males are more likely to express interest in games, social networking etc. But the moderate level of Internet addiction is higher in females that may be due to less outdoor exposure compared to males because of traditional customs. It was observed that association between age of students and level of internet addiction was not significant.

From this study, 67.66% of medical students reported poor sleep quality. It is higher compared to the study by Anurag Rathi et al (32.53%)<sup>14</sup>. In that 20.3% of poor sleep quality students were associated with high level of internet addiction and P value is significant.

**Conclusion**

This study shows an association between high level of internet addiction and poor sleep quality. Individuals with severe level of internet addiction have preponderance to poor sleep quality. Preventive measures should be taken to promote healthy and safe usage of internet create awareness among medical students.

**Limitations:** Limited sample size might have caused discrepancies in the results. Sleep Quality may

also influenced by many other factors like physical pain, mental illness.

**Funding:** Nil

**Conflict of Interest:** None declared.

**Ethical Clearance:** Obtained from Institutional Ethical Committee.

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# A Study on Perception and Utilization of Anganwadiservices among Mothers Having Children between 0-6 Years in a Selected Community at Mangaluru

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## Abstract

**Objectives:** The objectives of the study is to determine the perception of Anganwadi services among mothers, to find the utilization of Anganwadi services among mothers, to find the correlation between scores on perception and utilization of Anganwadi services among mothers and to find the association between scores on perception of mothers regarding Anganwadi services and selected demographic variables.

**Method:** A descriptive survey approach with non experimental descriptive design was adopted perception and utilization of anganwadi services among mothers having children between 0-6 years in a selected community at Mangalore. The conceptual frame work of the study was developed on the basis of general system model by Ludwig Von Bertalanffy. Content validity of tools was established in consultation with seven experts. Out of the seven experts, Four from the department of Community Health Nursing, one from the Child Health Nursing, One from the department of Community Medicine, one from the department of the Obstetrics and gynecological nursing. The reliability co- efficient of tool was calculated using Spearman's Rank Correlation of Co efficient formula. Non probability purposive sampling technique was used to select the sample for the study the final sample size was 100. Pilot study was conducted to find out the feasibility of the study. Data collected from the sample were analyzes by descriptive and inferential statistics.

**Result:** The result study shows that 50% of the subject are having moderate perception followed by average perception 23.4% and bad perception for 7.3%. The majority 61.3% of subjects had high utilization of Anganwadi services followed by 12.1% of subjects had moderate utilization and there is no correlation between perception and utilisation and there is no association between scores on perception and utilization of Anganwadi services and demographic variables.

**Conclusion:** The overall findings of the study revealed that majority of the mothers utilizing anganwadi services.

**Keywords:** *perception, utilisation, Anganwadi services, mothers, children, supplimentary nutrition, benefits,*

## Introduction

In India, we have Anganwadi centers, giving informal education for children between 3-6 years of age. These centers come under the charge of ICDS. If we go through the history of these centers one can know that it was started in the year 1975 with the aim of combat the menace of child hunger and malnutrition. Their work is not just limited to imparting informal

education; they also render their services in the form of sharing knowledge and supplementing nutrition to every antenatal, postnatal mother having BPL cards. Added to this, they also render nutrition demonstration, health checkups, growth monitoring, Vitamin A oral administration, such work is done under the supervision of Anganwadi teachers<sup>1</sup>.

The 2011 census of Dakshina Kannada indicates 9.97% of the total district population comprise of children between the age group of 0-6 years of age. The total children of this age group are 2, 08,297. This constitutes 53.33% in rural areas and 46.67% in urban.

This shows the rural- urban distribution remains more or less same. The Kotekar PHC is 6Kms away from the Yenepoya institute, where the investigators had an opportunity to render nursing services as a part of community health nursing practical activity. This PHC judiciary area there are 35 number of Anganwadi centers. The investigators have selected Talapady area which is having 2 numbers of Anganwadis and decided to interview the mothers having children between 0-6 years to know the perception and utilization of services by them<sup>2</sup>.

A study conducted in Wardha urban area among 140 women had indicated that 89.29% of the BPL families were utilizing Anganwadis services for their children between 0-6 years of age. The study also says that working women are under utilizing the services.<sup>3</sup> The study conducted in Lucknow had revealed that 250 parents of a community were not enrolled their children between 3-6 years of age in Anganwadis and they were refrain from informal education<sup>4</sup>. The study conducted in West Bengal in Howrah among 1235 mothers had revealed low perception about Anganwadi, 73% said that most of the time these Anganwadis remained closed and 27.3% said the food supplied by them is not satisfactory<sup>5</sup>.

### Materials and Method

- **Source of data/sampling method:** The unit of population selected for the research study will be mothers of a selected community having children between 0-6 years of age.
- **Sample size:** The sample for the present study consists of 100 mothers having children between 0-6 years of age.
- **Sampling Technique:** Purposive sampling technique will be used to collect the data from the subjects.
- **Subject Selection Criteria:**

#### Inclusion Criteria:

- Mothers having children between 0-6 years
- Mothers who are able to conversant in Kannada or in English.

- Mothers belongs to below poverty line

#### Exclusion Criteria:

- APL families
- Mothers having children above 6 years of age
- Hearing and mentally impaired mothers

#### Delimitation

- Study is conducted only in a selected community area.
- Utilization of services will be elicited only by the help of a checklist, that itself limits the subject's response towards the phenomenon under study.
- Perception is determined with the help of a rating scale therefore it restricts the response given by the subjects also forced them to restrict their response towards given parameters only.
- **Research variables:** Perception and utilization
- Demographic variables: Age, Gender, Education, Occupation of mother, years of residing in a area, number of children, Age of younger child, proximity to the Anganwadi etc.

#### Findings:

**Distribution of the Subject According to Their Perception:** It is found that many of the subject 50% have moderate perception followed by average perception 23.4% and bad perception for 7.3%. The mean percentage of overall perception was 1.80 and standard deviation

**Subject Distribution of According to The Utilization:** The findings of the study revealed that majority (61.3%) of subjects had high utilization of anganwadi services followed by 12.1% of subjects had moderate utilization and the mean percentage of utilization was 1.33 and the standard deviation was 0.637. 100 women were interviewed by pre designed checklist. The result revealed that 61.3% of mothers were having high utilization of anganwadi services.

**Correlation between Perception and Utilization:** It's found that there is no correlation between the perception and utilization.

**Association between Scores on Perception of Mothers Regarding the Anganwadi Services and Selected Demographic Variables:** Findings of the study shows that, there is no significant association between

the perception and demographic variables that is, age of the mother [p=0.920], education of the mother [p=0.271], number of children [p=0.858], number of children below 6 years [p=0.312], distance from the anganwadi [p=0.847], most used anganwadi services [p=0.523] and there is 100% utilization of anganwadi services. The perception score is not shown any association with any of the demographic variables.

**Association between Scores on Utilization of Anganwadi Services by the Mothers and Selected Demographic Variables:** The findings of the study shows that there is no significant association between utilization of anganwadi services and demographic variables. Age [p=0.164], education of the mother [p=0.73], number of children [p=0.143], number of children below 6 years [p=0.617], distance from anganwadi [p=0.678], services liking [p=0.26] and 100% mothers are utilizing anganwadi services. The utilization score is shown no association between the demographic variables like age, education of the mother, number of children, number of children below 6 years and distance from the anganwadi and most liking anganwadi services.

## Discussion

**Demographic Data:** Majority of the subjects (49%) belongs to the group of 26-30 years, 25% belongs to age group of 21-25 years, 20% belongs to 35 years and above and 6% belongs to the group of 18-20 years. The maximum number of the mothers having primary education (52%). The majority of subjects (76%) are having number of children between 2-4, 22% are having 1 child and 2% belongs to 5 and above. Most of the subjects (67%) are having number of children above 3 and 33% are belongs to the category of 1-3. Most of the subjects (43%) are utilizing formal education, 38% are utilizing health check-ups and weight monitoring and 19% utilizing food. Most of them are within 1KM and 35% are More than 1 km.

**Distribution of the Subject According to Their Perception:** In the present study, it is found that many of the subject 50% have moderate perception followed by average perception 23.4% and bad perception for 7.3%. The mean percentage of overall perception was 1.80 and standard deviation was 0.586.

The following study support to the findings of current study, “a study of perception and utilization of Anganwadi services among mothers having children between 0-6 years in a selected community at

Mangalore”. Objects were interviewed by pre designed questionnaire. Study revealed that, out of 100 mothers 50% had moderate perception about the anganwadi services.

**Subject Distribution of According to the Utilization:** The findings of the study revealed that majority (61.3%) of subjects had high utilization of anganwadi services followed by 12.1% of subjects had moderate utilization and the mean percentage of utilization was 1.33 and the standard deviation was 0.637. 100 women were interviewed by pre designed checklist. The result revealed that 61.3% of mothers were having high utilization of anganwadi services.

**Correlation between Perception and Utilization:** Findings of the study revealed that the correlation between perception and utilization was 0.070, which suggested that there is a very weak correlation between perception and utilization of anganwadi services. The p value was 0.486 p>0.05 (). So there is no correlation between these two variables. Hence the null hypothesis H<sub>0</sub> which states there is no significant correlation between utilization and perception of anganwadi services was rejected. This shows that effort can be undertaken by the community health nurse, ASHA workers and anganwadi workers to educate the community regarding the anganwadi services and the importance of those services.

**Association between Scores on Perception of Mothers Regarding the Anganwadi Services and Selected Demographic Variables:** A descriptive study was done “to assess the perception and utilization of anganwadi services among mothers having children between 0-6 years in selected community at Mangalore”

Findings of the study shows that, there is no significant association between the perception and demographic variables that is, age of the mother [p=0.920], education of the mother [p=0.271], number of children [p=0.858], number of children below 6 years [p=0.312], distance from the anganwadi [p=0.847], most used anganwadi services [p=0.523] and there is 100% utilization of anganwadi services. The perception score is not shown any association with any of the demographic variables. Hence the research hypothesis is rejected and the null hypothesis accepted.

**Association between Scores on Utilization of Anganwadi Services by the Mothers and Selected Demographic Variables:** The findings of the study

shows that there is no significant association between utilization of anganwadi services and demographic variables. Age [p=0.164], education of the mother [p=0.73], number of children [p=0.143], number of children below 6 years [p=0.617], distance from anganwadi [p=0.678], services liking [p=0.26] and 100% mothers are utilizing anganwadi services. The utilization score is shown no association between the demographic variables like age, education of the mother, number of children, number of children below 6 years and distance from the anganwadi and most liking anganwadi services. Hence the null hypothesis is accepted and the research hypothesis is rejected.

### Conclusion

Conclusion is the chronological end of any discussion or study. It is a stopping point of a detailed argument. Basically its occurrence ends rest of the debate or any study. A conclusion is not merely a summary of the main topics covered or a re-statement of the research problem but a synthesis of key point and, if applicable, where they recommend new areas future research.

The following conclusions were drawn the basis of the findings of study.

1. In the present study 50% mothers are having moderate perception regarding anganwadi services.
2. 61.3% of mothers are highly utilizing the anganwadi services.
3. There is no association or correlation between the perception of mothers regarding anganwadi services and utilization.
4. The finding shows that there is no significant association between perception of anganwadi services with selected demographic variables.

5. There is no significant association between utilization of anganwadi services with selected demographic variables.

**Ethical Clearance:** Yenepoya Ethics Committee-1 approved our study protocol number 2018/081 titled "a study on perception and utilization of anganwadi services among mothers having children between 0-6 years in a selected community at Mangalore" on 23/06/2018 under the chairmanship of Dr. Umakulkarni

**Source of Funding:** Self

**Conflict of Interest:** Nil

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# A Cross-sectional Study on the Assessment of Quality of Sleep among the Patients with Type 2 Diabetes Mellitus in a Rural Area

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## Abstract

**Background:** Type 2 Diabetes Mellitus results from the body's ineffective use of insulin. Type 2 diabetes mellitus comprises the majority of people with diabetes around the world and is largely the result of excess body weight and physical inactivity. Symptoms include increased thirst, frequent urination and unexplained weight loss. There are studies emphasising that type 2 diabetes mellitus has a higher incidence of sleep disorders which may be due to the disease or caused by the complications associated with diabetes. Contrarily, erratic and disturbed sleep habits has been directly linked to diabetes mellitus, obesity and metabolic syndrome.

**Aims and Objectives:** This study has been undertaken to establish the negative impact of blood glucose level on the quality of sleep.

**Methodology:** This is a cross sectional study carried out on 177 type 2 diabetes mellitus patients. Structured questionnaire (Pittsburgh sleep quality questionnaire) was administered.

**Results:** In this study the prevalence of sleep disorders was found to be 135 (76.3%) type 2 diabetes mellitus patients. Among the study subjects, it was found that 121 (68.4%) participants of the study were women and 56 (31.6%) were men. It was also found that females had a higher prevalence of sleep disturbances (79.3%). Mean age of all the participants was found to be 56.63 and 63 (35.6%) participants fell under 55-64 years age group which was the highest. Majority of the patients were illiterate 72 (40.7%) and education was found to have a significant relationship with sleep disturbance. Compliance to drug therapy, concomitant medication and age also had a significant relationship to the factors influencing their quality of sleep. Education, compliance to drug therapy, concomitant medication and age are the risk factors of developing sleep disorders in type 2 diabetes mellitus patients.

**Conclusion:** Therefore, due consideration has to be given to address the problem of sleep disturbance in diabetics and enhance the care and treatment program along with effective health education of the population.

**Keywords:** *Diabetes Mellitus, Sleep Quality, Blood Glucose, Pittsburgh Sleep Quality Questionnaire.*

## Introduction

Type 2 Diabetes Mellitus, results from the body's ineffective use of insulin. Type 2 diabetes mellitus comprises the majority of people with diabetes around the world and is largely the result of excess body weight and physical inactivity. Symptoms include increased thirst,

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frequent urination and unexplained weight loss. There are studies emphasising that type 2 diabetes mellitus has a higher incidence of sleep disorders which may be due to the disease or caused by the complications associated with diabetes.<sup>(1)</sup> Contrarily, erratic and disturbed sleep habits has been directly linked to diabetes mellitus, obesity and metabolic syndrome. According to the International Diabetes Federation the estimated number of diabetic patients worldwide was 382 million in 2013 and will rise to 592 million by 2035.<sup>(2)</sup> With regard to the significant burden, it is imperative to identify the modifiable risk factors which are associated with a lower risk of diabetes. Lifestyle modifications of people with a genetic predisposition of diabetes will help in decreasing the prevalence of diabetes mellitus.<sup>(3)</sup> Sleep is a bio-behavioural phenomenon that is regulated by circadian, homeostatic and neuro-hormonal processes.<sup>(4)</sup> Suboptimal sleep duration has been identified as a sleep disorder arising from the 24-hr lifestyle of modern societies represents an additional behavioural factor which affects the public health adversely. Several studies have reported a U-shaped association between sleep duration and type 2 diabetes.<sup>(5, 6)</sup> Diabetes prevalence increases during sleep of less than 6/more than 9 hours. Diabetics are more prone to have insomnia and daytime sleepiness compared to non-diabetics. The prevalence of sleep disorder is reported 42%<sup>(7)</sup> and 45%<sup>(8)</sup> in diabetics with restless leg syndrome and 71%<sup>(9)</sup> in diabetics with chronic complications. Treating sleep disorders is an important aspect in controlling diabetes. Adequate attention to better sleep quality is as important as nutrition, physical activity and medicine. Therefore, this study is aimed to determine the prevalence of sleep disorder and its relation to type 2 diabetes in order to improve the quality of sleep amongst patients.<sup>(3)</sup>

### Methodology

This cross-sectional study was conducted on 177 type 2 diabetes mellitus patients diagnosed at least 6 months previously who are residing in Thirumazhisai, Chennai (Field practice area of Saveetha Medical College) using simple random sampling. The study period was from January 2019 to March 2019. Proportion of an event  $p=50.7$  and proportion of an alternate event  $q=49.3$  (In a study conducted by Khosravan et al.<sup>(3)</sup> in Gonabad city, Iran the prevalence of sleep disorders was found to be 50.7%). Hence the same was used to calculate a minimum sample size of 172 participants in this study. Data collection in this study was done by administering a structured questionnaire which included 2 parts, namely,

general details and PSQI (Pittsburgh Sleep Quality Index). General details consisted of demographic details such as name, age, sex, address, religion, marital status, education, occupation, income, family type and family size. It also included information regarding the patient's disease such as years since diagnosis, fasting blood sugar, post prandial blood sugar, complications, medication, dose, compliance, co-morbid diseases and concomitant medication. Pittsburgh Sleep Quality Index was used to assess the sleep quality of the study subjects. The questionnaire analyses 7 components of sleep: sleep duration, sleep latency, sleep efficacy, self-assessment of sleep quality, sleep disturbances, sleep medication, day time dysfunction during the last one month. PSQI includes 9 main items. Likert scale is used to score all items ranging from zero to 3. The score of each person's sleep quality ranges from zero to 21. According to the questionnaire, a score of less than or equal to 5 indicates good sleep and a score greater than 5 indicates poor sleep. Higher score indicates worse sleep quality. The designers of this scale reported its reliability as 0.83, sensitivity as 89.6% and specificity as 86.5%. Data entry and analysis was done using SPSS software. Descriptive statistics was calculated for the background variables. Association between the factors influencing the quality of sleep was analyzed and chi-square test was employed as a test of significance. In this study the level of significance was set as 0.05.

### Results

In this study, 177 completed questionnaires distributed amongst the residents of Thirumazhisai with type 2 diabetes mellitus were collected.

According to PSQI the number of people with poor sleep quality is 135 (76.3%) and those with good sleep quality are 42 (23.7%).

The mean age of the patients was found to be 56.63 years and the median is 58 years. The minimum and maximum age recorded was 32 and 80 years respectively with a range of 48. Most of the patients belonged to the group of 55-64 years – 63 (35.6%). The least number of patients belonged to the group <45 – 27 (15.3%). Age was found to have a significant relationship to sleep quality in type 2 diabetics ( $P=0.049$ ) and a chi square value of 7.856.

The number of females taking part in the study was 121 (68.4%) and the number of males was 56 (31.6%). There is no significant relationship between sex and sleep

quality ( $P=0.158$ ) and chi square value was determined as 1.989.

Hindus taking the study was found to be 165 (93.2%) whereas number of Christians and Muslims was found to be 12 (6.2%). There is no significant relationship between religion and sleep quality ( $P=0.189$ ) and chi square value is 3.335.

Most of the patients in this study are married – 169 (95.5%) and 8 (4.5%) patients are widowed. There is no significant relationship between marital status and sleep quality ( $P=0.106$ ) and chi square value is 2.607.

Most of the patients in the study are illiterate which is 72 (40.7%) and 7 (4%) were graduates. Education was found to have a significant relationship to sleep quality ( $P=0.007$ ) and chi square value is 14.100.

Most of the patients interviewed lived in nuclear families which was 97 (54.8%). It was found that family type did not have a significant relationship to sleep quality ( $P=0.226$ ) and chi square value is 2.970.

The number of patients living in a family with less than 4 members were found to be 91 (51.4%). There was a significant relationship to sleep quality ( $P=0.048$ ) and chi square value is 3.909.

The highest number of people belonged to the Upper lower class of the Modified Kuppaswamy Scale – 92 (52%). The Socio-economic status of the patients was found to have a significant relationship to the sleep quality ( $P=0.028$ ) and chi square value is 7.156.

The mean fasting blood glucose level was determined to be 162.87 g/dL and the median was found to be 160 g/dL. The minimum and maximum values were found to be 107 and 320 g/dL respectively.

The mean post prandial blood glucose was determined to be 239.48 g/dL and the median was 227 g/dL. The minimum and maximum values were found to be 180 and 478 g/dL respectively.

Complications were present in 28 patients (15.8%) and all of them had poor sleep quality. Therefore, there was found to be a significant relationship between complications and sleep quality ( $P=0.001$ ) and chi square value is 10.348.

Compliance was adhered to by 159 (89.8%) patients and 18 (10.2%) patients were not compliant. There is

no significant relationship to sleep quality ( $P=0.312$ ) and chi square value is 1.021.

Hypertension was present in 89 (50.3%) patients and does not have a significant relationship to sleep quality ( $P=0.309$ ) and chi square value is 1.037.

Consequently, only 4 (2.3%) were found to have asthma and it does not have a significant relationship to sleep quality ( $P=0.212$ ) and chi square value is 1.561.

Accordingly, 15 (8.5%) patients had thyroid dysfunction and it does not have a significant relationship to sleep quality ( $P=0.723$ ) and chi square value is 0.126.

Out of the patients interviewed, 103 (58.3%) patients were on concomitant medication and it was found to have a significant relationship to sleep quality ( $P=0.046$ ) and chi square value is 3.966.

## Discussion

The prevalence of sleep disorder in this study was found to be 76.3%. Khosravan et al.<sup>(3)</sup> and Knutson et al.<sup>(9)</sup> reported a prevalence of 50.7% and 71% of sleep disturbance in diabetic patients which conforms to the results of the present study. In India, G.R. Sridhar et al.<sup>(10)</sup> reported that 33.7% of diabetics were suffering from sleep disturbances. This does not conform to the trend observed in our study.

The mean age of the participants of the study is 56.63 years whereas it is reported as 57.37 and 57.3 by Khosravan et al.<sup>(3)</sup> and Knutson et al.<sup>(9)</sup>. There is a significant relationship between age and sleep disturbance in the present study and agrees with Lopes et al.<sup>(8)</sup> and Yaggi et al.<sup>(11)</sup> in mentioning that low quality of sleep is related to a patient's age.

In the present study, no significant relationship was found between sleep disorders and sex of the patient which conforms to Yaggi et al.<sup>(11)</sup> but does not agree with Maracy et al.<sup>(12)</sup> and Ghanei et al.<sup>(7)</sup> studies.

No significant relationship was established between religion and sleep disturbances.

Marital status was not found to be significant in this study but is contradicted by Khosravan et al.<sup>(3)</sup> who states that risk of sleep disorders was greater in married individuals with diabetes.

We observed a significant relationship between level of education and sleep disturbance but Khosravan

et al.<sup>(3)</sup> reported no relationship between education and the sleep components. Yaggi et al.<sup>(11)</sup> conformed to the findings of the present study that those with a higher level of education have better sleep attributes than those who are illiterate.

Family type was not found to have any significant relationship to quality of sleep in this study and this parameter has not been evaluated by other studies.

Family size is figured to have a significant relationship to quality of sleep.

The socio-economic status of the patients was shown to have a direct significant relation to the decreased quality of sleep among diabetic patients and this is backed up by Khosravan et al.<sup>(3)</sup> and Yaggi et al.<sup>(11)</sup> in terms of education, occupation and income as separate parameters.

Complications had a significant relation to sleep quality among diabetics.

Compliance was found to not have a significant relationship with sleep quality.

No significant relationship was found between any co morbid illnesses and sleep quality of the patients, but Khosravan et al.<sup>(3)</sup> reported that a significant relationship was seen between the presence of other diseases with diabetes and sleep disorder in diabetics implying that diabetics with chronic diseases such as cardiovascular diseases, kidney diseases and blood pressure reported more cases of sleep disorder. While diabetics with other diseases had a longer initial insomnia and stayed in bed more than others, they had a worse sleep efficacy and reported more complaints of sleep disorder which agrees with Meisinger et al.<sup>(13)</sup> study. Men and women with a history of angina pectoris have sleep latency. Hypertension also has an impact on sleep duration such that these patients have a shorter duration of sleep compared to others. Cappuccio et al.<sup>(14)</sup> propounds that detrimental sleep quality results in higher calorie absorption leading to obesity specifically with change of leptin and in turn causes cardiovascular morbidity.

Patients taking concomitant medication were also found to have a significant relationship with sleep disturbances.

### Conclusion

In summary, type 2 diabetes mellitus is proved to

have a detrimental effect on the effective sleep quality of the individual. Both type 2 diabetes mellitus and sleep disorders coexist in numerous cases and are common problems. The high prevalence of sleep disorder can lead to negative effects to health, mood and overall quality of life. Longer-term randomized controlled trials are needed to establish causality and to elucidate the underlying mechanisms. Therefore, every single patient with type 2 diabetes mellitus has to be imperatively screened for such sleep disorders as a part of routine general examination of the patient and those identified to be suffering from said disorder have to be treated appropriately.

**Funding:** No funding sources

**Conflict of Interest:** None declared

**Ethical Clearance:** Ethical approval was obtained from the Institutional Review Board (IRB) and Institutional Ethics committee. Written informed consent was obtained from the study participants and information sheet regarding the study was given to all the participants.

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# Self Esteem and Psychological Well Being of Adolescent Children in Single Parent Families

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## Abstract

Families across the world are undergoing rapid change due to various reasons which make those families underserve and unfit to capacitate the individual's life. Therefore the present study re-searches on the Self Esteem and Psychological well being of adolescents from the Single parent family. This descriptive study emphasizes on Quantitative research where the primary data was collected through the Survey Method using a questionnaire. The data was collected from two schools in Kollam District, Kerala, one from an aided school and another Government school and the sample size is 51 students from 8<sup>th</sup> to 12<sup>th</sup> standard. The tool consists of socio-demographic data, Self Esteem Scale by Rosenberg and Psychological Well Being Scale by Carol Ryff. The study result showed a significant correlation between the Self Esteem and Psychological Well being of the adolescents from Single-parent family. Based on the results, effective recommendations are also proposed.

**Keywords:** *Self Esteem, Psychological Well being, Adolescent, Single Parent Family.*

## Introduction

According to the World Health Organization-Adolescence is the period in human growth and development that occurs after childhood and before adulthood, from the age of 10 to 19 years<sup>(1)</sup>. When we consider the global population, adolescents constitute 16% with an absolute number of 1.2 billion<sup>(2)</sup>. In keeping with the UNICEF's report quite 1/2, all adolescents board Asia, significantly in South Asia that is additional around 340 million than the other region<sup>(3)</sup>. When we compare the population of adolescents (10-19 years) with the Indian population, it represented 21.4 per cent which is one – fifth of the total population<sup>(4)</sup>. From the accounted population, nearly 72% of the adolescents

dwelt in rural areas. If we compare the urban-rural adolescents' population, it shows that the population in urban areas declined from 21.9% in 2001 to 19.2% in 2011, while in rural areas, it remained more or less same<sup>(5)</sup>.

In the dynamic stage of adolescence, brain development and active interaction with societal and environmental setup will enhance an individual to mould their capacity to move forward into adulthood<sup>(6)</sup>. During this period, adolescents acquire physical, emotional, cognitive, social and economic resources that are the foundation for health and well-being in later life<sup>(7)</sup>.

In this fast-moving world, adolescents expand the limits beyond their family to include more social networks and a variety of other social institutions. Besides those familiar institutions (like family) with which adolescents interact also undergo modifications in response to adolescents. Besides the social and economic contexts of adolescents' lives have undergone dramatic structural changes in the past two decades- e.g., Increases in poverty and single-parent families being two notable changes. <sup>(8)</sup>

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Bronfenbrenner's Ecological Systems Theory of Human Development examines the complex interactions and relationships between an individual and his/her multiple social and physical surroundings during adolescent development. The interactions that individuals have with others and with these various environments are seen as key to human development. Bronfenbrenner identifies four ecological systems: the microsystem, the mesosystem, the exosystem and the macro system<sup>(9)</sup>. Bronfenbrenner proposed an additional system the Chrono system, which examines over time the influence of environmental changes on an individual's development. The Chrono system focuses on "normative" (i.e., entering school, puberty, marriage) and "non-normative" (i.e., death, divorce, chronic illness) transitions that can occur across the lifespan and may indirectly impact development by affecting family processes<sup>(10)</sup>.

According to Bronfenbrenner, when the relation between different microsystems is well-suited, development progresses smoothly. And when the same relation between the microsystems contradict each other due to swift changes in the living condition will result in unpredictable outcomes. Lack of experience, ego-centrism and their need to experiment with new and sometimes risky social roles to establish a unique identity, places adolescents at high risk for developing certain psycho-social problems<sup>(9 & 10)</sup>.

In this modern world, children had to face and cross more complex and impersonal life today. Havighurst explained that the different types of problems faced by adolescents stem from pubescent development, their emotional life, the social groups with which the individual interacts and other biological and cultural changes<sup>(11)</sup>. Therefore any mishandlings in life's primary system itself will cause an interruption in an adolescent's life.

Therefore the purpose of the present study is to understand the adolescents in single-parent families who have been separated from their parents either by the death of a parent, divorce or separation. This study further tries to understand the Psychological Well Being of adolescents. This study further focuses on the relationship between the self – esteem and their Psychological Well Being.

### Method and Material

This descriptive study emphasizes on Quantitative

research and Survey research design has been adopted to understand the Self Esteem and Psychological Well Being of adolescents from a single-parent family. The primary data for the study was collected through the Survey Method using a questionnaire. The data was collected from two schools in Kollam District, Kerala, one an aided school and another Government school. Samples for the study were easily identified from the Snehapoorvam Scholarship list (Kerala Government Scheme for children of a deceased parent) and with the help of class teachers (identify children of parents who are either divorced or separated) and the sample size is 51 students from 8<sup>th</sup> to 12<sup>th</sup> standard.

The tool consists of socio-demographic data, Self Esteem Scale by Rosenberg, Psychological Well Being Scale by Carol Ryff. Statistical analysis of the present study was done by simple percentage, chi-square and correlation using SPSS 20 Version.

### Result

The collected data from the survey was on the basis of their Socio-demographic profile, level of Self-esteem and on the scale of Psychological Well Being. The findings from the study show that 80% of respondents in the study are from the age of 13 to 14 years. Hence the majority of them are studying in 8<sup>th</sup> and 9<sup>th</sup> grade. 71% of the respondents are girls and the majority among them are 67% among them are between 13-14 years. Nearly half (51%) of the respondents are from semi-urban, 31% from urban and the rest 18% from a rural setting. In Semi-urban settings, 88% are females while the rest are males.

To identify the nature of schools that the adolescent from a single-parent family opted for the research gave emphasis on the type of schools. From the findings, it was identified that more than half (59%) of the respondents are from Government School. Among those studying in a Government school, it is found that there is an equal proportion of male and female. Along with these basic details, an inquiry about their medium of instruction was also included, where the result shows as 2/3rd of the respondents are from English medium schools.

Further the researcher focused on the familial and parental details of the respondents like their relationship with the caretaker, employment status, the reason for being a single- parent, family type and the number of siblings. Statistical evidence of the above details clearly expresses a percentage display of the caretaker's status

as follows: respondents having mother’s as caretaker scores a percentage of 58.8, whereas those having father are 41.2%. In response to the parent’s employment status, 82% indicated their single-parent as employed, whereas 18% are unemployed. The shift in modern days family system also reflected in the study, which is highlighted in findings where 67% belong to Nuclear family and 23% live in extended family. But more surprisingly 10% of the respondents declared themselves as living in a joint family.

On analysing the reason for the parent’s single status the prime reason was death of the spouse (74.5%), while separation and divorce came as the second and third reason respectively. Respondents were also enquired about the number of siblings they have, as a result, 21.6% of respondents revealed themselves a single child, where 66.7% of respondents have one sibling and 11.8% have 2 and more siblings.

The respondents were asked to rate their parents’ attitude towards them in certain situations like whether his/her parent is proud of them, do parent takes an interest in their activities, do his or her parent listen when the child talks, whether the parent is accessible when the child needs, whether the child can talk to his/her parent about the things that really matter and if the child can comfortably share his or her thoughts and feelings. All the respondents unanimously rated “always” as their response to the parents’ attitude, which simply means that their single parent takes care of them.

**Table 1: Showing level of Self Esteem and Psychological Wellbeing**

Self Esteem	Percent	Psychological well being	Percent
Low	29.4	Low	21.6
Medium	47.1	Medium	56.9
High	23.5	High	21.6
<b>Total</b>	<b>100.0</b>	<b>Total</b>	<b>100.0</b>

From the table 1, we can infer that nearly half (47%) of the respondents have only below an average level of Self-esteem & whereas, on the other hand, 56.9% of the respondents shows above an average level of Psychological well being.

**Table 2: Test of association shows that there is a significant association with the type of the school respondents studied and the involvement of parent’s interest in child’s activities with the Self-esteem.**

Sl.	Variable	Value	df	Sig.	
1	Type of school	7.719 <sup>a</sup>	2	.021	
	Govt				
2	Parent’s interest in child’s activity	9.508 <sup>a</sup>	4	.050	
					Never
					Sometimes
	Always				

86.6% of respondents studying in the Government school showed a low level of self-esteem therefore the association test of Self-esteem with the type of school shows .021 level of significance.

Meanwhile the level of parent’s interest in the child’s activities showed more than 50% of positive response which figures .050 level of significant association with Psychological Well being and Parent’s Interest in Child’s activities.

**Table 3: Test of association shows that there is a significant association with the class studied, gender and type of the school respondents studied with Psychological well being**

Sl.	Variable	Value	df	Sig.
1	Class	6.306 <sup>a</sup>	2	.043
	10 <sup>th</sup> to 11 <sup>th</sup>			
2	Gender	5.853 <sup>a</sup>	2	.054
	Female			
3	Type of School	10.439 <sup>a</sup>	2	.005
	Aided			

66% of the respondents from 8 & 9<sup>th</sup> grade, 62% of female respondents and 66% of government school respondents in the study showed only an average level of Psychological Well being with .043, .054 and .005 level of Significant association with class, gender and type of school.

**Table 4: The test of Correlation shows that is a significant relation between Psychological Wellbeing & Self-esteem of adolescents from Single parent families.**

Correlations			
		Psychological well being	Self-esteem
Psychological Well Being	Pearson Correlation	1	.370**
	Sig. (2-tailed)		.007
	N	51	51
Self Esteem	Pearson Correlation	.370**	1
	Sig. (2-tailed)	.007	
	N	51	51

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

The table 4 of correlation between Psychological well being and Self-esteem shows that they are significant at the 0.01 level and therefore from the study, it is evident that there is an important correlation between the Psychological and Self Esteem of adolescent children from a single-parent family.

**Discussion**

Through this study the researcher makes an attempt to study the self-esteem and psychological well being of the adolescent respondents’ by making them evaluate their own life after the absence of a parent. From the study results, it is been identified that nearly half of the respondents belong to the age of 13 & 14 years, who are studying in their 8<sup>th</sup> and 9<sup>th</sup> grade. Among the respondents, female participants are majority in number and they dwell in a semi-urban setting. Nearly 60% of the respondents in this study are from the government school, studying in English medium and the gender proportion in this domain remained equal.

As per the 2011 census, there are 13,58,698 single women in the state, whereas, in the 2011 census report, there is a rise by 39 percent of single women in India<sup>(12)</sup>. Similar to these reports, this study also highlights a similar kind of result by showing an increase in the percentage of female caretakers due to the death of spouse, divorce and separation. Along with these socio-demographic details, respondents were asked to rate their parents’ involvement and impact on their daily life, which showed a pleasingly moderate response.

The test of association of the respondents’ social and demographic details with Self Esteem and Psychological Well Being demonstrated a wide range of

significant association with both. 86.6% of respondents studying in the Government school showed a low level of self-esteem, where girls outnumbered the boys. Though the study has not given more emphasis on the socio-economic conditions of the respondents, it can be construed that low self-esteem among the children with single parents studying in Government school is a result of low socioeconomic status, poor family background and environmental factors when compared to the students of aided schools<sup>(13)</sup>. Anne E. Foon in her study has also substantiated that students from the co-educational schools have a lower Self-esteem, but among them, female students find it tougher to cope up<sup>(14)</sup>. The level of single parent’s interest and involvement over children’s activities showed a positive response to their parenting which can be tinted as an excellent reply to sabotage the conventional societal thought towards single parenting which is considered to be a social taboo or a curse.

Similarly while considering their Psychological well being, 66% of the respondents from 8<sup>th</sup> and 9<sup>th</sup> grade, 62% of female students and 66% of government school students in the study showed an average level of Psychological Well being. These results reassure the previous studies that social and demography status like lower class, female gender and government school adolescent children who are generally considered as vulnerable, show a moderate level of psychological well being.

**Conclusion**

The phase of pre-adulthood is considered to be the most powerless condition in each child’s life. In

consonance with this, an adolescent from a single-parent family can be considered as twofold helpless. Findings from the present study reveal that there is a need for close observation of the psychological wellness of young people, particularly from Single-parent families. Despite the fact that the child-rearing of single guardians demonstrates a positive pattern in the study the psychological prosperity and self-esteem of the kids from single-parent family continue as before as in the past. For a positive quest towards this dormant social condition, they need unique consideration and support from Family, School, Communities and Government for a better Social, Economical and environmental background.

**Recommendation:** Children from single-parent families must be given extra care and support by the other family members. Living with grandparents and siblings will help a child feel more comfortable than in a nuclear family setup. Freedom for children to open up their feelings should be there at families.

Schools- as a child spends their major proportion of their quality time in school, should, therefore, work closely with children as their teachers may able to notice their discomforts easily. Proper training and sensitization programs for the teaching and non-teaching staff about the child's physical and emotional development in different stages are to be given.

Communities – a community-based care approach need to be executed among the various stakeholders to tackle the issues.

Government- As the second legal parent to a child the government should take serious steps for children from single-parent families too. Kerala model 'Snehapoorvam' scholarship scheme is an example of economic and education security for children belonging to a lower social and economic background especially with a deceased parent. The scheme needs to be more generous among kids from divorced/separated and never-married parents just rather than a deceased parent. Programs addressing physical and mental wellness need to be initiated for single parented children by the concerned ministry/department with an interdisciplinary approach.

**Ethical Clearance:** Taken from Human Ethics Committee, Dept. of Social work, Amrita Vishwa Vidyapeetham, Coimbatore, India.

**Source of Funding:** Self

**Conflict of Interest:** Nil

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# Relationship between Trunk Muscle Endurance and Static-Dynamic Balance in Physically Active Individuals

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## Abstract

**Background:** Weakness of trunk muscle contribute to spinal instability over strenuous and prolonged physical tasks therefore may lead to musculoskeletal injury, however from a performance perspective, relation between core muscle endurance and static-dynamic balance has not been well known. The purpose of this study was to examine the relationship of trunk muscle endurance and static dynamic balance in physically active individuals.

**Objectives:** To assess the Trunk muscle Endurance in physically active individual, to assess the Static-dynamic Balance in physically active individuals and to determine relationship between trunk muscle endurance and static-dynamic balance.

**Results:** There was positive relation between balance and trunk flexor, extensor and lateral endurance measures (Pearson correlation test,  $r = 0.425$  and  $p < 0.0001$ ;  $r = 0.490$   $p < 0.0001$ ;  $r = 0.500$   $p < 0.0001$ , respectively, relative to static balance.  $r = 0.480$   $p < 0.0001$   $r = 0.390$   $p < 0.0001$ ,  $r = 0.470$   $p < 0.0001$  relative to dynamic balance.

In BMI 8% of people was in obese category, 39% people were in over weight category and a 53% person was in normal weight category. Total 47% people was having weak core musculature and also affected balance.

**Keywords:** *Static-dynamic balance, Trunk muscle Endurance, Sorensen test, trunk flexor endurance, side bridge endurance test, Single-limb stance test, Y balance test.*

## Introduction

Core muscles play an important role in providing primary stability and protection to the spine during static and dynamic phasic alteration. Core made up of

several muscles of group the rectus abdominis (abs) at the front of abdomen; the internal and external obliques, in front and side of abdomen; the transvers muscles that run horizontally across your lower abdomen; the erector spinae the large muscles on either side of spinal cord; the muscles surrounding scapulae; the gluteus muscles and the iliopsoas and quadratus lumborum muscles.<sup>(1)</sup>

These muscles provide stability to trunk. They link our upper and lower body and enable to move in any direction or stand in one spot without losing balance of the body. A weakness of core can affect the daily activities, such as walking, bending, turning, dressing and bathing etc. If core isn't strong or stable, it will be impossible for the arms and legs to move well. for dynamic upper and lower extremity dominant tasks

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such as kicking and throwing a ball we need good core musculature which determines how far the ball can be thrown or kicked, Proper utilization of the kinetic chain allows maximal force to be developed in the core which can then be efficiently transferred to the upper extremity and Lower extremity during these actions; In order for the tasks to be effective. A decrease the strength of core musculature which affects the postural stability and it leads to hamper the balance of the body. A disturbance in balance system can affect day to day activities, thus core muscle endurance and balance goes hand in hand.<sup>(2),(3),(6)</sup>

Core muscle endurance can be measured by using the following tests: Plank test, Modify Sorenson test, bilateral side bridge test, Trunk flexion endurance test.

For testing endurance of the Trunk Flexor musculature, Trunk flexor endurance test is commonly use; TFT is used to assess the endurance of the anterior musculature of core.<sup>(15)</sup> Reliability of trunk flexor endurance test is excellent (ICC = 0.95) (95%IC = 0.88 – 0.98) S.E.M.s from 50.2 to 60.2s] <sup>(5)</sup>

For testing endurance of the Trunk extensor musculature, Modify Sorensen test is most common test used to assess the endurance of trunk extensor muscles.<sup>(13)</sup> Advantage of this test is it requires minimal, less expensive equipment and is simple and safe. Reliability of Sorensen test [Excellent test retest reliability for active subjects, ICC = 0.96. Poor test-retest reliability for inactive subjects ICC = 0.39]<sup>(4)</sup>

For testing endurance of Trunk lateral musculature, Bilateral side bridge test Is a commonly used to assess the endurance of lateral musculature of trunk. <sup>(15)</sup> Advantage of the test is simple to perform with minimal cost and can be self-administered. Reliability of bilateral side bridge test: [Good to excellent ICC = 0.76 to 0.91] <sup>(12)</sup>

Typically all tests simple and safer and also it requires minimal, less equipment so in this study; trunk flexor endurance test, Modify Sorenson test and bilateral side bridge test will be used for measuring trunk muscle endurance.<sup>(13)</sup>

There are several method of balance assessment for static and dynamic balance. Static balance is commonly measured by using, One leg stance test (OLS), Tandem stance test, Flamingo balance test and dynamic balance measured by following tests, Y balance test, Time up and go test (TUG), Modified star excursion balance test (SEBT).

Static balance can be assessed by using one leg stance test. One leg stance test is more sensitive and commonly used for assessing normal balance.<sup>(9)</sup> A 95% IC for ICC between 0.4 – 0.75 indicates good reliability, while value above 0.75 are indicative of excellent reliability. (Intrarater test reliability 0.67- 0.96) <sup>(9)</sup>

Dynamic balance can be assessed by using Y balance test. Y Balance test is simple, yet reliable. Intrarater Reliability (ICC, 95% IC) Maximal Reach = Excellent (080 – 094).<sup>(15)</sup> Average Reach of 3 Trials = Excellent (088 – 0.92). Limb length = Excellent (0. 92). Typically these tests are simple and safer so in this study; Single leg stance test will be used to measure static balance and Y balance test will be used to measure dynamic balance.<sup>(15)</sup>

## Material and Method

An approval for the study was obtained from the Protocol committee and the Institutional Ethical Committee of KIMSDU. Individuals were approached and those fulfilling the inclusive criteria were selected. The procedure was explained and written informed consent was taken from those willing to participate.

An observational analytical study was conducted on 97 subjects in the Krishna College of physiotherapy, Karad. Both male and female subjects, (61 female and 36 male) age 18-25 years. Subjects with spine pathology or fracture, Undergone abdominal surgery or spine surgery recently or in the past 2 years, Individuals with any history of Low back pain for more than 3 months or currently having LBP, Individuals going regularly to the gym or exercising on a daily basis; Individuals are exercise for 2-4 hours per day were excluded. Participants who fulfilled with inclusion criteria that, individuals who had been physically active for 5-6 hours daily; exercising for less than 1 hour per week. And gave informed consent to participate were included in the study. If any subject wished to withdraw from the session at any time, they were allowed to do so. Personal characteristics: Age, sex, height and weight for body mass index (BMI).

First all subjects were given a demonstration on how to carry out the tests correctly. A single trial was given for each test, to familiarize participants with the technique and procedure. 3-5 minute resting period was given between each core endurance test to ensure all the muscles involved had enough recovery time, to avoid fatigue. Subjects were encouraged to put in their maximal effort in each test.

Core endurance was assessed using the isometric core musculature endurance test. Subjects were asked to hold a specific static position for as long as possible according to the objective of the endurance test.<sup>(13)</sup>

In this study the first isometric test was assessed by using Modify Sorenson test, bilateral side bridge test and trunk flexion endurance test. All tests which were using protocols established by McGill et al.<sup>(13)</sup>

And Static balance was assessed by using Single leg stance test.<sup>(9)</sup> Dynamic balance was assessed by using Y balance test.<sup>(15)</sup>

**Trunk flexor endurance test:**



**Fig: 1.**

The subject was asked to lay in crook-lying position on the 60 degree Incline board with trunk positioned and supported at 60 degrees of trunk flexion while hips and knees are at 90 degrees of flexion with arms crossed over the chest and feet on the ground. For the endurance test, support of the trunk was removed and the subject was asked to hold the position as long as they can. If subject was unable to do so; timing was stopped and noted in seconds.<sup>(13)</sup>

**Modify Sorensen test:**



**Fig: 2.**

Modify Sorensen test or variant of the test, have been used in several studies to evaluate the relationship

between isometric endurance of the trunk extensor muscles, measuring how many seconds the subject is able to keep the unsupported upper body horizontal, while placed prone with the buttocks and legs fixed to the couch by three wide canvas straps and the arm folded across the chest.<sup>(13)</sup>

**Bilateral side bridge test:**



**Fig: 3**

Is a common test of muscular endurance originally developed by McGill et al.<sup>(15)</sup> The aim of this test is to hold an evaluated position for as long as possible. The subject lay on their right side the upper body supported of the ground by the right elbow and forearm. The legs are straight with the left foot front to your right foot. The hip is lifted off the floor so that the elbow and feet support the body, creating a straight line from head to toe. The left hand is placed on the supporting shoulder as soon as the subject is in the correct position the stop watch is started. The test is over when the subject is unable to hold the back straight. After five minute rest the other side is tested.<sup>(13)</sup>

**One leg stance test:**



**Fig: 4**

In one leg stance test is more sensitive for assessing normal balance. Ask subject to stand on dominant foot first, by placing their hands on the iliac crests with contralateral limb in hip flexion and knee flexion relying on medial side of dominant knee. The test is timed (in seconds) from the movement the participant gets into the test position, until the other foot touches the ground or until the other foot touches the ground or until the arms are separated from the hip.<sup>(9)</sup>

**Y balance test:**



**Fig: 5.**

Y Balance test is simple, yet reliable, test used to measure dynamic balance. Procedure: The subject should be wearing lightweight clothing and remove their footwear. After doing so, they are the required to stand on centre platform, behind the line and await further instruction. The test should be performed in the

following order: 1. Right Posterior 2. Left Posterior 3. Right Anteromedial 4. Left Anteromedial 5. Right Anterolateral 6. Left Anterolateral. With their hands firmly placed on their hips the subject should then be instructed to solid the first box forward as far as possible with their right foot and return back to starting upright position. They should then repeat this with the same foot for a total of 3 successful reaches with their right foot; they are then permitted to repeat this process with their left foot. Once the subject has performed 3 successful reach with each foot, they can then progress onto the next test direction (i.e. posteromedial). The test administrator should be recording the reach distance of each attempt in order to calculate the subjects YBT composite score.<sup>(15)</sup>

**Scoring System:**

Absolute reach distance (cm) = (Reach 1 + Reach 2 + Reach 3)/3.

Composite reach distance (cm) = sum of the 3 reach directions/3 times the limb length \* 100<sup>(15)</sup>

**Statistical Analysis:**

**Sample Size: 97 formula:**  $4pq \div L^2$

[p = 41, q = 59, L<sup>2</sup> = 10<sup>2</sup>.] Hence, p = 41, q = 59, L<sup>2</sup> = 10<sup>0</sup>, so  $4(41)(59) \div 10^2 = 96.76$  that's how study size was arrived.

**Standard deviation (SD):** Was calculated according to the following formula.

$$SD = \sqrt{\sum \frac{(X-X)^2}{N}}$$

**Pearson correlation test:** This test is used for measured correlation of trunk muscle endurance test duration with static and dynamic balance tests.

**Results**

**Table 1: Correlation of core muscle endurance test duration with Static and dynamic Balance.**

Outcome measures	Pearson correlation coefficient (r)	P value
1. Trunk flexor endurance test –Static Balance	0.425	0.0001
2. Modify Sorenson test – Static Balance	0.490	0.0001
3. Bilateral side bridge endurance test –Static Balance	0.500	0.0001
4. Trunk flexor endurance test- Dynamic Balance	0.480	0.0001
5. Modify Sorenson test- Dynamic Balance	0.390	0.0001
6. Bilateral Side bridge endurance test- Dynamic Balance	0.470	0.0001

“In this study we found that the obese and overweight candidates are less flexible and have weak musculature due to lack of mobility. It was clear that weak core muscles and impaired balance was found to be more prevalent in the BMI groups of more than or equal to 30 and 25.0 to 29.9. The result was 47% of people was having weak core musculature and affected balance.”

### Discussion

The primary purpose of this study was to determine the correlation between trunk muscle endurance and static-dynamic balance that eventually affect functional movement and physical activity. In balance context lower limb has been the main focus for study and therapeutic intervention; whereas role of endurance and strength shortage of core muscle has not been clear, so core training was not the priority in training program.

In 2009, suri et al evaluated the alliance of trunk muscle ascribes balance in elderly and found an average correlation (41%) between balance and trunk muscle endurance.

The literature shows that with one accord negative effects of trunk muscle fatigue on balance. In 2010, Helbostad et al signify the out-turns of lower extremity and trunk muscle fatigue, balance and functional tasks.

An observational analytical study was conducted on 97 subjects in the Krishna College of physiotherapy, Karad. Both male and female subjects, (61 female and 36 male) age 18-25 years. Subjects with spine pathology or fracture, Undergone abdominal surgery or spine surgery recently or in the past 2 years, history of Low back pain for more than 3 months or currently having LBP, Going regularly to the gym or exercising on a daily basis were excluded. Participants who fulfilled with inclusion criteria that, individuals who had been physically active for 5-6 hours daily; exercising for less than 1 hour per week. And gave informed consent to participate were included in the study. If any subject wished to withdraw from the session at any time, they were allowed to do so. Personal characteristics: Age, sex, height and weight for body mass index (BMI).

In BMI 8% of people was in obese category, 39% people were in over weight category and a 53% person was in normal weight category. Total 47% people was having weak core musculature and also affected balance.

**Limitations:** Limitations of study is group size was

small; hence study result cannot be generalized for entire population and Limited to one geographical location, study duration was small.

### Conclusion

In this study we found that the obese and overweight candidates are less flexible and have weak musculature due to lack of mobility. It was clear that weak core muscles and impaired balance was found to be more prevalent in the BMI groups of more than or equal to 30 and 25.0 to 29.9. The result was 47% of people was having weak core musculature and affected balance.

In according to the BMI a trend to lower its values the higher is the level of total physical activity required.<sup>(9)</sup>

On the basis of the results of the study; there was significant relationship between trunk muscle endurance and static-dynamic balance.

**Conflict and Interest:** The authors declare that there are no conflicts of interest concerning the content of present study.

**Source of Funding:** Self-funded

**Ethical Clearance:**

**Abbreviation:**

1. BOS: Base of support.
2. COG: Centre of gravity.
3. LBP: Low back pain.
4. BMI: Body mass index.
5. OLS: One leg stance test.
6. SEBT: Star excursion balance test.
7. TUG: Time up and go test.

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# Prevalence of Iliotibial Band Tightness in Prolonged Sitting Subjects

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## Abstract

**Context:** Musculoskeletal disorder are group of disorder that affect the musculoskeletal system involving nerve, tendon, muscle supporting structure. Muscle tightness leads to an imbalance in acting on the joint and in the long term can lead to pain and weakness and can cause several problems which can lead to have difficulties while walking and doing other activities. Flexibility is vital component of fitness for musculoskeletal functioning and maximizing the performance of physical activities And sedentary lifestyle can hamper the flexibility of the muscles. Tightness in muscles also reduces the range of motion .So there is need to aware people about the risk factors for poor health due to sedentary lifestyle. Hence the aim was to find the muscle tightness due to sitting for minimum 7 to 8 hrs at one place.

**Method:** In this consecutive study, 60 subjects were taken with working for 7 hours or more per day between age group 20-60 yrs, were included which consisted of 42% of females and 58% of males respectively. Thus tests such as ober's test, sit and reach test and straight leg raise test were performed.

**Result:** The tests which were correlated with the duration of working hours of sitting for more than 6-7 hours and the results showed that the ober's test was positive in 47% subjects. According to straight leg raise test the test was positive in 42% subjects and 53% subjects have fair flexibility according to sit and reach test.

**Conclusion:** By this study, it was found that there was 47% of prevalence of iliotibial band tightness in subjects who were being sedentary for more than 7 hours per day with p value of <0.0001.

**Keywords:** Iliotibial band, lower Extremity, Tightness, Flexibility.

## Introduction

The vital component required for most advisable musculoskeletal functioning and increasing the performance of physical activities is flexibility.

Flexibility dysfunction is a widespread problem which is faced by common people. Hamstring tightness is not only one factor for decreased range of motion but can leads to other orthopedic problems.<sup>[1]</sup>

**Anatomy:** The iliotibial band is a non-elastic collagen, long structure which crosses both the hip and knee joints on the lateral thigh. The fascia originates proximally from the iliac crest. It blends into one structure after converging from the tensor fascia lata muscle anteriolaterally and gluteus maximus posteriorly.<sup>[2]</sup>

**Biomechanics:** The pull of the iliotibial band in a static standing position is easily described. Proximally the combined pulls of the tensor fascia lata and gluteus

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maximus muscle with the lineaaspira attachment helps maintaining the band's position over. The biomechanics of band's pull is more complicated when locomotion is involved.<sup>[2]</sup>

The study has shown that the high rate of muscle tightness is among the people who are having prolonged sitting hours and their sedentary lifestyle. Being sedentary or not participating in sufficient physical activities leads to shorten and tighten muscles. Muscles becomes sore when tension occurs in under used muscles which results in muscle shortening. Elongation of muscles by providing oxygenated blood to them can alleviate the tightness.<sup>[4]</sup>

**Mechanism:** Physical activity leads in the working of circulatory system to provide oxygen rich blood through out the whole body to the muscles. When sedentary the muscles can go into tightness due to lack of oxygen. When sitting for long periods of time, person may round the shoulders involuntarily. And this position can cause shallow breathing which will result in lacking of oxygen supply to the muscle tissues.<sup>[4]</sup>

**Cause:** A reduction in ability of muscle to deform which leads to a lower range of motion is the main reason for muscular tightness. One of the main cause for postural abnormalities in modern society is due to sedentary style of living. The prolonged sitting hours required in educational setup, jobs can affect flexibility of the soft tissues. The tightness of muscle is very common problem in students, working people, having prolonged sitting hours. Exposure to high levels of sedentary time in office environment, office workers has to becomeon where they spend between two third and third quarter of their Working hour sitting with high proportion is prolonged, unbroken bouts<sup>[3]</sup>. Sedentary for 30 mins or more. Limited flexibility causes neuro-musculoskeletal symptoms leads to decrease in strength, endurance and stability.

Ideal prolonged sitting time is 30 bouts or more than that.

**Ergonomics:** Ergonomics can be described as the fit between people and the elements of the physical environment with which they interact. Sitting is involved in any work situation the chair represents the primary support system which puts the users in contact with the

workstation. Erect posture is a situation in which the head, trunk and lower legs are vertical and upper leg and arm are horizontal. Prolonged muscle contraction along with maintaining in awkward up supported sitting posture may result in reduced blood flow and consequent local dysfunction of muscle tissue. Electrical activity in muscle has been shown to decrease when the trunk thigh. When the trunk thigh angle is less than 90 degree, pressure on the internal organs of the body is increased. Pressure on the thighs, buttocks and the lower legs are to steep which result in impaired blood flow to these region. This effects is increased if the seatpan is too high or too low.<sup>[5]</sup>

**Aims:** To find the prevalence of the iliotibial band tightness in prolonged sitting subjects.

**Objectives:** To determine the prevalence of the tightness of iliotibial band in prolonged subjects.

## Material

It was an observational study comprised over a period of 24 weeks. consecutive method was used for calculating sample size. As per sample size calculation, 59 was the actual sample size, 60 subjects were included using random sampling method for data collection. We had selected only those subjects who have 7 to 8 hr of sitting. Subjects with any recent trauma history, recent fractures, any pain due to pathology in lower limb, decreased range of motion due to stiffness in knee and ankle and soft tissue injury of lower limb were excluded from the study.

**Methodology:** After receiving clearance from the institutional human research ethical committee of Krishna institute of medical sciences 'deemed to be' university for this study, Informed written consent was taken from all the subjects. Fifty nine subjects fulfilling the inclusion criteria i.e subjects who are sedentary for minimum 7 to 8 hrs in a day and people who spend most of the time sitting on the chair. were included. After taking consent and necessary demographic data including name, age, sex, weight, height, sitting hours per day, type of toilet used were inquired. All the subjects were assessed using three tests: Angle of straight leg raise was measured using a universal goniometer. Sit and reach test was performed based on grades and ober's test was also performed.

**Statistics:**

**1. Working Duration in Sitting:**

Duration in Hours	
7 Hr	23%
8 Hr	75%
9 Hr	2%

**2. Type of Toilet**

Type of Toilet	
Indian	88%
Western	12%

**3. Straight Leg Raise Test**

Positive	42%
Negative	58%

Working Hours in Sitting	SLR Test		Total
	Positive	Negative	
7	8	6	14
8	18	28	46
Significance	Chi square value- 1.036,	p-value -0.03087	60

**Interpretation:**

p value = 0.03087 the straight leg raise test in relation to working hours of sitting is not significant.

**4. Ober's Test**

Positive	47%
Negative	53%

Working hrs	Ober's Test		Total
	Positive	Negative	
7	5	9	14
8	25	21	46
Significance	Chi square test- 4.602	p value- 0.0319	60

**Interpretation:**

p value=0.0319 the ober's test in relation to working hours of sitting is not significant.

**5. Sit and Reach Test:**

SIT and Reach Test	
Poor	15%
Fair	53%
Average	32%

Working hrs in sitting	Sit and reach test				Total
	Poor	Fair	Avg	Good	
7	1	8	5	0	14
8	7	25	11	2	45
9	1	0	0	0	1
Significance	Chi square test- 25.930	p value -0.0011			60

**Interpretation:**

p value= 0.0011 the sit and reach test in relation to working hours of sitting is not significant.

**Inclusion Criteria:**

1. Subjects who are sedentary for minimum 7 to 8 hrs in a day.
2. People who spend most of the time sitting on the chair.

**Exclusion Criteria:**

1. Recent Fractures of lower limb.
2. Any pain due to pathology in lower limb.
3. Decrease range of motion due to stiffness in knee and ankle.
4. Soft tissue injury of lower limb.



**Limitations:**

1. Only one muscle was considered for the study.
2. Simple size was less.

**Suggestions:**

1. Other muscle groups can be assessed.
2. Various professions can be taken for the study.

**Result**

The tests which were correlated with the duration of working hours of sitting for more than 7-8 hours and the results showed that the ober;s test was positive in 47% subjects. According to straight leg raise test the tests was positive in 42% subjects and 53% subjects have fair flexibility according to sit and reach test, which showed not significant ( $p= 0.0319$ ) for ober's test in subjects ( $n=10$ ), straight leg raise test showed not significant ( $p = 0.03087$ ), sit and reach showed not significant ( $p= 0.0011$ ).

**Source of Funding:** Self funded

**Conflicts of Interest:** There are no conflicts of interest.

**Ethical Clearance:** An ethical clearance certificate was obtained from the Institutional Committee Krishna Institute of Medical Sciences Deemed to be University, Karad.

**Discussion**

The vital component required for most advisable musculoskeletal functioning and increasing the performance of physical activities is flexibility. Flexibility dysfunction is a widespread problem which is faced by common people. Muscle tightness is not only one factor for decreased range of motion but can leads to other orthopedic problems. Being sedentary or not participating in sufficient physical activities leads to shorten and tighten muscles. Muscles becomes sore when tension occurs in underused muscles which results in muscle shortening. Elongation of muscles by providing oxygenated blood to them can alleviate the tightness.<sup>[1]</sup>

The study shows that how much the effect is caused due to prolonged sitting. The study is one of its kind providing basic information regarding impact of iliotibial band tightness due to prolonged sitting. To our knowledge no such study is conducting to observe the

impact of prolonged sitting on iliotibial band.

Few tests were carried out such as straight leg raise test, sit and reach test and ober's test which were conducted among 60 subjects. It was studied in the population including bankers, IT professional workers and other people working for more than 6-7 hours. They were also examined according to the type of toilet they used in their daily lives. And how much time they spend by sitting. The results were achieved by correlating the working hours of sitting with the tests.

The SLR test was performed using a universal goniometer. All the tests were performed following the procedures. The mean value of SLR test was observed to be 0.4166 which falls below the border line. ( $p$ - value = 0.03087, Chi square value- 1.036) and it was found that in 42% subjects the test was positive and in 53% the test was negative. Further sit and reach test was conducted( $p$  value = 0.0011, Chi square test- 25.930) for assessing the flexibility and was found that 15% subjects have poor flexibility, 53% have fair flexibility and 32% subjects have average flexibility according to the grades. Also Ober's test was performed which is the important factor to know iliotibial band tightness. ( $P$  value = 0.0319, Chi square test- 4.602) the results were that in 45% subjects the tests came positive and in 53% subjects the tests came negative. an inverse correlation was found between the tests and chair sitting hours.

In another study “ extended sitting can cause hamstring tightness” which was studied by FATIMA G and QAMAR .M conducted among students, 200 students were examined for hamstring tightness and hamstring tightness was a very common complaint among this population too. The mean value of SLR was found to be  $60.97 \pm 10.21$ . 164 (82%), had tightness according to SLR test. There was a statistically significant difference between the popliteal angle and chair sitting hours ( $P= 0.010$ ) and an inverse correlation was found between SLR angle and chair sitting hours ( $r= -0.56$ ,  $P =0.010$ ) and it was concluded that tightness of hamstrings is observed in a majority of the students. Long duration sitting can be contributory factor in hamstring tightness.

The study claimed that maximum flexibility is found in mid 20's to 40's and the main reason for this is prolonged sitting hours and sedentary lifestyle.<sup>[1]</sup>

In the current study, it was seen that there is a tendency of increase in iliotibial band tightness with the increase in the number of sitting hours. Many other etiological

factors can be responsible for reduced flexibility. Further research with more vigorous methodology is required to establish a cause-effect relationship between sitting hours and iliotibial band tightness. However, further studies are required with a large sample size to get a deep insight about the cause-effect relationship.

### Conclusion

By this study, it was found that there was 47% of prevalence of iliotibial band tightness in subjects who were being sedentary for more than 7 hours per day with a p value of <0.0001.

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# A Study of Relation between Myopia and Head Posture in Young Adult Population

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## Abstract

**Objective:** The objective of this study was to find out the correlation between presence of forward head posture and myopia in young adults. Forward shoulder angle and craniovertebral angle were used for assessing the presence and severity of forward head posture.

**Method:** There were total 95 subjects who were willing participants of this study. This was a study on presence of forward head posture in myopic young adults. Here we evaluated the degree of forward head using photogrammetric assessment of forward shoulder angle and craniovertebral angle.

**Result:** There is a relation between forward head posture and myopia in young adults (58.95%). Forward head posture was found more in females (73.21%) compared to males (26.79%). Individuals with myopia for a duration of 5-10 years have the highest prevalence of forward head posture (58.93%). Individuals with myopia ranging from 0 to -1.5D had the greatest prevalence of forward head posture (67.85%).

**Conclusion:** There is prevalence of forward head posture in young adults with myopia.

**Keywords:** Myopia, Forward head posture, young adults, forward shoulder angle, craniovertebral angle.

## Introduction

The human eye is a sensory organ which reacts to light and pressure. It allows the perception of light and provides a three dimensional image. This occurs due to refraction of light.<sup>1</sup>

However, any disturbance in the refraction of light by the eye leads to blurring of vision; known as refractive errors. The various types of refractive errors include Myopia, Hyperopia/ Hypermetropia, Astigmatism and Presbyopia.<sup>2</sup>

Historically, the concept of myopia was first given by Aristotle (350 BC). He used the term ‘muops’ which was derived from ‘muein’ - to close and ‘oops’- the eye. The noun ‘Myopia’ originated in AD 550 in Latin *lusciositas*. Efforts have been started to prevent myopia since AD 1600.

It can be defined as refraction anomaly of the non-accommodated eye with a spherical equivalent of -0.5D or more negative.<sup>3</sup>

### Classification<sup>4</sup>:

Low Myopia	-	0D to -1.5D
Moderate Myopia	-	-1.5D to -6.0D
High myopia	-	-6.0D or more
Pathological Myopia	-	-8.0D or more

The prevalence of refractive errors has increased many fold. The incidence of myopia alone has increased

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from 0.4% (1993) to 34.2% (2016). The highest prevalence of myopia is in South-East Asian countries.

In India, the incidence of myopia in individuals older than 40 years of age is 34.6%

And in children it is 4.7%, 7% and 10.8% in 5, 10 and 15 year olds<sup>5</sup>

It was thought that myopia was caused due to genetic factors. However, recent research points towards the role of environmental factors also. There could be a possibility of these two factors being interrelated. Environmental factors such as near work, visual stress and educational stress have a strong impact on the development of myopia. Some factors such as race (mainly Asian) and age also play an important role. Prematurity, has also been proven to increase the risk of myopia in children.<sup>5,6,7</sup>

Primary myopia is caused by elongation of the visual axis. Other causes include the corneal curvature being too steep, lens swelling, dislocation of the lens and some genetic syndromes. Medicines such as eye drops may also cause myopia.<sup>3</sup>

Generally, the first symptom of myopia is blurring of far objects. Other symptoms such as eye strain, squinting, excessive bending forwards and resultant headaches can also be seen. Abnormal titling of head and excessive blinking may also be present.<sup>8</sup>

A myopic individual may generally squint, tilt their head or lean forwards in a unnatural position to see clearly. This may cause some common musculoskeletal problems like neck pain, tightness of the neck, shoulder and back muscles. These problems are generally ignored by the normal person. . Over time however, these problems worsen and may lead to more severe complications.<sup>9</sup>

Myopia has been linked with numerous postural changes.(pa, Collins, Buehren, Bece and Voetz...).

According to Simensen and Thorud (1994), workers in textile industries who were responsible for detecting and correcting flaws in the fabric. The workers had to lean forwards to carry out this task. A correlation between Myopia development and years of work was found.<sup>10</sup> Adams and McBrian (1992), studied a group of clinical microbiologists who were using microscopes. They worked for a minimum of 20h a week. A high myopia prevalence of almost 71% was found in them.<sup>11</sup>

Collectively, these studies show that there is a high prevalence of myopia in occupations that require working at a close distance for long periods of time.

Forward head posture, defined as excessive anterior positioning of the head in relation to a vertical reference line is one common postural fault that may occur here.<sup>12</sup> There is excessive flexion of the lower cervical spine and excessive extension of the upper cervical spine. Thus there is a muscle imbalance in the neck as well as the back. It could manifest as tingling or numbness in one or both the arms, headache and neck pain. Burning pain between the shoulder blades is also seen.<sup>13</sup>

Photogrammetry is a commonly used measure to assess the posture by taking a picture of the patient's head and neck from the lateral view or it can be measured manually.<sup>14</sup>

Although this study does not cover the management of forward head posture, it is worth mentioning some of the method most commonly used to treat it. McKenzie exercises, which are a self-therapy exercise programme are used. They include stretching, mobilization and manipulation.<sup>15</sup> Also, Kendall exercises which are known to correct forward head posture by strengthening the deep cervical flexors and shoulder retractors and stretching the pectoral muscles are used.<sup>16</sup> Pilates are also recommended for reduction in pain.<sup>17</sup> Electrotherapy interventions such as Ultrasound and IFT have also been proved effective.<sup>18</sup> Exercises for scapular stabilization are used as well.<sup>19</sup>

To our knowledge, not many studies have been done on the relationship between head posture and myopia. Therefore, focus needs to put on studying head posture at rest as well.

## **Methodology**

A total of 95 individuals were included in this study who fulfilled the inclusion criteria. The procedure was explained and consent was taken from them.

Here, the individual's head posture was assessed using the forward shoulder angle (FSA) and the craniovertebral angle (CVA). The individual was asked to stand as they normally would and to relax. Then a photograph was clicked from the lateral profile and required angles were measured using photogrammetry. After collection of data, the results were compared and statistical analysis was done.

**Result**

**1. Prevalence of Forward Head Posture:**

**Table No. 1: Distribution of Forward Head Posture**

	Forward Head Posture	Percentage
Present	56	58.95%
Absent	39	41.05%
Total	95	100%

**Interpretation:** From table no. 1, it is suggested that among 95 individuals with myopia 56 individuals had myopia. Hence the prevalence that was found was 58.95%.

**2. Distribution of forward head posture in accordance to degree of myopia:**

**Table no. 2: Distribution of Forward Head in accordance to degree of myopia.**

Degree (D)	Total	Presence of Forward Head	Percentage	Mean ± SD
0 to -1.5D	73	38	67.85%	-0.64 ± 0.18
-1.6 to -5.9D	21	17	30.35%	3.12 ± 0.94
>-6D	1	1	1.80%	-6
<b>Total</b>	<b>95</b>	<b>56</b>	<b>100%</b>	

**Interpretation:** From table no. 2, it was observed that out of 56 individuals with forward head posture maximum 38 (67.85%) had myopia ranging from (0 to -1.5D), 17 individuals had myopia ranging from (-1.6 to 5.9D) and remaining 1 individual had myopia of more than -6D.

**3. Distribution of forward head posture in accordance to duration of myopia:**

**Table no. 3: Distribution of Forward Head Posture in accordance to duration**

Duration (Years)	Total	Presence of Forward Head	Percentage	Mean ± SD
0-5	28	14	25%	3.43 ± 1.22
5-10	54	33	58.93%	7.48 ± 1.28
>11	13	9	16.07%	13.22 ± 1.39
Total	95	56	100%	

**Interpretation:** From table no. 3 it is observed that, out of 56 individuals with forward head posture maximum 38 (58.93%) had myopia for 5-10 years, 14 had myopia for 0-5 years and minimum 9 had myopia for more than 11 years.

**4. Association between duration of myopia and forward head posture:**

**Table no. 4: Association between duration of myopia with respect to craniovertebral angle and forward shoulder angle.**

Particulars	Craniovertebral Angle			Forward Shoulder Angle		
	r-Value	df	p- Value	r-Value	df	p- Value
Pearson Correlation Coefficient	-0.3252	93	0.0013(S)	-0.3702	93	0.0002(S)
'N' of Valid Cases	95			95		

**Interpretation:** Table 4 shows that, association between duration of myopia and craniovertebral angle by Pearson Correlation Coefficient Test, was found to be (-0.3252) with a p-value of 0.0013 which is significant. It

also shows that, association between duration of myopia and forward shoulder angle by Pearson Correlation Coefficient Test, was found to be (-0.3702) with a p-value of 0.0002 which is significant.

**5. Association between degree of myopia and forward head posture:**

**Table 5: Association between degree of myopia with respect to craniovertebral angle and forward shoulder angle.**

Particulars	Craniovertebral Angle			Forward Shoulder Angle		
	r-Value	df	p- Value	r-Value	df	p- Value
Pearson Correlation Coefficient	-0.4893	93	<0.0001(S)	-0.5375	93	<0.0001(S)
'N' of Valid Cases	95			95		

**Interpretation:** Table 5 shows that, association between degree of myopia and craniovertebral angle by Pearson Correlation Coefficient Test, was found to be (-0.4893) with a p-value of <0.0001 which is extremely significant. It also shows that, association between degree of myopia and forward shoulder angle by Pearson Correlation Coefficient Test, was found to be (-0.5375) with a p-value of <0.0001 which is extremely significant.

In the beginning, the occurrence of myopia was very less. It was thought to be caused due to genetic factors. However, recent research points towards the role of environmental factors also. There could be a possibility of these two factors being interrelated.

In the present study, out of 95 chosen individuals 56 had forward head posture. This gives a prevalence rate of 58.95%

This may be due to the increasing tendency of students and young adults to adopt inappropriate postures for long period of time. Also the increased used electronic devices and the long study hours have further led to a deterioration in vision and posture.

In this study 95 individuals with myopia were chosen of which maximum 69 were females and remaining 26 were males. The prevalence of forward head posture was more in females(73.21%) as compared to males(26.79%)

This may be due to the fact that females have been found to adopt a 2°-3° more neck flexion compared to males.<sup>20</sup> It may also be due to psychosocial issues such as stress which is linked to secondary sexual characteristics.<sup>21</sup> Ruivo assessed 275 adolescents, age 15,16 and 17 years reporting FHP to occur more likely in females.<sup>22</sup>

In this study, maximum 54 individuals had a duration of myopia belonging to the group (5-10) years, 28 individuals belonged to group (0-5) years and remaining 13 individuals belonged to the group (>11) years. Out of this, individuals from the group of 5-10 years duration had the highest prevalence of myopia



**Fig. 1. Outcome Assessment**

**Discussion**

The purpose of this study was to find out the prevalence of forward head posture in young adults with myopia.

whereas those belonging to the group >11 years had the lowest prevalence of myopia.

This may be due to there being a discrepancy in the distribution of the samples. The 5-10 years duration group being significantly larger than the other group may have led to a higher prevalence.

In the current study, 73 individuals had myopia between (0 to -1.5D), 21 individuals had myopia between (-1.6 to -5.9D) and remaining 1 individual had myopia greater than 6D. Out of this, individuals with myopia between (0 to -1.5D) had the highest prevalence of forward head posture (67.85%), those with myopia (-1.6 to -5.9D) had a prevalence of 30.35% and the lowest was of those with myopia >-6D (1.80%)

This may be caused due to uneven distribution of the samples. It may also be because greater the severity of myopia; greater is the strain being put on the ocular muscles and consequently the muscles of the head and neck thus leading to a fault in the head posture.

Association was calculated between duration of myopia and the severity of forward head posture. Both the outcome measures were assessed individually.

Association between duration of myopia and craniovertebral angle had a p-value of 0.0013 which is significant. Association between duration of myopia and forward shoulder angle had a p-value of 0.0002 which is significant.

This may be because as the years with myopia increase the postural adaptations also become more and more advanced and fixed thus worsening the overall posture.

Association was calculated between degree of myopia and the severity of forward head posture. Both the outcome measures were assessed individually.

Association between degree of myopia and craniovertebral angle had a p-value of <0.0001 which is extremely significant. Association between degree of myopia and forward shoulder angle had a p-value of <0.0001 which is extremely significant.

This may be because the severity of myopia leads to a rise in postural adaptations such as squinting and leaning forwards which may lead to an increase in the postural abnormality.

Thus more focus needs to be put on the relationship between myopia and head posture as it may lead to relief of many head and neck related problems that are often missed and ignored.

## Conclusion

On the basis of the results of the study, it was concluded that there is prevalence of forward head posture in young adults with myopia. Forward head posture was found more in females compared to males. Individuals with myopia for a duration of 5-10 years has the highest prevalence of forward head posture. Individuals with myopia ranging from 0 to -1.5D had the greatest prevalence of myopia.

**Conflict of Interest:** There were no conflicts of interest in this study

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

**Source of Funding:** Self

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# The Effectiveness of Vestibular Stimulation by Rocking and Vestibular Exercises on Auditory and Visual Reaction Time and Quality of Life in Elderly

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## Abstract

The present study was undertaken to observe the effectiveness of vestibular stimulation by rocking on auditory and visual reaction time and quality of life in the elderly. A total of 150 elderly male and females were part of the study after obtaining the written informed consent. After recruiting the participants, they were randomly grouped into three groups with 50 participants in each group. Neither exercise nor rocking was administered to the control group. Rocking was administered using a rocking chair once a day for 5 days in a week for 6 months for a rocking group. Rocking was administered using a rocking chair once a day for 5 days in a week + vestibular exercises were practiced two sessions per week for 6 months for rocking and vestibular exercise group. There was a significant decrease in the visual reaction time in the rocking only and rocking+ vestibular exercise groups ( $P<0.05$ ). There was a decrease in the auditory reaction time in rocking only group. However the decrease is not statistically significant. There was a significant decrease in the auditory reaction time in the rocking+ vestibular exercise group ( $P<0.05$ ). There was a significant increase in the physical health domain of quality of life in the rocking only and rocking+ vestibular exercise groups ( $P<0.05$ ). There was a slight increase in the psychological domain of quality of life in the rocking only and rocking+ vestibular exercise groups. However the increase is not statistically significant. There was a significant increase in the social relationships domain of quality of life in the rocking only and rocking+ vestibular exercise groups ( $P<0.05$ ). There was a slight increase in the environmental domain of quality of life in the rocking only and rocking+ vestibular exercise groups. However the increase is not statistically significant. The present study results support the beneficial effects of vestibular exercises and rocking on reaction time and quality of life in elderly. The study also recommends further detailed studies in this area to recommend application of vestibular exercises and rocking in elderly population.

**Keywords:** Vestibular stimulation, Elderly, Quality of life, Rocking.

## Introduction

The vestibular system is considered the gateway to the brain and is said to have the most important influence on everyday functioning. Several recent

studies associate the function of vestibular system beyond maintaining balance, equilibrium and/or reflexes with advanced functions such as improving cognition, improving general health and reducing stress. As the vestibular system remains enigmatic among the human senses, it is fast becoming one of the most thoroughly and broadly investigated topic of this era.<sup>1</sup> Vestibular stimulation is the Input that the body receives when it experiences movement or change in direction. It can be mild such as nodding head or climbing stair, or intense such as skydiving or going on a roller coaster.

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Vestibular sensation provides information to the CNS about movement and position of the head in space in order to have conscious perception of head movement and position and reflexive control of posture and balance, head position and eye-head coordination. Stimulating vestibular system in a controlled way has shown many benefits such as decreased self-stimulation and hypersensitivity, increased postural security, concentration, attentiveness, balance and body awareness, calming effects and reduction of abnormal muscle tone.<sup>2</sup> The role of vestibular stimulation in improving initiation of movement, a better posture, increase in step length and stabilize small sway is reported in Parkinson's disease.<sup>3</sup> Rotatory vestibular stimulation is reported to be effective in improving motor skills in children's with autism.<sup>4</sup> Vestibular stimulation is reported to have stimulatory effect on GABA transmission in the ipsilateral substantia nigra and has an enhancing effect on locomotion in hemiparkinson lesions.<sup>5</sup> Vestibular stimulation being a safe, inexpensive and non-time consuming technique to stimulate vestibular system offers ease of incorporation into our daily life to improve motor functions. The present study was undertaken to observe the effectiveness of vestibular stimulation by rocking and vestibular exercises on auditory and visual reaction time and quality of life in elderly.

## Materials and Method

**Study Design:** Experimental study with pre and post control.

**Study Setting:** The present study was conducted at St. Mary's school of nursing, Podanur, Tamil Nadu, India.

**Participants:** A total of 178 elderly male and female participants were screened to recruit in the study. Twenty-eight individuals were not met with the inclusion-exclusion criteria. The participants were recruited from different old age homes of Coimbatore. The study protocol was duly approved by the institutional ethics committee. Written in-formed consent was obtained from all the participants. The following inclusion and exclusion criteria were followed while recruiting the participants:

### Inclusion Criteria:

1. Age group 60 years to 75 years.
2. Willing participants.

### Exclusion Criteria:

1. Patients with Inner ear disease, Migraine, cerebrovascular disease and any serious systemic illness.
2. Patients undergoing therapy or treatment for postural stability
3. Unwilling participants.

After recruiting the participants, they were randomly grouped into three groups with 50 participants in each group.

**The control group (n=50):** Neither exercise nor rocking was administered.

**Rocking group (n=50):** Rocking was administered using a rocking chair once a day for 5 days in a week for 6 months.

**Rocking and vestibular exercise group (n=50):** Rocking was administered using a rocking chair once a day for 5 days in a week + vestibular exercises were practiced two sessions per week for 6 months.

**Rocking Chair:** Rocking chair was specially designed for the study. Details of the rocking chair was mentioned in our previous article.<sup>11</sup>

**Vestibular exercises:** Each session of exercises comprises of 45 minutes. Two sessions per week were administered to the participants.<sup>6,7</sup>

### Outcome Measures:

**Assessment of Reaction Time:** RT apparatus for research, manufactured by Anand Agencies, Pune, was used to record auditory and visual RT. Anand Agencies (<http://www.anandagenciespune.in>).<sup>8,9</sup>

**Assessment of quality of life:** Quality of life was assessed using WHOQOL-BREF questionnaire.<sup>10</sup>

**Ethical Considerations:** The present study was approved by the institutional human ethical committee of Saveetha Institute of Medical and Technical Sciences.

**Data Analysis:** Data was analyzed using SPSS version 20.0. One way ANOVA was used to observe significance of difference. Probability value less than 0.05 was considered as significant.

**Results**

There was a significant decrease in the visual reaction time in the rocking only and rocking+ vestibular exercise groups (P<0.05). There was a decrease in the auditory reaction time in rocking only group. However the decrease is not statistically significant. There was a significant decrease in the auditory reaction time in the rocking+ vestibular exercise group (P<0.05). There was a significant increase in the physical health domain of quality of life in the rocking only and rocking+ vestibular

exercise groups (P<0.05). There was a slight increase in the psychological domain of quality of life in the rocking only and rocking+ vestibular exercise groups. However the increase is not statistically significant. There was a significant increase in the social relationships domain of quality of life in the rocking only and rocking+ vestibular exercise groups (P<0.05). There was a slight increase in the environmental domain of quality of life in the rocking only and rocking+ vestibular exercise groups. However the increase is not statistically significant.

**Table 1: Visual reaction time (ms) of the participants before and after vestibular stimulation**

	Control	ROC	R+V
Baseline	0.781±0.5185	1.0582± 0.3978	0.8118± 0.3531
After 3 months	1.0646±0.576	0.5588± 0.5164	0.6298± 0.5921
After 6 months	0.9603±0.4938	0.382± 0.1708	0.4052± 0.2043
F value	3.72722	41.44296	12.27881
significant	P<0.05	P<0.05	P<0.05

(\*P<0.05 is significant)

**Table 2: Auditory reaction time (ms) of the participants before and after vestibular stimulation.**

	Control	ROC	R+V
Baseline	0.6263±0.4174	0.635±0.4126	0.9208±0.5791
After 3 months	0.9771±0.4365	0.593±0.3917	0.5166±0.3847
After 6 months	0.9772±0.5405	0.5084±0.3296	0.4052±0.2043
F value	9.55409	1.47115	21.44575
significant	P<0.05	no	P<0.05

(\*P<0.05 is significant)

**Table 3: QOL-Physical health of the participants before and after vestibular stimulation.**

	Control	ROC	R+V
Baseline	44.04±12.1133	44.84±13.9713	44.54±13.1587
After 3 months	43.56±12.0647	64.7±14.9178	72.94±10.3123
After 6 months	43.92±12.2705	69.38±15.8911	68.22±14.0354
F value	0.02114	37.98994	72.90773
significant	no	P<0.05	P<0.05

(\*P<0.05 is significant)

**Table 4: QOL-psychological of the participants before and after vestibular stimulation.**

	Control	ROC	R+V
Baseline	60.8±14.1465	62±12.8269	61.56±14.1308
After 3 months	60.08±13.1146	69.82±19.2351	68.42±18.0703
After 6 months	61.04±14.327	67.44±19.9378	67.06±17.9312
F value	0.06485	2.58602	2.33442
significant	no	no	no

(\*P&lt;0.05 is significant)

**Table 5: QOL-social relationships of the participants before and after vestibular stimulation**

	Control	ROC	R+V
Baseline	51.66±17.0349	51.36±17.0471	50.86±16.9489
After 3 months	50.72±9.9899	61.66±18.1688	72.7±12.8782
After 6 months	52.12±16.5562	56.46±15.1256	68.56±15.3492
F value	0.11501	4.68338	29.30893
significant	no	P<0.05	P<0.05

(\*P&lt;0.05 is significant)

**Table 6: QOL-environmental of the participants before and after vestibular stimulation**

	Control	ROC	R+V
Baseline	73.3±12.6495	74.12±11.5009	73.04±13.9532
After 3 months	66±13.4012	73.94±12.2481	74.18±12.7962
After 6 months	73.3±12.6495	76.92±13.7527	74.62±14.8858
F value	5.33314	0.88842	0.17196
significant	P<0.05	no	no

(\*P&lt;0.05 is significant)

## Discussion

The present study was undertaken to observe the effectiveness of vestibular stimulation by rocking and vestibular exercises on auditory and visual reaction time and quality of life in elderly. There was a significant decrease in the visual reaction time in the rocking only and rocking+ vestibular exercise groups (P<0.05). There was a decrease in the auditory reaction time in rocking only group. However the decrease is not statistically significant. There was a significant decrease in the auditory reaction time in the rocking+ vestibular exercise group (P<0.05). There was a significant increase in the physical health domain of quality of life in the rocking only and rocking+ vestibular exercise groups (P<0.05). There was a slight increase in the psychological domain

of quality of life in the rocking only and rocking+ vestibular exercise groups. However the increase is not statistically significant. There was a significant increase in the social relationships domain of quality of life in the rocking only and rocking+ vestibular exercise groups (P<0.05). There was a slight increase in the environmental domain of quality of life in the rocking only and rocking+ vestibular exercise groups. However the increase is not statistically significant. Vestibular system is extensively connected to the cognitive areas of the brain especially hippocampus, basal ganglia, parieto-frontal cortices, cerebellum which is collectively called vestibular cortices.<sup>12</sup> The hippocampus is the fundamental integrative center for spatial processing and regulating the exploratory activities. Vestibular system is extensively connected to the hippocampus through

four main pathways. Connections among vestibular nuclei, hippocampus prefrontal & parietal cortices, limbic system, thalamus are vital for cognitive functions such as spatial functions, navigation and various types memory. As we can see through examples, bilateral vestibular lesions had consequence like spatial memory deficits, bilateral hippocampal atrophy and reduced fractional anisotropy in white matter tracts within the limbic system and the thalamus.<sup>13</sup> Vestibular input is crucial in generating theta rhythm by place cells and head direction cells in hippocampus, Para hippocampal area and thalamus Which in turn important for spatial orientation or spatial memory. It has been proven that loss of vestibular function abolishes the theta rhythm generation and could lead to bilateral hippocampal atrophy.<sup>14</sup> Vestibular stimulation is known to stimulate septohippocampal cells in CA1 area of hippocampus there by Long Term Potentiation (LTP).<sup>15</sup> The increment of dendritic arborization and synapses in the hippocampal pyramidal neurons by vestibular stimulation improves the performance in the spatial learning tasks.<sup>16</sup> Controlled vestibular stimulation inhibits both stress axis (Hypothalamic-pituitary-adrenocortical (HPA) axis & sympathetic adrenomedullary (SAM) axis) and this leads to decrement of glucocorticoids and cortisol levels which indirectly modulates learning and memory.<sup>17</sup> The major mechanism behind it is vestibular system is extensively connected to brain structures involved in emotions, behaviour and cognition.<sup>18</sup> The study results are in accordance with earlier studies.

### Conclusion

The present study results support the beneficial effects of vestibular exercises and rocking on reaction time and quality of life in elderly. The study also recommends further detailed studies in this area to recommend application of vestibular exercises and rocking in elderly population.

**Source of Funding:** Self-funding

**Conflicts of Interest:** None declared

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# Assessment of Arsenic and Iron Levels in Tube Wells of Government Run Institutions in a Block of Murshidabad District, West Bengal

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## Abstract

**Background:** Murshidabad in West Bengal is considered as an endemic district for arsenic contaminated ground water. Iron is also a common inorganic material present in ground water which have ill effects on the body if beyond permissible limits. The present study was conducted to find out the level of arsenic and iron in the water samples in Government run institutions in one block of Murshidabad district.

**Methodology:** In this descriptive observational study, water sample reports of 26 Government run institutions in an arsenic affected block were analysed. WHO and Bureau of Indian Standard permissible and acceptable values of both materials were considered for analysis.

**Results:** As per Indian standards, only 26.9% of water samples in the study block were within acceptable limits for arsenic. If WHO recommended international standards were considered then more than 80% water samples were not safe as drinking water. In case of iron, only 7.7% water samples were within desirable limit as per Indian standards. While considering both arsenic and iron, only 1 water sample was seen to be within desirable limit.

**Conclusion:** In spite of ongoing arsenic mitigation activity in West Bengal the arsenic level was found to be above permissible level in the Govt run tube wells. Awareness generation for repeated testing of arsenic, use of arsenic removal method at household level and use of safe water for both drinking and cooking at community level should be stressed upon.

**Keywords:** Arsenic, Iron, Drinking water, WHO permissible limit, Acceptable limit, Bureau of Indian Standards.

## Introduction

Arsenic has been one of the most notorious

contaminants of ground water and hard to detect as arsenic has no flavour or odour. West Bengal with its nine districts is considered as an endemic state for arsenic contaminated ground water above WHO maximum permissible level of arsenic of 10 mcg/L.<sup>1</sup> As per government of West Bengal estimate, 79 blocks involving 26 million people across 2600 villages are worst affected with arsenicosis.<sup>2</sup> The US Environmental Protection Agency (EPA) classifies inorganic arsenic as a “human carcinogen”.<sup>3</sup> Chronic intake of drinking water with above 50µg/L arsenic concentrations can cause the development of arsenicosis.<sup>3</sup> A systematic review<sup>4</sup> had

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emphasised a large spectrum of systemic manifestations like chronic lung diseases, liver diseases, peripheral vascular disease, hypertension, to weakness, anemia and neuropathy.

Murshidabad is one of the nine affected districts of West Bengal with arsenic contaminated ground water. A three-year study in this district showed 26% of the tubewells were found to have arsenic above 50 microg/L while 53.8% had arsenic above 10 microg/L.<sup>5</sup> In a study in Jalangi, one of the worst affected block of Murshidabad, it was observed that 77.8% of the tube wells were found to have arsenic above 10 microg/l [World Health Organization (WHO)-recommended level of arsenic in drinking water]; 51% had arsenic above 50 microg/l [the Indian standard of permissible limit of arsenic in drinking water] and 17% had arsenic at above 300 microg/l [the concentration predicting overt arsenical skin lesions].<sup>6</sup> On the other hand, Iron is one of the most common inorganic material present in ground water and may have ill effects on the body if beyond permissible limits. It has been estimated that iron concentration of more than 1 mg/L in potable water hampers palatability and WHO recommends its level as below 0.3 mg/L.<sup>7</sup> As per GOI report, 15 districts of West Bengal including Murshidabad had iron level beyond 1 mg/L in ground water.<sup>8</sup>

With the current scenario of Murshidabad district the present study has been conducted in one block of this district with the following objectives.

1. To find out the level of arsenic and iron in the water samples in Government run institutions in one block of Murshidabad district
2. To determine separately whether the level of arsenic and iron is within acceptable limit and/or permissible limit in the absence of alternate source.
3. To find out the percentage of acceptable water sources taking both iron and arsenic levels into consideration

### **Materials and Method**

The present descriptive observational study with cross sectional design was conducted in one block of Murshidabad district. A total of 14 blocks situated in the Gangetic belt of Murshidabad district are worst affected

arsenic blocks. Out of them, Bhagwangola II block was chosen based on feasibility. Twenty-six tube wells were selected by simple random sampling out of all Government run tube wells situated in primary & high schools and ICDS centres where recent water quality sample test results were available from water testing laboratory.

For water quality testing guidelines of drinkable water in accordance to- Bureau of Indian Standards (BIS) IS: 10500:2012 was followed in this study.<sup>9</sup> Standard of drinking water by this guideline differ from WHO standards for iron. Indian standards consider iron level 0.3 mg/l as desirable limit and there is no relaxation of the limit in absence of alternate source of water. WHO considers 0.1 mg/l as highest desirable limit and 1 mg/l as maximum permissible limit.<sup>7</sup>

In case of arsenic, few differences existed between these two guidelines. WHO considers arsenic level 0.05 mg/l as desirable limit, whereas Indian standards consider 0.01 mg/l as acceptable limit and 0.05 mg/l as permissible limit in absence of alternate source.<sup>9,10</sup> Results were analysed in Microsoft excel.

Before conducting the study ethics committee clearance was taken from the institution and permission was taken from the concerned block authority.

**Findings:** The study was conducted in Bhagwangola II block of Murshidabad district and water report were analysed for 26 Govt run tube wells. It is evident from table 1 that as per Indian standards, only 26.9% of water samples in the studied block were within acceptable limits for arsenic. If WHO recommended international standards were considered then more than 80% water samples were not safe as drinking water. So far as iron was considered, only 7.7% water samples were within desirable limit as per Indian standards. If we considered both arsenic and iron, only 1 water sample was seen to be within desirable limit as evident from Fig 1a and Fig 1b.

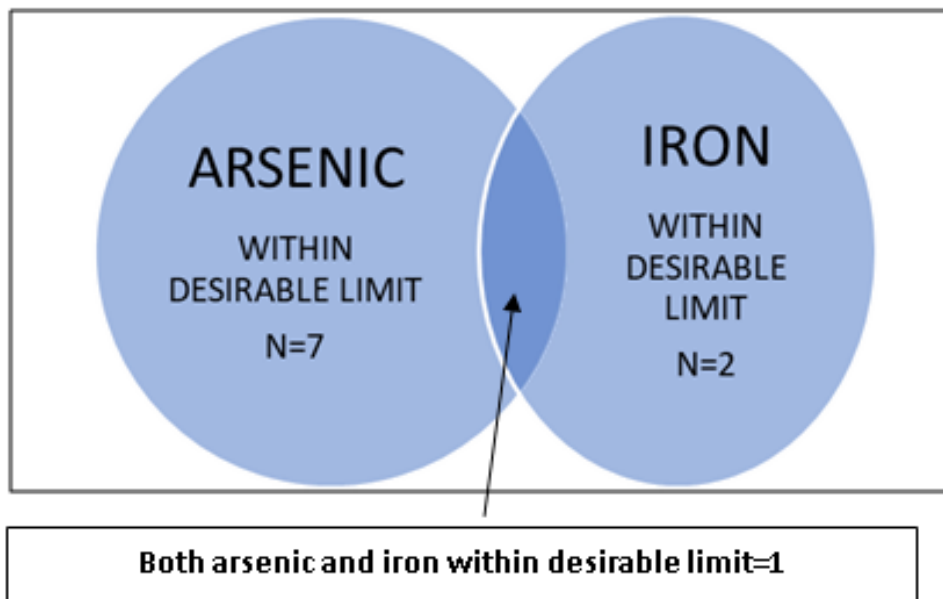
Fig 2 depicted that 19% water samples were having both iron and arsenic beyond permissible level in absence of alternate water sources.

It is evident from table 2 that about 85% of water samples contain iron beyond permissible level as per WHO criteria.

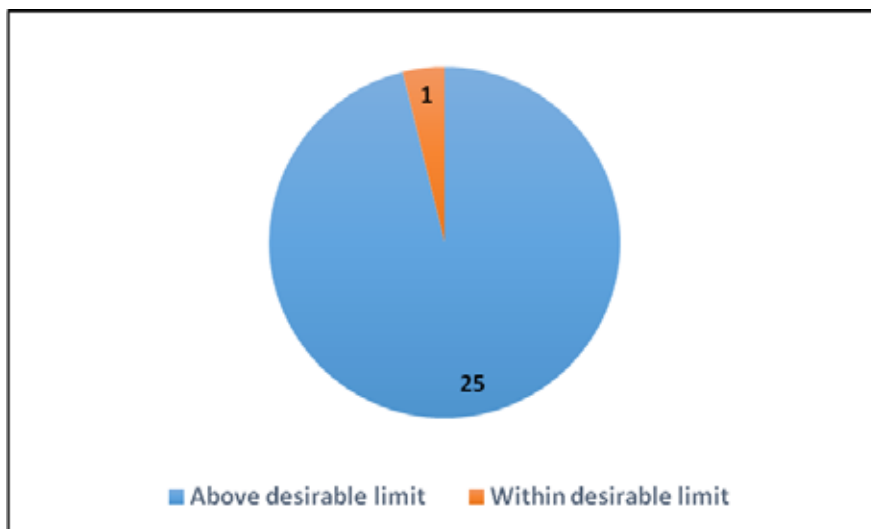


**Table 1: Level of arsenic and iron in studied water samples according to Bureau of Indian Standards (n=26)**

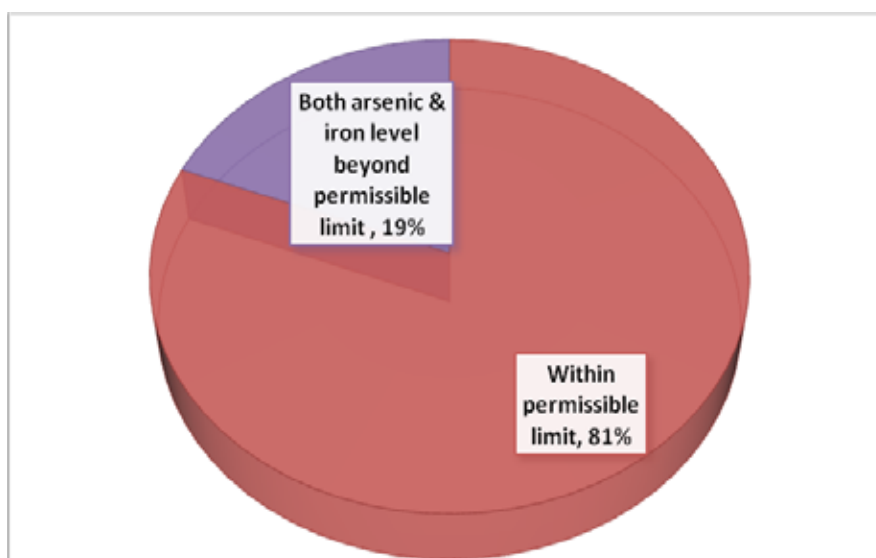
<b>Arsenic level (in mg/l)</b>	<b>No (%)</b>
<0.01 Acceptable limit	7 (26.9)
0.01-0.05 Permissible limit in the absence of alternate sources	14 (53.8)
>0.05 Not permissible	5 (19.3)
<b>Iron level (in mg/l)</b>	
<0.3 Desirable limit	2 (7.7)
>0.3 Not permissible	24 (92.3)



**Fig 1: Water samples with desirable water qualities for both arsenic and iron (n=26)**



**Fig 2: Water samples with desirable qualities (n= 26)**



**Fig 3: Samples having both arsenic and iron beyond permissible level even in absence of alternate sources**

**Table 2: Level of iron in water samples as per international drinking water standards by WHO**

Iron Level	No (%)
Iron level within highest desirable level ( $\leq 0.1$ mg/dl)	1 (3.8)
Iron level above highest desirable level but within maximum permissible level ( $>0.1 < 1.0$ mg/dl)	3 (11.5)
Iron level above maximum permissible level	22 (84.7)

## Discussion

The present study observed 19.3% of water samples had arsenic level above 0.05 mg/l which was considered as Indian standard of permissible limit. About 73% had level above 0.01 mg/l which was recommended level of arsenic in drinking water by WHO. In a study in Jalangi and Sagarpara GP of this district, it was shown as 51%, 78% and 58.8%, 86.2% respectively.<sup>6,11</sup> Somewhat better observation was reported in Murshidabad district as a whole (26% and 53%) and Gaighata block of 24 Parganas (N) (40.3% and 59.2%).<sup>5,12</sup> The ground water information booklet of 24 parganas (S) showed also the high arsenic level in sporadic manner in patches in 9 blocks with a range of 0.001 to 3.32 mg/l.<sup>13</sup> The difference might be due to the difference of area and period at which the study was carried out, because in many places the mitigation activity had already carried out. The Ganga-Brahmaputra plains in India and the Padma-Meghna plains in Bangladesh together constitute the most widespread arsenic-affected area in the world. But arsenic contamination of ground water has also

been reported from upper and middle Ganga plain and Terai area of Nepal. Study in middle Ganga plain in Bihar and three districts Ballia, Varanasi and Gazipur of Uttar Pradesh in the upper and middle Ganga plain, tube wells showed arsenic contamination.<sup>14,15</sup> Several studies conducted in Bangladesh revealed arsenic concentration above 0.05 mg/l varied from 37% to 59%.<sup>16,17</sup> Terai area of Nepal was not an exception too. The status report published in 2003 demonstrated that 23% of the samples were containing 0.01 to 0.05 mg/L of arsenic and the 8% of the samples were containing more than 0.05 mg/L.<sup>18</sup> Recent status showed a better result of 7.9% and 2.3% respectively.<sup>18</sup> So not only the Gangetic belt of West Bengal, arsenic contamination of ground water had become a public health problem in South East Asia also as evident from the study in Vietnam and Cambodia.<sup>19,20</sup> Recent contamination was also reported from Pakistan, Myanmar, China and Afghanistan.

A study in UP showed that older tubewells had a greater chance of contamination for arsenic. But in the present study the tubewells were set up within a span of

5 to 8 years. So, this analysis could not be done in that light. The present study observed the concentration of arsenic ranged from 0.004 to 0.115 mg/l with mean and median level of arsenic being 0.033 and 0.006 mg/l (SE 0.019) respectively. A study in 2 villages of northern Vietnam showed however higher concentrations ranged from 0.0128 to 0.884 mg/l with mean being 0.6147 and 0.1601mg/L, respectively.<sup>19</sup> In two villages of Cambodia, concentrations had wide range of 0.00664 to 1.543 mg/l, with average and median concentrations of 0.552 and 0.353 mg/L, respectively.<sup>20</sup>

So far as iron concentration of ground water was concerned, as per WHO standard, 84.6% of tubewells was above permissible level of 0.1 mg/l. According to Bureau of Indian Standards, 92.4% had iron level above desirable limit of 0.3 mg/l. It was also found that only 1 tube well was safe so far as both arsenic and iron were concerned. A study in Bihar had also reported simultaneous high concentration of arsenic and iron in tube wells.<sup>14</sup> In Ground Water Year Book of West Bengal (2014- 15), it was seen that concentration of iron ranged from traces to 26 mg/l with an average of 0.8 mg/l and 40% of the analysed samples showed higher Iron concentration. In Murshidabad, 79.6% tube wells had iron level more than 0.3 mg/l.<sup>21</sup> A study in different districts of West Bengal revealed iron level of 2 mg/l from a sample of pond in 24 Parganas (S) and Howrah district, but samples from tube wells were within normal limits.<sup>22</sup>

According to U.S. EPA the standard concentrations of iron in drinking water should be less than 0.3 mg/l, but sometimes it varies due to use of cast iron, steel or galvanised iron pipes in water distribution system. Presence of iron in water promotes growth of undesirable iron bacteria that result in deposition of slimy coating in the piping.<sup>22</sup> Elevated iron levels in water can impart objectionable taste and colours too.<sup>22</sup> Chlorination of groundwater that contains iron may result in low-level or no residual chlorine level in treated ground water as observed in a study in Bangladesh.<sup>23</sup>

### Conclusion

The two primary approaches in arsenic mitigation involve provision of alternative, arsenic-free water supply as a permanent solution and provision of arsenic removal technology to households and communities as a short-term measure. In spite of having this mitigation technology, still the arsenic level was found to be above

permissible level in the Government run institutions tube wells in the study block. Arsenic mitigation in West Bengal has given an utmost importance in the comprehensive National Rural Drinking Water Program in 12<sup>th</sup> 5-year plan, but still it is a long way to go. Awareness generation for repeated testing of arsenic, use of arsenic removal method at household level and use of safe water for both drinking and cooking at community level should be stressed upon. Supply of surface water through pipe lines and use of arsenic free shallow dug wells can be recommended as long-term measure, but rain water harvesting can be adopted as an eco-friendly approach with additional benefits of recharging the ground water aquifers.

**Conflict of Interest:** Nil

**Source of Funding:** Self

**Ethical Clearance:** Obtained from the institutional ethics committee.

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# Correlation of Two-point Discrimination and Finger Dexterity with the Hours of Computer Usage among Computer Users in South India

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## Abstract

**Background:** In this era of technology, computers have become an integral part of daily life. Repeated use of fingers and hands as in computer use may lead to sensory-motor abnormalities. Functional evaluation of hand is crucial, as physical evaluation does not measure patient's inability to offset for the loss of range of motion, sensation, strength and disability. This study was undertaken to assess the Two Point Discrimination (TPD) and Finger Dexterity (FD) in computer users and find correlation of TPD and FD to the number of hours of computer usage.

*Materials and Method:* This study is a cross-sectional study and 296 individuals who met the inclusion criteria were enrolled in this study and were grouped into three categories based on the hours of computer usage. TPD of all the participants were assessed using aesthesiometer and FD were assessed using Purdue pegboard

*Results:* There was significant change in TPD between the three groups of computer users for both the dominant and non-dominant hand; however, there was no significant change in the FD among the three groups. There was a positive correlation between the hours of computer usage and TPD, while a negative correlation was observed for FD in the assembly score measured using the Purdue pegboard.

*Conclusion:* Significant changes were observed in TPD of all the participants which suggests early sensory abnormalities among the computer users.

**Keywords:** Two-point discrimination, Finger dexterity, computer users, Aesthesiometer, Purdue pegboard.

## Introduction

Computer has an integral role to play in daily life and is inescapable through the modern society. Operating computers require fine motor skill. It cannot be denied that repeated exposure to such fine motor tasks is often associated with symptoms and complaints

in the upper extremities. According to epidemiological studies, some form of upper extremity, musculoskeletal disorder, mostly being carpal tunnel syndrome (CTS) and tendonitis are seen in between 9-50% of computer users.<sup>1</sup>

Hand function is evaluated as a qualitative and quantitative process. Some of the studies suggest that repetitive use of hand can also lead to sensory-motor abnormalities.<sup>1</sup> Motor learning and motor performances are inextricably linked to sensation. Cutaneous sensation is important to get information from external environment. The skin of the hands is designed to detect the spatial and temporal cues that subserve texture

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and form, particularly the glabrous or hairless skin on the palmar surface.<sup>2</sup> Sensory information from all the environmental input as well as from touch, movement and awareness of body insight, space, sound and smell is continually dealt with the human system. Sensory receptors are located at the distal end of an afferent nerve fibre. Once stimulated, they give rise to perception of specific stimulus. They have property of receptor specificity and labelled line principal.<sup>3</sup>

Two-point discrimination (TPD) is one of the sensory discriminative modalities, which give the information of subject's spatial acuity. It measures minimal distance at which an individual perceives two points of stimuli presented simultaneously with the same pressure. It is a precise and reproducible tool for assessing the process of peripheral nerve repair.<sup>3</sup> In clinical practice two-point discrimination is widely used to assess the severity of peripheral nerve injuries and to observe patient recovery and response to treatment.<sup>4</sup>

Manual dexterity is a skill which is important for activities of daily living and occupational task. Fine-motor tasks mainly include repetitive motions, which can lead to fatigue and contribute to the risk of injury. Risk of Work Related Musculoskeletal disorders (WMSD) is common amongst various occupations, it is not surprising that workers largely reliant on manual dexterity tasks, such as in manufacturing industries, are at a great risk of developing WMSD.<sup>5</sup>

Whether sensory assessment using aesthesiometer and finger dexterity using Purdue pegboard help to identify early sensory motor changes in finger among computer users is an area which has been not explored. This study aims to assess the sensory discriminative function and manual dexterity in different groups of computer users. These findings will have important implications for the assessment of hand function and in jobs requiring repetitive movement.

## Methodology

**Study Design:** This study is a Cross Sectional, Analytical study

**Source of Data:** Male and Female computer users between 20-40 years of age.

**Method of Data Collection:** 296 Computer users who satisfy inclusion and exclusion criteria was recruited for the study.

### Inclusion Criteria:

#### Study participants will be computer users:

1. Participants should be between 20-40 years of age.
2. Participants are required to be using computer for at least two years and above.
3. Participants with normal sensory modalities (pain, touch, temperature) and tendon reflexes.

### Exclusion Criteria:

1. Participants having musculoskeletal disease in Upper limb.
2. Participants with sensory symptoms.
3. Participants with skin disease, scar, burns or dermal hypersensitivity.
4. Previous history of diagnosed neuropathy or diseases commonly associated with peripheral neuropathy, (Renal disease, diabetes, rheumatoid arthritis).
5. Participants with history of usage of drugs which may cause sensory deficit or influence cooperation.

#### Sample Method: Convenience Sampling

**Sample Size:** Based on 26% population of internet users 5% precision 95% confidence level sample size required is 296.

**Statistical Analysis:** Statistical analysis was done using One way-ANOVA with Posthoc Tukey test. Karl-Pearsons correlation was used to correlate between parameters. Level of significance was set at <0.05(1-tailed) and <0.01 (2-tailed) If p-value is <0.05 was considered statistically significant.

**Procedure:** Informed consent was obtained from the participants before beginning the study. The hand used to sign the consent form was identified as the participant's dominant hand. During examination, it was made sure that participants were in a comfortable and relaxed position.

The participants were asked to sit on a comfortable chair and were asked to put their arm resting on the surface of the table. During the test participants were not allowed to see their hand, a cardboard block with the surfaces was held in place by the examiner during the exploration. The assessment was done on both the hands.

TPD was estimated by using a handheld aesthesiometer described by Catley MJ et al, 2013<sup>4</sup>.

The Purdue Pegboard test addresses both gross coordination of arm/hand/fingers as well as fine coordination of fingers by placement of pins, collars and washes on pegboard and this was carried out as described by Desia et al, 2005<sup>6</sup>. The participants were seated at a table with the Purdue Pegboard directly in front of them. The evaluator was seated to their right. Participants were given opportunity to practice 3 times, each subtest before the timed test to ensure understanding

## Results

296 individuals were enrolled for the study with equal male (n=148, 50%) and female (n=148, 50%) participants. The mean age of study participants was 27.29 (range:21-39 years). Mean age of males were 27.69 (range: 21-39 years) and mean age of females were 26.89 (range:21-39 years). Of the 296 participants, 295 were right handed (99.7%) while one was left handed (0.3%).

Mean of TPD of distal inter-phalangeal joint of dominant hand of index finger was 3.2mm (range 1mm-8mm) and that of little finger was 3.5mm (range 1mm-8mm). Mean of TPD of DIP of non-dominant hand of index finger was 2.2mm (range:1 mm-6 mm) and that of little finger was 2.4 mm (range:1 mm-6 mm). Mean dexterity score of right hand was 15.5 (range:11-19.33) and that of left hand was 13.67 (range:9-19.33). Mean dexterity score of both hands was 11.52 (range:7.67-15.67). Mean dexterity score for assembly was 30.71 (range:20-46.68). (table 1)

The mean hours of computer usage of study participants were 5.74 hours with the minimum hours of computer usage being reported was 1 hour and maximum being 18 hours.

One-way ANOVA showed that there were significant changes in the TPD among different group of computer users while no significant changes were observed in MD of different computer user groups. DIPJ of index finger of both dominant and non-dominant hand as well as the DIPJ of small finger of both dominant and non-dominant hand showed significant changes ( $p < .05$ ). Posthoc turkey test showed that there were significant changes in TPD among different computer user groups while no significant changes were observed in MD. DIPJ of index finger and small finger of the dominant hand showed significant changes between group 1 and group 2 as well as group 1 and group 3 while no significant changes were observed between group 2 and group 3.

All the parameters used to measure the TPD showed a positive correlation with hours of computer usage. With increase in the hours of computer usage, there is an increase in the TPD in all parameters which is statistically significant either at 0.01 (two tailed) level or 0.05 level (two tailed) – table 2.

Distal interphalangeal joint of index finger - Dominant hand showed the highest r value of 0.412 which may be interpreted as good correlation and was statistically significant with a p value  $< .0001$  (2-tailed), followed by the distal interphalangeal joint of small finger - dominant hand. Distal interphalangeal joint of index finger - Non-dominant hand and Distal interphalangeal joint of little finger - Non-dominant hand had lower value of  $r = 0.175$  and  $r = 0.119$  respectively which may be interpreted as poor correlation. However these were statistically significant at 0.05 level with p values of 0.002 and 0.045 respectively

Except for “average assembly” none of the parameters used to measure manual dexterity showed correlation which is statistically significant. Average-Right hand and Average- Left hand showed poor positive correlation with r values of 0.049 and 0.043 with p values of 0.398 and 0.462. Average- Both showed poor negative correlation with an r value of -0.007 and a p value of .899 which was not statistically significant. The average assembly score showed poor negative correlation with an r value of - 0.124 which was statistically significant with a p value of 0.033 (1-tailed), table 3.

**Table 1. One-way ANOVA to compare the groups of computer users with two-point discrimination and manual dexterity scores**

Area	Groups	N	Mean	Welch Statistics (*)/F (Anova)	P-value
DIPJ of index finger - DH	1	99	0.2545	33.895*	<0.001
	2	156	0.3526		
	3	41	0.3902		
	Total	296	0.325		
DIPJ of small finger - DH	1	99	0.2778	24.841*	<0.001
	2	156	0.384		
	3	41	0.4171		
	Total	296	0.353		
DIPJ of index finger - NDH	1	99	0.2051	4.069*	0.018
	2	156	0.2359		
	3	41	0.2415		
	Total	296	0.2264		
DIPJ of little finger - NDH	1	99	0.2242	3.798*	0.024
	2	156	0.2423		
	3	41	0.278		
	Total	296	0.2412		
Average-Right hand	1	99	15.42394	0.219	0.804
	2	156	15.54231		
	3	41	15.58585		
	Total	296	15.50875		
Average-Left hand	1	99	13.6495	0.741	0.478
	2	156	13.6159		
	3	41	13.93512		
	Total	296	13.67135		
Average- Both	1	99	11.52253	0.058	0.943
	2	156	11.5409		
	3	41	11.46415		
	Total	296	11.52412		
Average- Assembly	1	99	31.8257	2.96701	0.053
	2	156	30.2647		
	3	41	29.7234		
	Total	296	30.712		

DIPJ-Distal inter-phalangeal joint, DH-Dominant Hand, NDH-Non-Dominant Hand, SD-Standard Deviation

\*Significant at &gt;0.05 level

**Table 2. Pearsons correlation for correlation two-point discrimination with hours of computer use**

Parameters		DIPJ of index finger – DH	DIPJ of small finger - DH	DIPJ of index finger - NDH	DIPJ of little finger - NDH
Hours of Laptop usage	Pearson Correlation	.412**	.363**	.175**	.119*
	Sig. (2-tailed)	.000	.000	.002	.041
	N	296	296	296	296

\*\*. Correlation is significant at the 0.01 level (2-tailed), \*. Correlation is significant at the 0.05 level (1-tailed).



**Table 3. Pearsons correlation for correlation of the manual dexterity with hours of computer use**

Parameters		Average-Right hand	Average-Left hand	Average-Both	Average Assembly Score
Hours of laptop usage	Pearson Correlation	.049	.043	-.007	-.124*
	Sig. (2-tailed)	.398	.462	.899	.033
	N	296	296	296	296

\*. Correlation is significant at the 0.05 level (1-tailed).

### Discussion

The present study is one of the few studies that was undertaken in India to assess the TPD and manual dexterity among computer users and to assess the correlation between the hours of computer usage with TPD and manual dexterity. All the study participants completed the tasks assigned to them.

Study participants were grouped into three based on the hours of computer usage. The main criterion for this classification was based on the computer usage with respect to the working hours. Those who used computers for less than half of the working hours (<4hrs) were group one (n=99,33.4%), those who used for more than half of the working hours but not more than the entire working hours (5-8 hrs) were group two (n=156, 52.7%) and those who used computers for more than the working hours (>8 hrs) were group three (n=41, 13.9%).

The comparison of mean of TPD of DIP of index finger of dominant hand among the groups indicate that >8 hours has highest value of 3.9mm and <=4 hours has the least value of 2.5mm. This difference is statistically significant (p <0.001). Comparing <=4 hours and >8 hours groups show statistical significance (p<0.001). Comparing 5-8 hours and >8 hours show no significance (p=0.143). Comparison of distal interphalangeal joint of small finger of dominant hand between three group shows that >8 hours highest value of TPD 4.71 and <=4 hours has the least value of 2.7 mm. This difference was found statistically significant. The similar pattern was seen in non-dominant hand users. In the present study, Pearson’s correlation was used to identify if there were perceivable changes in TPD with hours of computer usage. It was found that all the parameters used to measure the TPD showed a positive correlation with hours of computer usage which is statistically significant either at 0.01 (two tailed) level or 0.05 level. Thus, concluding that with increase in the number of

hours computer usage there will be increase in the TPD value. Crosby et al established normative value of static two-point discrimination with aesthesiometer for index finger as 2.6+/-0.67mm and little finger is 2.6+/-0.74mm and found that TPD of nerve injured of index finger is 3.7+/-1.24mm of index finger and 4.2+/- 1.34mm for little finger.<sup>7</sup> Since prolonged use of computer can lead to carpal tunnel syndrome thus affecting two-point discrimination, it may be inferred that changes in TPD is an early sign of CTS or sensory-related disorder.<sup>1</sup> Another study done by Tomasz Wolny et al found that in mild and moderate forms of Carpal Tunnel Syndrome, there is a significant difference in the two-point discrimination compared with healthy individuals which may affect the efficiency of work of individuals affected by this disease. Nancy Byl et al in 2017 in their study suggested that healthy individuals who did repetitive tasks with their hands do not necessarily have preexisting tactile discrimination problems. However, persons with repetitive strain injury such as tendinitis or focal dystonia may have measurable sensory motor problems, particularly interpreting tactile stimuli.<sup>8</sup>

Normative value for assembly job of right hand is 17.86, left hand is 16.60, both hands is 14.38 and assembly is 43.58 according to the Lafayette manual.<sup>9</sup> Comparison of the mean of finger dexterity score of right hand between three groups shows that >8 hours group has the highest value of 15.5 and <=4 hours has the least value 15.42. But this difference is statistically not significant. Comparing 5-8 hours and >8 hours also wasn’t statistically significant. The similar pattern was seen in score of left hand and both the hands. Comparison of the mean of finger dexterity score of assembly between three group shows that <=4 hours group has highest value of 7.9 and >8 hours has the least value of 7.4. This difference is statistically insignificant (p=0.053). Comparing 5-8 hours and >8 hours group is not significant (p=0.85). Even though a difference of

mean was observed among the groups but they weren't statistically significant. Pearson's correlation was used to identify if there were perceivable changes in manual dexterity with hours of computer usage. Except for "average assembly" none of the parameters used to measure manual dexterity showed correlation which were statistically significant. The average assembly score showed poor negative correlation with an r value of - 0.124 which was statistically significant with a p value of 0.033 (2-tailed). Study done by Tremblay<sup>1</sup> on early tactile changes and manual dexterity in computer users showed that it is possible to detect early changes in hand function and it was detected in female than male and are predisposed to hand and wrist disorder. Tremblay concluded that there is decrease in TPD and finger dexterity in women who frequently use computers at work place. In the present study no difference is seen between genders. The study helps to create awareness about computer related health disorder. The test used to assess hand function could be important in outcome measure. If tactile interpretative issues are identified, sensory discrimination activities should be initiated to restore accuracy and speed in processing cutaneous information with the hand.

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# Appraisal of Preventive and Curative Outcome of Yasad Bhasma in Anemic Children.

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## Abstract

**Introduction:** In *Ayurveda*, lot of drugs have been mentioned to treat Anemia (*Pandu roga*) and is supposed to treat the disease relatively early and more rationally. *Yashad Bhasma* is considered as one of the drug to treat anemia disease of children in terms of improvement in hemoglobin, serum iron etc.

**Aim:** The aim of the study was to find out the effect of *Yashada Bhasma* in anemic children when given with or without iron salt (ferrous Ascorbate) as well as in diseased children.

**Methodology:** All the cases were registered from the O.P.D./I.P.D. of department of Kaumarbhritya/Bal Roga, FOA, IMS, BHU, after getting written informed consent from either parents or guardian of the baby/child. The study protocol was approved by the PG Medical Board of FOA, IMS, BHU and ethical committee of IMS, BHU.

**Observation and Result:** Mean serum iron level was seems to be increased in group –‘A’ after first follow up and on final follow up but on inter group comparison increase in serum iron level was more consistent and significant (t value of group A & B =4.6 Vs 12.43 and 7.53 Vs 8.78 respectively) in group B than others.

**Discussion:** Serum iron has better improvement in, when give iron along with *Yashad bhasma* rather than only iron. The present study also clarifies that incidence of URTI (upper respiratory tract infection), diarrhea associated with fever is found reduced at first follow up and maximum reduced in group-C. After final follow up patients of A, B & C do not show onset of any sign and symptoms of any disease.

**Keywords:** Iron-deficiency anemia, *Yashada Bhasma*, Iron, Morbidity.

## Introduction

Anemia is the principal nutritional dearth in the world and it especially affects children in developing

countries. Nutritional anemia among children continues to pose a considerable problem throughout the world<sup>1</sup>. It is widely prevalent in the developing countries especially South East Asia. According to the National Family Health Survey (NHFS-3) data the incidence of anemia in urban children is 71%, rural is 84% and overall is 79%.<sup>2</sup> Anemia resulting from lack of sufficient iron for synthesis of hemoglobin is the most common hematologic disease of infancy and childhood. It is estimated that 30% of the global population suffers from iron deficiency anemia; most of those affected lives in developing countries.<sup>3</sup> *Pandu Roga* as described in *Ayurvedic* classics, is equated with the anemia and

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it occurred due to deficiency or vitiation of *Rakta Dhatu*.<sup>4-5-6</sup>

Iron and zinc are essential micronutrients for human growth, development and maintenance of the immune system. Deficiencies of these two nutrients remain a global problem, especially among the children in developing countries. Supplementation with iron and zinc as single micronutrients enhances distinct and unique biochemical and functional outcomes.<sup>7</sup> There are findings that show if iron and zinc are provided together, because they have chemically similar absorption and transport mechanism, iron and zinc have been thought to compete for absorptive pathways.<sup>8</sup> Limited data exist on the effect of dual supplementation on infectious disease morbidity and growth. Many trials have shown a reduction in diarrhea morbidity with zinc. There are controversial findings of role of Zn with Fe administration. When Zn is given with iron the iron indicators do not improve as greatly as when iron is given alone. Some studies Other studies shows improvement in anemia with use of Zn. Zinc supplementation has been demonstrated to be beneficial, resulting in increased growth, improved immunity and decreased morbidity.<sup>9-10-11</sup>

The present study was planned to find out effect of *Yashada Bhasma* in anemic children when given with or without iron salt (ferrous Ascorbate) as well as in diseased children.

## Material and Method

**Plan of Study:** All the cases were registered from the O.P.D./I.P.D. of department of Kaumarbhritya/Bal Roga, FOA, IMS, BHU, after getting written informed consent from either parents or guardian of the baby/child. The study protocol was approved by the PG Medical Board of FOA, IMS, BHU and ethical committee of IMS, BHU. A proper screening of each child was carried out for the purpose of exclusion and inclusion in the study:

**Inclusion Criteria:** Inclusion criteria for the children are:

- Age eligibility : Less than 5 year
- Gender eligibility : Both
- Infants whose parents have given their written informed consent,
- Infants who are anemic and/or having history of

frequent attack of URTI, Diarrhea & other disorders except anemia.

**Exclusion Criteria:** Following exclusion criteria are adopted during the study-

- The children who are suffering with acute illness
- Any congenital or hereditary disorder
- Not fulfill the above inclusion criterion.

**Selection of the patient:** All the children, aged from birth to 60 months were divided into following groups. This whole study was carried out three groups i.e. A, B (specific to anemic children) and C (specific to ill children suffering with different diseases except anemia). Total patients of both sex were distributed into many groups as follows:

**Group A:** Anemic children who were receiving Iron preparation (n=15).

**Group B:** Anemic children who were receiving Iron + *Yashad Bhasma* simultaneously (n=15).

**Group C:** Having history of recurrent attack of diarrhea, URTI or any other disease except anemia and receiving only *Yashad Bhasma* (n=15).

**Diagnosis:** To make the confirm diagnosis of anemia in children, children were screened on the following Investigations:

- Hemoglobin Hb (gm %) (Sahli's Method)
- Serum Iron ( $\mu\text{g}/\text{dl}$ )
- Serum Zinc ( $\mu\text{g}/\text{dl}$ )

**Selection of Drug:** Following drugs were used in various groups of the present study.

- **Yashada Bhasma:** The selection of *Yashad Bhasma* for the patients of concerned groups was based on the *ayurvedic* literature. It is used for the treatment of *Pandu* (Anemia) Roga<sup>12-13</sup>. *Yashada Bhasma* was manufactured by *Baidyanath* company Shree Baidyanath Ayurveda Bhawan PVT, LTD. Naini, Allahabad.
- **Iron:** Syrup Ferrous Ascorbate was given to the patients of concerned group. Ferrous Ascorbate was manufactured by Emcure Pharmaceuticals Ltd. 255/2, Hinjwadi, Pune-411057, India.

**Dose and Administration of drug:** After making proper diagnosis, based on the clinical features & investigations the trial drug *Yashad bhasma* was given as 9-10mg/kg/dose with honey in children of all groups.

**Follow Ups:** During the study, two follow ups were adopted to gather the data. The interval between initial and 1<sup>st</sup> FU was four week followed by eight week. The total duration of follow ups was up to two month. At registration and on each follow ups blood was withdrawn from peripheral vein and was sent for investigation in laboratory.

**Atomic absorption Detection Technique:** The concentration of metals (Fe and Zn) in serum samples of patients was detected by atomic absorption spectrophotometer, Perkin Elmer, USA (Model No, 2380).

**Sample Preparation:** Blood Samples of different patients were collected from the peripheral vein of forearm or hand. This sample was estimated for serum Fe and Serum Zn by atomic absorption photometer (PerkinElmer, USA Model No, 2380) in CCI Lab Department of Botany, Faculty of Science, Banaras Hindu University (BHU).

**Statistical Analysis:** In the present study, SPSS software is used to calculate the Mean ( $\bar{X}$ ), Difference mean ( $\bar{d}$ ), Standard deviation (SD) and students “t” test etc.

**Observations and Results**

This whole study was carried out in three groups 30 anemic children of both gender comprised of 15 children in group-‘A’ & ‘B’, while the group –‘C’ included 15 diseased children except anemia.

**Table No. 1: Mean ± S D of Serum iron and inter group comparison in children of group A, group B and group C.**

Group	At Registration			1st Follow Up			2nd Follow Up		
	Group A (n=15)	Group B (n=15)	Group C (n=15)	Group A (n=15)	Group B (n=15)	Group C (n=15)	Group A (n=15)	Group B (n=15)	Group C (n=15)
$\bar{d} \pm S D$	80.67 31.60	80.73 ±25.66	96.93 ±23.37	106.86 ±30.02	95.08 ±26.91	103.83 ±23.63	124.36 ±26.47	117.69 ±30.02	111.36 ±22.41
<b>Serum iron inter group comparison unpaired t test</b>									
Group A VsGroup B	t=0.03 p>0.05			t=1.07 p>0.05			t=0.61 p>0.05		
Group A VsGroup C	t=1.62 p>0.05			t=0.28 p>0.05			t=1.30 p>0.05		
Group B VsGroup C	t=1.81 p>0.05			t=0.86 p>0.05			t=0.58 p>0.05		

**Table No. 1** revealed that the mean serum iron level of patients of group -‘A’ & ‘B’ and group C was towards the increasing pattern as evident from table. On inter group comparison, data revealed that increase in serum iron level in any group was not significant (p>0.05).

**Table No. 2: Difference mean  $\pm$  SD of serum iron and intra group comparison of group A, group B and group C.**

Intra Group Comparison									
Statistical Parameter	A R- 1 <sup>st</sup> F U*			A R- 2 <sup>nd</sup> F U*			1 <sup>st</sup> F U-2 <sup>nd</sup> F U*		
Group	GroupA	GroupB	Group C	GroupA	GroupB	GroupC	GroupA	GroupB	GroupC
$\bar{d} \pm S D$	25.1429 $\pm 20.168$	17.0000 $\pm 4.933$	8.7500 $\pm 8.024$	42.6429 $\pm 21.197$	39.6154 $\pm 16.276$	17.0000 $\pm 9.370$	17.5000 $\pm 17.177$	22.6154 $\pm 14.098$	8.8182 $\pm 7.264$
t value	4.66	12.43	3.78	7.53	8.78	6.02	3.81	5.78	4.03
p value	<0.001	<0.001	<0.02	<0.001	<0.001	<0.001	<0.02	<9.001	<0.05

\*AR= At Registration, 1<sup>st</sup> F U = First Follow Up, 2<sup>nd</sup> F U= Second Follow Up

However, mean serum iron level (per day) was seems to be increased in group –‘A’ after first follow up and on final follow up but on inter group comparison increase in serum iron level was more consistent and significant (t value of group A & B =4.6 Vs 12.43 and 7.53 Vs 8.78 respectively) in group B than others.

**Table No. 3: Difference mean  $\pm$  SD of serum Zinc and inter group comparison in children of group A, group B and group C.**

Inter Group Comparison									
Statistical Parameter	A R- 1 <sup>st</sup> F U*			A R- 2 <sup>nd</sup> F U*			1 <sup>st</sup> F U-2 <sup>nd</sup> F U*		
Group	Group A	Group B	Group C	Group A	Group B	Group C	Group A	Group B	Group C
$\bar{d} \pm S D$	42.20 $\pm 12.05$	33.67 $\pm 10.96$	48.07 $\pm 13.43$	46.57 $\pm 12.14$	37.62 $\pm 5.82$	51.58 $\pm 10.30$	46.56 $\pm 12.14$	44.77 $\pm 7.41$	61.64 $\pm 10.05$
Serum zinc inter group comparison unpaired t test									
Group A Vs Group B	t=2.03 p>0.05			t=2.41 p<0.05			t=0.47 p>0.05		
Group A Vs Group C	t=1.26 p>0.05			t=1.12 p>0.05			t=3.37 p<0.05		
Group B Vs Group C	t=3.22 p<0.001			t=4.21 p<0.001			t=4.73 p<0.001		

Table No.3 showed that increase in mean serum zinc level was increased more in group C (48.07  $\pm$  13.43, 51.58  $\pm$  10.30 and 61.64  $\pm$  10.05) at registration and subsequent follow ups in comparison to other groups. On inter group comparison between groups A & B and A & C, change in values was insignificant (p>0.05) except at 2<sup>nd</sup> follow up, while the inter group comparison between group B and group C present highly significant (<0.001) changes.

## Discussion

This study, suggest that the mean serum iron level of anemic group -‘A’ & ‘B’ and other diseased patients of group C was towards the increasing pattern on subsequent follow up. On inter group comparison the increase in serum iron level in any group was not significant (p>0.05) to each other. However, mean serum iron level (per day) was seems to be increased in group–‘A’ after first follow up and on final follow up but on inter group comparison increase in serum iron level

was more consistent and significant (t value of group A & B =4.6 Vs 12.43 and 7.53 Vs 8.78 respectively) in group B than others. The present study shows the better improvement in serum iron, when give iron along with *Yashad bhasma* rather than only iron thus the present study clarifies that iron along with *Yashad Bhasma* is more beneficial than iron alone in anemia. The present study clarifies the effect of iron with *Yashada Bhasma* in comparison to iron alone have more significance in improvement in serum zinc level.

The present study also clarifies that incidence of URTI (upper respiratory tract infection), diarrhea associated with fever is found reduced at first follow up and maximum reduced in group-C. After final follow up patients of A, B & C do not show onset of any sign and symptoms of any disease. These findings suggest that is no significant variation in effect of Iron, Iron & *Yashada Bhasam* or *Yashada Bhasam*. In infants and children, there were no adverse effects on plasma zinc concentrations of adding iron to zinc supplementation and suggested a benefit on morbidity.<sup>14</sup> In Indonesian infants there was no difference in plasma zinc concentration between children who received iron and zinc supplements and children who have received zinc alone.<sup>15</sup> Growth was also assessed but no effect of supplementation was observed. Iron supplementation did not negatively affect plasma zinc concentrations and zinc supplementation did not increase prevalence of anemia or iron deficiency anemia. However, iron supplementation combined with zinc was less effective than iron supplementation alone in reducing the prevalence of anemia (20% Vs 38%). Some studies have shown that there is no role of Zn in iron deficiency anemia.<sup>16</sup> Iron and zinc compete for absorption or interact at other sites; therefore the benefits of each may be less than if either were given alone.<sup>17-18-19</sup> Other studies shows improvement in anemia with use of Zn. Zinc supplementation has been demonstrated to be beneficial, resulting in increased growth, improved immunity and decreased morbidity<sup>20</sup>. Purpose of this clinical study was to evaluate the effect of *Yashada Bhasma* in anemic children, when given with iron preparation and prevention from other diseases

### Conclusion

Supplementation of Zn with iron has been demonstrated to prevent iron-deficiency anemia and may reduce cognitive impairment associated with anemia. Serum iron has better improvement in, when give iron along with *Yashad bhasma* rather than only iron. Iron

along with *Yashad Bhasma* is more beneficial than iron alone in anemia. The present study also clarifies that after final follow up patients of A, B & C groups do not show onset of any sign and symptoms of any disease.

**Source of Funding:** Self

**Source of support:** Nil

**Conflict of Interest:** None Declared

**Ethical Clearance:** The study protocol was approved by the PG Medical Board of FOA, IMS, BHU and ethical committee of IMS, BHU

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# Assessment of Level of Consciousness with Coma Recovery Scale among Patients with Traumatic Brain Injury

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## Abstract

Traumatic brain injury (TBI) is one of the major cause of fatality and disability in paediatric age groups and young adults. TBI is usually termed to as the “silent epidemic” because the adverse effects from TBI, such as changes affecting thought process, perception, language, or emotional process, may not be readily apparent<sup>1</sup>. It was found that nearly 1.5 to 2 million persons are injured and 1 million directed to death every year in India. The objectives are to categorise the patients with traumatic brain injury based on the level of consciousness, to compare the domains of level of consciousness (LOC) of patients with TBI and to find out the association between the LOC and selected variables among patients with TBI at Govt. Medical college Hospital, Kottayam. A quantitative non experimental approach was used for the study. A total of sixty patients with TBI were selected for the study by purposive sampling technique. The data were collected using socio personal-clinical data sheet and Coma Recovery Scale-Revised (CRS-R). The LOC of patients with TBI was assessed with CRS-R. The assessment of level of consciousness was assessed again by using the same scale on the sixth day to compare the domains of the LOC through the recovery process. The obtained data were categorised, compared and analysed by using descriptive and inferential statistics. The results showed that the majority of patients selected were minimally conscious and the mean scores of domains of level of consciousness (auditory, visual, motor, verbal, communication and arousal) increased from day 1 to day 6 and there is a significant association between the LOC and pupillary reaction at the time of first assessment ( $p < 0.05$ ).

**Keywords:** *Level of consciousness, coma recovery scale, traumatic brain injury.*

## Introduction

Traumatic brain injury (TBI) still represents the leading cause of morbidity and mortality in individuals under the age of 45 years in the world<sup>2</sup>. Each year, traumatic brain injuries contribute to a substantial number of deaths and cases of permanent disability. In 2014, there

were approximately 2.87 million TBI-related emergency department visits, hospitalizations and deaths in the United States<sup>3</sup>. Depending on the severity of injury, TBI can have a lasting impact on quality of life for survivors of all ages – impairing thinking, decision making and reasoning, concentration, memory, movement, and/or sensation (e.g., vision or hearing) and causing emotional problems (personality changes, impulsivity, anxiety and depression) and epilepsy<sup>4</sup>. Even minor head trauma in infants can lead to neurological complication like Acute arterial ischemic stroke, when adequate neurological assessment and follow up is lacking<sup>13</sup>.

The reticular activating system (RAS) resides in the brainstem reticular formation which extends from the top of the spinal column to the rostral midbrain

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with extensions into the thalamus and hypothalamus. The RAS is excited by input from surrounding sensory tracts and transmits this excitation to the cortex to induce generalized cortical and behavioral arousal. In the absence of input from the RAS, consciousness is impaired. Under the reticular hypothesis of concussion, loss of consciousness after brain trauma results from a disturbance or depression of the activity of polysynaptic pathways within the RAS<sup>5</sup>.

In the neurologic unconscious state, responses to the external world are primitive or reflexic and may be absent altogether. After severe traumatic brain injury, emergence from a coma into vegetative state does not change the fact that the individual is still unconscious, even though the eyes may be open. Only in the somewhat higher level of function known as the minimally conscious state do we see the beginning of neurologic consciousness and higher-level behaviours indicating an awareness of the external world<sup>7</sup>.

The priority of emergency care is to identify potentially life threatening intra-cranial injuries through the judicious application of appropriate imaging studies and neurological assessment<sup>6</sup>. It emphasises the need for continual, standardised assessment of neurological status by the use of neurologic scales. Passage of time is one of the most significant factors in predicting the resumption of consciousness in patients with brain injury and more accurate results are expected following the acute phase.

The fastest improvement happens in about the first six months after injury. During this time the injured person will likely show many improvements and may seem to be steadily getting better. The person continues to improve between six months and two years after injury, but this varies for different people and may not happen as fast as the first six months. Improvements slow down substantially after two years but may still occur many years after injury. Most people continue to have some problems, although they may not be as bad as they were early after injury. Rate of improvement varies from person to person.

## **Materials and Method**

**Research Approach and Design:** A descriptive quantitative design was used for the study.

**Research Setting:** The study was conducted in Govt. medical College Hospital, Kottayam.

**Population:** Patients admitted under the neurosurgery department with traumatic brain injury at Govt. Medical College Hospital, Kottayam.

**Sample and sampling technique:** 60 patients with traumatic brain injury admitted under Neuro Surgery Department at Neuro surgery ICU, Trauma care ICU and Surgical Critical Care Unit at Govt. Medical College Hospital Kottayam, who met with inclusion and exclusion criteria were selected as samples. Non probability purposive sampling technique was used in this study.

**Tools:** After an extensive review of relevant literature, two tools were adopted for the study. Socio personal and clinical data sheet was developed, which was the tool 1. It consisted of socio personal data sheet and Clinical data sheet. Socio personal data sheet consists of six items, which includes age, gender, education, marital status, unhealthy habits and monthly income. Clinical data sheet consists of eight items which includes cause of head injury, duration of coma, diagnosis, pupillary reaction at the time of first assessment, pre existing co- morbidities, hyponatremia, pre-existing disabilities and previous history of neuro trauma. The tool 2 was JFK Coma Recovery Scale – revised, which is a standardised tool. The coma recovery scale measured by assessing the six domains of level of consciousness such as auditory, visual, motor, verbal, communication and arousal functions in the selected subjects. The score ranges from 0 to 23. The score was interpreted as 0-9 as vegetative stage, 10-18 as minimally conscious and 19-23 as conscious. Reliability of coma recovery scale is assessed by test retest method and the inter rater method and was found as 0.9 and 0.80 respectively. Thus the tool was found to be reliable.

**Data Collection Procedure:** The research study was started after obtaining ethical clearance and formal permission from the scientific review committee, principal, head of the department, institutional ethical committee and Kerala University of Health Sciences. Data collection was conducted among 60 patients with traumatic brain injury admitted under Neuro Surgery Department at Neuro surgery ICU, Trauma care ICU and Surgical Critical Care Unit at Govt. Medical College Hospital Kottayam. The duration of the study was six weeks from 31-01-2018 to 10-03-2018. In that study period, a total of 113 patients with TBI, who were admitted under Neuro Surgery department in the selected settings. Among them, 60 patients were selected for the

study, who were recorded with GCS score between 6 to 10 and who met the inclusion criteria. They were selected using non probability sampling. Purpose of the study was explained to the relatives of the participants and informed consent was obtained. Socio personal data and clinical data were collected during the initial contact with the subjects. The level of consciousness is measured by using coma recovery scale on day 1. Conventional care was given to patient group. The level of consciousness is measured with coma recovery scale on the day 6. The data obtained in day 1 and day 2 are compared and categorised. Analysis was done with inferential statistics.

**Results**

**Sample characteristics based on socio demographic variables:**

The level of consciousness gradually increased from day 1 to day 6 after the conventional trauma care.

**1. Findings related to sample characteristics:** Majority of patients with traumatic brain injury under study were males (65%) and most of them (about

45%) were having age between 49 to 55. Half of the patients were possessed primary school education. Most of the patients were married (71.7%). About 46.7% of patients reported with no unhealthy habits like alcoholism and smoking. With regard to monthly income, 61.7% of patients had monthly income upto 5000 Rs.

- 2. Findings related to Clinical data:** Road traffic accidents (RTA) found as the major cause of trauma in the samples under the study (68.3%). The duration of coma was less than one week in 63.3% of patients. Most of the patients had subdural hematoma as the diagnosis. More than half of the patients (58.3%) had bilaterally reactive pupillary reaction at the time of first assessment. The total 83.3% of the patients had no pre-existing comorbidities like hypertension, diabetes mellitus, CAD renal diseases and seizure disorders. All of the patients under study had no hyponatremia, previous history of neurotrauma and pre existing sensory disabilities.
- 3.** Categorization of the patients with traumatic brain injury based on the level of consciousness, measured with coma recovery scale.

**Table 1: Categorization of the patients with traumatic brain injury based on the level of consciousness**

Category	Day 1		Day 6	
	Frequency	Percentage	Frequency	Percentage
vegetative state (0-9)	8	13.3	2	3.3
Minimally conscious (10-18)	52	86.7	58	96.7
Conscious patients (19-23)	0	0	0	0

**4.** Comparison of the domains of level of consciousness of patients with traumatic brain injury.

Domains of level of consciousness	Day 1		Day 6	
	Mean	SD	Mean	SD
Auditory(0-4)	2.38	0.49	2.45	0.502
Visual(0-5)	2.7	0.49	2.78	0.49
Motor(0-6)	3.2	0.514	3.32	0.567
Verbal(0-3)	1.63	0.486	1.78	0.415
Communication(0-2)	0.78	0.415	0.88	0.324
Arousal (0-3)	0.78	0.454	1.02	0.469

5. **Association between level of consciousness among patients with traumatic brain injury and selected variables:** Chi square test was used to determine the association of level of consciousness of patients with traumatic brain injury with selected variables. Study result found that there was significant association between pupillary reaction at the time of first assessment and level of consciousness of patients with traumatic brain injury. Among the selected variables, all except the pupillary reaction at the time of first assessment were not having significant association with the level of consciousness among patients with traumatic brain injury.

### Discussion

The findings of the study have been discussed in relation to the objectives and other similar studies.

1. **Findings related to sample characteristics:** A prospective study conducted in San Diego country on epidemiology of head injury showed that head injury rates were higher in males than in females. Majority of the studies on TBI emphasize more on male population as the incidence of TBI is more in male population. If stated, only few variables related to the female population are highlighted. In the literature the characteristics or differences unique to female patients with TBI has not been explored in great detail<sup>8</sup>.

In a study conducted in Taiwan, showed that mortality rate and incidence of TBI increased with age and lower monthly income which supports the current study<sup>9</sup>.

2. **Findings related to Clinical data:** In the present study, Road traffic accidents (RTA) found as the major cause of trauma in the samples under the study (68.3%). In a study conducted in five European countries, it was shown that TBI are among the most severe injuries and are in a large part caused by RTA<sup>10</sup>.

Most of the patients had subdural hematoma as the diagnosis. The study was supported by another study which shows the subdural hematomas are one type of focal brain injury occurring in approximately 30% of patients with TBI<sup>11</sup>.

3. Association between level of consciousness among patients with traumatic brain injury and selected variables

The present study result found that there was significant association between pupillary reaction at the time of first assessment and level of consciousness of patients with traumatic brain injury. A cohort study conducted on TBI patients shows that one or both un-reactive pupils was significantly associated with level of consciousness and recovery. The study also recommended that Glasgow coma scale and pupil reactivity can be used for prognostic analysis of patients with traumatic brain injury<sup>12</sup>.

### Conclusion

Traumatic brain injury (TBI) is a major public health problem as evidenced by both clinicians and epidemiologist in India. Disability due to neurological illness ranks third in India; the major contributor is TBI. It results in deaths, injuries and disabilities of all age groups, especially young and productive people. The study concluded that most of the patients with TBI belonged to the age group of 49-55 years and road traffic accidents being the predominant cause for TBI.

The level of consciousness was assessed with coma recovery scale and categorized the subjects under the interpretation and domains of level of consciousness. Majority of the patients were minimally conscious and the domains of level of consciousness found to be improved with conventional care. There was association between level of consciousness of patients with TBI and pupillary reaction at the time of first assessment and. Level of consciousness had no association with other selected variables in patients with TBI. In the light of present study,

**Interest of conflict:** Nil

**Source of Funding:** Self

**Ethical Clearance:** Permission had taken from the Institutional Ethical Committee committee and Scientific Review Committee of Govt. College of Nursing, Kottayam. Consent was obtained from the subjects.

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# Prevalence and Determinants of Depression among Patients with Tuberculosis in Municipal Corporation of Sagar District in the State of Madhya Pradesh, India

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## Abstract

**Introduction:** Tuberculosis remains one of the most important causes of mortality across world with 1.3 million deaths annually. India accounts for one-fourth of the global Tuberculosis (TB) burden. Aim of the study was to find out the prevalence and determinants of depression among Tuberculosis patients and association between depression and the socio-demographic characteristics of the TB patients.

**Methodology:** A cross sectional study was conducted in all 7 DOTS centers in Sagar Municipal Corporation of Sagar district, Madhya Pradesh, India. Convenient sampling technique was used for selecting 103 TB patients who undergone treatment in these DOTS centres during the period of March to May 2018. Data analysis was done by using SPSS version-17, with statistical significance at p-value of 0.05.

**Results:** Among 103 TB patients the prevalence rate of depression was nearly one third (64%). The age group of 38-57 years had 3.3 times more odds of developing depression compared to age group 18-37 years ( $p=0.037$ ). The unemployed group had 3.7 times more odds of developing depression compared to employed group ( $p=0.007$ ).

**Conclusion:** It concludes that the prevalence rate of depression among TB patients was high. The frequency of moderate/severe depression was found to be less among males than females. There was an association between depression and socio demographic determinants such as age, employment type of family etc. It emphasizes the need for providing a proper diagnosis and treatment for depression along with the TB drugs for improving the compliance of the TB program.

**Keywords:** Tuberculosis, depression, incidence, prevalence.

## Introduction

Tuberculosis is a leading cause of morbidity and mortality, especially in low-income and middle income

countries. Tuberculosis (TB) is an infectious bacterial disease caused by Mycobacterium tuberculosis which affect the lungs and can also damage other organs of the body. As per the Global TB report 2017 the estimated incidence of TB in India was approximately 28,00,000 accounting for about a quarter of the world's TB cases.<sup>[1]</sup> Tuberculosis kills more than 1 million people every year, most of them in low-income and middle-income countries.<sup>[2,3,4]</sup> An understanding of the trends in tuberculosis incidence, prevalence and mortality is crucial to track the success of tuberculosis control programmes and to identify remaining intervention challenges for tuberculosis care and prevention.

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People living with tuberculosis are often suffer from depression.<sup>[5,6]</sup> Depression weakens the psychosocial welfare and results in negative treatment outcomes among TB patients.<sup>[7,8]</sup> It can also negatively affects health-related quality of life of TB of patients.<sup>[9]</sup> In addition, TB patients with depressive symptoms have reduce social contact and ignore social responsibilities especially at the stage of coughing that leads to low self-esteem and hopelessness.<sup>[10]</sup>

There are certain factors are associated with the occurrence of depression among TB patients. Human Immune deficiency Virus (HIV) infection, poor social support and perceived stigma have a higher risk of developing depression among TB patients.<sup>[11-13]</sup> Other risk factors like side effects of the drugs and the financial constraints, Older age, female sex, duration of illness, level of education were also identified.<sup>[14,15]</sup> Depression is a condition that adversely affects patients' ability to cope with stress the side effects of treatment and everyday life. Many studies also found that depression had negative effect on treatment adherence, a very important aspect in TB control.<sup>[16]</sup> Therefore, it is essential to study the prevalence and determinants of depression among TB patients.

Methodology

**Selection of the DOTS centers**

All the 7 DOTS centers in Sagar Municipal Corporation of Sagar district were selected for the research study under the supervision of RNTCP program in Sagar Municipal Corporation facilitated by NGO "Bharti Jan Kaliyan Samitee Sagar Madhya Pradesh".

**Study Design:** A cross sectional study was conducted in all 7 DOTS centers in Sagar Municipal Corporation of Sagar district, Madhya Pradesh, India. Convenient sampling technique was used for selecting 103 TB patients who undergone treatment in these DOTS centres during the period of March to May 2018.

**Selection of the Respondents:** Convenient sampling technique was applied for selecting 103 respondents from 7 DOTS centers in Sagar Municipal Corporation. In order to take care of non-response due to various reasons, an extra 10% of respondents were included in the sample. i.e. 114 TB patients were selected for the interview. Totally, 103 TB patients were completed the interview and 8 TB patients declined to

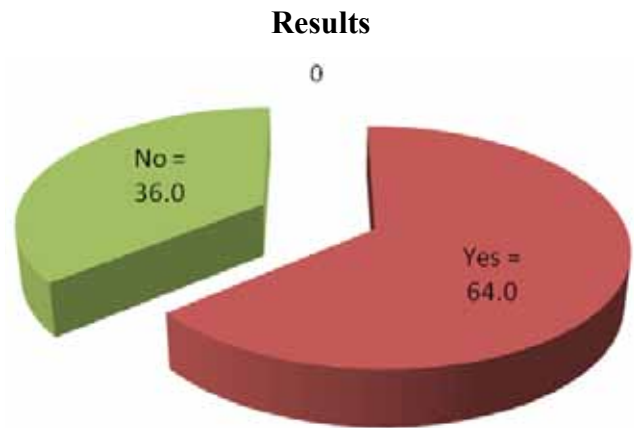
participate interview. The response rate of the research study was 84%.

**Tools:** The TB patients were assessed using a structured questionnaire which was pretested. PHQ-9 Depression Scale - The Patient Health Questionnaire (PHQ) is based on DSM-IV criteria, its disorders divided into threshold disorders according to DSM-IV and subthreshold conditions. It has been developed as a fully self-administered version of the original PRIME-MD by Spitzer et al.<sup>[17]</sup>

**Pilot testing of the tool:** The tool was pilot tested on 10 patients from Rahatghad DOTS centre Sagar MP. The pilot testing was done to practically use the tool and to understand the feasibility of the study. The individuals participated in the pilot testing were not involved in the main study.

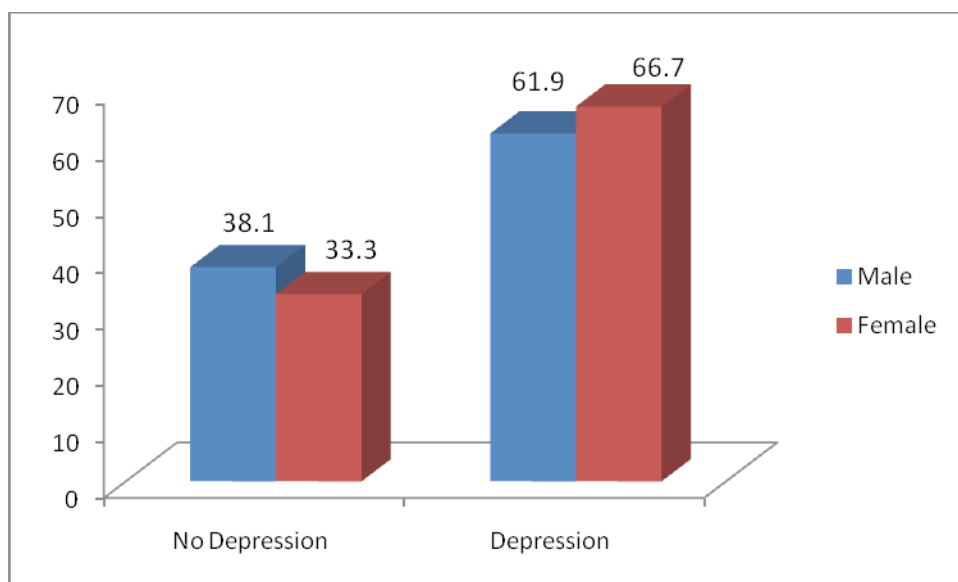
**Data Analysis:** Data analysis was carried out by using Statistical Package for Social Sciences version 20. Categorical variables were presented as frequencies and percentages. The association between the variables was analyzed by chi-square and regression analysis.

**Limitation of the study:** The study was restricted to a small city so the result is valid only for the specific area and situation. Limited resources were the major constraint in research as it was self-financed study.



**Figure 1. Percentage Distribution of Depression among TB patients (N= 103)**

A total of 103 TB patients were involved in the research study, [Figure 1] indicates that percentage distribution of depression among TB patients, a total of 66 (64%) of the TB patients were found to be depressed while 37 (36%) were not depressed.



**Figure 2. Prevalence of depression among TB patients according to sex**

According to [Figure 2], depression in TB patients regarding sex, among 55 male TB patients, 34 (61.9) were found to be depressed while among 48 female TB patients, 32 (66.7) were found to be depressed.

**Magnitude of depression of TB patients:** The present study shows that the level of depression among TB patients according to socio demographic characteristics. Depression in TB patients regarding age, 24 (72.7%) of TB patients had moderate depression in the age group of 38-57 years followed by 7 (70%) in the age group of 58 and above whereas 30 (50%) of TB patients had no depression in the age group of 18-37 years. Result reveals that out of 55 male patients, 31 (56.4%) of male had moderate depression and 3 (5.5%) had severe depression same time 29 (60.4%) of female had moderate depression. The result indicates that

among Muslim category, 8 (72.7%) of TB patients had moderate depression whereas among Hindu category it was 52 (57.1%). The prevalence of moderate depression was high among married patients 53 (65.4%) whereas 14 (63.6%) of unmarried TB patients had no depression. Two third of the 60 (60.6%) TB patients had moderate depression who belong to joint family whereas 3 (75%) of TB patients had no depression who belong to nuclear family. It can notice, prevalence of moderate depression was higher among unemployed 42 (66.7%) TB patients whereas it was 18 (45%) among employed category. It is quite interesting that, there was none among TB patients had severe depression who had completed UG and PG education. But 8 (72.7%) of TB patients who completed UG degree had moderate depression followed by primary educated patients 39 (68.4%).

**Table 1: Level of degree of Depression of TB patients**

Characteristics		Level of degree of depression (N = 103)		
		No Depression	Mild/moderate Depression	Severe Depression
Age	18-37	30(50)	29(48)	1(2)
	38-57	6(18)	24(73)	3(9)
	58 & above	1(10)	7(70)	2(20)
Sex	Male	21(38)	31(56)	3(5)
	Female	16(33)	29(60)	3(6)



Characteristics		Level of degree of depression (N = 103)		
		No Depression	Mild/moderate Depression	Severe Depression
Religion	Hindu	34(37)	52(57)	5(5)
	Muslim	3(27)	8(73)	0(0)
	Other	0(0)	0 (0)	1(100)
Marital status	Married	23(28)	53(65)	5(6)
	Unmarried	14(64)	7(32)	1(5)
Family type	Joint	34(34)	60(61)	5(5)
	Nuclear	3(75)	0(0)	1(25)
Employment status	Employed	22(55)	18(45)	0(0)
	Unemployed	15(24)	42(67)	6(10)
Educational qualification	Illiterate	4(44)	4(44)	1(11)
	Primary	18(30)	39(65)	3(5)
	Secondary	12(52)	9(39)	2(9)
	UG	3(30)	7(70)	0(0)
	PG	0	1(100)	0(0)
Addiction	No addiction	29(35)	50(60)	4(5)
	Addiction	8(40)	10(50)	2(10)

[Table 1] shows that the level of degree of Depression of TB patients in the study areas. The level of depression was rising while increasing the age. TB patients whose age was 57 & above had severe depression (20%) while half of the TB patients had no depression among 18- 37 age group. Both male and female had similar proportion of severe depression 5% and 6% respectively. Around three fourth of the (73%) TB patients belongs to Muslim category had mild/moderate depression than Hindu community (57%). Around three third of the TB patients (65%) who married had mild/moderate depression while this proportionate was very less among who had not married (32%). It was quite interesting that majority of the TB patients (75%) had no depression that belongs to nuclear family whereas 61% of TB patients had mild/

moderate depression that belongs to joint family. Result shows that two third of the TB patients (67%) who were unemployed had mild/moderate depression than employed patients (45%). Majority of the TB patients (70%) who were highly educated (UG & PG) had mild/moderate depression than illiterate patients (44%) and also 44% of the TB patients who were illiterate had no depression about their disease. Study result [Table 1] reveals that three third of the TB patients (60%) had mild/moderate depression were not addicted to any kind of substance abuse than those who were addicted (50%) and 10% of TB patients had severe depression were using substance abuse and also TB patients who were not addict and addict any substance abuse had no depression 35% and 40% respectively.

**Table 2: Logistic regression analysis of factors associated with depression among TB patients**

Determinants	Unadjusted regression (n=103)		Adjusted regression (n=103)	
	Odds ratio	p-value	Odds ratio	p-value
<b>Age</b>				
18-37 years	1	.004	1	.069
38-57 years	4.500	.004	3.351	.037
58 & above	9.000	.043	4.060	.213

Determinants	Unadjusted regression (n=103)		Adjusted regression (n=103)	
	Odds ratio	p-value	Odds ratio	p-value
<b>Sex</b>				
Male	1		-	-
Female	1.235	.609	-	-
<b>Religion</b>				
Hindu	1	.808	-	-
Muslim	1.591	.514	-	-
<b>Marital Status</b>				
Married	1	-	1	-
Unmarried	.227	.003	.355	.073
<b>Family Type</b>				
Joint	1	-	-	-
Nuclear	.174	.137	-	-
<b>Employment Status</b>				
Employed	1		1	-
Unemployed	3.911	.002	3.716	.007
<b>Education</b>				
Illiterate	1	.425	-	-
Primary	1.867	.391	-	-
Secondary	.733	.695	-	-
UG	1.867	.517	-	-

Result [Table 2] shows that there was an association between the age group of TB patients with respect to the level of depression about TB diseases. The difference in proportions of depression of TB patients for male and female was statistically significant as p-value is .609. Marital status of TB patients indicates that difference in proportions of depression for married and unmarried was statistically significant as p-value was .003. The prevalence of depression in different employment status has association with statistically significant as p-value is .002. All other responses and results in table.2 are not statistically significant as p-values are more than 0.05.

## Discussion

In the present research study, objective was to assess the frequency and degree of depression of TB patients in all the 7 DOTS centers in the Sagar municipal cooperation, Sagar district, Madhya Pradesh. A limited study has been conducted to assess the prevalence of depression of TB patients globally. The present research study shows that 64% of TB patients had either moderate

or severe depression. The finding was comparable with other studies carried out in southern Ethiopia such as 43.4% in Wolayta zone,<sup>[18]</sup> and 54% Gurage and Silte zone.<sup>[19]</sup> It is also similar with other studies conducted sub-Saharan Africa 49.4% in Angola<sup>[20]</sup> and 61.1% findings of the Southwest Region of Cameroon.<sup>[21]</sup> The prevalence of depression among TB patients in this study is slightly higher than other similar studies elsewhere like 35% in India,<sup>[22]</sup> This is similar to a study in Lima, capital city of Peru, in which depression was highly prevalent among newly diagnosed TB patients.<sup>[23]</sup> Another study indicated that being on retreatment for TB (OR= 11.2, 95% CI: 5.2–31.1,  $P<0.001$ ) and having discontinued treatment (OR=8.2, 95% CI: 1.1–23.3,  $P<0.05$ ) were factors associated with having a higher chance of being depressed.<sup>[24]</sup>

The degree of depression ranges from moderate form that may not need any kind of medical treatment but if it is severe depression that may require necessary assessment and appropriate treatment and management.

In this present study, almost two third of the TB patients were presented with mild/moderate depression. Diagnosing the severity may be important because individuals with advanced forms of depressions may be less likely to adhere to anti-TB drugs which increased risk of drug-resistance,<sup>[25,26]</sup> poorer quality of life and greater disability,<sup>[25]</sup> lack of adherence to anti-TB treatment and Poor treatment outcomes including death. The presence of depression in TB patients leads to poor compliance with anti-TB treatment and hence, poor prognosis, thus increasing the morbidity and mortality due to TB.<sup>[27]</sup> The prevalence of depression among tuberculosis patients was 51.9% (95%CI=42.7, 62.2%) with 34.2% were mild cases. In our logistic regression analysis, odds of developing depression among tuberculosis patients with age less than 25 years were 0.5(50% protective effect) [AOR=0.5, 95% CI 0.26–0.99] where as patients with a monthly income within the 25<sup>th</sup> percentile were four times higher odds to have depression [AOR=3.98, 95% CI: 2.15–7.39]. It shows that newly diagnosed patients for TB were associated with depression (OR=0.39 (0.21–0.74)).<sup>[28]</sup>

Tuberculosis patients are challenged by mental health problems too. It is difficult to them to lead socially and economically productive life with the health status currently they have due to social isolation<sup>[29]</sup>, depression and an enormous economic burden.<sup>[30]</sup> Hence, programs designed to reduce/eradicate tuberculosis in local level, national or international level should be screened and managed depression in addition to economically and socially support. People admitted to health care institutions due to TB or its complication, it's better to screen whether the person undergoing to depression or not, if yes, treat it. This may improve or enhance treatment outcome and engage in recreation a positive role in effort to reduce and eliminate tuberculosis from the community. According to HADS and PHQ-9, 17.73 and 18.13% of 1252 PTB patients, respectively, had significant depressive symptoms and based on HADS scale, 18.37% had significant anxiety symptoms. Approximately 70% of patients with probable depression also had significant anxiety symptoms and vice versa and 69.6% patients with anxiety symptoms were also diagnosed with probable depression in our study population. Dyspnea and TB were significantly associated with depressive symptoms. Other depressive symptoms-related factors included age, divorce, abnormal body mass index (BMI) and low income.<sup>[31]</sup>

Age was one of the major risk factors for depression

in the present study. As similar to another Ethiopian study,<sup>[32]</sup> age less than 35 years was protective for depression among TB patients. This may be at younger age people may engage in different activities to earn money which may increase social interaction and most probably get support from colleagues or relatives. At older age, life in poor countries may be challenging as the habit of saving was low, engagement to economical activities may be stressful beside the challenges of tuberculosis like stigma, discrimination, anti-Tb side effects.<sup>[33]</sup> These stressful life events and severity of tuberculosis were associated with depression in studies conducted in Nigeria and Ethiopia.<sup>[32, 34]</sup> During the present study, it was noticed that they had fear of losing their life, decreased hours of sleep and quantity of food and also decreased interest in communication with people due to complications of the disease. Once they undergone the diagnosis and treatment is started, TB patients experience relaxed and show sense of relief, however, they may soon become anxious, irritable and depressed due to nature of disease and its complications and prognosis. Level of education and emotional maturity were important factors for proper adaptation to treatment. Young TB patients tend to comply less well with drug treatment than older patients. Young TB patients are irregular in taking medicines. They are more argumentative and aggressive than the old patients.

Adult patients are more prone for the depression as they are very much concerned for their job loss, burden of expenses in the treatment, reversal of role in their family from bread earner to dependent one. It is also possible that patients with TB are perceived as a source of contagion in the community, which may lead to discrimination, stigma, social isolation and rejection and may predispose individuals to a higher risk for depression.<sup>[35,36]</sup> TB patients are totally dependent on their family, they feel neglected and isolated. Other medical conditions such as diabetes and hypertension aggravate the condition. Due to poor social support, these patients are more susceptible for the psychiatric complications.<sup>[37]</sup> The process of diagnosis was made and medicine was started, patients felt relaxed and get relief but very shortly they become depressed due to upset about the nature of TB and its consequences, seriousness and prognosis. Most of them had panic of death as a result of it their sleeping hours was substantially reduced and also less appetite. More over their interaction with public especially family members was less because of the nature of disease. Young TB patients were more

victim for the depression because they were much more worried for their job failure, expense of treatment, burden of family and also their society.

### Conclusion

The prevalence of depression was high among females than the male TB patients. The degree of depression was related to various determinants like age, sex, religion, type of family, marital status, education status and employment status. Due to physical weakness associated with disease, TB patients are not able to go for jobs regularly which put into more depression financially. A smaller amount of social and family support gives patients feeling of being mistreated, isolated and valueless. The aim of this study was to assess the depression and determinants of TB patients in Sagar Municipal Corporation of Sagar District, Madhya Pradesh State. By keeping this aim is the hope that such understanding will lead to developing ways of helping the TB patients to accomplish a most favorable adjustment. Young patients are more prone for the depression as they are very much concerned for their job loss, over expenses in the treatment, reversal of role in their family from independent to dependent one. With increasing number of patients suffering from TB disease, it is necessary to raise the level of screening, early diagnosis and treatment of depression of TB patients. Screening and diagnosis will help both the treating physician and the TB patient for further treatment and also emphasizes the need for providing proper diagnosis and treatment for reducing the depression of TB patients and also for their improving the quality of life.

**Acknowledgement:** We thank TB patients for their valuable cooperation in providing the necessary and required information. We would like to thank all the staff in 7 DOTS centers in Sagar Municipal Corporation of Sagar District and also NGO “Bharti Jan Kaliyan Samitee Sagar” for providing their supports during the study period.

**Conflict of Interest:** Nil

**Source of Funding:** Nil

**Ethical Clearance:** The research study entitled “Prevalence and Determinants of Depression among patients with tuberculosis in Sagar Municipal Corporation, Sagar District, Madhya Pradesh, India” was approved by the Ethics Committee of Indian Institute of Public Health Gandhinagar, Gujarat and

has given permission for data collection from National Health Mission Madhya Pradesh.

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# Role of Rugoscopy and Dactyloscopy in Predilection of Dental Caries in Children

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## Abstract

**Background:** Dental caries being the commonest infection of tooth can be related to hereditary and environmental factors as well. Rugoscopy and Dactyloscopy can be chosen as a genetic marker for diagnosis of many diseases related to genetic disorder. Hence determining the pattern of dermal ridge and palatal rugae also plays a role in predilection of the dental caries in children.

**Aim:** To determine the pattern of the dermal ridge and palatal rugae in caries-free and caries-active children and correlating it to predict the dental caries .

**Methodology:** 20 children (5-12years old) with dental caries were scored based on DEF index. Rugoscopy and Dactyloscopy was performed using Thomaz and Kotze method and Galton's method respectively. The datas were statistically analyzed for predilection of dental caries in these subjects.

**Results:** The results indicates that there is a definite correlation between the dermal ridge patterns, palatal rugae patterns and dental caries in children.

**Conclusion:** Dermatoglyphics and Rugoscopy can be used as a screening method to provide adequate preventive treatment to children showing a higher caries risk as detected by the hand ridge patterns and palatal rugae pattern.

**Keywords:** *Dactyloscopy, Dental Caries, Dermatoglyphics, Palatal rugae, Rugoscopy*

## Introduction

Dental caries is one of the most common dental illness found in children which has hereditary and environmental factors as contributing agents<sup>1</sup>. According

to Shafer, Dental caries is a biofilm-mediated, sugar-driven, multifactorial, dynamic disease that results in repeated phases of demineralization and remineralization of dental hard tissues. Caries can occur both in primary and permanent dentitions and can damage tooth crown and later lead to exposure of pulp. It will be a privilege for the dental physicians if there is a chance to predict the occurrence of dental caries which helps in prevention. Though there are several other preventive method the reason for choosing Dermatoglyphics and palatal rugae is that as a genetic marker the finger buds, palatal rugae as well as enamel forming tooth buds have same ectodermal origin<sup>2</sup>. Hence changes in any one of these may cause changes on the other or vice versa and both Dactyloscopy and rugoscopy are unique to each person.

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The term Dermatoglyphics (dactyloscopy) comes from two Greek word derma-skin and glyphe- carving which refers to the friction ridge formations which appears on the palms of the hands and soles of feet which was coined by Sir Francis Galton<sup>3</sup>. The term rugoscopy is the study of patterns of grooves and ridges (rugae) of the palate to identify individual patterns.

**Galton’s Classification of Dermatoglyphics:**

According to Sir Francis Galton (Fig 1), dermatoglyphic patterns can be classified into

- Loop pattern,
- Arch pattern,
- Whorl pattern.

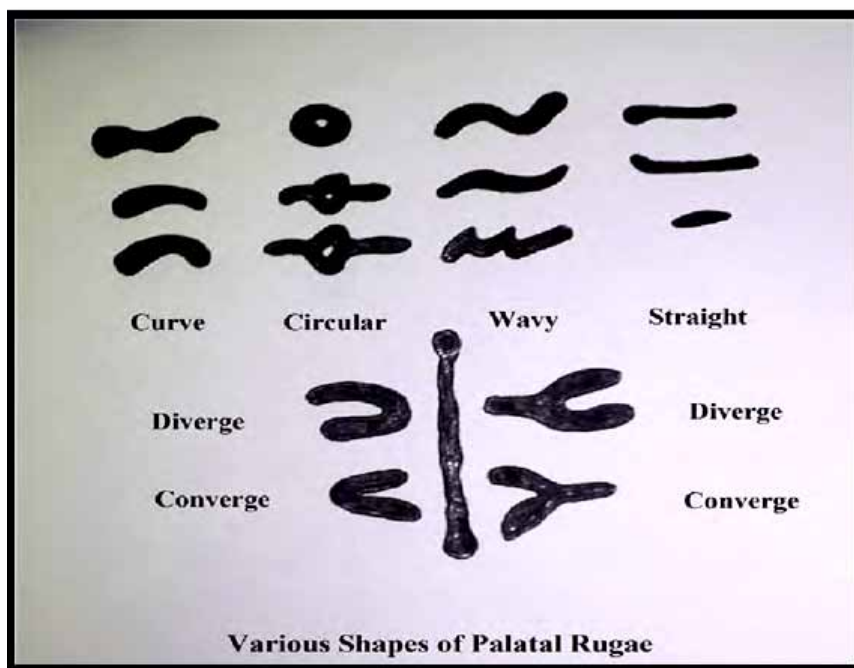


**Fig 1: Galton’s classification of dermatoglyphic pattern.**

**Thomaz and Kotze Classification of Palatal Rugae:**

According to this classification(FIG 2), palatal rugae were observed for:

1. Size,
  2. Shape,
  3. Direction,
  4. Unification
- **Based on size** the rugae were classified as: primary, secondary and fragmentary.
  - **Based on shape**, rugae were interpreted as: curved, wavy, straight and circular.
  - **Based on direction** : forward directed and backward directed.
  - **Based on unification pattern**, primary rugae were classified as: converging and diverging.



**Fig 2: Thomas and Kotze classification of rugoscopy**



**Aim:** The aim of the study is to find the majority type of pattern of the dermal ridge and palatal rugae in caries-free and caries-active children and correlating it to predict the dental caries in them.

**Materials and Method**

The aim of the study was to correlate the type of dermal ridge and palatal rugae in caries-free and caries-active children. Institutional ethical clearance was obtained. Patient as well as the parent/guardians reporting to the institution was explained about the study and informed consent was obtained.

Total of 20 subjects with the age group from 5 to 12 years who has visited the institution were selected and screened for the presence of dental caries .

**Inclusion Criteria:** Children with DMFT score more than or equal to 2 were included in the caries-active group and children with DMFT index score as 0-1 i.e, without any dental caries is considered as the caries-free group.

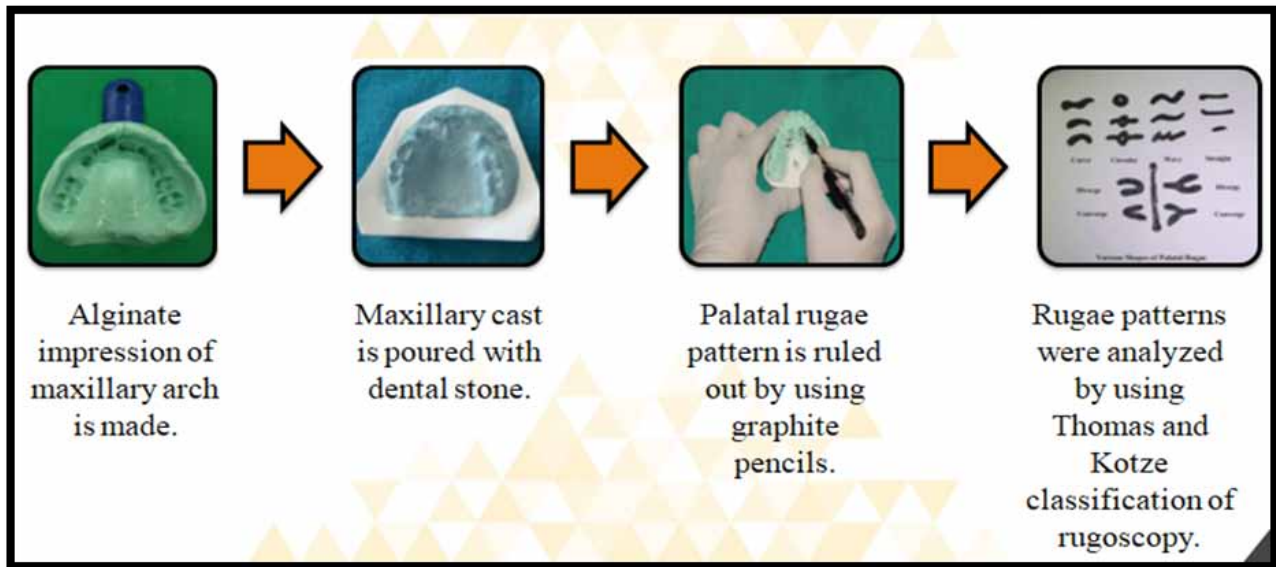
**Exclusion Criteria:** Children who are physically or mentally retarded are not included in the study.

Children with cleft lip and palate, supernumerary teeth, congenitally missing teeth, dentoalveolar abscess and other medically compromised conditions were excluded from the study.

**Grouping:** Based on 95% confidence level and 5% of error the samples were included in the study. A total of 20 children who fulfilled all the inclusion and exclusion criteria were selected and divided into two groups.

- Group 1-10 children with def index  $\geq 2$  (Caries Active)
- Group 2-10 children with def index score 0-1 (Caries Free)

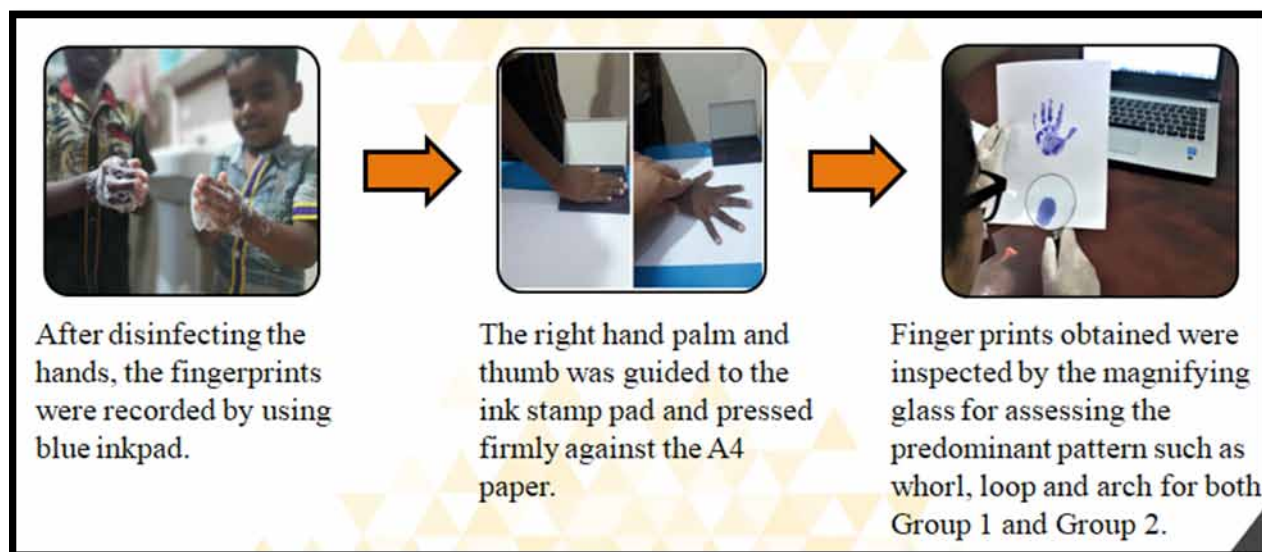
**Methodology for Recording Rugae Pattern:** For recording the palatal rugae pattern in children, preliminary impression is necessary (Fig 3). Hence the maxillary arch impression was taken with the alginate where tray selection procedure was done priorly. Then the cast was poured with dental stone. Palatal rugae pattern was analyzed by using graphite pencils. Palatal rugae patterns were interpreted by using Thomas and Kotze classification of rugoscopy<sup>4</sup>.



**Fig 3: Methodology for analyzing rugoscopy**

**Methodology for Recording Dermatoglyphic Pattern:** Hands of the subjects were disinfected with proper handwashing technique by using hand wash and sanitizers (Fig 4). Then the right hand palm and 5 digits were guided to the ink stamp pad and pressed firmly

against A4 paper which was stabilized on the table. The obtained finger and palm prints were inspected by using the magnifying glasses to determine the type and pattern of the finger print according to Galton’s classification such as whorl, loop and arch.



**Fig 4: Methodology for analyzing dactyloscopy.**

**Statistical Analysis:** The data obtained were analyzed statistically by using Windows Microsoft Excel 2007. The dermatoglyphics and rugae patterns were analyzed by Chi-square and the level of significance was set at  $p < 0.05$ .

**Results**

The present study was done among 20 children (5-12 years old) with dental caries were scored based on DEF index. Finger prints and maxillary impressions were taken for identification of specific predominant pattern of dactyloscopy and rugoscopy. The results were analyzed in predilection of dental caries in these subjects.

The results of Table 1 showed different patterns of rugae in caries active group and caries free group .

On comparison of rugae by shape, wavy pattern was predominant in caries active group and curved pattern in caries free group. Based on direction, forwardly directed pattern of rugae was predominant in caries free group and backwardly directed pattern was predominant in caries active group . Based on length, primary pattern of rugae was predominant in all the groups. Based on unification, converging pattern was predominant in all the subgroups caries active group . Based on direction and unification, converging patterns were predominant in caries active group and caries free group had increased diverging pattern. Statistically significant variation ( $p < 0.05$ ) was seen in shape, direction and size of palatal rugae in caries active and caries free group. Statistically significance value for unification in caries active group was ( $p < 0.05$ ).

**Table 1: Palatal Rugae pattern in caries active and caries free group.**

Variables	Group 1 N(10)	Caries Active %	Group 2 N(10)	Caries Free %	p Value
<b>Shape</b>					
Wavy	6	60.0%	1	10.0%	0.03*
Curved	1	10.0%	7	70.0%	
Straight	2	20.0%	1	10.0%	
Circular	1	10.0%	1	10.0%	
<b>Direction</b>					
Forward	6	60.0%	7	70.0%	0.63
Backward	4	40.0%	3	30.0%	

Variables	Group 1 N(10)	Caries Active %	Group 2 N(10)	Caries Free %	p Value
<b>Size</b>					
Primary	8	80.0%	8	80.0%	1.00
Secondary	2	20.0%	2	20.0%	
<b>Unification</b>					
Converging	6	60.0%	1	10.0%	0.06*
Diverging	4	40.0%	9	90.0%	

The results of table 2 shows different types of dermatoglyphic patterns in caries active group and caries free group . It also depicts that there is predominant loop pattern in caries active group and whorl dermatoglyphic pattern in caries free group respectively. Significant value (p < 0.05) was seen in dactyloscopy patterns of caries active and caries free group.

**Table 2: Dermatoglyphic pattern in caries active (group 1) and caries free group (group 2).**

Variables	Caries Active	Caries Free	P Value
Whorl	1	7	0.006*
Loop	8	1	0.006*
Arches	1	2	0.006*

**Discussion**

Dental caries is caused by host and environmental factors, hence the dermatoglyphic and palatal rugae patterns can be used as oral health markers in early prediction of dental caries<sup>5</sup>. This can be studied by using non invasive method such as dactyloscopy and rugoscopy. Some of the traditional method that are used for diagnosing dental caries are visual method by white spot lesion, tactile sensation by probing, radiographic detection, transillumination by UV light, basic fusion dyes, etc.

In dentistry, dermatoglyphics can be used in the detection of dental caries at an early age . The epithelium of the finger develops during the same intrauterine period as the development of enamel; hence, both genetic and environmental factors affecting one can affect the other. Enamel is usually the first structure which gets affected by caries and, therefore, preventing its occurrence is quite necessary. Hence, dermatoglyphic pattern can be used for detecting and preventing caries at an early age<sup>6</sup>.

According to the previous study made by Cheeli et

al<sup>7</sup>, rugoscopy revealed predominance of wavy pattern in caries free group. But in our study we observed wavy pattern in caries active and curved pattern in caries free group. Based on direction, size and unification- forwardly directed, primary and converging patterns were predominant in caries active and caries free group in previous study .But in our study the pattern was similar in caries active group and curved, diverging, primarily sized, forwardly directed pattern is noted in caries free group.

Dermatoglyphics study done by Abhilash PR<sup>8</sup>, Bhat PK et al<sup>9</sup>, Madan N et al<sup>10</sup>, Deepti A et al<sup>11</sup> in detection of dental caries among various groups revealed a statistical association between whorl patterns and loop patters in caries active and caries free group . The frequency of whorls was found to be more in caries group and the frequency of loops more in caries free group. In our study the result of the dactyloscopy shows predominant loop pattern in caries active group and whorl pattern in caries free group. This was in contrast with the study conducted previously that found and increased whorl pattern in caries active group and increased loop pattern in caries free group.

The limitation of this study could be the small sample size of 20 children and the limitation of establishing a comparative analysis without similar researches made difficult the methodological discussion. More studies on the present classifications must be performed in order to improve the literature support and also more systemic trials on larger sample size should be made in future to assess the role of dactyloscopy and rugoscopy in predilection of dental caries.

**Conclusion**

The results of this study indicates that there is a definite correlation between the dermal ridge patterns, palatal rugae patterns and dental caries in children.

The use of dermatoglyphics can be used as a screening method to provide adequate preventive treatment to children showing a higher caries risk as detected by the hand ridge patterns and palatal rugae pattern.

**Ethical Clearance:** Acquired

**Source of Funding:** Self

**Conflicts of Interest:** Nil .

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# Correlation of Working Hours with Morbidity in Working Professionals

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## Abstract

**Introduction:** In an era of accelerated economical progress, work culture is on a verge of change. Long working hours are soon becoming a common scenario in Indian work places. This change is said to affect the health of the population giving rise to non communicable diseases, of which diabetes and cardiovascular diseases are trending the list.

**Aim:** The study aims to assess the correlation of working hours with morbidity related to chronic diseases in male working age population.

**Method:** A cross sectional survey of male working population (n=320) engaged in full time sedentary work in public and private offices of Jaipur city of Rajasthan was carried out. The working hours were classified into two groups: those working for  $\leq 48$  hours/week (normal hours) and  $> 48$  hours/week (long hours). An interview was conducted via an interview schedule to collect general and work related information while biomedical profile was assessed by drawing blood samples for the participants and assessing them in the lab.

**Results:** A significant positive correlation of working hours with morbidity was found in male working age population for all biomedical parameters studied except HDL cholesterol.

**Conclusions:** Working hours are found to have a significant positive linear relation with morbidity in working male population.

**Keywords:** Long work hours, morbidity, non communicable diseases, diabetes, cardiovascular diseases.

## Introduction

Morbidity from non-communicable diseases is on a rise in the productive age group especially in low and middle-income countries like India<sup>1</sup>. According to the World Health Organization, non-communicable diseases kill about 15 million people between the ages of 30 and 69 years and a majority of these (approximately

85 %) premature deaths occur in developing countries<sup>2</sup>. Although, India is emerging as a major economic power the statistics prove that the morbidity and mortality rate in productive age group due to NCDs pose a looming threat to the nation. The economic growth is accompanied by the changing work environment and long work hour culture, which are often accused of promoting a sedentary and unhealthy lifestyle. More recently, long work hours have become a norm in metro cities and developing metros. The lifestyle has gathered pace and the time initially kept aside for rest and relaxation, have been increasingly devoted to working, thus diminishing the boundaries between work and life. Lack of time give way to unhealthy lifestyle choices and stress, affecting overall health. These adverse lifestyle choices have been increasingly linked to chronic non-

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communicable diseases<sup>3</sup>. Diabetes and Cardiovascular diseases are the two most prominent non-communicable diseases gripping the nation<sup>2</sup>.

#### **Working Hours and Cardiovascular disease:**

Gupta, Mohan and Narula<sup>4</sup> reviewed the current status of heart diseases in India and found an abrupt increase in its incidence from 1% to 9-10 % over the last 60 years in the urban population. Also, it has been reported that Indians are at higher risk of developing CVD's at least a decade early than their counterparts in other countries, especially in the prime productive age<sup>5</sup>. The disease has escalated in the younger age group in the last decade and is further expected to go up significantly for people between the ages 25-69. Further the statistics for age-standardized CVD death rates in people 30-69 years are highest in India with 405 deaths per 100,000<sup>6,7</sup>. This swell in the incidence of the disease could be attributed to the epidemiological transition which has taken a toll on the lifestyle and health of the young adult population. One of the major effects of this transition is being witnessed at the work-front where the need for development, intensified global competition and technological innovations have changed the workplaces<sup>8,9</sup>. Long work hours have only made the situation worse by giving the productive age group an excuse to allow the above-said causes to intervene with their daily routine coupled with other genetic and biological factors.

**Work Hours and Diabetes:** According to the International Diabetes Federation<sup>10</sup>, there were 425 million diabetics worldwide in 2017 and the number is expected to go upto 629 million by 2045. It is also estimated that approximately 279 million of these estimated numbers live in urban areas. According to a report on global estimates of diabetes, India topped the charts for having the highest number of people (adults 20-79 years) with diabetes—approximately 50.8 million in 2010, which is projected to rise to 87 million by 2030, still being on top at the list. If figures are to be believed, diabetes caused 1.1 million deaths in South East Asia alone while in India 50.7 % of all diabetic mortalities have been reported to be less than 60 years of age<sup>10</sup>. The recent meta-analysis by Kivimaki et al., found a link between long working hours and diabetes through a systematic literature search of 4 published and 19 unpublished articles including 222,120 individuals. Individuals working long hours (55 hours or more per week) were compared with individuals working standard hours (35-40 hours/week). A risk ratio of 1.07 for incident type II diabetes for people working long

hours as compared to people working standard hours was found<sup>11</sup>.

Various studies on the gender difference in prevalence and incidence of Type 2 Diabetes and cardiovascular diseases point increasingly towards the male population before the age of 60<sup>12-14</sup>. The main reasons cited are sex hormones<sup>13</sup> estrogen, insulin sensitivity, higher abdominal fat and body iron stores<sup>14</sup>. The predisposition is further accentuated by external and acquired factors like long hours of work (giving less time for rest and recovery) and an unhealthy lifestyle. Looking into the above scenario the present paper studies the correlation between working hours and morbidity in the male working-age population in a developing metro city in Rajasthan, India.

### **Material and Method**

**Study Population and tools:** Working males (320) in the age range of 30-60 years were interviewed for the purpose of this research. The population was selected based on the set inclusion and exclusion criteria. The participants were necessarily sedentary workers engaged in full-time jobs. The participants were informed about the aims and objectives of the study and asked to fill the screening form and sign a written consent before the start of the study. The data regarding general and work information was collected via a questionnaire during the interview and thereafter blood samples were collected from the participants and sent to the labs for assessment. The working hours were self - reported while the levels of blood sugar (HbA<sub>1c</sub>) and blood Lipids (Total cholesterol, LDL, VLDL, Non-HDL and HDL) were ascertained from the received blood sample for each participant and the resultant parameters were classified according to their respective guidelines. HbA<sub>1c</sub> (Glycosylated hemoglobin) was classified according to the classification given by the Research Society for the Study of Diabetes in India (RSSDI) in a recent consensus statement for the management of diabetes<sup>15</sup> while for the lipid profile classification the Adult Treatment Panel (ATP) III Guidelines were used<sup>16</sup>.

**Statistical Analysis:** Data analysis was done using the SPSS-PASW-18.0 trial version. Pearson's test of Correlation was used to assess the linear correlation between biomedical parameters and working hours.

**Ethical Approval:** The study protocol has been approved by the ethics committee of Department of Home Science, University of Rajasthan.

**Results**

The total sample consisted of 320 working-age males in the age range of 30-60 years. General and work-related information were collected using an interview schedule. The blood samples collected from each participant was studied in the lab and the results as received were classified according to standard guidelines. The morbidity pattern of the study subject was assessed in relation to the working hours using Pearson’s equation for linear correlation. The corresponding p and r values are given in the table (60) below. Table 1 summarizes the results obtained

**Table 1: Correlation between Biomedical parameters and Working hours**

Parameters	Pearson Correlation N= 320		
HBAIC	r Value	.158	
	P value	.005	Significant Positive Correlation
LDL	r Value	.118	
	P value	.035	Significant Positive Correlation
HDL	r Value	-.047	
	P value	.400	
TG	r Value	.149	
	P value	.008	Significant Positive Correlation
VLDL	r Value	.149	
	P value	.008	Significant Positive Correlation
Non hDL	r Value	.187	
	P value	.001	Significant Positive Correlation

All biomedical factors (bloodglucose and lipids levels) assessed in the study, except HDL cholesterol, showed a significant positive association with the working hours with a p-value of less than 0.05. This means that as the number of working hours increased, abnormalities in blood levels were found to be increased. Altered levels of blood sugar and blood lipids may give rise to morbidity due to non-communicable diseases namely diabetes and cardiovascular diseases in the long run.

**Discussion**

The study results indicated a significant positive correlation between morbid levels of blood glucose and lipids and working hours in males working full time in sedentary jobs. Glycosylated hemoglobin levels were used as a measure of assessing diabetes. A significant linear correlation implies that with an increasing number of working hours the serum sugar levels are found to increase which may be related to an increased risk of developing diabetes. The results of the present study are in accordance with the recent literature which suggests an increased risk of developing diabetes with increase in working hours<sup>11</sup>. Long working hours were considered if an individual is working more than 55 hours per week. They were compared with individuals working standard hours (35-40 hours/week). They found a risk ratio of 1.07 for incident type II diabetes for people working long hours as compared to people working standard hours. Kivimaki et al., suggested exploring the link through chronic stress at work which has been earlier suggested by Nyberg et al.,<sup>17</sup>.

Also the blood sample taken from the participants was used to estimate the levels of total cholesterol (TC), low density lipoprotein (LDL) cholesterol, high density lipoprotein (HDL) cholesterol, very low density lipoprotein (VLDL) cholesterol, triglycerides (TG) and non HDL cholesterol. The classification was made as per the guidelines given by the American Heart Association<sup>15</sup>. The results showed a significant positive correlation between working hours and morbid levels of TC, LDL, VLDL TG and Non HDL Cholesterol in the sample of the male working population indicative of the risk of development of cardiovascular diseases in the long run.

The possible explanation for the increase in morbid levels of lipids with increase in working hours might be associated with increased occupational stress and lesser time available for recovery. Long working hours have been implicated as a culprit in rising stress levels and its associated chronic health conditions<sup>18</sup>. Shuster and Rhodes (1985) developed a framework, to conceptually explain the mechanism underlying association of long working hours and cardiovascular diseases. He suggested that any increase, at any level, in the activity of the autonomic nervous system, in normotensive and hypertensive individuals, lead to an increase in blood pressure. Simultaneously, it causes a decrease in the

activity of the parasympathetic nervous system, thereby, increasing the risk to the cardiovascular system and leading to heart disease in the long run<sup>19</sup>.

A study by Kivimaki et al.,<sup>20</sup> examined the association between work stress and the risk of cardiovascular mortality in a prospective cohort on 812 participants. At baseline the participants selected were free from cardiovascular diseases. The mean length of follow up was 25.6 years. It was found that participants with high job stress had a 2.2 fold cardiovascular mortality risk as compared to their counterparts working in low-stress jobs. Furthermore, another meta-analysis on work stress and risk of coronary heart diseases by Kivimaki et al., in 2006 on 83,014 employees suggested an average 50 % excess risk for CHD among employees with work stress<sup>21</sup>.

A dose-response relationship between work hours and the risk of cardiovascular diseases also have been suggested by Kang et al., (2012) and Virtanen et al., (2012) in their meta-analysis on long work hours and cardiovascular diseases<sup>22,23</sup>. They offered evidence of the increase in the risk of cardiovascular diseases as the number of work hours increased. While, according to Kang et al.,<sup>22</sup> there is a 37 % increase in the odds of CVD when an individual is exposed to long work hours, Virtanen et al., (2012) suggested a 40 % increased risk in people working long hours<sup>23</sup>. Another dose-response relationship study conducted by Conway, Pompeii, Roberts, Follis, & Gimeno (2016) concluded that working more than 45 hours per week for more than 10 years becomes an independent risk factor for chronic heart disease and increases the risk by about 16 %<sup>24</sup>.

### Conclusion

The study found conclusive evidence that working hours have a significant positive relation with morbidity. The increasingly morbid levels of blood sugar and blood lipids might be related to the risk of developing diabetes and cardiovascular diseases in the long run. As evidenced the suggested causative factors might be stress and lesser time available for recovery along with the inability to follow a healthy lifestyle.

**Suggestions:** Gender specific evidence in research pertaining to working hours and chronic disease must be addressed in the future research owing to biological and environment for males and females.

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# Quality of Life Assessment in Breast Cancer Females Before and After Modified Radical Mastectomy

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## Abstract

**Objectives:** Objective of this study was to find out the health related of quality of life in females with breast cancer before and after 1 month of modified radical mastectomy. On the basis of EORTC QLQ C30 (version 3) and BR23 questionnaire, assessment was done.

**Methodology:** There were total 125 subjects, out of which 118 subjects were participants of the study. This was a study of evaluating the health-related quality of life in breast cancer females before and after 1 month of undergoing modified radical mastectomy. Here we evaluated the quality of life on the basis of the questionnaires EORTC QLQ C30 (version 3) and BR23.

**Result:** There is a significant change in the quality of life in females 1 month after undergoing modified radical mastectomy compared to before undergoing surgery. The global health status of females was better before surgery rather than after 1 month of surgery.

**Conclusion:** The health related quality of life is better in breast cancer females before surgery compared to 1 month after surgery.

**Keywords:** Health related quality of life, breast cancer, modified radical mastectomy, EORTC QLQ C30 (version 3), EORTC QLQ BR23.

## Introduction

Breast cancer is one of the most malignant type of cancer occurring in women in developed as well as developing countries.<sup>1</sup> 1,62,468 new cases and 87,090 death cases were reported in India in the year of 2018.<sup>2</sup> It is the second most common cause of death for women worldwide.<sup>3</sup> It represents nearly 25% of all cancers.<sup>4</sup> One female child out of 25 is destined to develop breast cancer in future.<sup>5</sup> In Indian subcontinent, as described in the global and Indian studies, there is an increase in the incidence and cancer associated morbidity and mortality.<sup>4</sup>

### Risk Factors:<sup>4,5,6</sup>

- Age: more common in 35 to 75 years
- Marital status

- Breast feeding
- Alcohol consumption
- Tobacco chewing and smoking
- Lack of exercise
- Heredity and genetic factors
- Hormonal factors: early menarche, late menopause.
- Diet and western lifestyle
- Obesity
- Radiation exposure
- Having child in older age
- Nulliparity

The inherited mutated genes that increase the likelihood of breast cancer: BRCA1 and BRCA2<sup>3</sup>

**Signs and symptoms<sup>5,6</sup>:**

- Typically the patient presents with a painless lump in the breast.
- Pain may sometimes occur and it is always present in advanced stages.
- Change in size, shape and appearance of the breast.
- Changes in the skin over the breast seen as dimpling.
- Retraction of the nipple.
- Peeling, scaling, crusting or flocking of the pigmented area around the nipple.
- Redness or pitting of skin over breast
- Nipple discharge.

**Surgical management<sup>5,6</sup>:** The standard surgery that is most widely used is the radical mastectomy. It is the removal of the following structures:

- Entire breast including the nipple and areola, skin overlying the tumor along with fat, fascia and lymphatics.
- Axillary block dissection, including complete clearance of axillary fat.
- Sternocostal portion of pectoralis major, entire pectoralis minor, few fibres and aponeurosis of internal oblique, serratus anterior, latissimus dorsi and subscapularis.

**Three important structures to be preserved:**

- Axillary vein
- Long thoracic nerve
- Cephalic vein

**Disadvantages of radical mastectomy:**

- Poor cosmetic results
- Lymphoedema of arm
- High morbidity rate

**Modified Radical Mastectomy:** In this operation the pectoralis major is left intact. It is retracted upwards and medially, making the pectoralis minor available for excision. The pectoralis minor is excised from its insertion and this gives access to the axilla for its clearance.

**The advantages of MRM over RM are:**

- The shape of the chest and the anterior axillary fold is maintained.
- The pectoralis major offers an ideal bed for split-skin grafts
- The arm is kept stronger.

**Complications of MRM:**

- Pain and numbness in axilla
- Shoulder dysfunction
- Winging of scapula
- Neurovascular injuries
- Lymphoedema of the arm
- Secondary infection

**Methodology**

Total 125 females were approached from Krishna Hospital, in Karad, Maharashtra out of which 118 females were selected for the study who fulfilled inclusion criteria. The procedure was explained and consent was taken from those willing to participate.

Here, two questionnaires namely, EORTC QLQ C30 (version 3) and BR23 were given to females who had their surgery planned the same females were called after 1 month of their surgery for follow up and the same questionnaires were given. The females were asked to choose the most relatable option according to their present condition to answer the question. After the collection of data, both the results were compared and statistical analysis was done in accordance to, global health status, functional scales and symptom scale from both the questionnaires.

**Result**

**For EORTC QLQ C 30 version 3**

**1. Comparison of Global Health Status Before and After MRM:**

**Table No. 1: Comparison of Global Health Status**

Global Health Score (Mean) Before Surgery	Global Health Score (Mean) After Surgery
68.644	14.194

**Interpretation:** The above table represents question no. 29 and 30 which were to be ranked between 1 and

7 where 1 indicates very poor and 7 indicates excellent. Mean of Global health score before surgery is 68.644 and after surgery is 14.194. Higher the score indicates comparatively better quality of life.

**2. Comparison of Functional Scales Before and After MRM:**

**Table No. 2: Comparison of Functional Scales**

Functional Score	Before (Mean)	After (Mean)
Physical functioning	86.214	40.451
Role functioning	85.581	48.587
Emotional Functioning	86.073	50
Cognitive Functioning	85.31	49.717
Social Functioning	85.451	19.35

**Interpretation:** The above table includes the following question numbers

**Physical functioning:** 1 to 5, Role functioning: 6,7, Emotional functioning: 21 to 24

**Cognitive Functioning:** 20,25, Social functioning: 26,27 which were to be ranked between 1 to 4 where 1 indicates not at all, 2 indicates a little, 3 indicates quite a bit, 4 indicates very much. The functional scale is directly proportional to the quality of life. Thus, higher the score, better the quality of life. In the above table the mean score after surgery are, 40.451, 48.587, 50, 49.717, 19.35 and before surgery were 86.214, 85.581, 86.073, 85.31, 85.451 for functional score, physical functioning, role functioning, emotional functioning, cognitive functioning and social functioning respectively.

**3. Comparison of Symptom Scales Before and After MRM:**

**Table No. 3: Comparison of Symptom Scales**

Symptom Scale	Before (Mean)	After (Mean)
Fatigue	11.101	80.983
Nausea_Vomiting	14.124	50.423
Pain	12.429	79.943
Dyspnoea	8.474	27.683
Insomnia	5.649	27.966
Appetite loss	7.627	30.225
Constipation	7.062	33.05
Diarrhoea	8.192	28.813
Financial difficulties	7.344	31.638

**Interpretation:** In the above table, questions included were, Fatigue: 10,12, 18, Nausea,vomiting: 14,15, Pain: 9,19, Dyspnoea: 8, Insomnia: 11, Appetite loss: 13, Constipation: 16, Diarrhoea: 17, Financial difficulties: 28, which were to be ranked between 1 to 4 where 1 indicates not at all, 2 indicates a little, 3 indicates quite a bit, 4 indicates very much. The symptom scale is inversely proportional to the quality of life. Thus, lesser the score, better the quality of life. Here the mean scores of the females before the surgery are lesser than the mean score of post-surgery.

**For EORTC QLQ BR 23**

**4. Comparison of Functional Scales Before and After MRM:**

**Table No. 4: Comparison of Functional Scales**

Functional Scale	Before (Mean)	After (Mean)
Body image	86.073	49.293
Sexual functioning	57.768	50
Sexual enjoyment	47.74	55.367
Future perspective	10.451	55.932

**Interpretation:** The above table shows mean values for functional scale of questionnaire BR23 before and after surgery, questions included in the following were, Body Image: 39-42, Sexual functioning: 44,45, Sexual enjoyment: 45,46, Future perspective: 43, which were to be ranked between 1 to 4 where 1 indicates not at all, 2 indicates a little, 3 indicates quite a bit, 4 indicates very much. The functional scale is directly proportional to the quality of life. Thus, higher the score, better the quality of life. The mean values of the females before surgery are higher, 86.073, 57.768, 47.74, 10.451 than after surgery, 49.293, 50, 55.367, 55.932, respectively.

**5. Comparison of Symptom Scales Before and After MRM:**

**Table No. 5: Comparison of Symptom Scales**

Symptom Scale	Before (Mean)	After (Mean)
Side effects	5.525	80.177
Breast symptoms	8.333	51.694
Arm symptoms	10.579	80.322
Hair loss	6.214	44.067

**Interpretation:** In the above table the questions included were, Systemic therapy side effect: 31 to 34, 36 to 38, Breast symptoms: 50 to 53, Arm symptoms: 47

to 49, Hair loss: 35. Which were to be ranked between 1 to 4 where, 1 indicates not at all, 2 indicates a little, 3 indicates quite a bit, 4 indicates very much. The symptom scale is inversely proportional to the quality of

life. Thus, lesser the score, better the quality of life. The mean score of females before surgery were 5.525, 8.333, 10.579, 6.214 and that of after surgery are, 80.177, 51.694, 80.322, 44.067 respectively.

**For Summary Score:**

**Table No. 6: Comparison of Summary Scores**

**C30**

	Mean ± SD	“P” value	Interference
Before	82.006± 4.566	0.0001	Extremely Significant.
After	48.461±4.183		

**BR23**

	Mean ± SD	“P” value	Interference
Before	71.6 ± 4.142	0.0001	Extremely Significant.
After	42.949 ± 6.283		

**Interpretation:** The above table shows the summary scores of both the questionnaires. It is calculated from the mean of 13 out of 15 questions, where global scale and financial scales are included. On comparing EORTC QOL C30 summary score before and after surgery, there is 40.9% reduction in the score. On comparing EORTC QOL BR23 score before and after surgery, there is 41% reduction in the score.

**Result**

Breast cancer is one of the most malignant type of cancer. It is a major cause of leading to death in females. One of the treatments is Modified radical mastectomy where the breast tissue is removed along with the tumor. Though the lump or tumor is removed causing no further general complications, but other functional and symptomatic complications are seen which leads to a degraded quality of life.

**The areas where quality of life is affected are:**

Physical functioning, Role functioning, Emotional functioning, Cognitive functioning, Social functioning, Fatigue, Nausea, Vomiting, Pain, Dyspnea, Insomnia, Diarrhea, Financial difficulties, Systemic therapy side effects, Upset by hair loss, Arm symptoms, Breast symptoms, Body image, Future perspective, Sexual

functioning, Sexual enjoyment. Thus, overall quality of life is affected.

Breast cancer affects women’s identities and therefore studying quality of life in women who lose their breast is vital. It is believed that women play a vital role in family. A female’s not only musculoskeletal system is affected but also psychosocial and day to day functioning is also affected. Symptoms like pain, depression, hair loss, anxiety, dyspnoea, sleep disturbances, financial difficulties are seen all of which have a negative impact on quality of life and survival. As there is an increase in survival rate of breast cancer subjects the impact of therapy on their quality of life is an important public health issue. EORTC has designed 2 scales namely, EORTC QLQ C30 version 3 and EORTC QLQ BR 23 for core cancer patients and specifically breast cancer females respectively. It consists of 30 and 23 questions respectively.

There are previous studies where it has been proven that QoL is affected in females who have undergone mastectomy after 1 month compared to 1 year.

This study proves that the QoL is affected more severely in females after 1 month of surgery compared to that of before surgery.

The aim of the study is to assess the quality of life in females with breast cancer before and after modified radical mastectomy

The inclusion criteria are, breast cancer survivor females of age group 35 to 65 years. Females diagnosed with breast cancer by certified oncologist. Post mastectomy females. Women who are currently receiving adjuvant oncological therapy. The subjects will be excluded if they have faced any recent trauma, undergone any complicated surgery other than Modified Radical mastectomy, if they have any neurological disorder or if the subject is uncooperative.

It was found that all the females' quality of life was severely affected after 1 month of modified radical mastectomy. On comparing EORTC QOL C30 summary score before and after surgery, there is 40.9% reduction in the score and for EORTC QOL BR23 score before and after surgery, there is 41% reduction in the score.

### Conclusion

On the basis of the results of the study, it can be concluded that, there is 40.9% and 41% reduction of scores indicating that the quality of life was better before surgery compared to one month after surgery.

**Conflicts of Interest:** There were no conflicts of interest in this study

**Ethical Clearance:** Ethical clearance was taken

from institutional committee of Krishna institute of medical sciences.

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# Prevalence of Scapulothoracic Joint Dysfunction in Patients with Lateral Epicondylitis

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## Abstract

**Background:** Lateral epicondylitis is a cumulative trauma disorder or repetitive motion disorder which is characterized by pain in the lateral epicondyle of humerus. This condition is mainly seen in individuals those who have repeated use of elbow like housewives, cooks, heavy load lifter, tennis player, painters, plumbers, carpenters, auto workers and in even butchers. As human body work as a unit. It is a kinetic chain if there is problem elsewhere in a body then nearby structures may also get affected. The patients those who have lateral epicondylitis are either avoid the movements of affected hand or do trick movements due to which proximal muscles undergo into weakness and it will leads to scapulothoracic joint dysfunction. This study was conducted to find out scapulothoracic joint dysfunction in patients with lateral epicondylitis.

**Objective:** To find out prevalence of scapulothoracic joint dysfunction in patients with lateral epicondylitis.

**Method:** An observational study was carried out using a cross sectional study design. The study was conducted in the city of Karad, Maharashtra. Study was conducted using a sample size of 21 patients with lateral epicondylitis ( $n= 4pq/L^2$ ) for a period of 6 months. The inclusion criteria was 30-50 years of age group and both male and female were included who were having lateral epicondylitis and exclusion criteria was the subjects with upper quadrant musculoskeletal problems and any thoracic surgery within past 6 months and subjects who have any spinal deformity like scoliosis.

**Result:** The results showed that there was significant dysfunction in scapulothoracic joint in patients with lateral epicondylitis by using DASH questionnaire, scapular retraction test and scapular load test.

**Conclusion:** On the basis of the result of the study, it was concluded that there is significant dysfunction in the scapulothoracic joint in patient with lateral epicondylitis.

**Keywords:** *Lateral epicondylitis and scapulothoracic joint dysfunction.*

## Introduction

Lateral epicondylitis is a cumulative trauma disorder or repetitive motion disorder which is characterized by pain in the lateral epicondyle of humerus.<sup>[1]</sup> There is a non specific inflammation of extensor tendon of forearm muscles (Extensor carpi radialis brevis, Extensor digitorum, Extensor digiti minimi and Extensor carpi ulnaris) is affected due to repetitive action of forearm.<sup>[2,4]</sup> Recent studies show that this often occur due to damage of specific forearm muscle especially Extensor carpi radialis brevis (ECRB). When the ECRB is weakened

due to overuse, microscopic tears form in the tendon where it attaches to the lateral epicondyle. The ECRB get damage when elbow bends and straightens the muscle rubs against bony bumps. It leads to pain and tenderness on the lateral side of the elbow.<sup>[3]</sup> These muscles help in wrist extension.<sup>[2]</sup>

This condition is mainly seen in individuals those who have repeated use of elbow like housewives, cooks, heavy load lifter, tennis player, painters, plumbers, carpenters, auto workers and in even butchers. Male develop this condition as frequently as in females.<sup>[5]</sup>

Individuals who have chronic hyperglycaemia are at high risk of lateral epicondylitis.<sup>[6]</sup> Most of the individuals who get this condition are in between 30 to 55 years. The action like holding a racquet, turning a wrench or shaking hands may worsen the symptoms.<sup>[3]</sup> Patient complains with pain, tenderness over lateral aspect of elbow and unable to grip objects while doing wrist extension it. Therapist should assess lateral epicondylitis with the help of Cozen's test, Mill's test and Maudsley's test.<sup>[7]</sup>

As human body work as a unit. It is a kinetic chain if there is problem elsewhere in a body then nearby structures may also get affected. The patients those who have lateral epicondylitis are either avoid the movements of affected hand or do trick movements due to which proximal muscles undergo into weakness and it will leads to scapulothoracic joint dysfunction.

Scapulothoracic joint is basically not an anatomical joint. Its articulation is forms by the convex surface of the posterior thoracic cage and the concave surface of the anterior scapula. This articulation allows increased shoulder elevation. For every 2° of glenohumeral elevation there 1° of scapulothoracic elevation. It attaches to axial skeleton with the acromioclavicular and sternoclavicular joints. During assessment of scapula therapist should observe scapulohumeral rhythm of shoulder complex. That is during 180° of shoulder abduction there is 120° movement occur at glenohumeral joint and 60° movement occur at scapulothoracic joint. There is 2:1 ratio in between these two joints. In some condition reverse scapulothoracic rhythm may also be seen.<sup>[8]</sup>

Scapular dysfunction means there is an alteration in a normal static or dynamic position or motion of the scapula during coupled scapulohumeral movement. This term is used to describe the loss of scapula motion. Normal resting position of scapula is 5cm from midline extended between 2<sup>nd</sup>-7<sup>th</sup> ribs or from T<sub>2</sub> to T<sub>7</sub>-T<sub>9</sub> vertebra. The scapula is internally rotated 35° to 45°, tilted anteriorly 10° to 15°, upward rotated 5° to 10°.<sup>[8]</sup> Its classification is base on prominence of scapular border.

Type 1 (inferior angle): at rest prominence of inferior medial scapular border.

Type 2 (medial border) : at rest medial border becomes prominent.

Type 3 (superior border): at rest scapula gets

elevated. Type 4 (symmetrical scapulohumeral): there is more upward rotation of involved side.<sup>[3]</sup>

Other causes of scapular dysfunction are postural abnormality or anatomical disruption, any cervical nerve injury, muscle imbalance or weakness etc.<sup>[3]</sup>

Scapular dysfunction was assess with the help of posture assessment in posterior view or with special tests like scapular retraction test and scapular load test.<sup>[7]</sup> In Scapular retraction test patient was in standing position and examiner should stand behind him, places the fingers of one hand over the clavicle with the heel over the spine of scapula for stabilization. The examiner's other hand compresses the scapula against chest wall. Holding the scapula in this position provides a firm stable base for the rotator cuff muscles, if scapular retraction reduces the pain then the test is positive it indicates that the weak scapular muscles must be addressed. Scapular load test was perform by loading the arm at 45° and greater abduction to see how the scapula stabilizes under the dynamic load. The scapula should not move more than 1.5 cm. Loading the scapula was indicate the stabilizing ability of the scapular muscles and whether abnormal winging or movement patterns occur.

## Material and Method

An observational study was carried out using a cross sectional study design. The study was conducted in the city of Karad, Maharashtra. The samples were chosen using the simple random sampling method. The participants in this study are both male and female who were having lateral epicondylitis. Subjects are selected as per inclusion and exclusion criteria. Study were conducted using a sample size of 21 patients with lateral epicondylitis ( $n = 4pq/L^2$ ) for a period of 6 months. The materials were using in this study includes data collection sheet and consent form.

**Outcome Measures:** The outcome measures was taken for this study were DASH questionnaire and the scapular stability special tests including scapular load test and scapular retraction test.

**Statistical Analysis:** Statistical analysis of the recorded data was done by using the software SPSS version 20.

21 subjects were selected for the study, of which 17 were females and 4 were males.



**Table No. 1. Frequency and percentage of DASH score**

DASH score	Frequency	%
<40	1	4.76%
40-55	20	95.23%

**Interpretation:**

- Above table is use to distribute the frequency and percentage of DASH score.
- Only one subject has < 40 DASH score whose percentage is 4.76%.
- 20 subjects have DASH score in between 40-55 and the percentage is 95.23%

**Table No. 2. 30-≤40 age wise distribution of DASH score.**

	Mean±SD	T value	P value	Interference
Age (30-≤40)	35.80±4.05	27.95	<0.0001	Extremely significant
DASH score	48.42±3.61	42.37	<0.0001	Extremely significant

**Interpretation:**

- Above table shows the distribution of DASH score in 30-≤40 age group.
- Age group is 30-≤40 with mean±SD 35.80±4.05 and DASH score mean±SD is 48.42±3.61.

**Table No. 3. DASH score in age group >40-50**

	Mean±SD	T value	P value	Interference
Age (>40-50)	46.54±3.01	51.25	<0.0001	Extremely significant
DASH score	46.36±7.55	20.34	<0.0001	Extremely significant

**Interpretation:**

- This table shows the age group wise DASH score distribution.
- Age group id>40-50 with mean±SD 46.54±3.01 and DASH score mean±SD is 46.36±7.55.

**Table No. 4. SRT findings**

Right		Left	
Positive	Negative	Positive	Negative
16	5	3	18

**Interpretation:**

- This table shows the positive and negative SRT findings.
- Above shows there are total 19 subjects have positive SRT 16 on right side and 3 on left side and 3 subjects have negative SRT on right side and 18 have on left side.

**Table No. 5. SLT findings**

Right		Left	
Positive	Negative	Positive	Negative
9	12	2	19

**Interpretation:**

- This table shows that total 11 subjects have positive SLT 9 have on right side and 2 on left side.
- 12 subjects negative SLT on right and 19 have negative SLT on left side.

**Result**

The result showed that there was significant dysfunction in scapulothoracic joint in patients with lateral epicondylitis by using DASH questionnaire, scapular retraction test and scapular load test.

**Discussion**

The patients with lateral epicondylitis initially have difficulty in wrist extension along with pain due to origin of extensor muscles of forearm get injured especially ECRB. These patients usually complaints of pain over lateral condyle of humerus. Some studies shows that the individuals with lateral epicondylitis either avoid the movements of affected extremity or else perform trick movements to fulfill the daily activity due to which stresses are act on the scapular muscles especially serratus anterior and trapezius as per some articles.<sup>[5]</sup> Muscular weakness may lead scapulothoracic joint dysfunction in later stages.

The aim of the study is to find out the prevalence of scapulothoracic joint dysfunction in patients with lateral epicondylitis.

This project was done in six months of duration with sample size 21(females- 17 and males- 4) and age group of 30 – 50 years. Individuals was selected as per inclusion and exclusion criteria. The confirmatory diagnosis of lateral epicondylitis was done with the help of Cozen's, Mill's and Maudsley's test.

After confirmation of lateral epicondylitis patient's consent form was taken and then ask to fill them a DASH questionnaire which includes 30 questions then their total score were calculated. 95.23% patients have total score in between 40-55 out of 100. Later on scapular stability tests are perform for confirmation scapulothoracic joint dysfunction which includes scapular retraction test and scapular load test..

According to Joseph M. Day. et. al, article he concluded that there is significant weakness of lower trapezius and serratus anterior as well as decline in the scapular muscle endurance. This article also mention

that the study does not allow for definitive conclusions that scapular muscle weakness is a causative factor for the development of LE.<sup>[5]</sup>

In table no. 1 there is distribution of DASH score with frequency and percentage <40 score percentage is 4.76% and between 40-55 score 95.23%.

Table No. 2 and 3 shows DASH score in two age groups including- a . age group 30 - ≤40 b. age group >40- 50.

In table no.4 SRT and in table no.5 SLT findings are shown. SRT findings of right side shows that 16 subjects have positive and 5 have negative SRT while left side SRT findings have 3 positive and 18 negative SRT. In right side SLT findings 9 subjects have positive and 12 have negative SLT while left side SLT findings have 2 positive and 19 negative SLT.

This study showed that there is significant weakness in the scapular muscles in individuals with LE with help of scapular stability test which is a causative factor for the scapulothoracic joint dysfunction. Therefore the findings suggest that therapists should consider the factors that impact scapular muscles performance which leads to scapulothoracic joint dysfunction in patients with lateral epicondylitis.

**Conclusion**

On the basis of the result of the study, it was concluded that there is significant dysfunction in the scapulothoracic joint in patient with lateral epicondylitis.

**Conflict of Interest:** There was no conflict of interest.

**Source of Funding:** This study was self funded.

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

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# A Study on Perceptions of Mothers regarding Electronic Screen Media Exposure of their Preschool-Aged Children

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## Abstract

**Background:** Media is a pervasive force that is becoming dominant in the lives of children. A growing proportion of children's leisure time is spent with screens including smartphones, tablets, gaming consoles and televisions, raising concerns about the effect of screen time on well-being among parents, health professionals and educators. An accurate understanding of the role of media in children's lives is essential for promoting healthy development. Hence this study was conducted to understand the perceptions of mothers regarding electronic screen media exposure of their preschool-aged children.

**Methodology:** A cross-sectional study was conducted among 1620 mothers having children aged between 2-5 years. An interview schedule having semi-structured questions was designed. The data thus collected was tabulated and converted into frequencies and percentages.

**Results:** All (100%) mothers reported having television and smartphone/mobile at home. Majority (81.4%) reported that their preschool-aged children spend >2 hours daily on screen media. Mothers had both positive and negative perceptions regarding screen-viewing behaviour of their preschool children in various aspects.

**Conclusion:** To promote child health and development in a digital world, physicians and other health care providers should counsel parents and caregivers of young children on the appropriate use of screen time.

**Keywords:** *Preschool-aged children, Screen media exposure, Perceptions of mothers.*

## Introduction

The screen, whether it is computer, mobile, tablet or television, is a symbol of our modern age.<sup>1</sup> A growing proportion of children and adolescents' leisure time is spent with screens including smartphones, tablets, gaming consoles and televisions, raising concerns about

the effect of screen time on well-being among parents, health professionals and educators.<sup>2,3,4</sup>

Experts feel that the early years of life are considered a critical time for brain development. As kids get older, too much screen time can interfere with activities such as being physically active, reading, doing homework, playing with friends and spending time with family. Excessive screen media use can impede language skills, which are best developed through reading and interactions with others in conversation and play and can also make risk-taking and social relationships difficult for many children.<sup>5</sup>

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In a new set of guidelines the World Health Organization has said that infants should not be exposed

to electronic screens and that children between the ages of 2 and 4 should not have more than one hour of “sedentary screen time” each day. United Nations health agency has announced that limiting and in some cases eliminating, screen time for children under the age of 5 will result in healthier adults.<sup>6</sup>

World Health Organization recently decided to include gaming disorder in the 11th revision of the International Classification of Diseases.<sup>7</sup>

Associations between screen time and poor health outcomes such as obesity and lack of exercise have been well-documented.<sup>8,9</sup>

Studies find significant associations between screen time and low well-being while others find null effects or even benefits with greater screen time.<sup>3,10</sup>

To our knowledge, very few previous studies have examined screen time exposure among children and factors affecting it including the knowledge of parents regarding effects of excessive screen time exposure. Therefore, this study was conducted with the objectives to know the duration of screen media exposure and other patterns of preschool-aged children and to understand the factors affecting the amount of time that mothers expose their preschool children to electronic screens and perceptions of mothers regarding screen-viewing behaviour of children in various aspects. It was also expected that gathering information regarding mothers’ beliefs about the effects of screen media would predict whether they monitor their children’s access to screen time.

## Methodology

**Type of study:** Cross-sectional study

**Place of study:** Anganwadi Centres of Kolar Taluk, Karnataka.

**Period of study:** 8 months (January 2019 to August 2019)

**Study Population:** Mothers of preschool children aged 2-5 years attending anganwadis

**Sampling:** Convenience sampling technique was adopted. According to 2011 Census, there are 362 villages in Kolar Taluk, Karnataka. The names of all the

villages were listed. It was decided to select 25 per cent (i.e. 91 villages) out of total number of villages by lottery method. Then one anganwadi was chosen randomly from each village. Thus all the 91 anganwadis were visited and mothers of all the preschool children aged 2-5 years attending these anganwadis were included in the study. So in total, 1620 mothers were interviewed.

**Inclusion Criteria:** Mothers of children aged 2-5 years attending the anganwadis who gave written informed consent to participate in the study.

**Exclusion Criteria:** Mothers who were not willing to participate in the study

**Tool:** A pre-designed and semi-structured proforma was used to collect the data. The questionnaire elicited information regarding:

- Availability of various types of electronic screen media at homes and their access to preschool children
- Duration of screen media use and activities followed on them by preschool children
- Factors affecting the amount of time that mothers expose their preschool children to electronic screens
- Perceptions of mothers regarding screen-viewing behaviour of their preschool children in various aspects

**Data Collection:** All the 91 anganwadis were visited and all the anganwadi workers were informed about the purpose and procedure of the study. Anganwadi workers were asked to inform and motivate mothers of all the children aged 2-5 years of age attending anganwadis to come on a particular day and the anganwadis were revisited on that day. Mothers of children were interviewed after taking written informed consent from them after explaining them the purpose of study in local language (Kannada).

**Statistical Analysis:** Data was analyzed using Epi Info software version 7. Descriptive statistics were presented in frequencies and percentages.

However, as the study was qualitative in nature, apart from quantifying some of the data, it was described qualitatively in detail so as to understand and analyze the results in a better way.

**Findings:****Table 1: Distribution on the basis of availability of various types of electronic screen media at homes and their access to preschool children (Multiple responses permitted).**

Availability of electronic screen media	Frequency (%)	Access of children to screen media
		Frequency (%)
Television	1620 (100%)	1620 (100%)
Smartphone/Mobile	1620 (100%)	1551 (95.7%)
Computer/Laptop	735 (45.8%)	718 (97.7%)
Video game console	192 (11.9%)	192 (100%)
Tablet	107 (6.6%)	85 (79.4%)

Table 1 shows that all (100%) study participants have television and smartphone/mobile at home, 45.8% have computer/laptop, 11.9% have video game console and 6.6% have tablet at home. Out of those participants having the mentioned screen media at home, 100% reported that their preschool children have access to television and video game console, 97.7% reported the access to computer/laptop, 95.7% reported the access to smartphone/mobile and 79.4% reported the access of their preschool children to tablet.

**Table 2: Distribution on the basis of duration of using various electronic screen media and activities followed on media by preschool children (N=1620).**

Duration of use of screen media/day	Frequency (%)
<2 hours	301 (18.6%)
3-5 hours	1293 (79.8%)
>5 hours	26 (1.6%)
Activities (Multiple responses permitted)	
Watching cartoons	1620 (100%)
Playing games and watching videos	1551 (95.7%)
Watching movies and serials along with mothers	1114 (68.8%)
Watching educational programs	450 (27.8%)

Table 2 shows that majority of study participants (79.8%) reported that their preschool children spend 3-5 hours/day on screen media, followed by 18.6% reporting <2 hours/day and 1.6% reporting >5 hours/day spent on screen media. 100% mothers said that their preschool children use screen media for watching cartoons, followed by 95.7% reporting for playing games and watching videos, 68.8% reporting for watching movies

and serials along with them and only 27.8% reporting for watching educational programmes.

**Table 3: Distribution on the basis of reasons for screen-viewing by preschool children (N=1620) (Multiple responses permitted).**

Reasons for screen-viewing	Frequency (%)
For child to rest, get entertained, relax or have some quiet time	1620 (100%)
Television would be playing in the common living area where the children would be present	1584 (97.8%)
When the child complains of boredom	1497 (92.4%)
To calm down the child and prevent disruptive behaviour	1412 (87.2%)
So that child would not disturb household chores	1293 (79.8%)
Education and development of skills	851 (52.5%)
As a positive reinforcement method	752 (46.4%)
As a distraction to feed the children	590 (36.4%)

Table 3 shows that mothers gave a range of reasons for why they allow their preschool child for screen-viewing. All (100%) mothers said that screen-viewing is a good way for their child to rest, get entertained, relax or have some quiet time, 97.8% disclosed that the main factor affecting television screen time is the fact that it would be playing in the common living area where the children would be present, 92.4% reported that children are allowed screen time when they complain of boredom, 87.2% mothers said that screen-viewing is also encouraged when they feel that their child is too restless or excited, so to calm down the child and prevent disruptive behaviour, 79.8% reported

that screen-viewing is allowed so that child would not disturb household chores, 52.5% mothers felt that screen-viewing provides a valuable educational and skill development opportunity, 46.4% said that they allow

screen-viewing as a positive reinforcement method and 36.4% expose their preschool children to screen-viewing as a distraction to feed them.

**Table 4: Distribution on the basis of perceptions of mothers regarding screen-viewing behaviour of their preschool children in various aspects (N=1620).**

Perceptions of mothers regarding screen-viewing behaviour of their preschool children	Agree n (%)	Disagree n (%)
Though good source of relaxation and entertainment but acceptable in moderation and balance	1620 (100%)	0 (0)
	<b>Yes n (%)</b>	<b>No n (%)</b>
Concerned about addictive nature of screen-viewing	1620 (100%)	0 (0)
Concerned about inappropriate/unsuitable/objectionable content	1620 (100%)	0 (0)
Concerned about adverse changes in behaviour	991 (61.2%)	629 (38.8%)
Concerned about negative effects on learning and education	1219 (75.2%)	401 (24.8%)
Concerned about adverse effects on development of important skills (motor, cognitive, social and technical skills)	375 (23.1%)	1245 (76.9%)
Effects on outdoor physical activity	1307 (80.7%)	313 (19.3%)
Concerned about adverse effects on health	1620 (100%)	0 (0)
Sleep disturbances	1282 (79.1%)	338 (20.9%)
Effects on parent-child relationship	1051 (64.9 %)	569 (35.1%)

Table 4 shows that all (100%) mothers agreed that though screen media are good source of relaxation and entertainment for their preschool children but are acceptable only in moderation and balance. All (100%) mothers showed concern about the addictive nature of screen-viewing and felt that their child would form habits that would continue in later life. All (100%) mothers showed concern about inappropriate/unsuitable/objectionable content shown on screen media like violence, sexual content, food advertising, etc and felt that it can have deleterious effects on their child. Majority (61.2%) of mothers felt that excessive screen-viewing can lead to adverse changes in behaviour of their child. Some mothers reported that they have even observed behavioural changes (like stubbornness, aggressiveness, hyperactive/inattentive behaviour) in their children due to excessive screen-viewing. Some also showed concern that excessive use of screen media can encourage bad behaviour or violence in their children in future. Only 38.8% mothers considered screen media as valuable behaviour management tool with no adverse effects. Majority (75.2%) of mothers showed concern about the

adverse effects (like school maladjustment and poor academic performance in future) that excessive screen-viewing can have on their children. Only 24.8% felt that screen media have no adverse effects on learning and education and considered that screen media provide valuable learning and educational opportunities for children. Majority (76.9%) of mothers considered screen media as valuable tool for development of important skills for their children (like motor, cognitive, social and technical skills). Only 23.1% mothers showed concern about the adverse effects that excessive screen-viewing can have on the development of important skills for their children. They felt that excessive screen-viewing can negatively affect the development of cognitive skills (like language acquisition, attention, memory and thinking) and can also lead to communication problems and social disconnection. Some mothers even reported that their children are socializing less due to hours being spent in front of screen media. Majority (80.7%) of mothers felt that excessive screen-viewing has considerably reduced the playing time of their children and 19.3% reported no effect on outdoor physical activity of their

children. All (100%) mothers were concerned about the adverse effects that excessive screen-viewing can have on the health of their children. Some even reported health problems (like vision problems, obesity, frequent headaches and backaches, adverse dietary outcomes due to either eating too less or more) that their children are already suffering from due to spending long hours in front of screens. Majority (79.1%) of mothers reported sleeping disturbances (like inadequate/insufficient sleep, delayed sleep-wake behaviour) in their children and 20.9% reported no sleep disturbances. Majority (64.9%) of mothers felt that their relationship with the child is affected due to excessive screen-viewing. They said that as the child is glued to the screen for many hours, they are not able to spend a sufficient amount of time with them. 35.1% said that screen-viewing has not affected their relationship with their child.

### Conclusion and Recommendations

Majority of mothers reported that their preschool-aged children spend >2 hours daily on screen media, which is not recommendable for this age group. It was found that most of the time, preschool-aged children are being exposed to screens by parents for reasons other than being exposed for the purpose of education and skill development. Mothers had both positive and negative perceptions regarding screen-viewing behaviour of their preschool children in various aspects.

To promote child health and development in a digital world, physicians and other health care providers should counsel parents and caregivers of young children on the appropriate use of screen time. Specific recommendations include the following:

#### Minimize Screen Time:

- Screen time for children younger than 2 years is not recommended.
- For children 2 to 5 years, limit routine or regular screen time to less than 1 hour per day.
- Ensure that sedentary screen time is not a routine part of child care for children younger than 5 years.
- Maintain daily 'screen-free' times, especially for family meals and book-sharing.
- Avoid screens for at least 1 hour before bedtime

#### Mitigate (reduce) the risks associated with screen time:

- Be present and engaged when screens are used and, whenever possible, co-view with children.
- Be aware of content and prioritize educational, age-appropriate and interactive programming.
- Use parenting strategies that teach self-regulation, calming and limit-setting.

#### As a family, be mindful about the use of screen time:

- Conduct a self-assessment of current screen habits and develop a family media plan for when, how and where screens may (and may not) be used.
- Help children recognize and question advertising messages, stereotyping and other problematic content.
- Remember: too much screen time means lost opportunities for teaching and learning.
- Be reassured that there is no evidence to support introducing technology at an early age.

#### Adults should model healthy screen use:

- Choose healthy alternatives, such as reading, outdoor play and creative, hands-on activities.
- Turn off their devices at home during family time.
- Turn off screens when not in use and avoid background TV.

**Source of Funding:** Self

**Conflict of Interest:** None

**Ethical Approval:** The study was approved by the Institutional Ethics Committee.

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# Corticosteroid Utilization Pattern: A Prospective Study at a Tertiary Care Teaching Hospital

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## Abstract

**Objectives:** This study aimed to explore the prescribing pattern of steroids among patients from different departments and study the most commonly prescribed corticosteroid medications and the assessment of patient knowledge about the use of corticosteroids.

**Method:** We conducted a prospective observational study on 120 patients receiving corticosteroids in the department of General medicine, Respiratory and Orthopedic in a tertiary care teaching hospital for the period of 6 months. Inpatients between 18-60 years receiving corticosteroid therapy were included in the study, exclusion of those patients who were under critical condition, lactating and nursing mothers and those not willing to sign on inform consent form.

**Key Findings:** The study involved 120 patients to evaluate the appropriate use of corticosteroids. The analysis of prescription was done and 24% of the prescriptions were found with drug interactions the majority of drug interactions were minor (72%), followed by moderate (26%) and no severe interaction was found and 76% were without interactions. Total 29(24.1%) side effects were found in the study due to corticosteroid use, hypertension was detected in 8 (28%), hyperglycemia in 7 (24%), sleep disturbance in 5 (17%), weight gain in 5 (17%) and gastrointestinal upset in 4 (14%). The use of inhaler was improved in patients from 55% to 83%.

**Conclusions:** The study was found to be rational as the majority of interactions were minor, followed by moderate and no severe interaction was found. Greater awareness for use of corticosteroids is essential; therefore, strategies to improve drug safety and better patients outcome. Prevention of side effects and rational prescribing can be better achieved by clinical pharmacist's intervention in patient care.

**Keywords:** Corticosteroids; Disease; Haryana; Rational; Side effects; Steroids.

## Introduction

Steroids, since their identification in 1935 have wide range of applications in various diseases.<sup>[1]</sup> The term steroid is relevant to a wide range of molecules showing varying physiological effects.<sup>[2]</sup> Corticosteroids (CS) belongs to the class of chemicals are naturally

produced and laboratory-synthesized hormones.<sup>[3]</sup> Since their discovery in the 1940s, Corticosteroids play a vital role in the treatment of many diseases including Chronic Obstructive Pulmonary Disease, Asthma and Rheumatoid Arthritis.

Chronic Obstructive Pulmonary Disease (COPD) is a multidimensional disease with a variety of intermediate and clinical phenotypes. It is estimated that COPD will become the third most common cause of death worldwide by 2030.<sup>[4]</sup> COPD was defined by the Global Initiative for Chronic Obstructive Lung Disease (GOLD) as a common treatable and preventable disease characterized

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by constant airflow limitation that is usually progressive and coupled with an enhanced chronic inflammatory response to noxious particles or gases in the airway and the lung. Chronic bronchitis and emphysema are associated with COPD.<sup>[5]</sup> The pulmonary injury involves three stages i.e, initiation (due to exposure to cigarette smoking, pollutants and infectious agents), progression and consolidation.<sup>[4]</sup> Symptoms including cough with or without sputum, chest pain, breathlessness, decreased the quality of life (QOL) and loss of lung function become worst with acute exacerbations of COPD. During exacerbation of COPD airway inflammation is significantly increased the number of lymphocytes, eosinophils and neutrophils are elevated in airways and sputum.<sup>[6]</sup> Exacerbations play an important role in etiology as it accounts for morbidity, mortality and associated costs with COPD.<sup>[7]</sup> Studies have shown that the use of corticosteroids improves short term lung function and decreases the rate of treatment failure as well as the length of hospital stay. But their side effects made them unsuitable to treat long term stable COPD. The inhaled form of corticosteroids proved to be highly effective in the treatment of COPD and asthma.<sup>[7]</sup>

The prevalence of asthma has been increased rapidly over the last few decades and it is estimated that there are 334 million sufferers of asthma worldwide.<sup>[8]</sup>

Asthma is a respiratory condition which consists of increased airway hyper-responsiveness and increased episodes of obstruction and inflammation of lungs due to hyperactive inflammatory replications towards agents such as dust, chemicals and allergic pathogens.<sup>[9]</sup> The disease is characterized by recurrent episodes of cough, wheezing and breathlessness.<sup>[10]</sup> The central feature of bronchial asthma is airway inflammation. The main changes related to the airway circulation include the proliferation of blood vessels (angiogenesis),<sup>[11]</sup> increased blood flow,<sup>[12]</sup> increased micro vascular permeability,<sup>[13]</sup> and edema formation in the airway wall.<sup>[14]</sup> There is no cure for asthma, but the symptoms can be controlled by advanced and conventional therapy.<sup>[15]</sup> The current asthma treatment aims at decreasing day-to-day asthma symptoms and reducing future risks which includes severe exacerbations, hospitalizations and death which can be decreased by inhaled corticosteroids (ICS). ICS are the strength for the standard of care in long-term treatment of asthma.<sup>[16]</sup> They are the most commonly used treatment for asthma which can suppress the characteristic inflammation in airways.<sup>[17]</sup>

Rheumatoid Arthritis is an autoimmune disease which affects nearly 1% population all over the world.<sup>[18]</sup> It is characterized by inflammation of synovial and destruction of a joint which can cause severe disability if left untreated.<sup>[19]</sup> It mainly affects the small joints of hands and feet. It is a chronic inflammatory disease which causes pain, swelling and stiffness. The disease has no cure yet. Symptomatic treatment can be given to the patients suffering from RA which can increase the quality of life. Treatment includes disease modifying anti-rheumatic drugs (DMARDs), non-steroidal anti-inflammatory drugs (NSAIDs) and low dose steroids. In the effective management of RA symptoms, oral corticosteroids are widely used therapy.<sup>[20]</sup>

Considering the economic burden of the chronic disease treatment and because of the increased prevalence of the chronic diseases, it is very important to study the drug prescribing pattern of diseases.

So, drug utilization studies are important in evaluation of health care system. So the clinical pharmacist's intervention has a positive impact in identifying and managing chronic diseases among patients.<sup>[21]</sup> Irrational use of steroids can increase the risk of adverse effects and hence the aim of this study is to improve and ensure patient safety on long term use of corticosteroid by observing the prescribing pattern.

## Materials and Method

A prospective observational study was conducted on 120 patients for 6 months from December 2018 to June 2019 to evaluate drug utilization pattern of corticosteroids. The protocol of the study was approved by Institutional Ethics Committee (IEC) at Maharishi Markandeshwar Institute of Medical Sciences and Research (MMIMSR), Mullana with ethical clearance number: 1316

A data entry format was specially designed which was used to enter patient demographic data (name, age, gender, address), date of admission, date of discharge, patient social history, medication history, past medical history, diagnosis, type of corticosteroid prescribed, dose, side effects. Patients were provided with standardized questionnaires (Modified St. George respiratory questionnaire). The detection and casualty assessment of ADRs is done by Naranjo scale<sup>[22]</sup>. The data was collected using suitably designed data collection form during regular ward round in the General Medicine, Respiratory and Orthopedic department.

Finally the results were analyzed using descriptive statistical method and were reported to concerned departments.

**Study Site:** The study was carried out in various department (General Medicine, Respiratory and Orthopedic) of Maharishi Markandeshwar Institute of Medical Sciences and Research (MMIMSR), Mullana, Ambala, Haryana.

**Inclusion Criteria:** Patients of various age groups who received any category of steroid therapy in all the departments of the hospital were included. Inpatients above 18 years receiving corticosteroids therapy and patients willing to participate are included in the study.

#### **Exclusion Criteria:**

- Patients treated on outpatient basis. Patients under critical condition and requiring critical stay.
- Lactating and nursing mothers. Geriatric population (>60 years).
- Patients not willing to participate were excluded from the study.

**Findings:** The data was analyzed using descriptive statistical method and were reported to concerned departments. All subjects satisfy the inclusion and exclusion criteria were included as the study population. 120 subjects enrolled in the study who were prescribed with corticosteroids and admitted to various department of Medicine, Respiratory and Orthopedic in Maharishi Markandeshwar Institute of Medical Science and Research (MMIMSR), Mullana, Ambala, Haryana.

Age distribution result shows that there were more number of female patients than male in the study population and maximum population belongs to the age group of 51-60 years as discussed in Table 1.

By analyzing the social history of the patients, it was found that most of the patients 65% were addicted,<sup>[23]</sup> and 35% of the population have no addiction as illustrated in Table 2. Subjects were distributed according to area 66% were rural and 34% were urban. Employment status of the patients were analyzed and it was found that 29% patients were employed and 71% were non-employed.

Patients were categorized according to their disease and out of 120 subjects, 60 (50%) were of COPD, 30 (25%) of Asthma and 30 (25%) of Rheumatoid Arthritis as illustrated in Table 2. On evaluation of prescription

budesonide (long acting) was commonly prescribed corticosteroid in case of COPD i.e. 45% and in case of asthma it was found to be 76%, followed by duolin (short acting) in case of COPD i.e. 42% and in case of asthma it was found to be 15%, hydrocortisone in case of COPD, 5% and in case of asthma 9%.<sup>[24]</sup> In case of RA most commonly prescribed corticosteroid was prednisolone (intermediate acting) (90%) followed by methylprednisolone (10%) as discussed in Table 3.

Patients with mono and dual therapy were found to be 54 and 66. Corticosteroids used in monotherapy were Prednisolone, budesonide and duolin. Combination therapy prescribed were budesonide + duolin, budesonide + hydrocortisone and prednisolone + methylprednisolone.

In our study the most preferred route of administration in case of COPD and Asthma was nebulizer (80%) and in case of RA the preferred route was oral (92%). This prescribing pattern is comparable to the study in which inhaler administration was found to be highest (44.5%).<sup>[25]</sup> The evaluation of proper use of inhaler was done before and after counseling. Patients were provided with standardized questionnaires (Modified St. George respiratory questionnaire) which helped us to evaluate the patient's knowledge about the proper use of inhaler. The use of inhaler was improved in patients from 55% to 83% after providing counseling regarding the steps followed during inhalation process, nebulizers are most commonly prescribed form of corticosteroids. In case of nebulizer it delivers a fine liquid mist of medication in significantly faster rate to the lungs which provide an effective therapeutic outcome and reduces and reduces the period of hospital stay.<sup>[25]</sup> It was found that correct steroids were prescribed to the patients for particular indications.

The study revealed that 76% of the prescriptions were found with drug interactions and 24% were without interactions as illustrated in Table 4. The majority of interactions were minor (72%), followed by moderate (26%) and no severe interaction was found as discussed in Table 4.<sup>[26]</sup>

The major concomitant drugs category was antihypertensive (20%), cardiac drugs (18.2%), anti-diabetics (17.5%), gastrointestinal drugs (12.5%), hepatic drugs (8.4%) and others (23.4%) as illustrated in Table 5.

On evaluation of prescription the common side effects due to corticosteroid use were hypertension (28%)

followed by hyperglycemia, (24%), sleep disturbance (17%), weight gain (17%) and gastrointestinal (14%) as illustrated in Table 6.

In our study 3 ADRs were found due to corticosteroids use. Headache was detected in 2 (67%) and facial mooning in 1(33%). By using Naranjo

causality assessment scale 1 ADR was possible and 2 ADRs were probable.<sup>[26]</sup>

The study outcome reveals that with increase in age of a person, number of diseases increases due to which use of corticosteroid increases.

**Table 1: Gender Categorization of Study Population (n=120)**

Gender	COPD	Asthma	RA	Percentage (%)
Male	36	8	11	46%
Female	24	22	19	54%
Total	60	30	30	100%

**Table 2: Addiction History and Disease wise distribution of study Population**

Addiction History of study Population						Disease wise distribution of study Population		
	COPD	Asthma	RA	Total	Percentage (%)	Disease	No. of Patients	Percentage (%)
Smoker	40	09	10	59	42%	COPD	60	50%
Tobacco	11	05	03	19	16%	RA	30	25%
No-Addiction	9	16	17	42	35%	Asthma	30	25%

**Table 3: Commonly prescribed Corticosteroids in study Population**

	Budesonide	Duolin	Hydrocortisone	Methylprednisolone	Prednisolone	Ipratropium Bromide
COPD	45%	42%	5%	8%	0	10%
ASTHMA	76%	15%	9%	0	0	0
RA	0	0	0	10%	90%	0

**Table 4: Drug interactions and Severity of interactions in study Population**

Drug interactions in study Population				Severity of interactions within the study population		
				Severity	Number of interactions	Percentage (%)
Prescription screened	No. of Prescription	Percentage (%)	Minor	21	72%	
Prescription with drug interaction	29	24%	Moderate	8	28%	
Prescription without drug interaction	91	76%	Severe	0	0	

**Table 5: Concomitant Drugs observed in the study Population (n=120)**

S.No.	Diagnosis	Drug Category	No. of Patients	Percentage (%)
1.	Hypertension	Anti-hypertensive	24	20%
2.	Heart disease	Cardiac drugs	22	18.2%
3.	Diabetes mellitus	Anti-diabetics	21	17.5%
4.	Gastrointestinal disease	Gastrointestinal drugs	15	12.5%
5.	Liver disease	Hepatic drugs	10	8.4%
6.	Others	Other category drugs	28	23.4%

**Table 6: Side effects associated with Corticosteroids**

Side effects	No. of Patients	Percentage (%)
Hypertension	8	28%
Hyperglycemia	7	24%
Sleep disturbance	5	17%
Weight gain	5	17%
GI upset	4	14%

### Conclusion

The present study demonstrates the prescription and utilization pattern of corticosteroids. Amongst the healthcare professionals, not much variation was found in the pattern of prescription of corticosteroids. The study was found to be rational as majority of interactions were minor.

Establishing the social and economic implications of the prescription patterns to the community will shed light in understanding the gap to be filled in this field.

So, we can conclude that involvement of Clinical pharmacist in patient care can help in rational prescribing as well as prevention of drug- drug interactions, side effects and ADRs.

Education of the general public through media programmes and introduction of continuing medical education programmes for medical, paramedical personals and pharmacist which is probably the most important steps to be taken to create awareness about the rational use/misuse of corticosteroids.

**Conflict of Interest:** Nil

**Acknowledgement:** The authors would like to thank all physicians and nursing staff who participated in this study.

**Source of Funding:** None

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# Estimation of Levels of Streptococcus Mutans in Children with Black Stain

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## Abstract

**Background:** Black stain is a discolouration which mainly occurs along the cervical third of buccal or lingual surfaces of the teeth. It most commonly affects the primary dentition, but permanent dentition may also be affected. Studies state that children with black stain are generally caries free.

**Aim:** To estimate levels of Streptococcus mutans in children with black stain.

**Objective:** To evaluate levels of Streptococcus mutans in children with black stain, in children with dental caries and non carious children.

**Materials and Method:** The study was conducted in school going children of the age group between 3-12 years of age, 5ml unstimulated saliva samples were collected from 15 children comprising of three groups (5 children each) with black stains, with and without dental caries and evaluated for Streptococcus mutans colony forming units.

**Results:** This study showed that children with black stains had lower levels *Streptococcus mutans* (189.6+/-64.16) colony count which was significantly lower when compared to children without any stains or caries (388+/-106.47) and children with dental caries (680.80+/-280.07) which was found to be statistically significant (P value of 0.003\*).

**Conclusion:** Children with black stain have low levels of Streptococcus mutans when compared to children with and without Dental caries.

**Keywords:** Black stains, discolouration, *S.mutans*, dental caries colony count.

## Introduction

Black stain is a discolouration or an extrinsic deposit which most commonly affects the primary dentition, sometimes even the permanent dentition

is also affected. Black stains usually comprise of an insoluble iron salt most commonly ferric sulphide and high levels calcium and phosphate according to Reid et al<sup>[1]</sup>. Koch et al<sup>[2]</sup> formulated a criteria for diagnosing black stains in individuals : presence of dark dots forming a linear discoloration parallel to the gingival margin at the smooth surfaces of atleast two permanent teeth. Black stains have shown equal prevalence in both males and females in previous studies. <sup>[3,4]</sup> Black stains have a tendency to calcify over a period of time if left untreated <sup>[5,6]</sup>. The other causes of black stains are due to chromogenic bacteria like *Prevotella intermedia* and *Prevotellanigrescens* which are dependent on the heme portion of haemoglobin which provides the iron content

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present in the black stains associated with other chemical reactions<sup>[7]</sup>.

In 1924, Clarke isolated a bacterial species from carious lesions which was similar to a mutant form of a coccus and so he designated it *Streptococcus mutans*. The process of dental caries is initiated by the bacteria present in the biofilm and is initiated by the demineralization of the enamel and degradation of the hydroxyapatites when the biofilm remains on the tooth for a long period of time<sup>[8]</sup>. About 700 types of bacteria have been identified from the human oral microbiome<sup>[9]</sup>. *Streptococcus mutans* is the initiator of caries and an important factor for enamel decay. The *Lactobacillus* bacterial species are responsible for further caries progression and development in the dentin. *Mutans Mutans streptococci* and *Lactobacilli* are characterized by the ability to grow in an acid environment and the property of rapid metabolism of sugars supplied in the diet to organic acids, including lactic acid <sup>[10-12]</sup>. *S. mutans* metabolises a number of sugars and glycosides such as glucose, fructose, sucrose, lactose, galactose, mannose, cellobiose, glucosides, trehalose, maltose and a previously unrecognised, group of sugar-alcohols. In the presence of extracellular glucose and sucrose, *S. mutans* synthesizes intracellular glycogen-like polysaccharides (IPSs)<sup>[13]</sup>. *S. mutans* produce bacteriocins, which plays an important role in the colonization and establishment of *S. mutans* in the dental biofilm. Merritt J et al. <sup>[14]</sup> stated that *Streptococcus mutans* is generally recognized as a causative agent of human dental caries. The mutacins or the bacteriocins that are produced by *S. mutans* are considered to be an important factor in the colonization of *S. mutans* in the biofilm. *S. mutans* also survive as they have a low resting pH in the plaque environment and the ability to maintain intracellular pH homeostasis using H<sup>+</sup>/ATPase and acid end product efflux<sup>[15]</sup>. Bowden et al explained the acid tolerance response of *S. mutans*.

Dental caries is one of the most common chronic disease which affects children. Dental caries can be of In developing countries like India, caries prevalence have shown results ranging from 31.5% to 89% <sup>[16-20]</sup>. Dental caries is both a reversible and an irreversible progressing disease which degrades the hard calcified structures. Miller formulated a mechanism which stated that acidogenic microorganisms which are present in the saliva act on the food which have accumulated over the tooth surfaces thereby producing proteolytic enzymes and degrade the organic substances<sup>[19]</sup>.

Previous studies have stated that the levels of *S. mutans* was high in children with dental caries<sup>[21,22]</sup>, comparatively lower in children without any carious lesions<sup>[23]</sup> and least in children with black stains. Not many studies have been done to determine the levels of *S. mutans* in children with and without black stains and compare it with children with and without caries. The purpose of this study is to determine the levels of *S. mutans* in children with and without black stains and to compare it with children with dental caries.

## Materials and Method

- A. Ethical Consideration:** Ethical approval for the study was obtained from the University Ethics and Research Committee of Saveetha Dental College and Hospitals (SRB/SRTG). An informed consent which was written was obtained from the parents of the children who participated. Only children who volunteered and agreed to participate were enrolled into the study.
- B. Subject Recruitment:** 98 children of a Private Childrens Home (Rakshak Organisation), Perungallathur, Chennai were screened for black stains. As only 5 of the total number of children had black stains equal number of children were recruited into the study. 15 children were taken and divided into three groups: Group 1, Group 2, Group 3 namely. Group 1 comprises of children with black stains. Group 2 and 3 are with and without dental caries respectively.
- C. Inclusion Criteria:**
  - a. Children between 3-12 years of age.
  - b. No systemic illness.
  - c. No intake of any antibiotics for the past 3 months.
- D. Exclusion Criteria**
  - a. Child's parents failed to give consent for the study.
  - b. Child who required emergency dental management.
  - E. Intra oral examination

Intra oral examination was done using standard examination instruments like mouth mirror, dental explorer and straight probe.

**Diagnostic Criteria:** The black stains were diagnosed based on Koch et al.[2] black stain criteria. He considered that the presence of dark dots less than 0.5mm in diameter, Forming linear discoloration which were parallel to the gingival margin of smooth surface of atleast two different teeth without any cavitation of the enamel surface.

**F. Sample Collection:** The children were asked to relax and swallow all the saliva present in their oral cavity before the saliva collection. 5ml of Unstimulated saliva was collected in sterile containers from all the three groups.

**G. Streptococcus Mutans Cultivation:** The samples were transferred to the microbiology lab of Saveetha Dental College immediately for bacterial culture. Mutans Sanguineous agar medium was prepared and saliva was inoculated into the agar medium. The samples were spread evenly all over the plate and incubated at 37 Degree Celsius for 24 hours. After 24 hours the culture plates were evaluated for

Streptococcus mutans colony count for all the three groups and the results were statistically evaluated using ANOVA and CHI square test.

**Results**

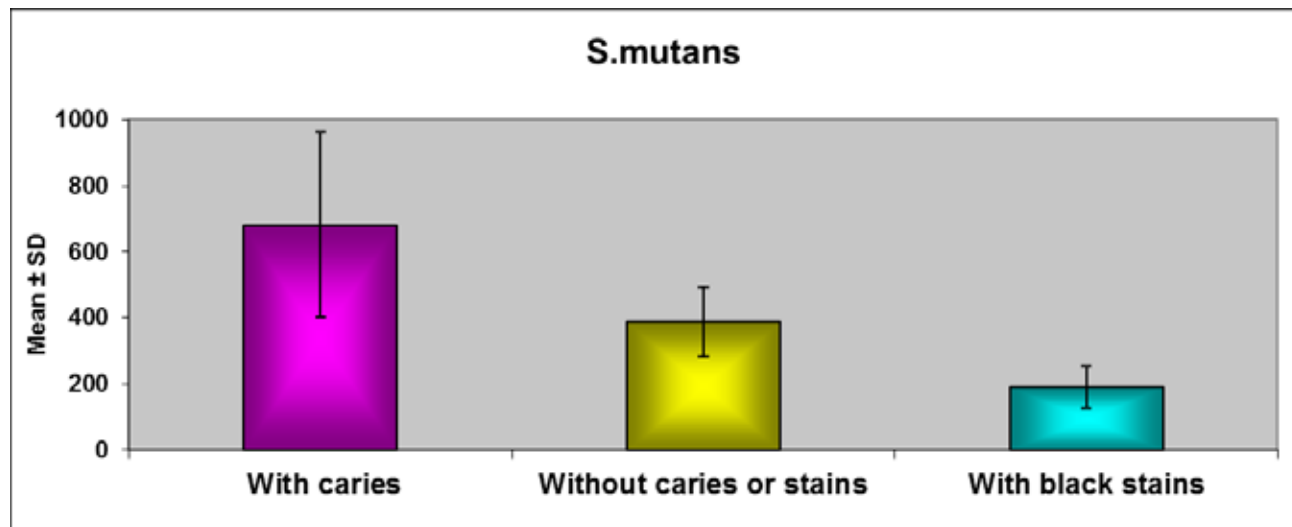
**Table 1: Represents the Streptococcus mutans colony count in each of the groups.**

Group	Mean+/-SD	P values
Group 1	189.6+/-64.16	0.003*
Group 2	388+/-106.47	
Group 3	680.80+/-280.07	

**Table 2: Shows the Inter group comparison – Post HOC test.**

Group 1	Group 2	Group 3
Group 1	-	0.002*
Group 2	0.002*	-
Group 3	0.22	0.055

**Legend:**



**Figure 1: Shows the graphical representation of Streptococcus mutans colony forming units of the three groups.**

Results showed that children with black stains had lower levels *Streptococcus mutans* (189.6+/-64.16) colony count which was significantly lower when compared to children without any stains or caries (388+/-106.47) and children with dental caries (680.80+/-

280.07). P test showed a significance of 0.003\* which is statistically significant. Inter group test results showed that Group 1 and Group 2 comparison had a significant P value of 0.002\*. The other inter group tests did show any significant P values.

## Discussion

The study was aimed to estimate the levels of *S. mutans* in children with black stains and compare it with the colony count in children with and without caries. The results of this study show that children with black stains have a *S. mutans* colony count of 189.6±64.16 which is lower when compared to the children without caries or stains 388±106.47. Children with dental caries had very high levels of *S. mutans* colony count (680.80±280.07). Previous studies have shown strong association of *S. mutans* in children with dental caries<sup>[24,25]</sup> and children with black stains have a lower incidence of black stains<sup>[26,27,28]</sup>.

Children with dental caries have very high levels of *Streptococcus mutans*, as it plays a very important role in the initiation of dental caries. The levels may be high due to various other mechanisms like malnourishment, improper maintenance of the oral hygiene or due to increased levels of *Streptococcus mutans* in the mothers of the children with dental caries thereby vertical transmission. Children without any caries or stains also had a significantly lower levels *Streptococcus mutans* when compared to the children with dental caries even in the absence of black tooth stains which comprised of calcium and phosphate. However the levels of *Streptococcus mutans* in children without any caries or stains was higher than the children with black stains. Thus, due to some other mechanisms only the levels of *Streptococcus mutans* are low in children with black stains and children without any caries or stains when compared to the children with dental caries. Further studies have to be done to evaluate the actual mechanism behind the lower levels of *Streptococcus mutans* and lower incidence of caries.

The results of the present study states that children with black stains had lower levels of *Streptococcus mutans* when compared to the other two groups. Reid JS et al. performed the study in Sixty-four 13-year-old children who were residents of the City of Glasgow and concluded that children with black stains had a lower incidence of caries due to the presence of calcium and phosphate in the biofilm of the stain. The results of the present study also coincided with Heinrich-Weltzien et al, who stated that *S. mutans* and *S. sobrinus* were not significantly found in samples of black stains and non-discolored plaque in both caries-free and affected children, but counts of *Lactobacillus* sp. were higher in non-discolored plaque samples<sup>[29]</sup>. Contradicting to

the results obtained from the present study Gasparetto et al.<sup>[30]</sup> also reported higher caries experience in 6-12 year old children without black stain but significance of this difference was not statistically tested. The present study compares the levels of *S. mutans* in children with black stain to the children with and without dental caries which has not been done in many studies.

The major short come of the present study is that the sample size is very limited and hence further study has to be done to evaluate the accurate reason for the lower incidence of caries in children with black stains and also the reason for black stains to appear in the oral cavity.

**Conflict of Interest:** Nil

**Source of Funding:** Self

**Ethical Clearance:** Ethical clearance obtained from The Department of Research, Saveetha Dental College and Hospitals, Saveetha University.

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# Comparing the Anthropometric Measurements as a Tool for Anterior Teeth Selection

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## Abstract

**Aim:** To determine a correlation between the dimensions of the ear and the inter canine width for anterior teeth selection process.

**Objective:** The objective of the study is to compare the dimensions of the ear with the bizygomatic width and the canine to canine width to determine a correlation for selection of anterior teeth.

**Materials and Method:** A total of 20 individuals who were of the South Indian population were selected at random. The height and width of the ear (Pinna) the bizygomatic width and their inter canine distance were measured and compared. Data was analysed and the results were statistically evaluated using Student T test.

**Results:** The average values obtained for the height of the ear is (64.4±6.27)mm and for the bizygomatic width is 32.76±1.93mm respectively. The average value for the inter canine width measured was 63.4±5.93mm . The average values obtained from the height of the ear was very close to the inter canine distance measured.

**Conclusion:** Anthropometric measurements of the ear can be used as a tool for anterior teeth selection.

**Keywords:** *Inter canine distance, anterior teeth selection, bizygomatic width*

## Introduction

Selection of artificial teeth is one of the important steps in complete denture and removable partial dentures. It is a step which is often neglected which results in an unesthetic appearance of the denture prosthesis. Selection of the correct artificial teeth is important as it is directly related to the appearance of the patient and preservation of the residual ridges. The size and form

of the maxillary anterior teeth are important for facial and dental esthetics. The goal is to restore the maxillary anterior teeth in harmony with the facial appearance<sup>[1]</sup>. According to Young “it is clear that beauty, harmony, naturalness and individuality square measure major qualities” of esthetics.<sup>[2]</sup>

Teeth were selected in the ivory age mainly by dimensional measurements with very little importance given to the facial form and other dimensions of the facial structures. The first concept considered in dentistry for esthetic selection of teeth was used by artists which was given by Madame Schimmelpainik in 1815. The geometric classification of the facial form and profile was given by her. J W White proposed the Correspondence and Harmony concept in 1872. The concept stated that the temperaments called for a characteristic association of the tooth form and color and that harmony called for a corresponding proportion and size of tooth to that of the face. A tooth color in harmony with facial complexion

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and that both form and color were modified to be in harmony with sex and age.

H Pound proposed a concept which stated that the width of the teeth can be estimated by measuring the distance from zygoma to zygoma (bizygomatic width), one to one half inches back of the lateral corner of the eyes, that is the width of the central incisor is bizygomatic width divided by 16. Length of the face is measured by measuring the distance from the hairline to the lower edge of the bone of the chin with the face at rest. Length of the central incisor is length of the face divided by 16<sup>[3]</sup>.

Leon William proposed the concept of law of harmony. William proposed three typical forms of teeth as square, tapering, ovoid. He believed that there is a relationship between the inverted face form and the form of maxillary central incisor. This concept was believed to be true in most of the people <sup>[4]</sup>.

Wrinkler proposed that teeth selection should be based upon three main points. The three points are psychological, biological-physiological and the biomechanical point of view. Psychological point of view is mainly based upon the appearance of the face and esthetics. Biomechanical point is based upon mechanical limitations in placement of anterior teeth. The importance of harmony of the facial musculature and physiological limit with teeth arrangement is the biological and physiological point of view<sup>[5]</sup>.

Frush and Fischer in 1955 proposed the concept of dentogenics. The concept of dentogenics is based upon three characteristics, i.e; the age, personality and the sex of the patient. This concept stated that teeth selection was dependent on these three characteristics for each and every patient<sup>[6]</sup>. They also divided the personality of the patient for teeth selection as delicate, medium pleasing and vigorous <sup>[7]</sup>.

Krajicek in 1956 proposed that the duplication of the patient's natural teeth either before or after extraction provide better esthetics.

Klein, Kafandaris, Theodoros and Hayward stated that incorporating the natural teeth of the patient in the denture provide better esthetics.

The temperamental technique was one of the first techniques involved in selecting the form of the teeth. It is dependant upon the point of influence and universal acceptance. This method was proposed in 1885<sup>[8]</sup>.

Typical form theory was proposed by W.R. Hall in 1887. This concept preceded the geometric theory which was proposed later on by Williams. This theory was based on the concept which was two-fold. The major concept was based on the transverse and gingiva-incisal surface curvatures, neck width and outline form<sup>[9]</sup>.

Mavroskoufis et al in 1981 proposed and concluded that the inter alar distance was a reliable guide in the selection of anterior teeth. This concept stated that the canine tips are based on a line which passes through the posterior border of the incisive papilla. This is proven to be a stable land mark in the selection of anterior teeth<sup>[10-11]</sup>.

Clapp's tubular dimension table method proposed in 1910. The overall dimensions of the anterior teeth which were arranged on the Bonwill circle were measured and the vertical space available for the patient were measured. Teeth were selected based on the above dimensions measured <sup>[12]</sup>.

Cigrande in 1913 proposed that the outline offingernail of the patient can be used to select the shape and dimensions of the central incisor.

Molar tooth basis proposed by Valderrama in 1913. This concept used the measurements of cusp points for the size of individual tooth measurements. This theory was later disproved for edentulous patients as they did not have molars.

Wrights Photometric concept proposed in 1936. This concept stated that teeth selection can be done using photographs of the patient with natural teeth. A ratio was established by comparison with various measurements of the face.

Sears in 1941 proposed the Anthropometric – Cephalic index concept. This concept stated that the width of the maxillary central incisors can be estimated by the transverse circumference of the head divided by 13. This can also be estimated by dividing the bizygomatic width by 3.3. The length of the face is directly proportional to the length of the tooth<sup>[13]</sup>.

The Golden Proportion proposed by Lombardi (1973) and Levin (1978)

Lombardi and Levin demonstrated that the width of the central incisor can be estimated using the golden proportion to the width of the lateral incisor. The width of the lateral incisor can be estimated by the width of the canine respectively using the golden proportion<sup>[14]</sup>.

This study aims to find out about the relationship between the dimensions of the ear and the anterior teeth as a guide for anterior teeth selection. The height and the width of the ear were used to find a correlation between the maxillary anterior teeth.

**Materials and Method**

A total of 20 individuals were selected at random who were of the South Indian population. The height of the ear and the width of the ear were measured. The height of the ear was measured from the highest to the lowest point of the ear in millimetres. The width of the ear was measured from the midpoint of the tragus to the outermost point of pinna in millimetres. The dimensions of the six maxillary anterior teeth (inter canine distance) were measured in millimetres and divided by 3.36. The values measured were compared and evaluated statistically using Student T test. Results were formulated.



**Figure 1: Shows the dimensions of the ear(height and width of the ear).**



**Figure 2: Shows the bizygomatic width**



**Figure 3: Shows the intercanine distance**

**Results**

**Table 1:**

G1	G2		G3
60	65	68	29.76
63	69	62	32.44
58	61	52	31.84
61	56	60	29.76
62	64	58	33.33
53	54	52	31.54
74	75	66	35.71
68	65	58	34.82
59	57	60	30.65
63	67	64	33.03
70	68	58	33.63
73	75	62	35.71
60	62	58	30.05
67	64	54	33.04
61	66	64	36.01
63	68	60	32.14
71	73	56	33.63
53	54	50	31.54
68	66	56	34.22
61	59	60	32.44

Table 1 shows the values obtained. G1 (Group 1) shows the inter canine distance measured in millimetres. G2(Group 2) shows the height of the ear measured in millimetres and the width of the ear measured and multiplied by 2. G3 (Group 3) shows the bizygomatic width measured and divided by 3.36.

**Legends:**

G1: Group 1: Shows the inter canine distance.

G2: Group 2: Height and width of the ear.

G3: Group 3: Bizygomatic width divided by 3.36.]

**Table 2:**

	Mean	Standard Deviation
G1	64.4	±5.93
G2	63.4	±6.26
	58.9	±4.74
G3	32.7	±1.26

Table 2 shows the mean values obtained for the groups. The mean value obtained for the intercanine distance (Group 1) is  $64.4 \pm 5.93$ , for (Group 2) the height of the ear is  $63.4 \pm 6.26$  and the width of the ear is  $58.9 \pm 4.74$ . The mean value obtained for Group 3 (Bizygomatic width divided by 3.36) is  $32.7 \pm 1.26$ .

### Legends:

G1: Group 1: Shows the inter canine distance.

G2: Group 2: Height and width of the ear.

G3: Group 3: Bizygomatic width divided by 3.36.]

## Discussion

Based on the above obtained results the mean value obtained in Group 1 which is the Mean inter canine distance is close to the mean value obtained in Group 2 (height of the ear) and has a P value of **0.6**. The P value obtained is more than 0.05 which is not significant. P value obtained between the inter canine distance and the width of the ear is 0.01 which is not more than 0.05. P value obtained when compared between Group 1 and Group 3 (bizygomatic width) is not more than 0.05 which is significant.

**Facial beauty and golden proportion:** The correlation between Golden proportion and facial beauty was described by Jefferson Y<sup>[15]</sup>. He proposed concepts relating Golden proportion and facial beauty and established an existence of a universal standard. Jefferson Y et al proposed that there is a presence of an universal standard for facial beauty regardless of age, gender and race. All humans and other living organisms are encoded genetically to develop according to the divine proportion. Any facial abnormalities or disproportions generally occur due to environmental causes and not caused by genetic factors.

Jefferson et al also proposed a biological proportion which is true for all the human irrespective of age, gender, race and any other variables.

GOLDEN PROPORTION = FACIAL BEAUTY  
= TEMPEROMANDIBULAR JOINT HEALTH =  
PSYCHOLOGICAL HEALTH = PHYSIOLOGICAL  
HEALTH = TOTAL WELLNESS AND HEALTH =  
QUALITY OF LIFE.

**Proportions between teeth to teeth:** The anterior teeth which comprise of the esthetic segment of the

dentition, from the first premolar on one side to another premolar on the other side, when observed from the front are within the golden proportion<sup>[14]</sup>. During anterior teeth selection the phenomenon of golden proportion is combined in the form of a grid is called as the golden proportion grid or the diagnostic grid. The diagnostic grid help is perfecting the esthetic component of anterior teeth selection. Diagnostic grids are available in seven sizes. These sizes help in accommodating the width of the incisors from a range of 7mm to 10mm in steps of half a millimetre.

Ward DH et al<sup>[16]</sup> and Lombardi RE<sup>[17]</sup> proposed the concept of using a 'repeated ratio' or a 'continuous proportion'. This ration helped in establishing a relationship between the width of the central and lateral incisors respectively and continues in the placement of the remaining teeth in the spaces. This ration was termed as Recurring esthetic dental (RED) proportion. RED proportion was recommended to be used more consistently while moving distally in the arch. This proportion was 62 percentage more consistent when compared to the golden proportion.

This study aims to use the dimensions of the ear in the selection of teeth in completely edentulous patients when no other records are available to aid in teeth selection. The dimensions of the ear cannot be influenced by any external factors. The height of the ear or the pinna helps in aiding a similar value to the inter canine distance in almost all the individuals. The width of the ear when measured from the midpoint of the tragus to the outermost point of the ear resulted in a value which when almost doubled resulted in a value which approximated the actual inter canine distance measured. However, when Student T test was performed P value was more than 0.05 when the actual inter canine distance and the height of the ear was compared. P value was not more than 0.05 when Student T test was done between the actual inter canine distances measured and the width of the ear. Hence, this was significant\*.

Many factors can be taken into account while selecting teeth for complete denture prosthesis. This study aims to include the dimension of the ear, more specifically the width of the external ear or Pinna as a factor in teeth selection when other modes of selection cannot be used.

**Limitation of the study:** The main limitation of the study is that the study was performed in a limited number



of individuals. Further study has to be performed in more number of individuals for a more standardization.

### Conclusion

Thus from the above obtained results it can be concluded that the width of the ear can be used as a guide in teeth selection for a complete denture prosthesis. The mean value obtained of the width of the upper anteriors which was calculated using the bizygomatic width shows a lot of variation from the actual inter canine width. Hence the formula bizygomatic width divided by 3.36 has to be re-evaluated for the South Indian Population. There are many factors to be considered for teeth selection the purpose of the study is to consider the height of the ear as a guide for teeth selection.

**Ethical Clearance:** Ethical clearance taken from Department of Research, Saveetha Dental College and Hospitals, Saveetha University, Chennai.

**Conflict of Interest:** Nil

**Source of Funding:** Self

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# Determination of Position of Mental Foramen on CBCT

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## Abstract

**Aim:** To determine the position of mental foramen based on the height from alveolar crest and lower border of the mandible from CBCT scans.

**Objective:** The purpose of the study is to determine the position of mental foramen based on the height from alveolar crest and lower border of the mandible from CBCT scans.

**Materials and Method:** A total of 50 CBCT scans will be evaluated. The number, size and form of the mental foramen will be recorded and their three dimensional relationship with the mandibular premolars will be observed and noted. The position of each mental foramen relative to bony reference points will be measured and distances from mental foramen to the cement enamel junctions of the mandibular premolars will be measured. Data will be analyzed and results will be determined.

**Results:** The average values were obtained for the distance between the mental foramen and the alveolar crest, mental foramen to the lower border of the mandible the horizontal and vertical dimensions of the mental foramen. All of the individuals has a single mental foramen which was ovoid in shape. The mean horizontal dimensions were (2.70±0.73)mm and (2.73±0.72)mm on the right and left sides respectively. Vertical dimensions were (2.20±0.65)mm and (1.86±0.16)mm respectively on the right and left sides. Mean distances from the mental foramen to alveolar crest and the lower border of the mandible were (11.35±3.92,10.48±2.84) and (9.47±1.48, 9.72±1.38) respectively.

**Conclusion:** The average values obtained from the study help in understanding the anatomy and position of the mental foramen better on CBCT. The detailed information about the relationship between mental foramen and its surrounding structures will facilitate diagnostic and surgical procedures done in the oral and maxillofacial region.

**Keywords:** Cone beam computed tomography, mental foramen.

## Introduction

Mental foramen is situated mostly in the anterolateral aspect of the body of the mandible. It lies most commonly

in between the first and the second lower premolars and in between the upper and the lower borders of body of the mandible<sup>[1]</sup>. A division of the inferior alveolar nerve is the mental nerve which supplies the lower lip,labial mucosa, lower anteriors upto the premolars. Any foramen in addition to mental foramen in the body of mandible is called as an accessory mental foramen. It usually transmits auxillary nerves to the teeth<sup>[2]</sup>.It is important for surgeons to know the exact location of the mental foramen in relationship with its peripheral structures in any type of an invasive procedure as well as tofacilitate diagnostic, surgical,local anaesthetic in relation to the oral and maxillofacial region. There are

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many variations related to the size, shape and position of the mental foramen. The shape of mental foramen can be round or oval: diameter ranges from 2.5 to 5.5mm<sup>[3-5,6-10]</sup>. It was shown in number of studies that the location of the mental foramen is related with race. For example the position of mental foramen in the Mongoloid population was in the line with longitudinal axis of the second lower premolar and the positions in Caucasoid samples were just mesial to those in Chinese, Melanesian, Asian Indians, Thai, Korean, Saudi and Tanzanian samples<sup>[11-14,15-19]</sup>. When examined the vertical mental foramen position in relation to the premolars root apices of 936 patients by Fishel et al. found that the MF was situated coronal to the apex in 38.6% of cases, at the apex in 15.4% of cases and apical to the apex in 46.0% of cases<sup>[20]</sup>. For second premolar, mental foramen was coronal to the apex in 24.5% of cases, 13.9% at the apex and 61.6% apical to the apex. As about 25%-38% of the foramen is located coronal to the premolars apex it is

a challenge in immediate implant placement especially in the premolar areas <sup>[20]</sup>.

### Materials and Method

A total of 50 CBCT scans which comprised of 14 males and 14 females with an age range of 18-70 years were evaluated for the position of the mental foramen based on the height of the alveolar crest and the lower border of the mandible. The number, size and form of the mental foramen were recorded and three dimensional relationship with the mandibular premolars were noted. The position of each mental foramen relative to bony reference points were measured, distances from mental foramen to the cement enamel junctions of the mandibular premolars were measured using Planmeca Romexis viewer software (Planmeca OY, Finland). Data was analysed using SPSS Ver 17 [IBM Corporation, USA] and results were determined.



MF-AC, LM(R)



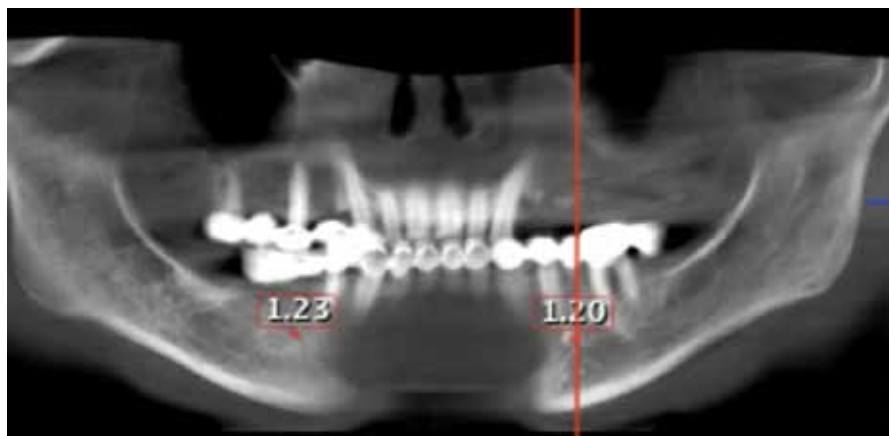
MF-H(R)



MF-AC, LM(L)



MF-H(L)



MF-W(R & L)

**Legends:**

MF-AC: Distance between the mental foramen and the alveolar crest

MF-LM: Distance between the mental foramen and the lower border of the mandible

MF-H: Horizontal dimension of the mental foramen

MF-W: Width of the mental foramen

R: Right

L: Left

**Results**

**Table 1: Shows the average values obtained for the parameters**

Gender	MF-AC R	MF-AC-L	MF-LM-R	MF-LM-L	MF-H-R	MF-H-L	MF-W-R	MF-W-L
Male N=14	12.34±3.44	10.81±2.52	9.63±1.68	10.03±1.22	2.87±0.73	2.87±0.81	2.29±0.46	1.97±0.73
Female N=14	10.34±4.24	10.15±3.20	9.30±1.30	9.42±1.50	2.53±0.71	2.58±0.62	2.10±0.81	1.75±0.25
Total N=28	11.34±3.92	10.48±2.84	9.47±1.48	9.72±1.37	2.69±0.73	2.72±0.72	2.19±0.65	1.85±0.16

**Table 2: Shows the comparison of the average values obtained between males and females**

Males		Females	P Value	Significance
MF-AC-R	12.34±3.44	10.34±4.24	0.183	Not Significant
MF-AC-L	10.81±2.52	10.15±3.20	0.545	Not Significant
MF-LM-R	9.63±1.68	9.31±1.30	0.566	Not Significant
MF-LM-L	10.03±1.22	9.42±1.50	0.245	Not Significant
MF-H-R	2.87±0.73	2.53±0.71	0.219	Not Significant
MF-H-L	2.87±0.81	2.58±0.62	0.288	Not Significant
MF-W-R	2.29±0.46	2.10±0.81	0.454	Not Significant
MF-W-L	1.97±0.73	1.75±0.95	0.480	Not Significant

**Table 3: Shows the comparison of the average values of right and left sides in females**

Females Right		Left	P Value	Significance
MF-AC	10.35±4.24	10.15±3.2	0.836	Not Significant
MF-LM	9.31±1.30	9.42±1.50	0.714	Not Significant
MF-H	2.53±0.71	2.58±0.62	0.775	Not Significant
MF-W	2.10±0.81	1.75±0.95	0.028	Significant *

**Table 4: Shows the comparison of the average values of right and left sides in males**

Males Right		Left	P Value	Significance
MF-AC	12.34±3.44	10.82±2.52	0.143	Not Significant
MF-LM	9.64±1.68	10.03±1.22	0.246	Not Significant
MF-H	2.87±0.73	2.87±0.81	0.979	Not Significant
MF-W	2.29±0.46	1.97±0.73	0.157	Not Significant

**Table 5: Shows the comparison of the right and left sides of the total samples**

Total Sample Right		Left	P Value	Significance
MF-AC	11.35±3.92	10.48±2.84	0.214	Not Significant
MF-LM	9.47±1.48	9.72±1.38	0.252	Not Significant
MF-H	2.70±0.73	2.73±0.72	0.839	Not Significant
MF-W	2.20±0.65	1.86±0.16	0.012	Significant*

**Legends:**

- MF-AC: Distance between the mental foramen and the alveolar crest
- MF-LM: Distance between the mental foramen and the lower border of the mandible
- MF-H: Horizontal dimension of the mental foramen
- MF-W: Width of the mental foramen
- R: Right
- L: left

**Statistical Analysis:** Paired T test was done and used to compare the right and left sides and an Independent T test was done and used to compare the male and female values. There was no significant difference between the right and left sides. Most commonly only a single mental foramen is seen as stated by previous studies<sup>[21]</sup>.

	VALUES	Male	Female
MF-Alv Crest Rt	11.34 +/-3.92	12.34 +/-3.44	10.34 +/-4.24
MF-Alv Crest Lt	10.48 +/-2.84	10.81 +/-2.51	10.15 +/-3.19
MF-Lower border Mand- R	9.47 +/-1.48	9.63 +/-1.67	9.30 +/-1.30
MF-Lower border Mand- L	9.72 +/-1.37	10.02 +/-1.21	9.41 +/-1.49
Ht of Mental Foramen -R	2.69 +/-0.72	2.86 +/-0.72	2.52 +/-0.71
Ht of Mental Foramen -L	2.72 +/-0.72	2.87 +/-0.80	2.57 +/-0.62
MF-Width - Rt	2.19 +/-0.65	2.28 +/-0.45	2.09 +/-0.80
MF-Width -Lt	1.85 +/-0.83	1.97 +/-0.73	1.74 +/-0.94

**Horizontal Position of Mental Foramen:** The distance from the mental foramen and the alveolar crest was measured. The most common location of the mental foramen is between the apices of the premolars. The average horizontal distance measured was similar on both sides 11.34+/-3.92,10.48+/-2.84 respectively with a P value of 0.214. The average values were greater in males (12.34+/-3.44,10.81+/-2.51) when compared to the females (10.34+/-4.24,10.15+/-3.19) respectively on the right and left.

**Vertical Position of the Mental Foramen:** The average distance from the position of the mental foramen and the lower border of the mandible for the right and left sides are 9.47+/-1.48,9.72+/-1.37 respectively with a P value of 0.252. The average values were greater in males (9.63+/-1.67,10.02+/-1.21) when compared to females (9.30+/-1.30,9.41+/-1.49).

**Morphology of the Mental Foramen:** The predominant shape of the mental foramen observed in all the individuals was the oval shape.

**Dimensions of the Mental Foramen:** The average horizontal dimension of the mental foramen seen in the individuals is 2.69+/-0.72 on the right side and 2.72+/-0.72 on the left side with a P value of 0.839. Horizontal dimension was slightly greater in males when compared to the females.

The average vertical dimension of the mental foramen seen in the individuals was 2.19+/-0.65,1.8±0.15 on the right and left sides. P value is 0.012 which was significant statistically. Comparison between the right and left sides of males (2.28+/-0.45,1.97+/-0.73) and females (2.09+/-0.80,1.74+/-0.94) which was significant with a P value of 0.028\*.

## Discussion

This study discusses mainly about the position of the mental foramen and its relationship with its adjacent structures. The distance from the mental foramen and alveolar crest and the distance between the mental foramen and the lower border of the mandible. Also the horizontal and the vertical dimensions of the mental foramen was recorded in millimetres. The values were compared between the right and left sides and also compared between the male and the female sexes. Periodontal disease frequently causes bone resorption at the alveolar crest the Cemento enamel junctions of the mandibular premolars provide better reference points for the location of the mental foramen. This study gives the average values by which the anatomy of the mental foramen and its associated structures can be located and used during routine diagnostic and surgical procedures. The relationships that are determined help to analyse the safe range of surgery performed in the mandibular region, so that damage to the neurovascular bundles exiting from the mental foramen can be avoided. Previous studies have carried out only a comparative study by age and gender. Udhaya K et al. performed the study in 90 adult dry human mandibles from the south Indian population, irrespective of age and sex. The location, shape, orientation and the presence of the accessory foramen were studied by visual examination. The size and position of the mental foramen were measured by using a digital vernier caliper and found out that in most of the mandibles mental foramen was located at the level of the root of the 2nd premolar, midway between the inferior margin and the alveolar margin of the mandible and were ovoid in shape. Accessory mental foramina was also seen in five of the dry mandibles. Carruth et al. performed the study using Tangential, axial and coronal CBCT images of 106 patients retrospectively and were evaluated for size and position of the MF with respect to the mandibular second premolar apex and the cemento-enamel junction. Distinguishing characteristics of sex, age and race were evaluated. 53.7% of the MFs were located mesial, 45.3% distal and 1% coincident to the apex of the mandibular second premolar. Males had a significantly greater coronal height and tangential height measurement than females. The mean width of the MF was 4.08mm(axial) or 4.12 mm(tangential), whereas the mean height was 3.54mm (tangential) or 3.55mm (coronal). Kalendar A et al. performed the study to determine the occurrence and location of the mental foramen and accessory mental foramen in Turkish patients using cone-beam computed-

tomography with 3D-imaging software. CBCT scans of 386 sites in 193(92 male, 101 female) patients were retrospectively analyzed to determine mental foramen and the occurrence of an accessory mental foramen, sizes and locations. Digital imaging and communications in medicine (DICOM) data were transferred to surface-rendering software to generate 3D images. Distances between the mental foramen and accessory mental foramen and from both foramina to the alveolar ridge and to the closest tooth were measured. Accessory mental foramina were observed in 6.5% of patients and were most commonly in an anteroinferior location. Mean accessory mental foramen size did not differ significantly by sex or side [males: horizontal = 1.5mm(1-2.4mm), vertical = 1.4mm(0.8-2.4mm); females: horizontal = 1.5mm(0.8-3 mm), vertical = 1.3mm(0.8-2.1mm);  $P > 0.05$ ]. Males showed significantly greater mean vertical and horizontal MF dimensions compared with females [males: horizontal = 3.9mm(1-7mm), vertical = 3.6mm(1.2-7mm); females: horizontal = 3.5mm(1.3-5.6mm), vertical = 3.3mm(0.8-5.8mm);  $P < 0.05$ ]. von Arx et al. used Sagittal, axial and coronal CBCT images of 142 patients (26 bilateral and 116 unilateral cases) were retrospectively screened to determine the location of the mental foramen with respect to adjacent teeth and to take linear measurements of the size of the mental foramen and its distances to the upper and lower borders of the mandible. In addition the course and angulation of the mental canal exiting the mental foramen were assessed. Results of this study showed that majority of mental foramen (56%) were located apically between the 2 premolars and another 35.7% of mental foramen were positioned below the second premolar. On average the mental foramen was localized 5.0mm from the closest root of the adjacent tooth. The mean size of the mental foramen showed a height of 3.0mm and length of 3.2mm; However, individual cases showed large differences in height (1.8-5.1mm) and in length (1.8-5.5mm). All mental canals exiting the mental foramen demonstrated an upward course in the coronal plane, with 70.1% of the mental canal presenting an anterior loop(AL) in the axial view<sup>[22-25]</sup>. Mean diameters in previous studies were 2.26mm in the American population and 2.13mm in Taiwanese population. Apinhasmit W et al. performed the study using Sixty-nine adult mandibles (45 male, 24 female) of Thai dry skulls. They were assessed for the size the orientation and the location of the mental foramen related to gender and side. The results showed that the usual direction of exit of the mental foramen was in a posterosuperior

direction. The most common location of the mental foramen was bilaterally symmetrical and located on the same vertical line with the long axis of the lower second premolar. The mean distances from the alveolar bone crest across the mental foramen to the lower border of the mandible was 29.97mm. No measurements varied according to the sides ( $P > 0.05$ ). In contrast, gender differences were significant in all measurements with the longer distances in males ( $P < 0.05$ )<sup>[25-26]</sup>, which is consistent with the present study. Particularly, Kalender et al.<sup>[24]</sup> observed greater dimensions among males in both mental foramen height and width. Orhan et al.<sup>[27]</sup> described that the distance from mental foramen to the alveolar crest varies significantly among children aged 6±12, children aged 13±15, and children aged 16±18 years; presenting lower distances in the youngest group. This apparent movement of mental foramen position is relative and depends on alveolar bone apposition<sup>[28]</sup>.

### Conclusion

The average values obtained from the study help in understanding the anatomy and position of the mental foramen better on CBCT. The detailed information about the relationship between mental foramen and its surrounding structures will facilitate diagnostic and surgical procedures done in the oral and maxillofacial region. To conclude, this study helps to analyse the position of the mental foramen and also get the average values which help in understanding the anatomy better for diagnostic and surgical procedures.

**Ethical Clearance:** The study was carried after ethical approval from The Department of Research, Saveetha Dental College and Hospitals.

**Source of Funding:** Self funding.

**Conflict of Interest:** Nil

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# Effect of Yoga Therapy on BMI Rate among Class I Obese Patient

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## Abstract

The purpose of the present study was to investigate the effect of yoga therapy on BMI rate among class I obese patient. To achieve the purpose of the study thirty class I obese patient were selected from, Sivganaga District, Tamilnadu, India during the year 2019. The selected patient were divided into two equal groups consists of 15 patient each namely experimental group and control group. The experimental group underwent yoga therapy programme for six weeks. The control group was not taking part in any training during the course of the study. BMI was taken as criterion variable in this study. The selected subjects were tested on BMI was measured through weight (kg)/height (m<sup>2</sup>) method. Pre-test was taken before the training period and post-test was measured immediately after the six weeks training period. Statistical technique 't' ratio was used to analyse the means of the pre-test and post test data of experimental group and control group. The results revealed that there was a significant difference found on the criterion variable. The difference was found due to yoga therapy given to the experimental group on BMI when compared to control group.

**Keywords:** Yoga therapy, BMI and 't' ratio.

## Introduction

Yoga has the answer for a healthy life vogue. it's a whole package with marvellous cardio, dynamic exercise, pondering posture and influence on one's behavior and life vogue. Regular apply of posture, pranayama and kriya result in a holistic life vogue. Today, sports have become a part and parcel of our culture. It is being influenced and does influence all our social institutions including education, economics, arts, politics, law, mass communication and even international diplomacy (Alaguraja, K. et.al, 2019)<sup>4</sup>. Yoga is universally

benefiting all people of all ages. The study of Yoga is fascinating to those with a philosophical mind and is defined as the silencing of the mind's activities which lead to complete realization of the intrinsic nature of the Supreme Being (Alaguraja, K. et.al., 2017)<sup>1</sup>. In the sports world, physical education is the most essential aspect due to the fact physical schooling increases the performance and the effectiveness of the sports (Alaguraja, K. et.al., 2018)<sup>2</sup>.

Yoga is a system of exercises which helps the mind and body in order to achieve tranquillity and spiritual insight (Alaguraja, K. et.al, 2019)<sup>5</sup>. Make sure that when you practice yoga asanas, you don't just stretch the body because the mind has to be with the body. (Alaguraja, K. et.al, 2019)<sup>8</sup>. One can start practicing Yoga at any given moment of time and you may start with meditation or directly with pranayama without even doing the asanas (postures). (Alaguraja, K. et.al, 2019)<sup>3</sup>. Today's there is an escalating emphasis on appearing smarter, feeling better and living longer. In order to achieve these ideals as, scientific evidence tells us that one of the keys is

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high fitness and exercises (Alaguraja, K. et.al, 2019)<sup>7</sup>. When consciousness is operating with the intellect and with all the senses, by making an individual think that he or she is awake and aware, but the mind is actually less receptive and more critical (Yoga, P. et. al., 2019)<sup>9</sup>. Yoga is completely a present to humanity from our ancestors. i think they were terribly advanced in their thoughts regarding future generations, on purpose or accidentally taking under consideration the constraint of house and time. Yoga apply neither needs any machines or abundant house.

### Methodology

**Selection of Subjects:** The purpose of the study was to find out the effect of yoga therapy on BMI rate among class I obese patient. To achieve this purpose of the study thirty class I obese patient were selected as subjects at random. The age of the subjects were ranged from 25 to 40 years.

#### Selection of variable

##### Independent variable

- Yoga Therapy

##### Dependent variable

- BMI

**Experimental Design:** The selected subjects were divided into two equal groups of fifteen subjects each, such as ayoga therapy group (Experimental Group) and control group. The experimental group underwent yoga therapy for six days per week for six weeks. Control group, which they did not undergo any special training programme apart from their regular physical activities as per their curriculum. The following physical variable, namely BMI was selected as criterion variable. All the subjects of two groups were tested on selected criterion variable BMI was measured through weight (kg)/height (m<sup>2</sup>) method at prior to and immediately after the training programme.

**Statistical Technique:** The ‘t’ test was used to analyse the significant differences, if any, difference between the groups respectively.

**Level of Significance:** The 0.05 level of confidence was fixed to test the level of significance which was considered as an appropriate.

**Analysis of the Data:** The significance of the difference among the means of the experimental group was found out by pre-test. The data were analysed and dependent ‘t’ test was used with 0.05 levels as confidence.

**Table I: Analysis of t-ratio for the Pre and Post Tests of Experimental and Control Group on BMI**

Variables	Group	Mean		SD		df	‘t’ ratio
		Pre	Post	Pre	Post		
BMI	Control	32.26	32.16	1.16	0.92	14	0.77
	Experimental	32.46	30.86	1.24	1.05		8.53*

\*Significance at 0.05 level of confidence.

The Table-I shows that the mean values of pre-test and post-test of the control group on BMI were 32.26 and 32.16 respectively. The obtained ‘t’ ratio was 0.77, since the obtained ‘t’ ratio was less than the required table value of 2.14 for the significant at 0.05 level with 14 degrees of freedom it was found to be statistically insignificant. The mean values of pre-test and post-test of the experimental group on BMI were 32.46 and 30.86 respectively. The obtained ‘t’ ratio was **8.53\*** since the

obtained ‘t’ ratio was greater than the required table value of 2.14 for significance at 0.05 level with 14 degrees of freedom it was found to be statistically significant. The result of the study showed that there was a significant difference between control group and experimental group in BMI. It may be concluded from the result of the study that experimental group improved in BMI due to six weeks of yoga therapy treatment.

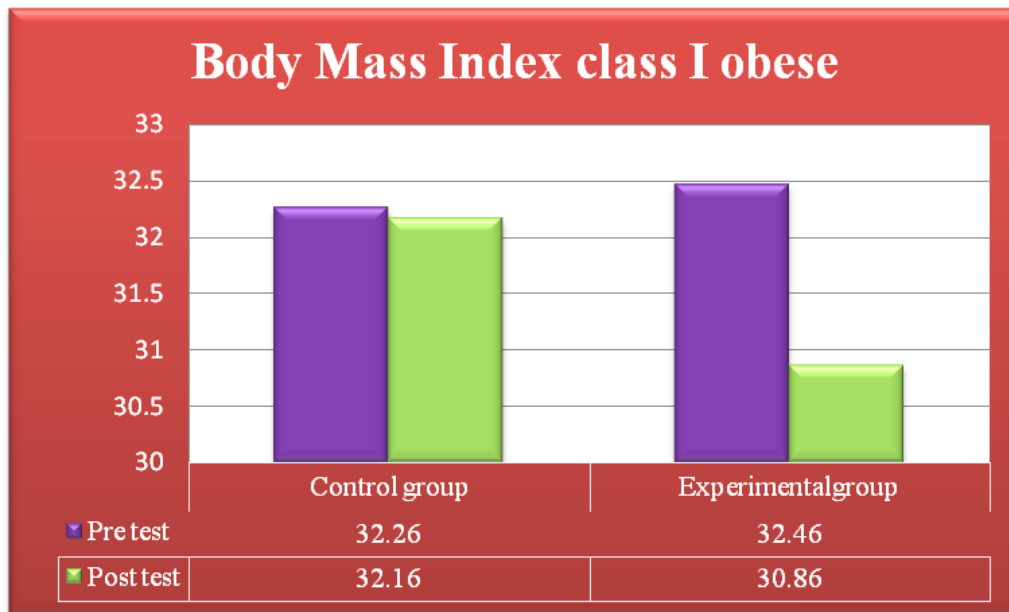


Figure I: Bar Diagram Showing the Pre and Post Mean Values of Experimental and Control Group on BMI

### Discussions on Findings

The result of the study indicates that the experimental group, namely yoga therapy group had significantly improved the selected dependent variable namely BMI, when compared to the control group. It is also found that the improvement caused by yoga therapy when compared to the control group.

### Conclusion

**On the basis of the results obtained the following conclusions are drawn:**

1. There was a significant difference between experimental and control group on BMI after the training period.
2. There was a significant improvement in BMI. However the improvement was in favor of experimental group due to six weeks of yoga therapy.

**Ethical Clearance:** With respect to the above said Research Article involving human subjects for which the ethical clearance being sought, I am to state that I have gone through the “NIMHANS Ethical Guidelines.....Human Subjects” and am aware of the Helsinki Declaration of 1975, as revised in 2000 (5) rules governing the studies involving the human

subjects. I am also aware that these guidelines are strictly to be followed while carrying out the above said research article involving human subjects.

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# Improving Public Health Care in India through Urban Primary Health Centres-Trends, Progress and Concerns

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## Abstract

Focus of primary health care always stood over rural health, as a result the attention on health needs of the urban deprived is constantly marginalised. Rapid urbanization imparted a serious concern over urban health and to address the health concerns of the urban poor, Government of India launched National Urban Health Mission. NUHM envisages service delivery through a network of Urban Primary Health Centres and serve the health needs of poor and vulnerable in the urban area. The implementation of the Mission and UPHC sensured a systematic representation of urban health needs of the deprived. However the activities of the urban health centres in most of the Indian states lacks adequate support, makes a barrier in their effective service delivery. Proper governance and allocation of resources is the urgent need of the hour to empower the functioning of the urban health care system in the country.

**Keywords:** *Urbanization, Urban Health, National Health Mission, Urban Health Centres.*

## Introduction

The emergence of urban health system and urban health centres is a mile stone in the development of universal health care, providing a special platform for the health needs of the marginalised and vulnerable communities in the urban areas. It is a realisation and recognition of the fact that health problems in the urban areas are much more serious than that of rural. Primary Health Centers provide an integrated, curative and preventive health care to the people and supports to achieve universal health coverage at a comparatively lower cost<sup>(1)</sup>. As per census the population in the urban area has increased from 28.6 crore in 2001 to 37.7 crore in 2011. This rapid urbanization has led to hasty increase in the number of urban poor population, where many of them live in slums and other unhealthy conditions.

As a solution to address the health concerns of the urban poor the Ministry of Health and Family Welfare proposed to launch a National Urban Health Mission. The NUHM try to strengthen the urban public health system and the focus of the mission will be on reducing the pressure of the urban poor in seeking quality health

services. In this background the study tries to analyse the role of National Urban Health Mission and Urban Primary Health Centres as an alternative for health care delivery in the urban areas. Since the Urban Health Mission and Health centres are in its childhood stages, not much studies were done in this area and a large literature gap exists in the current filed. In this regards the present work helps to contribute new knowledge in to the existing literature vacuum.

## Materials and Method

The study analyse the role of National Urban Health Mission and Urban Primary Health Centres as an alternative substitute for improved health care delivery for the poor and deprived sections in the urban areas. For analysing the trends, pattern and rationale of urbanization, urban health problems and health care needs of urban people; study evaluate various publications and reports of Ministry of Health and Family Welfare, National Health Mission, Government of India and World Health Organisation. Percentages, Annual Growth rates and Figures were used to analyse and interpret the data.

## Results

### Healthcare and rationale of Urban Health Care:

World Health Organisation<sup>(2)</sup> defines health as “a state of complete physical, mental and social wellbeing and not merely the absence of disease or infirmity”. Providing good health and healthcare to all is the need of the hour and this long process starts from assuring primary

health care to all people. Primary health care supports to achieve universal health coverage at a comparatively lower cost<sup>(3)</sup>.

Table one presents the growth in number of health centres in India during the last seven Five Year Plan periods.

**Table 1- Growth of the Health Centres in India**

Five Year Plans	CHCs	PHCs	Sub Centres
6th	761	9115	84376
7th	1910 (150.98)	18671 (104.84)	130165 (54.27)
8th	2633 (37.85)	22149 (18.63)	136258 (4.68)
9th	3054 (15.99)	22875 (3.28)	137311 (0.77)
10th	4045(32.44)	22370(-2.21)	145272 (5.79)
11th	4833 (19.48)	24049 (7.51)	148366 (2.13)
12th	5626(16.41)	25650(6.66)	156231(5.30)

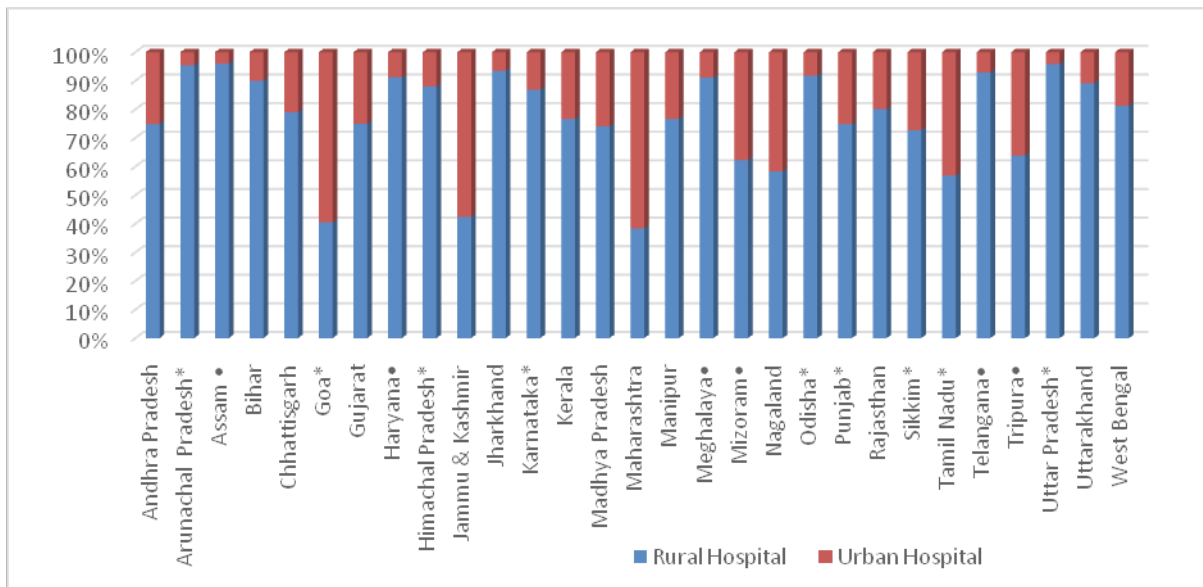
**Source:** Rural Health Statistics, 2015<sup>(4)</sup>, National Health Profile, 2018<sup>(5)</sup>  
(Figures in parenthesis are Annual Growth Rates)

The number of Community Health Centers, Primary Health Centers and Sub Centres during 6<sup>th</sup> to 12<sup>th</sup> Five Year Plan Period in India shows an increasing trend in actual figure, however, there is a frequent drop in annual growth in the number of PHCs and sub centres during the period. The standardization of health institutions in 2009 leads to the decline in number of Sub Centres and PHCs, and a rise in CHCs as a few Primary Health Centers were converted into Community Health Centres<sup>(6)</sup>.

**Urbanization and Urban Health:** Rapid urbanization has become a global phenomenon. The urban population of the world which was estimated 2018 million in 1985, is projected to reach 3197 million by 2000 and 5493 million by 2025<sup>(7)</sup>. The early stages of urbanization occurred as a part of migration from rural to urban areas followed by the demographical changes and the excess of birth rate over death rate in the later stages. Urbanization created inequality in income and other socio-economic aspects and thereby formed a section of under privileged/marginalised communities mainly found in the outer areas of the cities and towns<sup>(7)</sup>.

**Problems in Urban health delivery:** Health of people living urban areas has become a worry due to the density of population, insufficiency of health facilities and ignorance on various health programmes. The unhygienic conditions in the cities lead to wide spread of diseases and health problems. Lack of information, awareness, low level of health promotion and leadership are considered as the key issues in urban health system, which can be managed through proper health promotion, re-orientation of urban health services, capacity building etc. and the role of primary health care intuitions in transforming this role is vigorous.

Similarly the health problems and situations in urban and rural areas is found to be different. The focus of primary health care always brood over rural health systems and as a result the attention on urban health needs of the deprived is constantly side-lined.

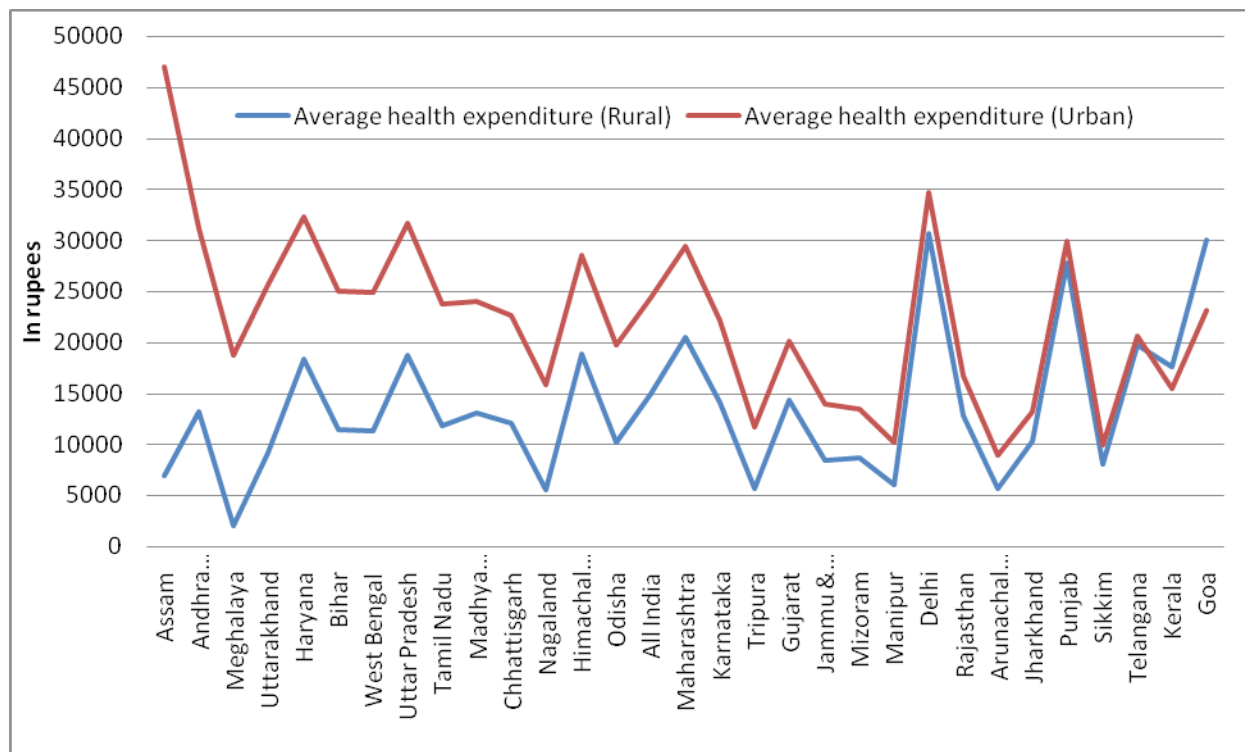


Source: National Health Profile, 2018<sup>(5)</sup>

**Figure 1- Number of Government Hospitals in Rural & Urban Areas**

Figure 1 presents the distribution of government hospitals in rural and urban areas in India by the end of twelfth Five Year Plan. The insufficiency of health centres in urban India is evident from the figure. Except

Goa, Jammu and Maharashtra the coverage of urban health centres is less than 50% in all other Indian states and the ratio is very meagre in a large number of states.



Source: Health and Family Welfare Statistics in India<sup>(10)</sup>

**Figure 2- Average health expenditure in urban and rural (Rs.)**

The figure makes it clear that, except Kerala and Goa the average health expenditure in all other Indian states is higher in urban area than rural. And the difference is higher in states like Assam, Andhra Pradesh and Meghalaya.

Thus the health care in urban area has a deficiency in hospital strength and human capital and at the same time involves higher health expenditure. This makes the focus on urban health quite essential to achieve the goal of health for all. As a solution to this the National Health Mission introduced the NUHM exclusively for urban areas in India.

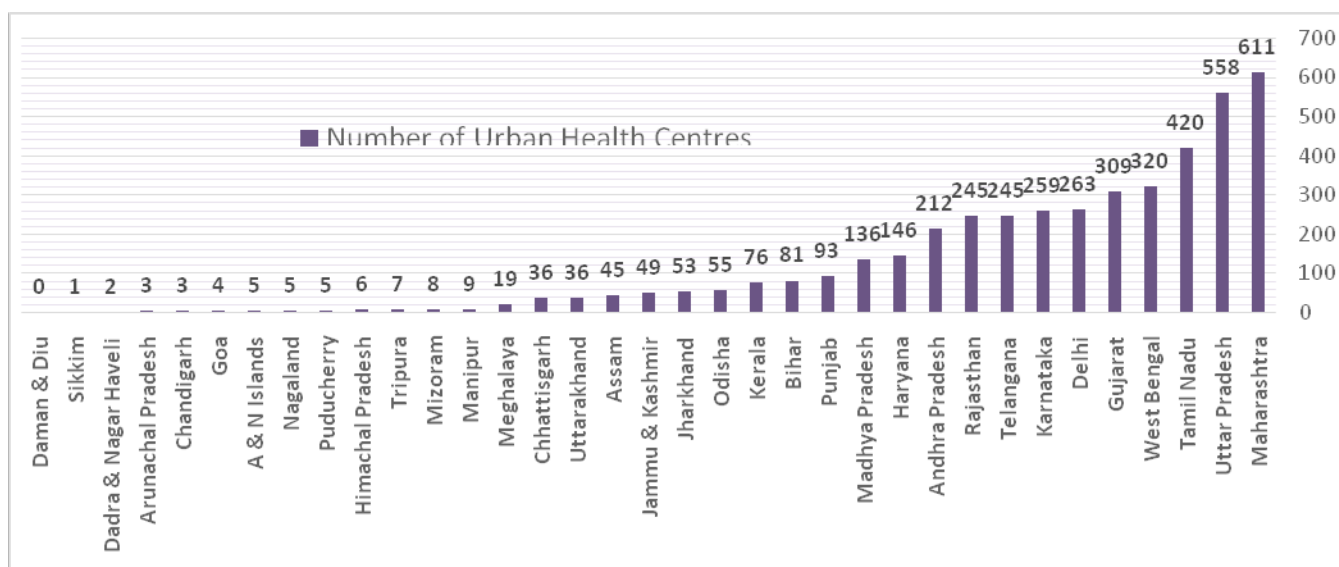
**National Urban Health Mission:** The urban areas today are increasingly becoming congested, especially slum and slum like habitations with improper sanitation, water supply, garbage disposal mechanism etc. The uncongenial living environment, scantiness of the urban public health institutions and the limited access to health care services leads to poor health condition to the urban people. Ineffective extension activities, weak referral system, social exclusion etc., makes the urban poor unfamiliar to the modern environment of hospitals, thus restricting their access.

The existing situation necessitated setting up of health centres exclusively for these marginalized and excluded urban sections in the country. As a solution to address the health concerns of the urban poor the health ministry proposed to launch a National Urban

Health Mission. The first stage of the mission started in West Bengal during 2013-14, later expanded through the country and the required expenditure is met by both central and state government in a 60:40 ratio. The programme aims to cover nearly 800 cities with populations greater than 50000 and there by encompass more than 200 million people including 77.5 million poor. The purpose of the Mission is to improve the health status of the urban population especially the poor and other disadvantaged sections, involves revising existing urban public health care system based on the needs and challenges in urban areas<sup>(1)</sup>.

NUHM envisages service delivery through a network of Urban Primary Health Centres and Urban Community Health Centres to address the health care needs of the poor and the vulnerable population like rickshaw pullers, vendors, construction workers etc and provides healthcare service through outreach activities to the population residing in slum and other vulnerable areas.

**Urban Primary Health Centres:** Primary Health Centres helps to provide access to basic health services to all people in their doorsteps. The optimum and efficient functioning of Primary Health Centers has been the feature of rural area, while in the urban areas the accessibility and availability of the same have been very limited and unsystematic in their population coverage, service package and locations.



Source: Press Information Bureau, GoI<sup>(5)</sup>

**Figure 3- State-wise Urban Health Centres in India**



The implementation of NUHM helped for a systematic representation of the urban health needs for the first time. The UPHCs on the lines of a Rural Primary Health Centers has introduced as the nodal point for delivery of health care services under the Mission. The services and services delivery mechanism of UPHCs is modified to address the unique health and livelihood challenges faced by the urban population and flexibility is ensured to adapt suitable changes for the needs and capacities of the states and local bodies.

The operation hours of the UPHCs enable the working population to conveniently access the health centres. UPHCs are recommended to operate preferably from 12 to 8 pm, flexibility in time is allowed based on the nature and conditions of each state. The operational time is very helpful for the urban working community in the sense that, outpatient departments in the PHCs worked only in the morning and for a working person visiting hospital would mean losing a day's salary<sup>(4)</sup>.

**Functions of the Urban Primary Health Centres:** UPHCs work as the nodal institution of providing health services to its designated population, although it can be accessed by anyone outside its designated catchment area. Each urban health centres must be capable of carrying out a set of mandated processes. First set of processes manifesting in direct health care and the other set indirectly imparting health care service delivery. Along with Centre based curative medical care, Urban Primary Health Centres also offer Clinical Care through Outreach Component of health care delivered by Auxiliary Nurse Midwife, ASHA and other outreach initiatives. All UPHCs provide essential lab tests to the needy.

**Disparities in the performance of National Urban Health Mission:** Even though the burden of urban health care is completely fall on NUHM the mission still pause behind in terms of the coverage, budget allocations and staff strength. Table two presents the expenditure allocation to NUHM during last three budgets.

**Table 2- Allocation to major expenditure heads under the MoHFW (incrore)**

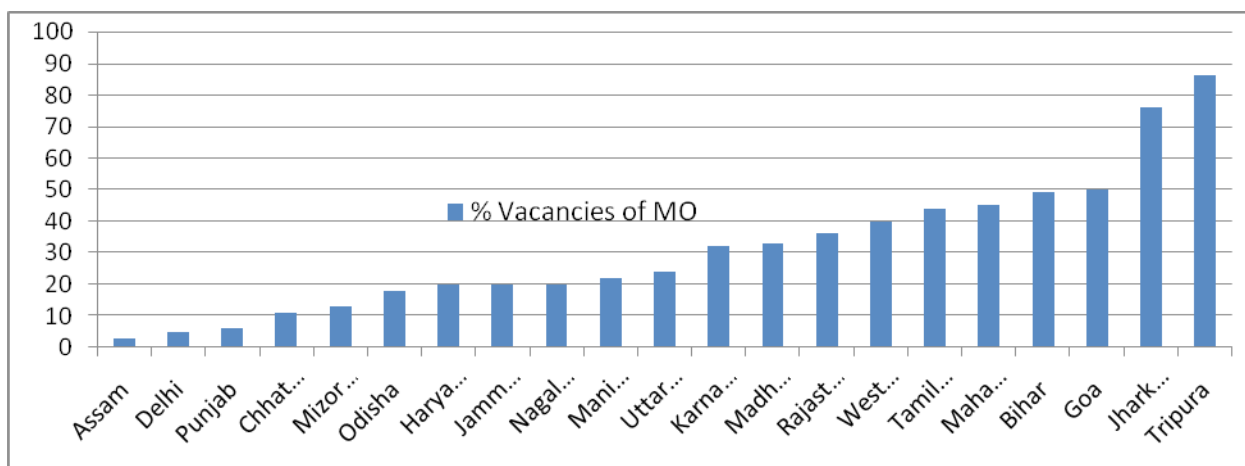
Heads	2016-17	RE 2017-18	BE 2018-19	% Change (RE to BE)
NRHM	19,826 (88.30)	25,459 (82.65)	24,280 (80.58)	-5%
NUHM	491 (2.19)	652 (2.12)	875 (2.90)	34%
OTHERS	2,137 (9.52)	4,691 (15.23)	4,975 (16.51)	6%
<b>NHM (Total)</b>	<b>22,454</b>	<b>30,802</b>	<b>30,130</b>	<b>-2%</b>

Source: Union Budget, 2018-19<sup>(12)</sup>

**Figures in parenthesis are percentage to NHM (Total):** The table makes it clear that the share of National Urban Health Mission in total allocation to National health Mission is too meagre. The share of NUHM in 2016-17 budget allocation was just 2.19% of the total expenditure allocated. However, a high percentage change in Revised Estimate to Budget Estimate in 2018-

19 indicates a positive sign towards fund deployment to NUHM and urban health needs.

Figure 4 and 5 depicts the shortage of Medical Officers and Staff Nurses under NUHM in various Indian states by the end of twelfth Five Year Plan.

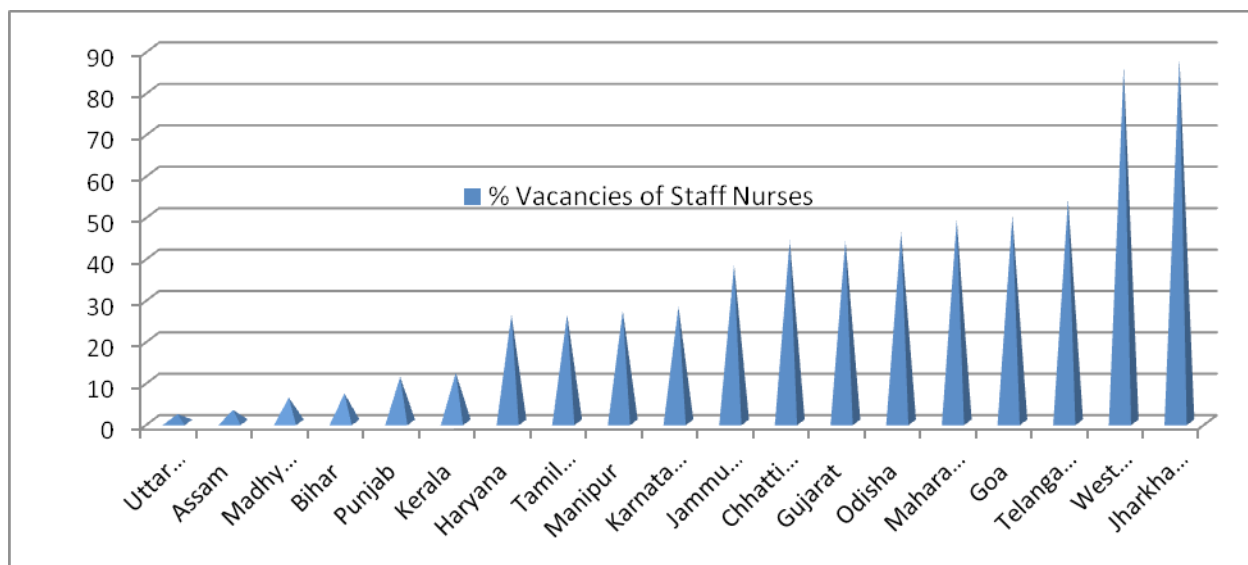


Source: Government of India, MoHFW, 2017<sup>(10)</sup>

**Figure 4- State wise shortage of Medical Officers under NUHM**

More than 70% of the Medical Officer posts are vacant in states like Tripura and Jharkhand, followed by Goa, Bihar and Maharashtra. The severity in the shortage of Medical officers is evident from the fact that

less than one third of the Indian states filled 80% of their vacancies. The similar is the case for vacancies in Staff Nurses under the Urban Health Mission.



Source: Government of India, MoHFW, 2017<sup>(10)</sup>

**Figure 5- State wise shortage of Staff Nurses under NUHM**

States like Uttar Pradesh, Assam, Madhya Pradesh, Bihar etc., filled nearly 90% of the staff nurse vacancies in urban health centres. The situation in the remaining states is a matter of worry since more than two third of the post are still vacant.

**Discussion**

A positive growth in number of health centres is visible from the study, however the standardization of health institutions lead to a fall in its annual growth rate.

While analysing the area wise statistics the number of health institutions in the government sector is found to be very low in urban area. Thus, there is profound imbalance is obvious in the distribution of Government health centres between urban and rural India. The higher cost of living and treatment in urban areas makes the problem more serious.

Health problems and health care in urban and rural area is entirely different and the implementation of programmes must follow the needs and necessities in the respective area. This actually laid the foundation and good rationale for starting urban health care and urban health centres as a counterpart for the urban dwellers and urban community.

The burden of urban health care is completely fall on NUHM, but the mission lacks enough support. The fund allocation to NUHM is found to be insignificant to meet the growing needs.

More than 65 percent of the human capital are vacant in urban health centres across India. Lack sufficient financial support leads to low staff strength and poor performance in the urban health delivery.

**Concluding Notes:** Urbanization created a section of deprived and marginalised group in urban areas. The socio- economic status of this section is too awkward and challenging. Inorder to achieve the objective of universal primary health care, all sections of the society must get appropriate health care support. The efficient use of health services/facilities depends upon the conscious and awareness of the beneficiaries. Thus, creating proper health awareness to these sections of the people is become important. With this aim the Ministry of Health and Family Welfare segregated the urban health needs from national health Mission and initiated the National Urban Health Mission. NUHM aims to impart quality health care and awareness to its beneficiaries in the urban areas thorough UPHCs and UHCs. Though the implementation of Urban Health Mission and Urban Primary Health Centres helped for a systematic representation of the urban health needs of the deprived the present situations in Urban health centres is not satisfactory. The activities of NUHM and urban health sector in most of the Indian states lacks enough financial and staff support and this acts as a barrier in their efficient and effective health care delivery. Thus as part of improving the health status of the country in general and urban areas in particular, it is vital to

encourage the performance of National Urban Health Mission and Urban Primary Health Centres. So proper governance with human face and allocation of sufficient resource both human and physical is the urgent need of the hour to empower and enrich the functioning of the urban health care centres as a nucleus of the urban health care delivery system in the country.

**Conflict-of-Interest Statement:** The authors have no competing interests.

**Source of Funding:** The research paper is the outcome of Minor Research Project Funded by Kannur University.

**Ethical Clearance:** The article does not need any ethical clearance.

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# Assessment of Patient Satisfaction in Physiotherapy Department in Rural Area

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## Abstract

**Background:** As 70% of population of India resides in rural areas, there is need of providing effective health care to people in these areas. Health care system in rural areas faces the problems of shortage of facilities. For this reason rural population needs to take treatment in established physiotherapy department in surrounding. So the study is aimed to assess satisfaction of patients taking treatment in rural physiotherapy setup.

**Aim:** To find effectiveness of physiotherapy in Rural Physiotherapy setup.

**Methodology:** A cross sectional study was conducted among 122 patients coming to take treatment in rural physiotherapy setup. The purpose and procedure of the study was explained to the subjects. A pretested self-administered structured questionnaire was used for data collection. Simple random sampling method was used for the study. Descriptive statistics such as percentages, mean and standard deviation were used for data analysis.

**Result:** In age wise treatment satisfaction score the p value is 0.1101 the result of T test is 2.785 with 2 degrees of freedom and with 95% confidence interval and 95% confidence interval of the difference is -194.70 to 890.03. In gender wise treatment satisfaction score the p value is 0.1094 the result of T test is 5.762 with 1 degree of freedom and with 95% confidence interval and 95% confidence interval of the difference is -628.39 to 1671.

**Conclusion:** More than 90% of patients found Physiotherapy treatment effective for improvement of their daily living activities.

**Keywords:** *Physiotherapy, Rural population, Health services, Satisfaction.*

## Introduction

Physiotherapists are primary healthcare professionals concerned with the assessment, treatment and prevention of the dysfunction and movement in people of all ages

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and with a wide range of context.<sup>1</sup> Physiotherapists maintain, restore and improve movement, activity and health for individuals in all age groups.<sup>2</sup> Physiotherapist are involved in health promotion, prevention and treatment of disorders to ensure optimal functioning and better quality of life of individuals and population.<sup>2</sup> In rehabilitation, physiotherapists aim to help disabled people to maximize their potential capabilities of achieving function and independence for activities of daily living.<sup>1</sup> Many people continue to live with physical disabilities in rural areas despite expertise of physiotherapists and available evidence of effectiveness of physiotherapy.<sup>3</sup> A recent exploration of factors affecting rural physiotherapy service provision revealed

considerable variation in services available between communities of the study.<sup>4</sup> Multiple factors combined to influence local service provision, including macro level policy and funding decisions, service priorities and fiscal constraints of rural health services.<sup>4</sup> The major obstacles in obtaining optimal physiotherapy services in rural communities are unavailability of specialized physiotherapy services, poor knowledge of health workers, poor healthcare seeking behavior of rural communities.<sup>3</sup> Private physiotherapy practices add valuable service capacity; however, rural communities cannot sustain a private practice.<sup>4</sup> Affordability also challenges notions of availability of private physiotherapy services and hence most of the rural population is left behind in the development process.<sup>4,3</sup> Rural communities should be educated on roles and scope of physiotherapy.<sup>3</sup> There is a need for raising awareness of the management options for movement and functional problems for rural communities.<sup>3</sup> The conventional approach for the rehabilitation of people with disabilities includes the provision of essential elements of physiotherapy for them.<sup>3</sup> Such an approach focuses on recovery of body functions and they rely on professionals institutions.<sup>3</sup> This makes disabled people themselves, their families and community to network with appropriate health services.<sup>3</sup> The review of

objective was to assess satisfaction of patients coming to take treatment in established rural physiotherapy setup.

## Materials and Methodology

This was a study on assessment of patient satisfaction taking treatment in physiotherapy department in rural area. The study was conducted in rural physiotherapy setup around Karad. The duration of study was 6 months. Subjects were selected according to the inclusion and exclusion criteria. Ethical clearance was obtained from ethical institution community. Subjects were recruited according to the inclusion and exclusion criteria. The purpose and procedure of the study was explained to the subjects. A written informed consent was taken from the subjects to voluntarily participate in the study. A pretested self-administered structured questionnaire was given to the patients to fill in. The questionnaire given to the patients was in their local language. The data was collected and recorded for the analysis.

## Statistical analysis and Result

Statistical analysis of the recorded data was done. Study design is cross sectional. Arithmetic mean & standard deviation was calculated for each outcome measure. Chi-square was calculated. T test was done.

### 1. Association (Age Wise)

Demographic Variable	Positive response	Negative response	Chi-square	Degree of freedom	P value
<30	587	44	0.3153	2	0.8
31-60	424	36			
>61	121	9			

1. **Table of Association:** In all age groups positive response is more compared to negative response.

### 2. Association (Gender Wise)

Gender	Positive response	Negative response	Chi-square	Degree of freedom	P value
Male	666	54	0.1155	1	0.7340
Female	466	35			

2. **Table of association:** In both males and females, positive response is more compared to negative response

### 3. Age Wise Treatment Satisfaction

Age	Response	Good	Average	Poor
<40	Positive response	323	171	93
	Negative response	7	171	27
>40	Positive response	147	142	28
	Negative response	2	135	15

**3. Table of treatment satisfaction (Age wise):** The positive response in age group less than 40 is good compared to negative response.

The positive response in age group more than 40 is also good compared to negative response.

**4. Gender Wise Treatment Satisfaction**

Male	Good	Average	Poor
Positive response	219	73	20
Negative response	0	7	21
<b>Females</b>			
Positive response	104	62	8
Negative response	2	4	7

**4. Table of treatment satisfaction (Gender wise):** Positive response in males is good as compared to negative response

Positive response in females is good as compared to negative response

**5. Age Wise Treatment Satisfaction Score**

Demographic Variable	Positive response	Negative response
<30	587	44
31-60	424	36
>61	121	9

	Positive response	Negative response
Mean	377.33	29.66
Standard deviation (SD)	236.48	18.339
Standard error of mean(SEM)	136.53	10.588
Lower 95% confidence limit	-210.16	-15.895
Upper 95% confidence limit	964.83	75.228
Median	424	36

P value is 0.1101

T test=2.785 with 2 degrees of freedom.

95% confidence interval

Mean difference =347.67(Mean of paired difference).

95% confidence interval of the difference: 194.70 to 890.03.

**6. Gender Wise Treatment Satisfaction Score**

Gender	Positive response	Negative response
Male	666	54
Female	466	35

	Positive response	Negative response
Mean	566	44.5
Standard deviation (SD)	141.42	13.435
Standard error of mean(SEM)	100	9.500
Lower 95% confidence limit	-704.60	-76.207
Upper 95% confidence limit	1836.6	165.21
Median	566	44.5

P value is 0.1094

T test= 5.762 with 1 degrees of freedom.

95% confidence interval

Mean difference = 521.50 (Mean of paired difference).

95% confidence interval of the difference: 628.39 to 1671.4

## Discussion

This study was to assess the satisfaction of patients coming to take treatment in established rural physiotherapy set-up. The results showed that, all the patients participated actively. The pre-tested structured questionnaire filled in by patients had more positive answers compared to negative answers. Male gave more positive answer than female. Age group <30 gave more positive answer compared to that of other age groups.

Physiotherapy is about giving conservative treatment without any medications. Physiotherapy helps people with situations whereby their movement and functions are vulnerable due to the process of ageing, injury or being infected by a disease.

This method of healing uses non-surgical method in the treatment and/or management of numerous and physical conditions such as strokes, back pains, heart disorders, asthma and lifestyle conditions.

Physiotherapy comes a long way and its advancement to the present day owes many benefits. It offers holistic and patient centered treatment and management to whole range of conditions. It addresses both health and well being aspect of an individual. And also prevents lifestyle related conditions such as high blood pressure through physical exercises and healthy living education.

With every health profession, side effects are bound to emerge perhaps once in awhile depending on the individual that is being treated for particular condition.

Physiotherapy treatment techniques and modalities

are generally very safe with little to non-existent side effects. All the treatment modalities used are well evidence based with known outcomes. The universally practiced modalities include TENS, therapeutic ultrasound and interferential therapy.

Physiotherapy techniques comprise of hands-on physiotherapy techniques which include massage, joint mobilization, neurodynamics, therapeutic exercises, acupuncture and sport physiotherapy. The duration of a physiotherapy session depends on the physiotherapy settings.

Thus through the study it was concluded that more than 90% of patients found Physiotherapy treatment effective for improvement of their daily living activities.

Conclusion: After the analysis it was concluded that the questionnaire which was filled by the patients had 92.7% positive answer and 7.41% negative answers.

And the people who were dissatisfied were not completely dissatisfied.

They were only dissatisfied to a small percent.

Thus it concludes that patients coming for treatment in rural physiotherapy setup were satisfied to a great level.

**Ethical Clearance:** Taken from INSTITUTIONAL ETHICAL COMMITTEE, KIMS 'DEEMED TO BE' UNIVERSITY, KARAD, MAHARASHTRA.

**Source of Funding:** Self

**Conflict of Interest:** Nil.



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# Variation in Gait Parameters for Children with Down's Syndrome

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## Abstract

**Background:** Survey reports states that, there are various musculoskeletal deformities in children with Down's syndrome. There is paucity of studies in this field. Down's syndrome leads to ligament laxity or hypotonia. There are various foot deformities seen in children with Down's syndrome like pes planus and hallux valgus. This may affect the gait of children. Therefore, as physiotherapists, we should study about this problem and correct the problems so to lead a healthy life to the children with Down's syndrome.

**Aim:** Assessment of gait parameters in children with Down's syndrome. To determine the variation in gait parameters for children with Down's syndrome.

**Methodology:** There were 85 participants in the study. There were 41 female and 44 male participants. This was a study of variation of gait parameters in children with Down syndrome. Here we evaluated stride length, step length, stride duration, step duration and cadence. The results were calculated by unpaired t test.

**Results:** The children with Down's syndrome have gait problem. The study has p value <0.000 and is extremely significant. The results were same for all the age groups. There is increase in step width. There is decrease values of stride length, step length and cadence. There was no difference in parameters seen in male and female participants.

**Conclusion:** There is variation in gait parameters for children with Down's Syndrome.

**Keywords:** Down's syndrome, Gait parameters, Physiotherapy assessment.

## Introduction

Down syndrome is a complex multisystem disorder. Down syndrome is a chromosomal disorder resulting in 47 chromosomes instead of 46 chromosomes, also commonly known as Trisomy 21. People with down syndrome are born with an extra chromosome. With Down syndrome, this extra chromosome leads to range of issues the deficits include affect you both mentally and physically<sup>1</sup>.

Down syndrome have many effects on body. This results from faulty cell division affecting the 21st pair of chromosomes. Down syndrome results in neuromotor, musculoskeletal and cardiopulmonary pathologies. Down syndrome has visual and hearing problems. Visual problems include congenital as well as adult onset

cataracts, myopia, strabismus and nystagmus. Hearing problem includes mild to moderate hearing loss. Otitis media is a frequently occurring problems. 40-45% also suffer from congenital heart defects<sup>2</sup>. Musculoskeletal problems include hypotonia and ligamentous laxity. Generalized hypotonia, found in all muscle groups of extremities, neck and trunk, is a hallmark feature. Grip strength, isometric strength and ankle strength are also diminished<sup>2</sup>.

Linear growth deficits are seen, including a decrease in normal velocity of growth in stature, leg length reduction and some reduction in metacarpal and phalangeal length. There is also lack of differentiation of distinct muscles bellies for the major and minor and the levator labii superior, which may account for

typical facial appearance. Back of the head is slightly flattened (bradycephaly). They have somewhat flat contour, primarily because of underdeveloped facial bones, facial muscles and a smaller nose. The eyes are characterized by narrow, slightly slanted eyelids, with the corners marked by epicanthal folds. Hands and feet tend to be small and 5<sup>th</sup> finger is curved inward. The toes are usually short and in majority of children, there is wide space between the 1<sup>st</sup> and 2<sup>nd</sup> toes, with crease between them and sole of the foot. Normal walking age of child is 12 to 14 months of age<sup>3</sup>. Initially a child walk with a broad base of support, externally rotated gait age and short steps. A normal gait pattern is established by 3 years of age. A child with 7 years age resembles a normal adult gait pattern<sup>7</sup>.

Gait is a process of purposefully losing or disturbing the body’s balance and then regaining it at each step by counterbalancing the various external and internal forces which try to disturb the balance. The parameters included are step length, step width, stride length and cadence. Any abnormalities in any of this parameters states that there is some musculoskeletal problems. Stride length is the distance of heel strike of one limb to heel strike of the other limb. Step length is the distance of heel strike of one limb to heel strike of the other limb. Step width is the linear distance between midpoint of heel of one foot and same point on other foot. Cadence is the number of steps taken in one minute.

**Methodology**

There were 85 participants in the study. There were 41 female and 44 male participants. The study was taken place Krishna College of Physiotherapy. This is a study of variation of gait parameters in children with Down syndrome. Here we evaluate stride length, step length, stride duration, step duration and cadence. The gait parameters are calculated by allowing the participants to walk on the ground. The participants are asked to stand with the normal base of support then measure the distance between two feet. Then asked the participant to take one step ahead and mark a point at the heel of resting foot and foot taken ahead. Then ask to take another step and mark a point at heel of that feet. After marking the points measure the distance between the starting feet and the next feet. Then measure distance between starting feet and same feet taken. For cadence ask the person to walk for 1 minute and calculate the steps taken in 1 minute.

**Results**

Statistical analysis of the recorded data was done. Study design is cross sectional. Arithmetic mean and standard deviation was calculated for each outcome measure. T test was done. The children with Down’s syndrome have gait problem. The study has p value <0.000 and is extremely significant. The results were same for all the age groups. Female:

**Table No. 1: Age wise (5 to 7years) interference.**

Sr.no	Mean ± SD	T Value	P value	Interference
Age	6.23 ± 0.832	27.00	<0.0001	Extremely significant
SRL	43.69 ± 1.494	105.47	<0.0001	Extremely significant
STL	25 ± 0.816	110.40	<0.0001	Extremely significant
SW	13.07 ± 0.954	49.47	<0.0001	Extremely significant
C	64 ± 1.472	156.77	<0.0001	Extremely significant

**Interpretation:** Stride length, step length, step width and cadence have extremely significant values in age group of 5 to 7 year females.

**Table No. 2: Age wise (8 to 11years) interference.**

Sr.no	Mean ± SD	T value	P value	Interference
Age	9.38 ± 1.193	28.364	<0.0001	Extremely significant
SRL	50.15 ± 5.490	32.938	<0.0001	Extremely significant
STL	28.15 ± 2.703	37.551	<0.0001	Extremely significant
SW	16 ± 3.536	16.317	<0.0001	Extremely significant
C	68.53 ± 1.984	124.56	<0.0001	Extremely significant

**Interpretation:** Stride length, step length, step width and cadence have extremely significant values in age group of 8 to 11 year females.

**Table No. 3: Age wise (12 to 15years) interference.**

Sr.No	Mean ± SD	T value	P value	Interference
Age	13.60 ± 1.113	47.570	<0.0001	Extremely significant
SRL	64.66 ± 1.397	179.24	<0.0001	Extremely significant
STL	32.6 ± 0.828	152.47	<0.0001	Extremely significant
SW	23.33 ± 1.175	76.901	<0.0001	Extremely significant
C	75.86 ± 2.850	103.09	<0.0001	Extremely significant

**Interpretation:** Stride length, step length, step width and cadence have extremely significant values in age group of 12 to 15-year females.

**Males:**

**Table No. 4: Age wise (5 to 7years) interference.**

Sr. No	Mean ± SD	T value	P value	Interference
Age	5.92 ± 0.828	26.767	<0.0001	Extremely significant
SRL	43.64 ± 1.336	122.20	<0.0001	Extremely significant
STL	22.42 ± 1.651	50.835	<0.0001	Extremely significant
SW	14.57 ± 1.222	44.598	<0.0001	Extremely significant
C	62.42 ± 1.342	174.0	<0.0001	Extremely significant

**Interpretation:** Stride length, step length, step width and cadence have extremely significant values in age group of 5 to 7 males.

**Table No. 5: Age wise (8 to 11 years) interference.**

Sr.No	Mean ± SD	T Value	P Value	Interference
Age	9.56 ± 1.153	53.177	<0.0001	Extremely significant
SRL	53.37 ± 4.815	44.341	<0.0001	Extremely significant
STL	29.81 ± 2.316	51.496	<0.0001	Extremely significant
SW	19.12 ± 1.408	54.320	<0.0001	Extremely significant
C	69.62 ± 1.147	242.71	<0.0001	Extremely significant

**Interpretation:** Stride length, step length, step width and cadence have extremely significant values in age group of 8 to 11 year males.

**Table No. 6: Age wise (12 to 15 years) interference.**

Sr.No	Mean ± SD	T Value	P Value	Interference
Age	13.5 ± 1.225	41.243	<0.0001	Extremely significant
SRL	65.14 ± 3.183	76.575	<0.0001	Extremely significant
STL	34.21 ± 1.888	107.73	<0.0001	Extremely significant
SW	23.5 ± 1.743	50.443	<0.0001	Extremely significant
C	74.21 ± 3.423	81.113	<0.0001	Extremely significant

**Interpretation:** Stride length, step length, step width and cadence have extremely significant values in age group of 12 to 15 year males.

## Discussion

The children with Down's syndrome have unique pattern of walking. They also have various musculoskeletal problems. Gait is an essential part of the human being. As a child during development the parameters keep changing. Walking is must for every individual for carrying out various activities of daily living. The child with Down's syndrome have various musculoskeletal problems including various foot deformities, ligament laxity and muscle weakness. The children with Down's syndrome have hypotonia.

The aim of the study is to find out the variation in gait parameters for children with Down's syndrome.

The objectives of this study were to assess the various gait parameters of children. The participants included were both males and females. The child has only Down's syndrome and no other foot deformity from any other condition. The study was carried out and result was drawn by using usual technique of measuring gait parameters.

This project was done in six months of duration with sample size 85 (females- 41 and males- 44) and age group of 5 – 15 years. Later, this group was divided into three different groups of age. The groups were from age five to seven, age eight to eleven and age twelve to fifteen. Also the groups were divided in males and females. The individuals participated in the study were diagnosed as Down's syndrome by a pediatrician. Some of them along with Down's syndrome had minor foot deformity. The subjects were taken from the different schools in and around area of Karad. Consent form was taken from the subjects and assent form was taken by their caretakers.

The values which are measured from the participants are compared with the standard values of the same age and gender also the values which are mentioned in the article for a better result.

The procedure was carried according to the usual techniques of measuring gait parameters the measurements were taken by using a measuring tape. 52 percent males and 48 percent females has decreased stride length, step length, cadence and increased step

width. It was found that, there were no difference in gait parameters of males and females.

In the age group of five to seven the gait parameters of the Down's syndrome vary very slightly with the normal ranges. In the age group of eight to twelve the gait parameters of the Down's syndrome vary slightly with the normally with the normal ranges. In the group of thirteen to fifteen the gait parameters of Down's syndrome vary largely with normal ranges.

mentioned that there is difference in step length and step width. When step length and step width go in opposite direction that is when step length increases than step width decreases and if step length decreases than step width increases. As this study contradicts the above study as this study states that as the step length increase the step width also increases.

According to a article, it is proved that step length, stride length and step length increases with age. The cadence decrease with age. This study partially supports this article. There is increase in stride length, step length and step width. But there is also increase in cadence with increasing age.

According to a article, it has been studied that the children with Down's syndrome has foot deformities and so has problem in gait parameters. But this study has seen very rare cases with foot deformities and having gait parameters. This study instead showed that even if the child has no foot deformities they have problem in gait parameters. The step length, stride length and cadence decrease because of muscle weakness and hypotonia. The step width increases in order to maintain the center of gravity, to maintain base of support and to prevent falls.

## Conclusion

There is decrease in step length, stride length, cadence and increase in step width. There is variation in gait parameters for children with Down's Syndrome. There is increase in step width. There is decrease values of stride length, step length and cadence. There was no difference in parameters seen in male and female participants.

**Conflicts of Interest:** There were no conflicts of interest in the study.

**Ethical Clearance:** Ethical clearance was taken from institutional committee of Krishna institute of medical sciences, deemed to be university, Karad.

**Funding:** No funding.

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# Efficacy of Home Versus Centre-Based Cardiac Rehabilitation in Improving Functional Capacity and Left Ventricular Ejection Fraction in Coronary Artery Bypass Graft (CABG) Patients

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## Abstract

**Background:** Coronary Artery Bypass Grafting (CABG) surgery is the most commonly performed surgery for the coronary artery disease patients. Cardiac Rehabilitation (CR) is an essential, useful and safe part of the care for patients with coronary artery disease and who underwent CABG surgery. Regular physical activity can improve functional capacity in patients after CABG. Objectives: To determine the efficacy of home and centre-based cardiac rehabilitation in improving functional capacity and left ventricular ejection fraction (LVEF) in patients underwent CABG surgery.

**Materials and Method:** Total twenty four (n=24) CABG surgery participants were selected. They were divided into 2 groups by utilizing convenient (purposive) sampling method. Group 'A' i.e. centre- based (n=12, mean age: 53.83±7.61) and Group 'B' i.e. home- based (n=12, mean age: 55.91±5.79). Both the groups received an eight (8) weeks of CR program. Group-A participants attended a supervised structured exercise training program for 3 days per week in hospital set-up. Group-B participants were given an individualized tailored program of aerobic exercises to do at home. All the participants were screened and evaluated for baseline measurements and all the values were recorded at the day of discharge from hospital. After 8 weeks of CR program participants were re-assessed for LVEF and functional capacity.

**Results:** Statistical analysis was done by using SPSS 22.0. After an eight week of CR program, significant improvements were observed in 6-MW distance, LVEF and Rate of Perceived Exertion (RPE) (p=0.0001).

**Conclusion:** The home-based and centre-based cardiac rehabilitation programs were equally effective in improving functional capacity and left ventricular ejection fraction in CABG patients.

**Keywords:** Coronary Artery Bypass Grafting, Functional Capacity, Left Ventricular Ejection Fraction, 6-Minute Walk Test, 6-Minute Walk Distance, Rate of Perceived Exertion, Centre-based Cardiac Rehabilitation, Home-based Cardiac Rehabilitation.

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## Introduction

Coronary artery disease (CAD) is the primary cause of global mortality.<sup>[1]</sup> Premature mortality due to cardiovascular disease in the India increased by 59% from 23.2 million (1990) to 37 million (2010). The commonest cause of myocardial ischemia is atherosclerosis of epicardial coronary arteries, which

causes a local diminution in myocardial blood flow and perfusion from the concerned coronary artery.<sup>[2]</sup>

This structural change causes reduction in ventricular systolic function (LVEF) and decreased functional capacity.<sup>[3]</sup> This leads to an increased revascularization surgeries. Currently it represents for more than 60% surgeries and 25,000 CABGs are performed each year.<sup>[4]</sup>

During CABG surgery, novel routs are created around the narrowed and blocked arteries that allocate adequate blood flow to carry oxygen and nutrients to the heart.<sup>[5]</sup>

The goal of CABG is to preserve and reinstate cardiac functions to normal by relieving myocardial ischemia<sup>[6]</sup> National guidelines strongly recommend Cardiac Rehabilitation (CR) after CABG surgery.<sup>[7]</sup>

According to United State Surveys, CR is described as a course involving medical assessment, monitored exercise training, counseling of the heart disease patients.<sup>[8]</sup> For patients undergoing CR the Six Minute Walk Test (6-MWT) has confirmed to be a simple and effective measure of functional capacity. The investigated clinical program has efficiently enhanced patients ' functional capacity as assessed by the 6-MWT.<sup>[9]</sup>

Rate of Perceived Exertion (RPE) is reliable measure for directing and monitoring the exercise intensity. Borg scale makes it possible for participants to individually mark their exertion level in exercise tests and courses.<sup>[10]</sup>

Left ventricular ejection fraction (LVEF) is a clinical index for myocardial contractility as well as for its pumping action. Echocardiography illustrates that cardiac dimensions, left ventricle volumes and ejection fraction are widely associated with heart disease progression.<sup>[11]>[12]</sup>

The research showed LVEF enhancement in patients attending the CR program as well as improvement in functional capacity.<sup>[13]</sup>

After cardiac incidents, CR is prescribed to people to facilitate recovery and to prevent recurrence by optimizing risk prevention and promoting an active lifestyle. Including exercise training, it is suggested that CR programs provide lifestyle education on risk factor management for coronary heart disease (CHD) plus counseling so-called 'comprehensive CR'. These programs are intended to reduce physiological impacts of CVD (e.g. by enhancing functional capacity to support early return).<sup>[14]</sup>

CR is prescribed as either Home or Centre-based. The Home-based rehabilitation programs were developed as a substitute for Center-based CR to extend the participation and access. The Home-based CR is a structured program with comprehensible participant goals, surveillance (monitoring), intermittent follow-up visits, phone calls, or at least monitoring diaries by patients themselves. The Center-based CR is a supervised program carried out at the community or hospital set up.<sup>[14]</sup> Meta-analysis of the efficiency of mixed programs established that CR programs could reach a 20–26% reduction in cardiac mortality over a span of 1–3years.<sup>[15]</sup>

Home-based CR program has the ability to enhance CR uptake, reduce expenses and enhance self management abilities. The home-based tele-monitoring instruction training has comparable short-term effects on exercise capacity as Center-based training.<sup>[16]</sup>

Since there are plenty of evidence about the CR program in CABG patients, but very few have been undertaken at rural set-up. The aim of this research was to determine the effectiveness of Home and Center-based cardiac rehabilitation in enhancing LVEF and functional capacity in patients underwent CABG surgery.

## Material and Method

- **Study Design:** This was an experimental (comparative) study in which the effectiveness of early structured individually tailored exercise training on functional capacity and LVEF in CABG patients was studied. Eligible patients who gave a written informed consent were allocated into two groups by utilizing convenient (purposive) sampling method.
- **Subjects:** Total number of 24 (n=24) post CABG surgery patients were recruited between April-2018 to March-2019 from the Department of Cardiovascular and Thoracic Surgery.
- **Duration of Intervention:** 3 days per week, for total 8 weeks.
- **Inclusion Criteria:** CABG Patients of both genders were screened at the time of discharge from the hospital for eligibility criteria, including age group of 30–60 years.
- **Exclusion Criteria:** High-risk group patients (AACVPR-99): LVEF of < 40%, survivor of cardiac arrest or sudden death.<sup>[17]</sup> Or anysystemic,



musculoskeletal or neurological conditions that restrict participating in aerobic exercise and hemodynamic instability.

- **Procedure:** The institutional ethics committee clearance DMIMS (DU)/IEC/2018-19/7201) was obtained before the start of the study. Total 34 CABG Patients were screened for the study, out of which the 30 participants were discovered to be eligible as per inclusion criteria. Out of that 30 the 6 participants denied to participate. Therefore, 24 (n=24) participants included in this study and divided into two groups by utilizing purposive sampling method.

1. Group-A: Center-based program (n=12)
2. Group-B: Home-based program (n=12)

The procedure was explained to all the eligible participants and they signed an informed written consent before allocating them into two groups.

Base-line data was collected and recorded for all the outcome measures at the day of discharge from hospital. Functional capacity was measured by 6MW distances (in meters). Borg scale was used to measure the RPE after the 6MWT. LVEF was evaluated by 2D-Echocardiography.

An eight week structured exercise training program was offered to the participants either in the form of Center or Home-based.

Exercise was prescribed according to the Karvonen's formula and the achieved HR max (peak) was used for exercise prescription as baseline.

After 8 weeks of exercise training program, participants were reassessed for LVEF, 6-MWT and RPE.

- **Outcome Measures:**

1. **LVEF:** LVEF was evaluated by a cardiologist with Two-Dimensional and M-mode Echocardiography.
2. **6-MWT:** The 6-MWT was conducted indoors along a wide, straight, enclosed 30 meter corridor with a traffic cone marked for the turning points.<sup>[18]</sup>

The total distance covered in 6 minutes was recorded in meters.

3. **RPE (BORG SCALE):** The original Borg (Category) scale (scale 6 to 20) was used.<sup>[10]</sup> After

6 minute walk test, RPE score was taken as the outcome measure.

- **Group 'A'-Center-Based Cardiac Rehabilitation:**

This group received a supervised, structured exercise training program 3 days per week for total 8 weeks in the hospital set-up.

Patients were assessed for BP, HR and SPO2 before the exercise program. The exercise program comprised of 10 minutes of warm up (stretching exercise, breathing exercise and walking on the treadmill) with 15-20 minutes of graded aerobic training and 10 minutes of cool down.

Graded aerobic training was mainly treadmill walk for 3-times per week, with an intensity of 40–70% of HRR achieved in the exercise test applying the Karvonen's formula and RPE of 11–13 for a duration of 15-20 min with intermittent rest.<sup>[19]</sup>

- Karvonen's formula =  $[(HR_{max} - HR_{rest}) \times \% \text{ intensity desired}] + HR_{rest}$   
( $HR_{max} = 220 - \text{age}$ )<sup>(19)</sup>

Patients were re-assessed for all the outcome measures after the exercise program. A total of 70-80% attendance was mandatory for this group (A).

- **Group 'B'- Home-Based Cardiac Rehabilitation:**

An individualized tailored aerobic exercise program was given for this group which included aerobic exercises; brisk walking, as the literature shows, brisk walking is an activity that is sufficiently intense to improve aerobic capacity in both healthy sedentary and cardiac patients.

Initial exercise prescriptions and the training sessions were provided in the hospital under the physiotherapist's supervision and then the participants were given the program protocol for 8 weeks to do at home.

Patients were also taught to palpate the pulse and calculate the HR and rate the RPE at grade of 11–13.

The exercise program was of 5–10 minutes warm up, including stretching exercise, breathing exercise and gentle active exercise, to larger muscle groups like the trunk and lower limb followed by graded aerobic training and 5-10 minutes of cool down.

Graded aerobic training was brisk walking 3-times a week with an intensity of 40–70% of HRR by using the Karvonen's formula, converted to a walk speed and RPE

of 11–13 for a duration of 15-20 min with intermittent rest.<sup>[19]</sup>

Home-Exercise group participants were regularly approached by telephone every 2 weeks to find out their adherence to the program and guidance or program modifications and to monitor progress. The log of the exercise was evaluated every 15 days.

Participants were also recommended to contact the physiotherapist if any guidance was required.

- **Monitoring:** RPE provides a subjective means of monitoring exercise intensity.
- **Do's and Don'ts:** “During the exercise we want you to pay close attention to how hard you feel the exercise rate is. This feeling should reflect your whole amount of exertion and fatigue, combining all sensations of physical strain. Do not concern yourself with any one factor such as leg pain, shortness of breath or exercise intensity, but try to concern on your total inner feeling of exertion. Try not to underestimate or overestimate your feeling of exertion. Be as accurate as you can.”<sup>[19]</sup>
- **Indications for Termination of Exercise:** Detailed awareness of the signs and symptoms during the exercise and the criteria for terminating the exercise

were well explained to the participants.

- **Exercise Intensity Progression:** As the RPE grading decreases with improving functional capacity the intensity of exercise was increased at 5–10% of the maximum heart rate and by maintaining RPE of 11–13 throughout the 8 weeks duration. For the initial 4 weeks, patients performed the exercise training for 15–20 minutes, from the 5<sup>th</sup> to 8<sup>th</sup> week it was increased to 20–30 minutes. (The progression of exercise was individualized according to the patient’s tolerance).<sup>[19]</sup>

**Data Analysis:** Statistical analysis was done by using descriptive and inferential statistics using student’s unpaired t test and paired t test and software used in the analysis was SPSS 22.0 version and the results were concluded to be statistically significant with  $p < 0.05$ ,  $P < 0.001$  is very significant and  $p < 0.0001$  is highly significant.

A total of 24 (19 male, 5 female) participants, with mean age of participants in group A was  $53.83 \pm 7.61$  and in group B was  $55.91 \pm 5.79$ . (Table-1)

In group-A: 10 male, 2 female

In group-B: 9 male, 3 female

**Table 1: Distribution of participants according to their age in years**

Group	N	Minimum	Maximum	Mean	Std. Deviation
Group A	12	40	60	53.83	7.61
Group B	12	43	60	55.91	5.79

Subjects completed their course of exercise training with a minimum of 70%-80% attendance in the exercise sessions. Both groups had similar demographic and clinical characteristics at baseline with respect to the LVEF, 6-MWD, RPE.

Baseline LVEF in group-A was  $42.08 \pm 2.57$  and

in group-B was  $40.83 \pm 1.94$ . There was a significant improvement in LVEF after an 8 weeks of exercise training in both the groups ( $p = 0.0001$ ), group-A ( $42.08 \pm 2.57$  to  $58.33 \pm 6.85$ ) and in group-B ( $40.83 \pm 1.94$  to  $54.16 \pm 6.33$ ). By using Student’s unpaired t test statistically no significant difference was found in LVEF (%) between two groups ( $t = 1.54$ ,  $p = 0.13$ ). (Table-2)

**Table 2: Comparison of LVEF (%) in two groups by Student’s unpaired t test**

Group	N	Mean	Std. Deviation	Std. Error Mean	t-value
Group A	12	58.33	6.85	1.97	1.54
Group B	12	54.16	6.33	1.82	$P = 0.13$

\*LVEF: Left Ventricular Ejection Fraction

Baseline 6-MWD in the group-A was 272.50±43.30 and in the group-B was 275±42.10. There was a significant improvement in 6-MWD after an 8 weeks of exercise training in both the groups (p=0.0001), group-A (272.50±43.30 to 527.50±39.34.) and in group-B

(275±42.10 to 505±28.12). By using Student’s unpaired t test statistically no significant difference was found in 6MWD score between two groups (t=1.61, p=0.12). (Table-3)

**Table 3: Comparison of 6-MWD score in two groups by Student’s unpaired t test**

Group	N	Mean	Std. Deviation	Std. Error Mean	t-value
Group A	12	527.50	39.34	11.35	1.61
Group B	12	505	28.12	8.11	P=0.12

\*6-MWD: 6-Minute Walked Distance

Baseline RPE in the group A was 10.75±1.60 and in the group B was 11.41±1.08. There was a significant difference (p=0.0001) in RPE score after an 8 weeks of exercise training in group-A (10.75±1.60 to 6.25±0.45.)

as compare to group-B (11.41±1.08 to 7.08±0.79). By using Student’s unpaired t test statistically significant difference was found in RPE score in patients of two groups (t=3.16, p=0.005). (Table-4)

**Table 4: Comparison of RPE score in two groups by Student’s unpaired t test**

Group	N	Mean	Std. Deviation	Std. Error Mean	t-value
Group A	12	6.25	0.45	0.13	3.16
Group B	12	7.08	0.79	0.22	P=0.005

\*RPE: Rate of Perceived Exertion

By using students unpaired t test the results showed that there was no significant difference between the two groups for the LVEF and 6MWT i.e. Home-based CR is equally effective as the Centre-based CR program.

**Discussion**

The present study aims to find out the efficacy of home versus centre-based cardiac rehabilitation in improving functional capacity and left ventricular ejection fraction in coronary artery bypass grafting patients.

This study was an experimental study and total twenty four (n=24) CABG patients of age between 30 to 60 years were included. They were conveniently divided into two groups: Group A- Centre based (n=12) and Group B- Home based (n=12) and the outcome

measures i.e. LVEF, 6-minute walked distance and RPE were recorded.

The results were significant and showed that the CR was beneficial in improving the functional capacity and LVEF in CABG surgery patients in both the groups (A and B).

**LVEF:** Decreased left ventricular systolic function is a well-established independent predictor of mortality in CAD patients; little information is available regarding the effect of exercise training on LVEF.

In our study, by using Student’s paired ‘t’ test statistically significant difference between pre and post test LVEF (%) values was found in both the groups. In group A (p=0.0001, t=9.26) and in group B (p=0.0001, t=8.00). By using Student’s unpaired t test statistically no

significant difference was found in LVEF (%) between two groups ( $t=1.54$ ,  $p=0.13$ ).

In a randomized controlled trial study of Mohammad Haddadzadeh et al in CAD patients, found that a twelve-week structured individually tailored exercise training substantially enhance LVEF in post-event CAD patients.<sup>[20]</sup>

**6MWT:** After cardiac incidents the functional capacity decreases. The 6-MWT assesses the submaximal level of functional capacity. 6-MWD better reflect the functional exercise level for physical activities.

After CR, statistically significant difference was found in 6-MWD values in both groups i.e.  $p=0.0001$ . By using Student's paired t test, it showed significant difference in pre and post values, in group A it was ( $272.50\pm 43.30$  to  $527.50\pm 39.34$ .) and in group-B ( $275\pm 42.10$  to  $505\pm 28.12$ ). By using Student's unpaired t test statistically no significant difference was found in 6-MWD score between two groups ( $t=1.61$ ,  $p=0.12$ ).

Fatemeh E. Ghashghaei et al, also proved that CR enhance the functional capacity and some post-CABG hemodynamic outcomes. The walk test distance of the rehabilitation group ( $P < 0.01$ ) compared with the reference group ( $P = 0.33$ ) was significantly improved after CR.<sup>[21]</sup>

**RPE:** RPE is a valid way to regulate training intensity, independent of exercise duration. It is a self-rating measurement method to rate the exertion.<sup>[10]</sup>

In our study by using Student's paired 't' test statistically significant difference was found in RPE score at pre and post test in both the groups ( $p=0.0001$ ). By using Student's unpaired 't' test, statistically significant difference was found in RPE score in group 'A' ( $6.25 \pm 0.45$ ) as compare to group 'B' ( $7.08 \pm 0.79$ ). ( $t=3.16$ ,  $P=0.005$ ).

Our study observed the significant difference in all outcome measures after CR. But on comparing two groups, there is no any difference found.

Likewise, S. Shagufta et al found that Home based phase II CR is equally efficient in enhancing HRR as compared to supervised group in CABG patients.<sup>[22]</sup>

All the above evidences of different studies and the present study results suggested that an eight week cardiac rehabilitation program whether it is centre or

home-based are equally beneficial to all the participants who underwent CABG surgery.

## Conclusion

The present study concludes that a an eight week structured individually tailored Home-based exercise program is equally effective as the Center-based exercise program in improving functional capacity and LVEF in CABG patients and the results were significant in both the groups: A (Centre-based) & B (Home-based).

**Ethical Clearance:** It has been obtained by Institutional Ethics Committee (DMIMS (DU)/IEC/2018-19/7201), Sawangi (M), Wardha.

**Conflict of Interest:** Nil

**Funding:** Intramural funding was provided by Institutional Ethics Committee, DMIMS (DU) for this study.

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# Impact of Post Mastectomy Pain Syndrome on Health-Related Quality of Life in Modified Radical Mastectomy Patients

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## Abstract

**Background and Objective:** Post Mastectomy Pain Syndrome (PMPS) is one of the most commonly experienced side effects of radical mastectomy and modified radical mastectomy. PMPS is a chronic, progressively debilitating neuropathic pain felt in the axilla, arm, breast and chest wall after the surgery is performed which hampers or affects the daily functions like bathing, washing, normal arm movements to reach out and has a direct or indirect impact on general health and psychological aspect affecting quality of life. Sleep disturbances, increased absenteeism is seen in PMPS subjects. Hence the purpose of the study was to find the impact on health-related quality of life of postmastectomy pain syndrome subjects undergone modified radical mastectomy.

**Material and Methodology:** In this cross-sectional study, 92 post mastectomy subjects were enrolled between the age group of 30 and 60, who completed treatment 3 months prior to the study and scoring of pain above 7 according to LANSS pain scale. Intensity of pain was assessed according to Visual Analogue Scale. Thus, SF-36 questionnaire was used to determine the impact on health-related quality of life.

**Result:** According to this study there is a decline of 49.22% in general health, 52.70% in physical functioning, 46.80% in role physical, 40.37% in role emotional, 36.69% in social functioning, 35.42% in mental health, 42.61% in vitality and 55.83% in pain. This indicates an overall decline in the quality of life of the post mastectomy subjects which sums up to 44.98% which is seen to be significant.

**Conclusion:** Many post mastectomy subjects experienced post mastectomy pain syndrome which had an effect on their health related quality of life. There is a need to develop awareness about the occurrence of syndrome and also, we need some interventions to overcome and improve the quality of living.

**Keywords:** *Post mastectomy pain syndrome, modified radical mastectomy, health related quality of life.*

## Introduction

Cancer is the disease that results when cellular changes causes the uncontrolled growth and division of cells causing tumor like structures. There are many causes of cancer and some are preventable. Cancer shows various local and systemic symptoms. Swelling, pain and local skin changes are some local symptoms seen in cancer patients. While the systemic symptoms are fever, excessive fatigue, weight loss and generalized skin changes.

Breast cancer in females stands most common cancer

in India with a rate of incidence as 25.8 per 1,00,000 females. In 2018, 1,62,468 new cases were reported and 87,090 deaths were seen. The incidence of breast cancer in India is observed more in metropolitan cities like Thiruvananthapuram (43.9 per 100 000), Chennai (40.6 per 100 000), New Delhi (34.8 per 100,000), Mumbai (33.6 per 100 000). Earlier cervical cancer was most common type of cancer in Indian women but these days breast cancer has surpassed cervical cancer and is major cause of cancer mortality. In India, breast cancer cases generally showed up or were diagnosed in advanced stages<sup>2</sup>.

In Modified Radical Mastectomy the breast tissue along with nipple, lymph nodes in axilla are surgically removed but the muscles of chest wall under breast are kept intact<sup>6</sup>. This surgery was less invasive type of surgery but may injure the surrounding nerves or vessels. Removal of lymph nodes also was one of the reasons for pain in the post-surgical patients.

After modified radical mastectomy the subjects generally tend to show signs like tightness over the chest wall, pain along the chest wall which may or may not radiate to the consecutive arm, swelling and alsoedema formation on the consecutive arm of the excised breast. Pain could also be due to the radiotherapy and chemotherapy sessions post mastectomy. These sessions cause inflammation of the nerve endings over the chest wall and hence cause pain.

Post Mastectomy Pain Syndrome (PMPS) is one of the most commonly experienced side effects of radical mastectomy and modified radical mastectomy. PMPS is a chronic, progressively debilitating neuropathic pain felt in the axilla, arm, breast and chest wall after the surgery is performed<sup>1</sup>. It continues up to three months or more and may start immediately after surgery or after days or months. The quality of this pain is typically aching, tingling, shock-like or burning pain. Some of the women experienced either type of pain, whereas some experienced a combination of the types. Majorly affected regions were axilla and the arm. The two most important causes for this type of pain are tumor located in the upper lateral quarter and radiotherapy<sup>1</sup>. About 57-67 % of the breast cancer located in the upper lateral quarter are malignant. According to previous studies the prevalence of Post Mastectomy Pain Syndrome has been reported to range from 20% to 68%.

Health related quality of life is a multidirectional approach, which includes physical, psychological, social and personal aspects of the subject as both positive and negative. Quality of life is the difference between the patient's requirements and achievements. Lesser the difference, better is the Quality of life<sup>4</sup>.

Quality of life is widely affected in post mastectomy patients. Social withdrawal and associated depression or anxiety are majorly seen. Pain is considered to be affecting the normal functioning of the individual. Hyperesthesia is also seen in these patients causing reduced functional activities. Overall physical health is also affected<sup>8</sup>.

Despite the prevalence and negative impact of post mastectomy pain, this symptom is under-reported by patients and undertreated by clinicians. One of the barriers to the assessment and management of this type of pain is the lack of information about mechanisms underlying this symptom, risk factors and effective treatments.

SF-36 is survey of patient health on the basis of patient. It is a measure of health status based on the patient response. It is one of the most widely used measure of health-related quality of life and has been shown to discriminate between subjects with chronic conditions and subjects with different severity levels of the disease. The 8 subscales are : physical functioning,, role limitations due to physical problems, bodily pain, general health perceptions, vitality, social functioning, role-limitations due to emotional problems and mental health<sup>1-2</sup>.

### Methodology

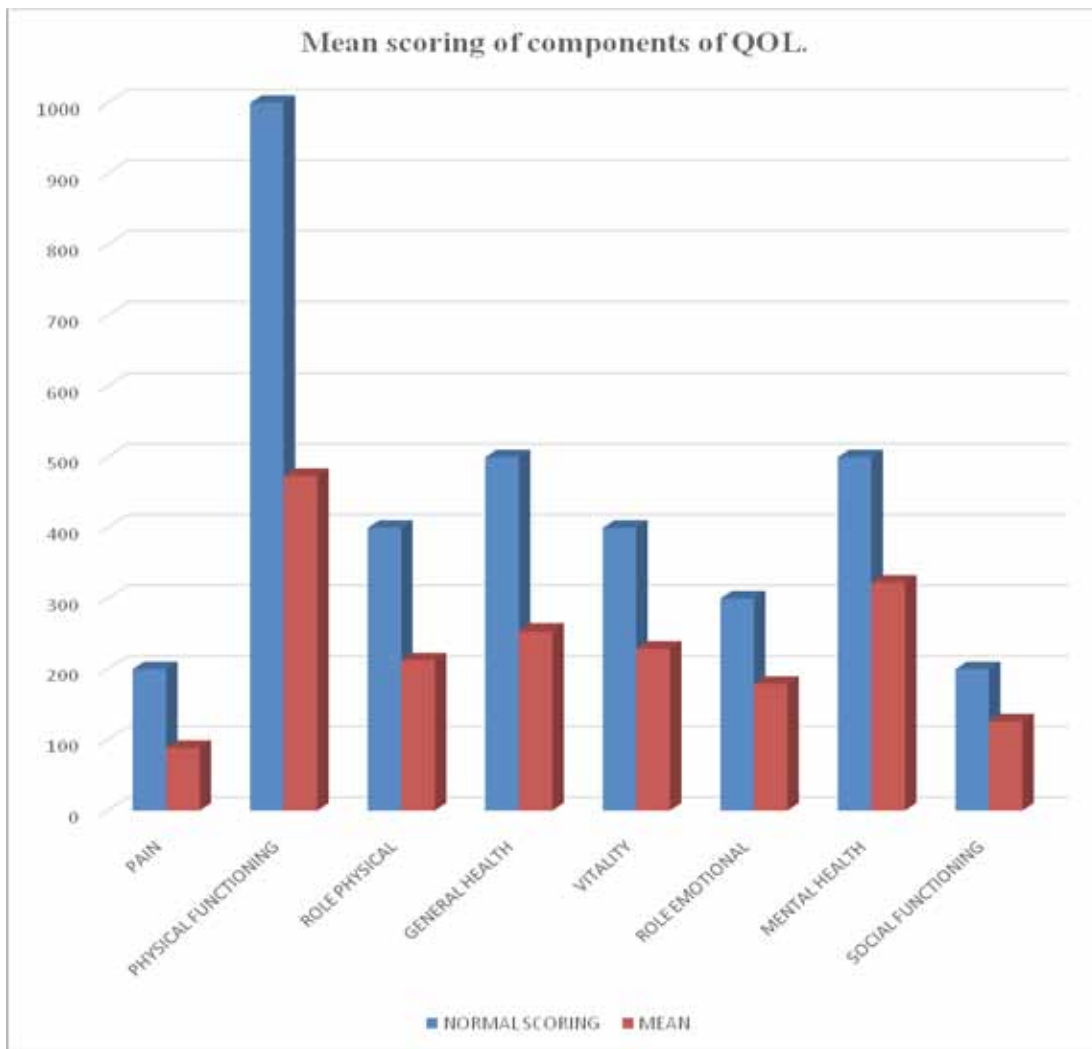
This cross sectional survey was carried out on 92 subjects which were selected on basis of convenient sampling method. This study was done from Krishna hospital, Karad and was completed in 6 months.

### Statistical Analysis and Results

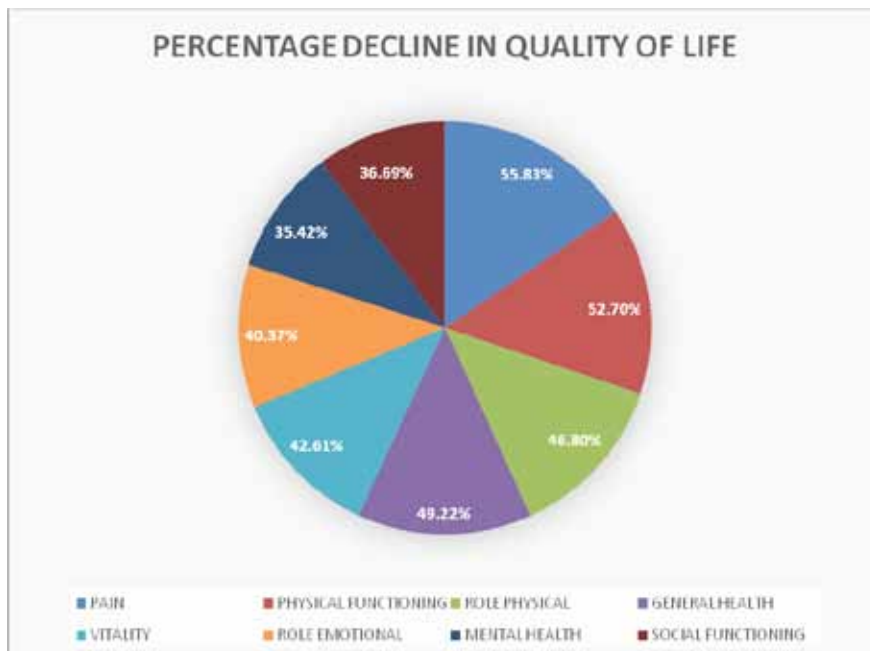
Statistical analysis of the recorded data was done. Study design is cross sectional. Arithmetic mean and standard deviation was calculated for each outcome measure. T test was done. The study has p value <0.0001 and is extremely significant.

**Table 1: Scoring of the health related quality of life according to the scales**

Scales	Mean
Pain	88.33
Physical Functioning	473
Role Physical	212.78
General Health	253.88
Vitality	229.55
Role Emotional	178.89
Mental Health	322.88
Social Functioning	126.61



Graph 1:



Graph 2:



**Interpretation:** The graph shows decline in physical functioning, role physical, role emotional, vitality, mental health, social functioning, pain and general health. Thus, there is an overall decline in the quality of life in post modified radical mastectomy subjects.

**Table 2 – Mean and Standard Deviation**

Components	Mean±SD
Pain	88.33±34.83
Physical Functioning	473±151.62
Role Physical	212.78±87.91
General Health	253.88±67.86
Vitality	229.55±40.02
Role Emotional	178.89±72.66
Mental Health	322.88±47.74
Social Functioning	126.61±20.47

## Discussion

The purpose of the study was to find the impact of Post Mastectomy Pain Syndrome on health related quality of life in Modified Radical Mastectomy subjects.

Objectives of this study were to assess the signs and symptoms of pain and to assess its severity, to assess its impact on health related quality of life in the modified radical mastectomy subjects.

Modified radical mastectomy is a procedure which surgically removes the breast tissue, nipple and axillary lymph nodes. This results into pain and edema formation. This pain is of neuropathic type, which causes burning, tingling and stinging type of sensations over the breast area and may be felt in the arm. This pain is known as Post Mastectomy Pain Syndrome (PMPS). Neuropathic pain in general affects the normal functioning of an individual and results in decrease of work ability and quality of life. Decline in the quality of life is due to improper physical functioning, social withdrawal, psychological problems and other such factors.

The areas where quality of life was affected are Pain, Physical functioning, Role physical, Role emotional, General health, Vitality, Mental health and Social functioning. Thus, quality of life, as a whole, was affected in the individuals.

Various changes take place in the individual ranging from the functional state to psychological problems. This pain was found to occur months later after the surgery

was performed. This pain progressively caused decline in quality of life and affected the work quality.

The study was completed in six months of duration and was conducted in Krishna Hospital, Karad. A number of post Modified Radical Mastectomy subjects were approached and then 92 subjects were selected on the basis of inclusion and exclusion criteria and written consent was obtained. Then subjects were then explained the procedure of study. The severity of symptoms and impact on quality of life was assessed using LANSS pain scale and SF-36 questionnaire and conclusion was obtained.

According to the survey, PMPS was seen in Modified radical mastectomy subjects. The pain and its duration of the course of pain was seen to average of 5.60 months. The average age of the population affected with PMPS was seen to be 51.17 years of age. Among the 92 subjects the pain rating reported according to VAS are 24 subjects had low intensity of pain (VAS 0-3, 26.08%), 52 subjects had moderate amount of pain (VAS 4-7, 56.52%) and only 16 subjects had vague pain (VAS >7, 17.40%). Most of the subjects reported the pain was after radiotherapy sessions.

After analyzing the data, it was seen there is a decline in the different aspects of quality of life in post mastectomy subjects. Pain (55.83%) was seen most important component to affect the quality of life followed by decline in physical functioning (52.70%), general health (49.22%), role physical (46.80%), vitality (42.61%), role emotional (40.37%), social functioning (36.69%) and mental health (35.42%), which sums up to be on average of 44.98% of decline in the health related quality of life as a whole.

## Conclusion

According to the results of the study, it was concluded that pain was neurological type which had a major impact in decline on the health-related quality of life affecting the sensory and neurological components of pain. Other aspects like physical functioning, role physical, general health, vitality, role emotional, mental health and social functioning were also affected. Occurrence of symptoms was seen to last around 5-6 months (5.60 months) after surgery.

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

**Ethical Clearance:** An ethical clearance certificate was obtained from the Institutional Ethical Committee Krishna Institute of Medical Sciences Deemed to be University, Karad.

**Acknowledgement:** The authors would like to express their special gratitude towards all the patients that participated in the study. We would also like to thank our families and institution for their everlasting support which enabled us to continue our research activities.

**Source of Funding:** Self.

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# Prevalence of Low Level Fitness in Middle Aged Women Bank Employee

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## Abstract

**Background:** As we know people working in bank sit for a long period of time and do not get time for physical activity, especially middle age population. After this middle age phase they will be entering old age and with changes in their body they will have various problems. Females who are not involved in regular physical activity at this phase will have low level fitness at this phase and in later phase also. This will hamper their activities of daily living (ADL).

**Objective:** To find out the prevalence of low level fitness in middle aged women bank employee.

**Methodology:** An observational study was carried out using a cross sectional design. The study was conducted in Karad, Maharashtra. Study was conducted using a sample size of 100 [n= 4pq/l] women bank employee, which was carried out for 6 months. The inclusion criteria was age group 40-50 years and a sedentary lifestyle with no physical activity, with exclusion criterion of any recent surgery, trauma or systemic illness.

**Result:** There was significant low level fitness in middle aged women bank employee. It was calculated using Health related fitness (HRF) and Functional performance (FP) test.

**Conclusion:** After analysing the data, it was found that there is a prevalence of low level fitness among middle aged women bank employee with a sedentary lifestyle.

**Keywords:** Middle aged women, bank employee, age group 40-50 years, fitness level.

## Introduction

Fitness is defined as the ability to carry out daily tasks with vigor and alertness, without undue fatigue and with ample energy to enjoy leisure-time pursuits and respond to emergencies. Its components are: cardiorespiratory endurance, muscular endurance, muscular strength, muscle power, flexibility, balance, speed, body composition.

Physical inactivity is considered to be one of the most important public health problems of the modern society. Sedentary means a distinct class of behaviour (e.g., sitting, watching tv, driving) characterized by little physical movement and low energy expenditure. Physical inactivity is the absence of physical activity usually reflected as the amount or proportion of time

not engaged in physical activity of some predetermined intensity.<sup>1</sup>

Office workers are spending greater amounts of work time in sedentary behavior. sedentary lifestyle and obesity are important lifestyle related public health problems throughout the world. The prevalence of inactivity and obesity and their negative health consequences are rapidly increasing in both developed and developing countries.<sup>4</sup>

Physical inactivity and a low level of physical fitness are a risk factor for premature mortality. It also has been shown to be associated with obesity. Obesity is a well known risk factor for several chronic disorders.<sup>5</sup>

Physical inactivity is a leading health problem

associated with cardiovascular diseases, cancer, obesity, diabetes and other diseases. Association between physical activity and development of hypertension has reported in a few cases.<sup>6</sup>

In severe cases overall health declines, resulting in poor quality of life and even disabilities. It poses health threats with the most obvious symptom being a reduction in muscle density and increase in adipose tissue between the muscles. Moreover, inadequate exercise or bodily activities and acceleration of loss in muscle strength creates a vicious cycle that leads to massive loss of bone density and a significant increase in probability of diseases. It is common in post-menopausal women.<sup>3</sup>

From a public health perspective, knowledge of the fitness status of the middle aged women is of critical importance if physical activity intervention is to be targeted towards those who are at a high risk; as the present young population will be in their middle age in upcoming years.

### Material and Methodology

An observational study was carried out using a cross sectional design. The study was conducted in Karad, Maharashtra. Study was conducted using a sample size

of 100 [n= 4pq/l] women bank employee, which was carried out for 6 months. The inclusion criteria was age group 40-50 years and a sedentary lifestyle with no physical activity, with exclusion criterion of any recent surgery, trauma or systemic illness.

### Outcome Measures:

The outcome measure used for this study was

Health related fitness (HRF) and Functional performance (FP) test

The HRF and FP test aims to evaluate the overall fitness of middle aged individuals. Its five components which are assessed is body composition(BMI), motor fitness, musculoskeletal fitness, functional performance and cardiorespiratory fitness.

**Statistical Analysis:** Statistical analysis of the recorded data was done by using the software SPSS version 20.

100 subjects were successfully assessed using HRF and FP test. Arithmetic mean and standard deviation was calculated for each component. T test was done. The study has P value <0.0001 and is extremely significant.

**Table 1: Age versus BMI (body mass index)**

	Mean ± SD	T	p	Interference
Age	48.75±2.838	171.90	<0.0001	Extremely significant
BMI	24.4581 ± 4.935	49.562	<0.0001	Extremely significant

**Interpretation:** It shows a decrease in BMI.

**Table 2: Age versus motor fitness**

	Mean ± SD	T	p	Interference
Age	48.75±2.838	171.90	<0.0001	Extremely significant
1 Leg stand	27.22 ± 14.590	14.590	<0.0001	Extremely significant

**Interpretation:** It shows a decrease in motor fitness.

**Table 3: Age versus trunk flexibility**

	Mean ± SD	T	p	Interference
Age	48.75±2.838	171.90	<0.0001	Extremely significant
Lateral flexibility (right)	7.05 ± 1.417	49.575	<0.0001	Extremely significant
(left)	6.8 ± 1.449	46.913	<0.0001	Extremely significant

**Interpretation:** It shows a decrease in trunk flexibility.

**Table 4: Age versus mobility**

	Mean ± SD	T	p	Interference
Age	48.75±2.838	171.90	<0.0001	Extremely significant
Mobility (stair climbing)	3.11±1.317	23.609	<0.0001	Extremely significant

**Interpretation:** It shows a decrease in mobility.

**Table 5: Age versus cardiorespiratory fitness**

	Mean ± SD	T	p	Interference
Age	48.75±2.838	171.90	<0.0001	Extremely significant
1 km walk	14.93 ± 2.701	55.262	<0.0001	Extremely significant

**Interpretation:** It shows a decrease in cardiorespiratory fitness.

### Discussion

The purpose of this study was to find out the prevalence of low level fitness in middle aged women bank employees having sedentary lifestyle. Many studies have been conducted on low level fitness in old age, physical activity of office workers but very few studies have focused on middle age.<sup>5</sup>

This study was conducted among middle aged women bank employee with sedentary lifestyle working in different banks of Karad, Maharashtra. 100 females participated in this study. The females were in between age of 45 – 55. According to health related fitness (HRF) and functional performance (FP) test it was carried out. Demographic data was collected and the test included body composition, motor fitness, musculoskeletal fitness, functional performance and cardiorespiratory fitness.

In body composition BMI (body mass index) was calculated using  $w/h^2$  (h=height, w=weight), where weight was taken in kg and height in meters. In motor fitness, ability of individual to stand on one leg without any support was recorded in seconds. In musculoskeletal fitness, trunk flexibility was checked. The individual was asked to stand straight supporting his back against a wall and bend laterally on both sides sliding his fingers on thigh. Distance was measured before and after from middle finger to the ground. In functional performance mobility was assessed asking the individual to climb up and descend a flight of stairs.

Time was recorded in minutes. In cardiorespiratory fitness, individual was made to walk for 1km and time taken to complete was recorded. Statistical analysis were done with the age component constant. Graphs were obtained by correlating age with BMI, age with one leg stand, age with trunk flexibility on right and left sides, age with mobility and age with cardiorespiratory fitness.<sup>7</sup>

According to a study done by Biernat E., Tomaszewski P and Milde K. on physical activity of office workers found out low physical activity in about 70% of local administration employees, 50% of bank officials and about 35% of workers employed in civil administration. My study supports this article.<sup>8</sup>

According to a another study done by Gislaine C. Vagetti, Valdomiro de Oliveira, et al. on functional fitness in older women from southern Brazil found out some components were increased due to regular physical activity and some components were low. My study partially supports this.<sup>2</sup>

My study showed that 70% people had normal BMI, 20% overweight and 10% obese. 50% were able to stand for 10-20 seconds, 40% for 20-40 seconds and 10% for 50-60 seconds. Overall 80% had decreased trunk flexibility. 80% took 2-4 minute for climbing and descending stairs, 15% 4-6 minutes, 5% 1-2 minutes. 80% were able to walk 1 km in 10-15 minutes and 20% in 15-20 minutes.

### Conclusion

On the basis of the result of the study, it was concluded that there was increase in BMI in 10-20% females, motor fitness decreased, trunk flexibility was the most decreased component, mobility decreased and cardiorespiratory fitness was also decreased in 20% females.

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

**Ethical Clearance:** An ethical clearance certificate was obtained from the institutional Ethical Committee Krishna institute of Medical Sciences Deemed to be University, Karad.

**Acknowledgement:** The authors would like to express their special gratitude towards all the employee who participated in this study. We would also like to thank our families and institution for their everlasting support which enabled us to continue our research activities.

**Source of Funding:** Self.

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# Physicochemical, Nutritive And Sensory Attributes Of Value Added Horse Gram Incorporated Cookies And Chapati

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## Abstract

*Macrotyloma uniflorum* (horse gram) is a native legume of South East Asia and generally cultivated in India for cattle feed and human consumption. However, owing to the presence of anti-nutritional elements and use of conventional legumes, horse gram is an underutilized crop. Due to its high nutritive value and long history of medicinal and therapeutic value, this study was conducted to study the physicochemical and nutritional attributes of plain and roasted horse gram flour and further incorporate roasted flour to prepare value-added food products for human consumption. The physicochemical attributes such as swelling capacity, hydration capacity and oil absorption capacity were higher in roasted flour. Roasted horse gram flour was mixed with refined flour in different ratios (30:70, 60:40 and 50:50) to prepare cookies and chapati (Indian flatbread). The nutritive value analysis showed an increase in fibre, protein, carbohydrate, calcium, vitamin and iron for both cookies and chapati. The value-added products showed the presence of phytonutrients such as flavonoids, saponins, tannins, terpenoids, polyphenols etc. indicative of their health beneficial properties. Finally, sensory analysis using a 5 point hedonic rating scale gave an overall acceptability score of 4.7 and 4.5 for cookies and chapati, respectively.

**Keywords:** Horse gram, functional properties, value-added products, sensory analysis and nutritive value.

## Introduction

Legumes were among the earliest food crops cultivated by man. Grain legumes or pulses belong to the family Leguminaceae and subfamily Papilionaceae occupies an important place in the world food. Grain legumes are an important source of protein for the majority of the Indian population. However, over the last two decades, production and productivity of most pulse crops have either declined or stagnated. This has resulted in a decline in per capita availability of pulses

from 64 g to 47.78 g/day<sup>1</sup>. Increase in population has increased demand for food crops. Hence, efforts are being made to augment pulse production for better availability including the exploitation of new and underexploited grain legumes. In this regard the Asia Pacific region possesses a rich diversity of several useful underexploited plants which are resilient and tolerant to adverse conditions. These crops can grow on poor marginal lands and can be cultivated with comparatively lower management costs. Many of them are nutritionally superior compared to conventionally grown pulses. Hence, such nutritionally rich crops could be exploited for better health and nutrition.

In view of the above the aim of this study was to prepare value-added products by incorporating horse gram flour and studying the physicochemical, sensory and nutritive properties of the products. Additionally, horse gram flour was roasted and compared to plain flour as roasting is said to reduce the anti-nutritional factors.

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## Materials and Method

**Sample Collection:** Horse gram was obtained from the local departmental store Pondicherry city. Seeds were cleaned manually from extraneous material and used for analysis. One part of seeds was grounded to fine powder while the other part was roasted and then ground to obtain flour.

**Formulation of roasted horse gram flour incorporated cookies and chapati:** Horse gram flour

was used to prepare a value added snack. Cookies were prepared using roasted horse gram flour in combination with refined wheat flour (30, 40 and 50%) as given in Table 1. Briefly, baking powder, roasted horse gram flour and refined wheat flour were sieved twice. Butter and powdered sugar were creamed, blended with flour and made to dough, rolled and cut using biscuit cutter. Cookies was baked at 170°C for 15 minutes, cooled and evaluated for sensory attributes. Cookies prepared without addition of horse gram flour was taken as control.

**Table 1: Composition of horse gram incorporated cookies**

Ingredients	Control	Level of incorporation (%)		
		30	40	50
Refined wheat flour	100	70	60	50
Horse gram flour	-	30	40	50
Powdered sugar	50	50	50	50
Butter	30	30	30	30
Baking powder	0.5	0.5	0.5	0.5

**Table 2: Composition of horse gram incorporated chapati (flatbread)**

Ingredients	Control	Level Of Incorporation (%)		
		30	40	50
Wheat flour	100	70	60	50
Horse gram flour	-	30	40	50
Salt	2	2	2	2

Chapati is a typical north Indian dish prepared from wheat flour and it is creatively modified to various forms like stuffed chapati, potato chapati, etc. Chapati was prepared from wheat flour (control) and by mixing horse gram flour varieties at different levels of substitution (30, 40 and 50) as given in Table 2. In a mixing bowl, add the roasted horse gram flour with whole wheat flour. Mix it well and add required salt to it and add two spoon of oil. Adding water little by little knead it into a dough and let it rest for 5-10 minutes. After 10 minutes pinch small portions of the dough, make a ball out of it gently on a polpat. Flatten the dough with a rolling pin. Heat a flat pan, place the flattened dough over it. Wait for bubbles to appear on one side. Flip it and cook well on both the sides Serve hot. Chapati prepared with plain refined wheat flour was treated as control.

### Physical characteristics of formulated products:

Physical parameters such as diameter and weight of the product before and after cooking was evaluated.

**Nutrient analysis of formulated products:** The nutritive values of horse gram flour incorporated cookies and chapati are assessed. The nutrients assessed includes moisture, carbohydrate, protein, fat, crude fiber, iron, vitamin A, calcium specified<sup>4</sup>.

**Evaluation of Phyto-nutrients in formulated products:** The phytochemical content of developed horse gram flour incorporated cookies and chapati were assessed. The phytonutrients and antioxidant properties assessed includes tannins, saponins, flavonoids, steroids, terpenoids, alkaloids, polyphenols triterpenoids and cardiac glycosides specified according to<sup>4</sup>.



**Sensory Evaluation:** Sensory evaluation of the value added horse gram flour products was done to select the most acceptable product from first trial. The quality attributes in terms of colour, appearance, flavour, texture and taste were evaluated by untrained judges using score card with 5 point hedonic rating scale.

**Statistical Analysis:** All experiments conducted were statistically analysed and represented with mean and standard deviation values. T-test and ANOVA were used wherever appropriate and significance value (p) was set based on the criteria assessed.

### Results

**Physical properties of horse gram seed:** The physical characteristics of horse gram seed were evaluated. Parameters such as colour, height and weight were determined. The height was found to be 3-6 mm and weight measured 0.29 g for 100 seeds while the colour of the seed was brown.

**Physical characteristics of value added products (cookies and chapati):** The diameter and height of the formulated products were measured. The initial and final diameter of the cookie was 6 cm and 7 cm, respectively while the weight was 35 and 33 g, respectively. There was an increase in the diameter and reduction in weight after baking. The initial and final diameter and weight of chapati remained the same, 15 cm and 25 g, respectively.

**Nutrient composition of horse gram formulated cookies and chapati:** The nutrient composition of cookies and chapati is given in Table 3. The values were compared with control products prepared without the addition of horse gram flour. Horse gram flour incorporated cookies contained 10.85% of fibre, 38.56% of protein, 15.63% of fat, 26.96% of carbohydrate, 30.25mg of iron, 68.32mg of calcium and 48.35IU of vitamin A. The content of fibre, protein, carbohydrate, iron, calcium and vitamins considerably increased in the value-added product compared to the control.

**Table 3: Nutrient composition of horse gram incorporated cookies and chapati**

Parameters	Control Cookies (100 g)	Horse gram cookies (100 g)	Control Chapati (100 g)	Horse gram chapati (100 g)
Moisture content (%)	19.2	8.60	12.20	11.50
Crude fiber (%)	0.3	10.85	1.9	12.65
Protein (%)	11.1	38.56	12.1	28.45
Fat (%)	12.2	15.63	1.7	14.50
Carbohydrate (%)	9.46	26.96	23.4	28.44
Iron (mg)	2.77	30.25	4.9	32.52
Calcium (mg)	26.6	68.32	20.2	22.41
Vitamin A (IU)	25	48.35	22	24.60

**Phytochemical content in value-added products:** Evaluation of phytochemicals in the value added products showed the presence of flavonoids, tannins, steroids, saponins, terpenoids, alkaloid, anthroquinone, polyphenol and glycoside in cookies. Whereas, in chapati tannin, saponin, flavonoids, terpenoids and polyphenols were found (Table 4).

**Table 4: Phytochemical composition on horse gram incorporated cookies and chapati**

S.No.	Test analysis	Cookies	Chapati
1	Tannins	+	+
2	Phlobatannin	-	-
3	Saponin	++	++
4	Flavonoids	+	+
5	Steroids	++	-
6	Terpenoids	++	+

S.No.	Test analysis	Cookies	Chapati
7	Triterpnoids	+	+
8	Alkaloid	++	-
9	Carbohydrate	++	+
10	Protein	+	+
11	Anthroquinone	+	-
12	Polyphenol	+	+
13	Glycoside	+	-

(+ Present, - Absent and ++ High concentration)

**Sensory Evaluation:** Sensory evaluation was done using a 5 point hedonic rating scale method employing 20 untrained evaluators. Criteria such as appearance, taste, texture, flavour and crispiness were evaluated. Both cookies and chapati had overall acceptability values of 4.7 and 4.5, respectively (Table 5).

**Table 5: Sensory evaluation of horse gram incorporated cookies and chapati**

S.No.	Sample I Cookies		Sample II Chapati	
	Criteria	Mean±S.D	Criteria	Mean±S.D
1.	Appearance	4.75±0.44	Appearance	4.60±0.50
2.	Taste	4.60±0.50	Taste	4.30±0.47
3.	Texture	4.85±0.36	Texture	4.40±0.68
4.	Flavor	4.70±0.47	Flavor	4.80±0.41
5.	Crispiness	4.70±0.47	Overall acceptability	4.50±0.51

## Discussion

*Macrotyloma uniflorum* commonly called horse gram is one of the underutilized legumes. Normally cultivated for cattle feed, some parts of India also consume the whole beans, seeds or sprouts. It has several medicinal and beneficial effects on humans and is said to be highly nutritious compared to conventional legumes. Hence, this study was undertaken to analyze the physicochemical and nutritional characteristics of plain and roasted horse gram flour and prepare value-added products with the incorporation of flour. The physical appearance of the seed showed that the length and breadth were similar to previous reports varying between 3-6 mm and could vary between seed varieties<sup>2</sup>.

Carbohydrates are one of the major constituents of legumes constituting about 50-70% of dry matter<sup>4</sup>. In legumes, carbohydrates comprise of starch and dietary fibre. Horse gram contains more dietary fibre than kidney beans<sup>5</sup>. The high dietary fibre content of horse gram considerably increased the fibre content of both value-added products which could also contribute to several bioactive effects such as cholesterol reduction, prebiotic activity, reduction of constipation and blood pressure,

blood glucose<sup>5,6,7</sup> etc. The carbohydrate content of horse gram flour incorporated cookies and chapati were higher compared to the product control. Grain legumes are vital sources of protein. The content of protein in horse gram ranges between 18.5 to 28.5%<sup>8,9</sup>. This is consistent with the protein content of cookies and chapati in our study which increased upon incorporation of horse gram. Low fat content of horse gram flour observed in our study is consistent with earlier reports and may be useful for formulating weight restriction diets<sup>10</sup>. Calculated nutritive value for both the products showed considerable increase in protein, carbohydrate, fibre, calcium, iron and vitamins indicating value addition of the product as a result of horse gram incorporation.

Phytochemical analysis of value added products revealed the presence of flavonoids, tannins, saponins, polyphenols and terpenoids. Phenolic compounds confer antioxidative effect on humans<sup>11</sup>. The content of phenolic acid in legumes ranges between 0.325-6.378 mg gallic acid equivalent (GAE)/g<sup>12</sup>. Horse gram contains the highest amount of phenolic acid content (3.579 mgGAE/g). Phenolic compounds are said to contribute to sensory, organoleptic and colour attributes of foods<sup>6</sup>.

Phenolic acids also synergistically benefit human health aiding in platelet aggregation, enzyme activities, blood vessel dilation, detoxification etc<sup>13,14</sup>. These properties enhance the value addition of food products. Similarly, polyphenols were also present in our value-added products. Polyphenols have antimicrobial, antiviral, antimutagenic, anti-inflammatory, anti-oxidant and prevent cardiovascular disease<sup>15</sup>. However, polyphenols can also act as an anti-nutritional factor which was not quantitated in this study.

Sensory analysis of roasted horse gram flour incorporated cookies and chapati was conducted using a 5 point hedonic rating scale. The cookies showed an overall acceptable score based on taste, appearance, texture, flavour and crispiness with an average ranging from 4.6-4.8. Similarly, chapati also scored high overall acceptable sensory score of 4.5. Sensory analysis is a criteria used to test the acceptability of food products. From our study, it is evident that incorporation of roasted horse gram not only increased the nutritive value of the food but also enhanced its sensory and organoleptic characteristics.

### Conclusion

In our study the physicochemical properties of plain and roasted horse gram flour were studied. Roasted horse gram flour was incorporated with refined flour to prepare value-added cookies and chapati. Roasting is said to reduce the anti-nutritional factor in horse gram. The content of carbohydrate, protein, minerals and vitamins were higher. The overall nutritive value of the value-added products increase considerably compared to the controls. Finally the products received a high acceptable score upon sensory analysis. Further studies are required to determine changes in the anti-nutritional factor of the products, its bioavailability and health beneficial properties.

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

**Ethical Clearance:** Ethical Clearance not required for this study.

**Source of Funding:** Self

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# Efficacy of Innovative Smart Phone App in Influencing the Life Style of Adults with Metabolic Syndrome-Observational Case Control Study

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## Abstract

**Background:** Changing habits and dietary pattern of 21<sup>st</sup> century has led to increase incidence of lifestyle disorders. Digitalization has both beneficial and deleterious influence on every aspect of our life like mobile phones on health. This study has been done to study the efficacy of mobile phone applications in improving the life style of adults with metabolic syndrome.

**Methodology:** Sixty subjects aged 40-60 years who have access to mobile phone with any two criteria of metabolic syndrome NCEP ACP III criteria were recruited to two groups.(App messgaes alert and control). Mobile phone App (MGM Smart) was installed in the volunteers' mobile phone which gives reminder for walking, records the duration, provides feedback and saves the data for analysis. The duration of walking of controls were followed by message/calls. After recording study parameters (weight, Blood Pressure and quality of life) the subjects were followed for a period of 1 month and the parameters were recorded. The pre post interventional parameters were compared and analysis done to derive at any significant difference. Comparison of the post interventional data between the two groups by independent t test ( $p < 0.05$ )

**Results:** The duration of walking had increased significantly with the usage of app. Weight, DBP remain the same in both groups. Systolic blood pressure of the group A was significantly less than that of the controls. The quality of life is also greater by 24% in the cases. It is observed that there was no significant difference in weight, diastolic BP after the study period in both groups. The mean SBP, reduced, quality of life bettered in group A.

**Conclusion:** Significant reduction in the SBP, increase in duration of walking, QOL has occurred for subjects who had access to MGM Smart App.

**Keywords:** Metabolic syndrome, mobile, applications, lifestyle.

## Introduction

Sedentary lifestyle and unhealthy dietary habits of the 21<sup>st</sup> century have disturbed the normal metabolism of human compromising health and wellness. Metabolic syndrome is one amongst the many aftermath of modernization.<sup>1</sup> Metabolic syndrome refers to the co-occurrence of cardiovascular risk factors, insulin resistance, obesity, atherogenic dyslipidemia and

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hypertension<sup>[2,3]</sup>. It is closely linked with obesity and lack of physical activity<sup>[4]</sup>. Age standardized prevalence rate of metabolic syndrome is 33.5%, 24.9% in male and 42.3% in female<sup>[5]</sup>. In this era of digitalization the advancements of information and technology have done revolutionaries in every aspect of our lives, one such gadget is smart phone. A mobile app is a computer program designed to run on a mobile device such as phone/tablet or watch<sup>[6]</sup>. It has innumerable operations in the healthcare systems which medical professionals have started to become aware of. The healthcare apps are developed for diverse uses such as diagnosis, follow up of patients, obtaining demographic survey etc. There are few health apps like **medscape**, **skyscape** which are validated after clinical trials<sup>[7]</sup>. It is well known that the progression of metabolic syndrome can be reduced by adapting healthy lifestyle habits. The mobile apps can be utilized to motivate the subjects to adopt such changes be periodic reminders/feedback<sup>[8]</sup>. An attempt has been made to study the effectiveness of one such newly developed mobile app in augmenting the adherence of healthy lifestyle changes of adults with metabolic syndrome.

## Methodology

**Study Design:** Observational case control study

**Study Population:** 60 executives of government organization who have access to android phones, grouped equally into group A (interventional group) and group B (control)

**Inclusion Criteria:** Subjects of age 40-60 years with any two positive features of metabolic syndrome according to the NCEP ACP III criteria.<sup>[9]</sup>

**Exclusion Criteria:** Subjects with endocrine disorders, acutely ill patients.

**Duration of Study:** One month.

Study was conducted in a semi urban town of south India after obtaining approval of the Institutional Human ethics committee (Ethical clearance reference-ICMR-ST/2018/06/04) between August 2018 and September 2018. Basic awareness on metabolic syndrome, its consequences and the benefits of lifestyle changes such as exercise, dietary modifications were given to the recruited subjects. They were given a briefing on the study plan and informed consent obtained from them. Subjects who volunteered to use the mobile App (MGM

Smart) were grouped as A and others were included as control. During recruitment, weight, blood pressure were recorded and their quality of life was assessed by validated questionnaire (Respondent Self-Report version) (Q-LES-Q-SF)<sup>[9]</sup>. An innovative computer application “MGM Smart” was developed with help of software experts, which monitors and send feedback on the duration of walking of the user. MGM Smart App has two different modules. i.e., User app and Admin dashboard. User app is the android mobile application where the users have to register/signup (Figure 1) with their personal details. After signing up, users have to login with their user-id and password for giving daily response. The personal details like name, e-mail-ID, height, weight, blood pressure, glucose level, have to be furnished in the corresponding screen. Specific walking time which the user prefers has to be provided as the default walking time according to preference by the user in the screen intended for the same. The default time is changeable by the user. Every day notification will pop up in their android device to remind user for walk.

After walking the user has to enter the duration of their activity. App provides immediate feedback on the quality of walk, as “Good, can do better etc.”. Once the process is completed the App comes to the home screen and notification will be shown for the next day. The user can check their performance of the whole week from the weekly report page.

Admin dashboard is the module desktop where the administrator will receive all the details of the user and their walking activities. All details received from the user will be stored in the database which can be downloaded for analysis by the admin.

The e-health app (MGM Smart) was installed in the mobile phones of subjects belonging to Group A. They received sufficient training on usage of the App. Their walking habit was monitored feedback provided immediately. Whereas the controls were periodically (weekly) contacted to gather information about their exact walking duration. After a period of one month, weight and blood pressure were recorded and their Quality of life was assessed for all subjects. The duration of walking for Group A was retrieved from the stored data of the App, whereas that of control group was gathered daily by contacting them via messages/call.

### Assessment Parameters:

1. Weight (kgs)

2. Blood pressure (mm Hg)
3. Quality of life
4. Duration of brisk walking

**Statistical Analysis:** Comparison of pre and post interventional data of the two groups were done by paired t-test (significance,  $p < 0.05$ ). Comparison of the post interventional data between the two groups by independent t test ( $p < 0.05$ ).



Figure 1. Home page of MGM Smart app

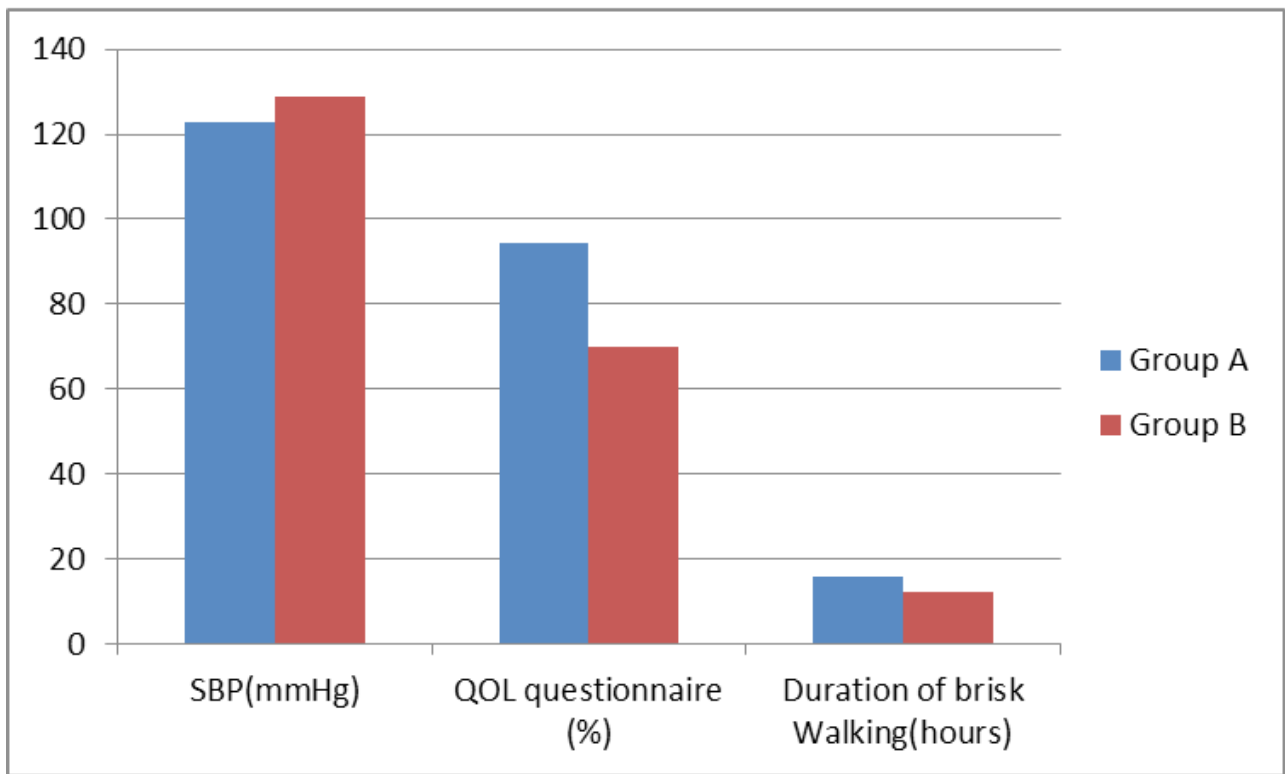


Figure 2: Showing the comparison of both the groups over outcome variables.

Table 1: Comparison of pre and post interventional data of Group A

S.No.	Parameter	Pre-intervention		Post-intervention		p value
		Mean	Std. deviation	Mean	Std. deviation	
1	Weight (kg)	70.77	11.428	70.433	11.6639	.746
2	SBP (mmHg)	133.17	10.326	122.70	9.041	.041
3	DBP (mmHg)	84.93	6.097	83.60	4.994	.812
4	QOL	73.26	10.49	94.43	8.79	.002

\* p value < 0.05 is significant

**Table 2: Comparison of pre and postinterventional data of Group B**

S.No.	Parameter	Pre-intervention		Post-intervention		p Value
		Mean	Std. deviation	Mean	Std. deviation	
1	Weight (kg)	70.83	11.647	69.617	12.638	.191
2	SBP(mmHg)	130.53	14.450	128.67	10.223	.255
3	DBP(mmHg)	83.67	6.082	82.57	6.235	.312
4	QOL	69.23	10.23	69.96	9.44	.684

\* p value < 0.05 is significant

SBP-Systolic blood pressure mm Hg, DBP-Diastolic blood pressure mm Hg, QOL-Quality of life

**Table 3: Comparison between the pre-interventional data of the control and case group**

S. No.	Parameter	Control		Case		P Value
		Mean	Std. Deviation	Mean	Std. Deviation	
1	Weight (kg)	70.77	11.43	70.83	11.65	0.98
2	SBP(mmHg)	133.17	10.33	130.53	14.45	0.42
3	DBP(mmHg)	84.93	6.10	83.67	6.08	0.42
4	QOL questionnaire (%)	73.26	10.49	69.23	10.23	0.14

\* p value < 0.05 is significant

SBP-Systolic blood pressure mm Hg, DBP-Diastolic blood pressure mmHg, QOL-Quality of life

**Table 4: Comparison of the post-interventional data between the groups**

S.No.	Parameter	Case		Control		P Value
		Mean	Std. Deviation	Mean	Std. Deviation	
1	Weight (kg)	70.43	11.66	69.62	12.64	0.80
2	SBP(mmHg)	122.70	9.04	128.67	10.22	0.01
3	DBP(mmHg)	83.60	4.99	82.57	6.23	0.48
4	QOL questionnaire (%)	94.43	8.79	69.96	9.44	0.05
5	Duration of brisk Walking (minutes)	952.33	642.05	740.00	414.34	0.01

\* p value < 0.05 is significant

SBP-Systolic blood pressure mm Hg, DBP-Diastolic blood pressure mm Hg, QOL-Quality of life

## Results

Comparison of physiological parameters and QOL, within the groups before and after study period was performed by paired t test and comparison between the groups done by independent t test. It was observed that there was no significant difference in weight, diastolic BP after the study period. The mean of Systolic Blood pressure (SBP), 133.17mmHg has reduced to 126.70mm Hg after the intervention. (Table 1)Quality of life which was 73% during the pre-interventional period has

significantly increased to 94%. On analyzing the above data, it was obvious that significant alteration in the SBP and QOL has occurred for subjects who had access to MGM Smart App (Table 2) (Group B)

It was evident from the Table 2 that the differences between all the pre and post interventional values are negligible. Hence we infer that no significant improvement in the quality of life and other physiological parameters had occurred in group B after the study period.



Comparison of physiological parameters and QOL, between the groups before and after study period was performed by independent t test.

Table 3 provides the comparative results of the pre-interventional data of the control and case group. Before intervention the mean weight of the both the groups were almost the same. The mean of the systolic blood pressure of the control group before intervention is 133.17 mmHg and that of case group is 130.53 mmHg and the p value is insignificant. Likewise, diastolic blood pressure also remains almost same in both the populations. From the above findings, it is clear that the subjects are appropriately matched before grouping.

Comparisons of the post-interventional data's were performed to analyze the influence of the App. The duration of walking during the entire period had increased significantly with the usage of app. Weight, DBP remain the same in both groups. Systolic blood pressure of the group A is 6mmHg less than that of the controls with significant p value ( $p = 0.01$ ) The duration of walking has significantly increased by 210 minutes. The quality of life is also greater by 24% in the cases.

## Discussion

Digitalization has become the way of our life in this era. The electronic gadgets are like double edged sword with both merits and demerits. Their usage has considerable influence in every walk of our life. Biotechnologist and healthcare professionals collaborate to meticulously explore the ways for beneficial utilization of digital technology in enhancing healthcare services. Mobile technology on smartphones and tablets allow health care providers access to clinical information at the point of care [10]. Majority of smart phone users belong to the economically stable, executives who are more prone to suffer from metabolic syndrome. Hence the study was designed to analyze the influence of mobile app in promoting healthy lifestyle behaviors. It could record a significant improvement in the health status by reduction in SBP, improved QOL and increased duration of walking. Earlier few studies had researched the outcome of health applications in diverse setup. Kenneth D Mandl documents after the observational study on SMART platform that smartphone applications can bring down healthcare costs by support standard evolution accommodate differences in care work flow, foster competition in the market and accelerate innovation [11].

Zhao J, Freeman B researched the influence of mobile phone app on health behaviors state that there is improvement in adherence to healthy habits by the smart phone users provided they are monitored with regular reminders. [12].

Similar research to find out the efficacy of smartphone apps in managing the dietary habits of people had reported that there is no much change in the calorie intake and weight of the person using it but it was found to be useful for the physician to follow up and calculate the approximate calorie intake of the patients [13].

For the management of diabetes 12 apps were studied and out of them only 5 apps were associated with clinically significant improvements. None of the studies showed patient improvements in quality of life, blood pressure, weight, or body mass index [14] which is contrary to our result obtained in this study. Similarly the result of the aforementioned clinical trial ENGAGED which aimed at obesity intervention with smartphone phone application also concludes that self-motivation is the only thing needed to improve life style and improve health whether the person uses an application for it or with paper [15]. Thus, smartphone applications influence or motivate people to lead a better and healthy life style during the interventional period of one month. There are many limitations in introducing health care apps among people because most people feel it as a burden to use these mobile apps regularly and enter their data into it. Apps don't help in motivating people to lead a healthy life style like brisk walking daily. It can just help people who are already motivated to do brisk walking by supporting them.

## Conclusion

From our study we could conclude that the MGM smart app for monitoring metabolic syndrome is efficient in getting desirable response from willing participants. Significant health improvement as observed by augmented duration of brisk walk leading to improved quality of life and reduction in SBP of the App user is observed. Long term follow up/usage of app is expected to validate the efficacy of the health App. Motivation and willingness among people is required for greater benefits. Future studies can be conducted on the benefits of long term usage of the App in diverse settings and clinical conditions.

Partly funded by ICMR Rs 10000 and partly self:  
Reference -ICMR-STs/2018/06/04

**Conflict of Interest of each Author:** Nil

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# Infant Feeding Practices: Barriers and Benefits of Breastfeeding Practices among Mothers in a Village in North Karnataka

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## Abstract

**Introduction:** Giving pre lacteal feeds is a common cultural practice in many countries around the world. Though breastfeeding is the best source of nutrition for the infants, its importance is ignored in various ways. Therefore, an attempt was made to determine the breast feeding practices among mothers of rural north Karnataka.

**Method:** A cross-sectional study was conducted among mothers of Shivanagi village who had atleast one child in the age group of 6 months to one year. Information regarding knowledge, attitude and practices related to breastfeeding practices was collected in a pre-tested, semi-structured questionnaire by interview technique.

**Results:** Of the 167 mothers, prelacteal feeds were given by 65.9% of them whereas colostrum was given by only 43.1%. Mother and infant illnesses and ignorance (37.1%, 37.1% and 317% respectively), followed by lack of privacy (25.1%) were mentioned as the major barriers faced for breast feeding.

**Conclusion:** IEC (Information, education and communication) activities in this regard can play a major role in putting an end to widespread misconceptions for withholding colostrum and giving pre lacteal feeds.

**Keywords:** Breast feeding practices, mothers, rural, infants.

## Introduction

Breastfeeding is the most cost-effective, ideal, affordable and safest way of providing not only nutrients for growth and development of infants, but also antibodies which protect them from illnesses like pneumonia and diarrhea. World Health Organization(WHO) and Government of India recommend exclusive breastfeeding of newborn upto 6 months of age, continued along with appropriate complementary foods up to 2 years of age. Practices like avoidance of prelacteal feeds, initiation of breast feeding within an hour of birth, exclusive breastfeeding for first 6 months of life and continued breastfeeding up to the age of two years, could save about 8 lakh children every year<sup>1</sup>. However, most working mothers tend to abandon breastfeeding partially or completely because they do not have sufficient time or a

place to breastfeed their babies. Therefore, it is essential to provide mothers with safe, clean and private place in or near their workplace to continue breastfeeding.<sup>1-3</sup>

According to United Nation's Indian Millennium Development Goal Achievement Report, even though India has achieved considerable success on maternal health the progress in child health has been slower.<sup>4</sup> Infant Mortality Rate in Karnataka, has reduced from 43/1000 live births [NFHS 3] to 28/1000 live births [NFHS 4], with higher rates in rural Karnataka [with IMR of 34/1,000 live births].<sup>5-7</sup> In rural Karnataka, exclusive breastfeeding for 6 months is practiced by 58.2% of mothers and anaemia among children (6-59 months age Hb < 11 gm/dl) has been found to be 63.4%.<sup>6</sup>

The benefits of breastfeeding are influenced

by various practices adopted which vary among different regions and communities.<sup>3,8</sup> Urban or rural difference, age, breast problems, societal barriers, insufficient support from family, knowledge about good breastfeeding practices, mode of delivery, health system practices and community beliefs have all been found to influence breastfeeding practices.<sup>9-12</sup> Therefore, this study was undertaken to assess the breastfeeding practices among mothers in rural north Karnataka and to understand the barriers and benefits in them.

## Materials and Method

After obtaining Institutional ethical clearance, a community based cross-sectional study was conducted for a period of 3 months (from October 2015 to December 2015) at Shivanagi village the rural field practice area of Department of Community Medicine, Shri. B. M. Patil Medical College, Vijayapura. The sample size was calculated considering a prevalence of 40% as the proportion of babies who were exclusively breastfed till 6 months of age in rural Karnataka.<sup>13,14</sup> After taking an absolute precision of 8% at 95% confidence interval the sample size calculated was 150. Also, considering a nonresponse rate of 25% the required sample size was obtained as 167.

**Sampling Method:** Systematic random sampling. House was taken as the sampling unit.

**Step 1:** Sampling interval,

$$m = \frac{\text{total number of houses}}{\text{sample size}} = \frac{700}{167} = 4.19 \approx 4.$$

**Step 2:** k, random number was less than or equal to sampling interval i.e., m.

After noting down all the houses with mothers who had atleast one child in the age group of 6 months to one year, random number, k, was selected by using lottery method and so k<sup>th</sup> house was taken as the first house and from then on every 4<sup>th</sup> house was visited to find the eligible person.

**Step 3:** k, k+4, (k+4)+4,..... This process was continued till the required sample size of 167 was reached. If the inhabitants were not at home at the time of the visit the next house was visited.

After taking informed consent participants were interviewed using a predesigned, semi-structured questionnaire. Information regarding knowledge,

attitude and practices related to breastfeeding practices, their barriers and benefits was collected.

**Inclusion criteria:** who had atleast one child in the age group of 6 months to one year willing to be a part of the study.

**Exclusion Criteria:**

1. Those who were not willing.
2. Mothers whose infants were suffering from congenital or any systemic diseases.

**Statistical Analysis:** The data was analyzed using MS Excel 2007 software and SPSS 17.0 software, represented using frequency distribution, cross tabulation and chi square test.

## Results

Majority of the participants were house-wives (95.8%), belonged to joint families (76.0%) and class IV socio-economic status (71.1%) and were Hindu by religion (74.8%). About half of mothers were in the age group of 21-25 years (53.9%) and 30.5% of mothers were illiterate. Mean age at marriage was  $21.6 \pm 4$  years and age at first pregnancy was  $22.3 \pm 3.8$  years. Nearly 90% of mothers had availed minimum of 1 antenatal checkup (89.8%). Less than 50% of mothers (46.7%) reported to have ever received advice regarding breastfeeding. Source of information regarding importance and correct breastfeeding practices was usually a doctor (23.4%), followed by relatives (14.4%) and ANMs (10.8%). Prelacteal feeds were reported to be given by 65.9% of mothers, whereas colostrum was given by only 43.1%. About half of mothers (50.9%) reported to have exclusively breastfed their infants for 6 months, whereas 40.7% of mothers gave for less than 6 months. On demand breastfeeding was practiced by only 5.4% of mothers. Majority of the participants did not face any problems during breastfeeding (89.8%). Mother and infant illness and ignorance (37.1%, 37.1% and 31.7% respectively), followed by lack of privacy (25.1%) were mentioned as the major barriers faced for breastfeeding. About half of illiterate mothers and those who had studied upto degree and mothers who belonged to nuclear families practiced less than 6 months of exclusive breastfeeding (49.0%, 50.0%, 50.0% respectively). (Table 1) Majority of mothers who had received antenatal checkups (55.3%) and those who had male child (58.6%), exclusively breastfed their infants for 6 months. These associations were found to be statistically significant ( $p < 0.05$ ).

(Table 2) 65.9% of the mothers who had delivered by Caesarean section (65.9%) did not feed colostrum to their newborns when compared to those who delivered normally (46.8%). This difference was statistically

significant ( $p < 0.05$ ). (Table 3) No significant association was found between any of the socio-demographic factors and giving prelacteal feeds ( $p > 0.05$ ).

**Table 1: Association of Exclusive breastfeeding practice with socio-demographic factors**

	EBF less than 6 months	EBF for 6 months	EBF 7 months and above	Total	Chi square test
<b>Occupation of mothers</b>					
Housewife	65 (40.6)	81 (50.6)	14 (8.8)	160 (100.0)	$\chi^2 = 0.677$
working women (Daily wager/ job holders)	3 (42.9)	4 (57.1)	0 (0.0)	7 (100.0)	$p = 0.713$
<b>Gender of infant</b>					
Male	30 (34.5)	51 (58.6)	6 (6.9)	87 (100.0)	$\chi^2 = 4.341$
Female	38 (47.5)	34 (42.5)	8 (10.0)	80 (100.0)	$p = 0.014^{**}$
<b>ANC checkups</b>					
Received	54 (36.0)	83 (55.3)	13 (8.7)	150 (100.0)	$\chi^2 = 13.893$
Not received	14 (82.4)	2 (11.8)	1 (5.9)	17 (100.0)	$p = 0.001^{**}$
<b>Total</b>	<b>68 (40.7)</b>	<b>85 (50.9)</b>	<b>14 (8.4)</b>	<b>167 (100.0)</b>	

\*Note: 8 mothers refused to answer income

**Table 2: Association of Colostrum feeding with socio-demographic factors**

	Colostrum given	Not given	Total	Chi square test
<b>Occupation of mothers</b>				
Housewife	70 (43.8)	90 (56.2)	160(100.0)	$\chi^2 = 0.630$
working women (Daily wager/job holders)	2 (28.6)	5 (71.4)	7(100.0)	$p = 0.427$
<b>Gender of infant</b>				
Male	43 (49.4)	44 (50.6)	87(100.0)	$\chi^2 = 2.950$
Female	29 (36.2)	51 (63.8)	80(100.0)	$p = 0.086$
<b>ANC checkups</b>				
Received	68 (45.3)	82 (54.7)	150(100.0)	$\chi^2 = 2.960$
Not received	4 (23.5)	13 (76.5)	17(100.0)	$p = 0.085$
<b>Place of delivery</b>				
private hospitals	46 (46.9)	52 (53.1)	98 (100.0)	$\chi^2 = 1.415$
Government hospital	26 (37.7)	43 (62.3)	69(100.0)	$p = 0.234$
<b>Type of delivery</b>				
Normal Vaginal	42 (53.2)	37 (46.8)	79(100.0)	$\chi^2 = 6.175$
LSCS	30 (34.1)	58 (65.9)	88(100.0)	$p = 0.013^{**}$
<b>Total</b>	<b>72 (43.1)</b>	<b>95 (56.9)</b>	<b>167 (100.0)</b>	

\*Note: 8 mothers refused to answer income

**Table 3: Association of giving Prelacteal feeds to newborns with socio-demographic factors**

	Prelacteal feeds			Chi square test
	Given	Not given	Total	
<b>Occupation of mothers</b>				
Housewife	106 (66.2)	54 (33.8)	160(100.0)	$\chi^2 = 0.247$
working women (Daily wager/job holders)	4 (57.1)	3 (42.9)	7(100.0)	p = 0.619
<b>Gender of infant</b>				
Male	61 (70.1)	26 (29.9)	87(100.0)	$\chi^2 = 1.457$
Female	49 (61.2)	31 (38.8)	80(100.0)	p = 0.227
<b>ANC checkups</b>				
Received	97 (64.7)	53 (35.3)	150 (100.0)	$\chi^2 = 0.946$
Not received	13 (76.5)	4 (23.5)	17 (100.0)	p = 0.331
<b>Place of delivery</b>				
private hospitals	62 (63.3)	36 (36.7)	98 (100.0)	$\chi^2 = 0.715$
Government hospital	48 (69.6)	21 (30.4)	69 (100.0)	p = 0.398
<b>Type of delivery</b>				
Normal Vaginal	51 (64.6)	28 (35.4)	79 (100.0)	$\chi^2 = 0.115$
LSCS	59 (67.0)	29 (33.0)	88 (100.0)	p = 0.735
<b>Total</b>	<b>110 (65.9)</b>	<b>57 (34.1)</b>	<b>167 (100.0)</b>	

## Discussion

Notably, all the mothers in this study had opted for institutional deliveries. Only 50.4% of the deliveries were institutional in a study by Mahmood et al.<sup>12</sup> Though 90% of participants had availed minimum of 1 ANC check-up, only half of the mothers had knowledge about exclusive breastfeeding for 6 months. This could be due to the fact that only half of participants had ever received advice about breast feeding. Colostrum helps in establishment of lactation and protects the newborns against allergies, electrolyte imbalance, gastrointestinal and upper respiratory tract infections.<sup>15-17</sup> Most participants (56.9% and 65.9% respectively) were discarding colostrum and giving prelacteal feeds to their infants. Also, only 51% of infants were exclusively breastfed for 6 months. Raval D et al revealed that 61.9% infants had received prelacteal feeds and 36.9% received colostrum.<sup>18</sup> Kulkarni et al observed that 61.8% received pre-lacteal feeds and 81.6% received colostrum.<sup>19</sup> Kumar D et al found that only 15.9% mothers discarded colostrum, whereas prelacteal feeds were given by 40% of mothers the reasons being family restrictions and social customs.<sup>20</sup> In the present study,

it was found that a significantly higher percentage of mothers who delivered by caesarean section didn't feed colostrum to their newborns as compared to women who delivered by normal vaginal route. This may be due to fear and apprehension among mothers and relatives regarding caesarean section. Majority of mothers from joint families, who belonged to upper socioeconomic status didn't give colostrum to their newborns (60.3% and 61.3% respectively). These findings suggest that family customs, norms, beliefs and ignorance play a role in colostrum feeding. On demand breastfeeding was practiced only by 5.4% of mothers, which is very less when compared to findings of Shaili V et al.<sup>13</sup> These results indicate that the breastfeeding practices among the mothers in rural area are primitive compared to WHO recommendations. In this study, 37.1% of mothers stopped breastfeeding during their ill health and child's illness. Similar results were found in a study conducted by Kumar N et al.<sup>14</sup> These highlight the ignorance and cultural beliefs prevalent in the community. 25% of mothers reported privacy as a major barrier for breastfeeding and 32% didn't know the procedure and benefits of breastfeeding in this study.

## Conclusion

According to mothers the benefits of breastfeeding were good health in the newborn, adequate nutrition and easy availability. Many barriers were faced by the mothers while breastfeeding their infants which included mother and infant illness, ignorance and lack of privacy. Majority of the mothers received ANC checkup. More than half of the mothers were giving pre lacteal feeds. IEC (Information, education and communication) activities should be conducted abundantly to create awareness regarding ill effects of pre lacteal feeding practices and importance of exclusive breast feeding practice among mothers of rural areas. This plays a major role in putting an end to widespread misconceptions for withholding colostrum and giving pre lacteal feeds.

**Ethical Clearance:** Taken from BLDEU's Shri B. M. Patil Medical College Hospital & Research Center Institutional Ethical Committee.

**Source of Funding:** Self

**Conflict of Interest:** Nil

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# Gender Determination through Molecular Analysis of Pulp Tissue of Deciduous Teeth—A Study Using Polymerase Chain Reaction Technique

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## Abstract

**Background:** Accurate determination of gender from the skeletal remains has a significant role in the identification process. In conditions of extreme fragmentation, information from DNA plays a vital role in establishing the gender of the person and further contributes to personal identification.

**Method:** Sixty sound and non-carious extracted deciduous teeth were grouped into three of 20 each. Group 1 was analyzed immediately after extraction. Group 2 and Group 3 were stored at room temperature for three months and Fifteen months respectively before subjecting them to PCR analysis. The X and Y chromosomes from each sample were amplified and compared with the actual gender of the person. Shapiro-Wilk test the independent sample t-test, paired t-test and the chi-square test were used to analyze the data obtained.

**Result:** The mean DNA volume (mg/ml) obtained immediately after extraction was significantly more than that from the teeth stored at room temperature for 15 months.

The PCR analysis did not show any significant difference between group 1 and group 3 ( $p=0.072$ ). Statistically significant difference was observed, when the results of group 1 were compared with that of group 3.

**Conclusion:** Gender could be conclusively determined from the samples analyzed immediately after extraction. The accuracy of gender determination decreased as the period of storage increased.

**Keywords:** Deciduous dentition, gender determination, Pulp Tissue, DNA isolation, PCR analysis.

## Introduction

The accurate identification of human remains is

a public duty justified by social, legal and insurance considerations. Fingerprints and dental means represent the most scientifically, reliable modes of identification. In general the higher the degree of tissue destruction the greater the importance of dental characteristics in effecting proper identification.<sup>1</sup> Hence the role of Forensic Odontologist can never be overemphasized in the civilized modern world if justice is to be sought in solving medico-legal problems including establishing a person's identity.<sup>2</sup>

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Gender determination is a significant component in

the analysis of biological evidence submitted to forensic laboratories.<sup>3</sup> Teeth may be used to determine the gender and provide vital information of personal identification in the event of a severe disaster such as fire or airplane crash.

The technique of Polymerase Chain Reaction (PCR) is commonly used for DNA analysis and the gender determination using X and Y chromosomes has become a reliable tool for forensic investigations. It is generally possible to extract adequate quality and quantity of DNA from dental pulp tissue in order to conduct a Polymerase Chain Reaction (PCR) based analysis, in spite of the body is buried, mutilated, or exposed to explosion or incineration.<sup>4</sup>

Availability of DNA depends on many factors, which includes the storage period of the teeth, environmental conditions and the quantity and quality of pulp retrieved from the teeth.

In the literature, there has been a tremendous amount of work done in gender determination from the dental pulp tissue collected from adult teeth. However, studies on the deciduous dentition area very few in number. Hence the present study is planned and designed to explore the possibilities of determining the gender of a person using the pulp tissue samples collected from exfoliated deciduous teeth and stored in room temperature for different periods.

### Methodology

A total of 60 sound non-carious deciduous teeth extracted from children of both genders in the age group of 6 to 13 years were collected. Informed written consent was obtained from the parents of children whose extracted teeth were chosen for the study. After the Institutional Ethics Committee cleared the study the teeth were grouped into three of 20 each, based on the storage period. Group 1 samples were analyzed for gender determination immediately after the extraction. Group 2 and Group 3 samples were analyzed three months and fifteen months of storage, at room temperature in an open environment. Coding and decoding of all samples were done based on the duration of storage

The pulp tissue was collected from all the samples using a sterile disposable needle and spoon excavator from the pulp chamber and stored in labeled bottles of Dulbecco's phosphate buffer saline (Fig 1).



**Fig. 1. Collected pulp tissue in labeled bottles**

**DNA Isolation:** Isolation of DNA from the pulp tissue was done using the Nucleo Spin Tissue kit (DSS Takara Bio India Pvt. Ltd). The tissue sample was placed in a microcentrifuge tube of 1.5 ml and 180  $\mu$ l of buffer T1 was added to 25  $\mu$ l of proteinase K solution and vortexed. Care was taken that the sample was completely covered with the lysis solution. The samples were then incubated at 56°C until complete lysis was obtained. Samples were then vortexed vigorously and incubated at 70°C for 10 min and 600  $\mu$ l of buffer was added and centrifuged at 11000 rpm for 1 min [Fig 2]<sup>5</sup>



**Fig. 2. Centrifuge**

**DNA quantification and amplification:** The isolated DNA from the pulp tissue of each sample was then quantified in  $\mu\text{g}/\text{mL}$  using Bio Spectrometer [Fig.3], to analyze the amount of DNA obtained from the samples of each of the Group 1, 2 and 3.



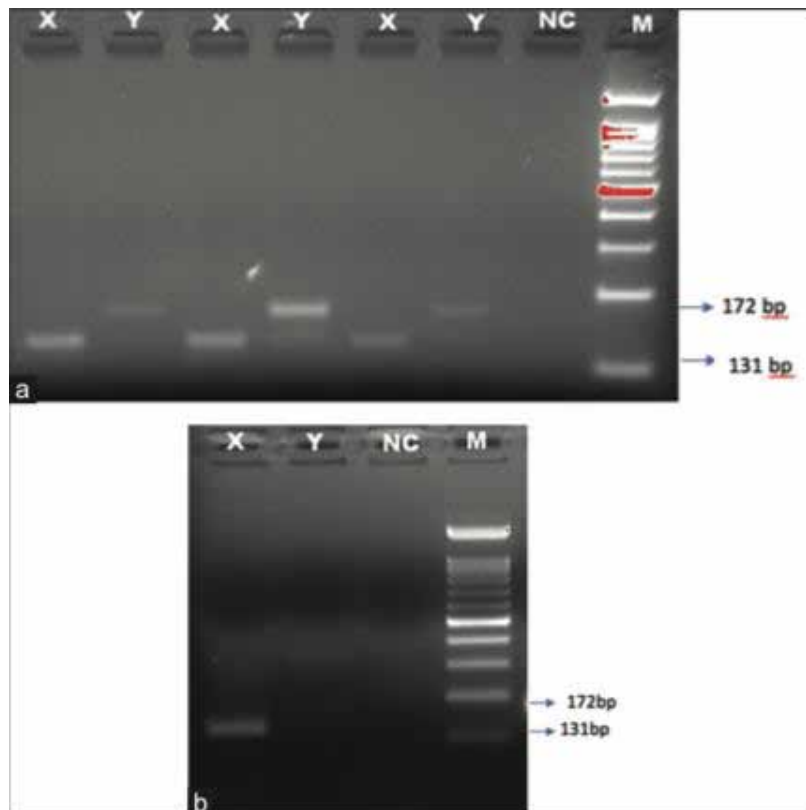
**Fig. 3. Bio Spectrometer**

In the present study, amplification of the 172 base-pair Y chromosome-specific alphoid repeat sequence

was carried out using two Y chromosome-specific primers, Y11:5'-ATGATAGAAACGGAAATATG and Y22:5'-AGTAGAATGCAAAGGGCTC. The 131-basepair X chromosome-specific alphoid repeat sequence was done using two X chromosome-specific primers, X1:5'-AATCATCAAATGGAGATTTG and X2:5'-GTTCAGCTCTGTGAGTGAAA. Heat stable Taq DNA polymerase was provided in the PCR Buffer kit.[17]. The heating cycles of PCR were preheating at 95°C for 3 min and 35 heating cycles (94°C for 40 sec, 55°C for 40 sec and 72°C for 40 sec) using a thermocycler.

**Electrophoresis and gender determination:** The PCR products were then electrophoresed in 2% agarose gel at 80–100 V for one hour ethidium bromide staining was performed and amplified bands of Y- and X- specific band sequences were examined by using Gel DOC™ with Image Lab™ software (Bio-Rad).

The gender of the subjects was considered to be male when both Y- and X- specific sequences were detected, but female when only X-specific sequences were detected [Fig. 4].



**Fig. 4. Detection of X and Y specific chromosomes for male and X- Specific chromosome for female sample.**

Descriptive and analytical statistics were done. The data is represented in mean and standard deviation. The normality of data was analyzed by the Shapiro-Wilk test. As the data followed a normal distribution, parametric tests were used to analyze the data. The Independent sample t-test and paired t-test were used to check the mean differences among the groups. The chi-square test was used to analyze the differences in proportions. The data was analyzed using SPSS, Version 24.0 (IBM Corporation, Chicago, USA).

### Result

The mean DNA volume obtained immediately after extraction and teeth stored at room temperature for three months did not show any significant difference (p=0.085). However the mean DNA volume (mg/ml) obtained immediately after extraction was significantly more than that from the teeth stored at room temperature for 15 months (p=0.025). [Table 1]

**Table 1: Intra-group comparison of mean DNA volume (ng/μl)**

Groups	N	Mean	S.D.	P-value#
Group 1	20	71.34	107.65	0.085
Group 2	20	26.64	35.15	
Group 1	20	71.34	107.65	0.025†
Group 3	20	11.41	7.56	
Group 2	20	26.64	35.15	0.079
Group3	20	11.41	7.56	

#P-value derived from paired t-test; NS – non-significant; †significant at p < 0.05

The mean DNA volume obtained from teeth stored at room temperature for three months showed no statistically significant difference when compared with teeth stored at room temperature for 15 months (p=0.079).

**PCR Analysis:** PCR analysis between the groups showed 100 % accuracy and specificity rate in group 1 and group 2 with no false positive or false-negative results. The PCR analysis results of extracted teeth obtained immediately after extraction showed 100 % sensitivity whereas from teeth stored for three months showed 70% sensitivity which was not statistically significant. (p=0.072).

The PCR analysis results of group 1 showed significantly more (p<0.05) correct interpretation than that of group 3. The PCR analysis of DNA obtained

from group 3 showed sensitivity of 100.0%, specificity of 71.43% and accuracy of 86.67%. There was no statistically significant difference when compared between group 2 and group 3. (p=0.144). The samples analyzed immediately after extraction (Group 1) and after three months of storage (Group 2) showed zero false positive rates, whereas false negative result of 23.1% was found only among Group 2. As the time period of storage increased to 15 months (Group 3) the false positive rates also increased to 20%. [Table 2]

**Table 2: Intra-group comparison of PCR analysis results**

Groups	N	Interpretation N (%)		P-value#
		Correct	In-correct	
Group 1	20	20 (100.0)	0 (0.0)	0.072
Group 2	20	17 (85.0)	3 (15.0)	
Group 1	20	20 (100.0)	0 (0.0)	0.004†
Group 3	20	13 (65.0)	7 (35.0)	
Group 2	20	17 (85.0)	3 (15.0)	0.144
Group 3	20	13 (65.0)	7 (35.0)	

#P-value derived from paired t-test; NS – non-significant; †significant at p < 0.05

### Discussion

Gender determination can be a very difficult process after disastrous events such as severe fires, high impact crashes and explosions. Fragmentation or thermal trauma to the remains calls for extraordinary measures for the discrimination of gender. Gender chromatin diagnosis is beneficial in such cases.<sup>6</sup>

Teeth have emerged as one of the most vital postmortem specimens during forensic investigations since many times teeth are the only well preserved remains available for forensic purposes. In the present day scenario, one of the biggest social stigmas attached to society is child abuse. Children may be abused physically, mentally and/or emotionally. During these violent acts the deciduous teeth could be exfoliated and retrieved from the crime scene, which could be the only evidence available for further investigation. The dental pulp tissue is surrounded by dentin and enamel, which offers the best source of DNA for reliable genetic type in forensic science. Gender determination from dental pulp tissue can be done by various method such as Southern-blot hybridization, Restriction Fragment Length Polymorphism (RFLP) analysis, fluorescence Y chromosome test, etc. However, PCR technique has

gained much popularity owing to its ability to analyze even the minute quantity of DNA especially in cases of gender determination after months or years of death.

DNA obtained from deciduous teeth have proved to be extremely useful for gender determination with the use of adequately standardized DNA analysis method using PCR technique<sup>7</sup>. Witt and Erickson also reported that the PCR technique is a rapid and reliable method for gender determination.<sup>8</sup>

In the present study the pulp tissue was collected from the exfoliated deciduous teeth which were in their active stages of resorption. Hence the quantity of the pulp tissue was less compared to that usually retrieved from the permanent teeth.<sup>9</sup> However, many studies have shown that it is possible to determine the gender of an individual even if the quantity of DNA obtained from the pulp tissue was as less as 20–70 pg of good quality DNA.<sup>10</sup> According to Jacqueline B. Duffy et al. (1991), owing to the active stages of resorption in deciduous teeth the process of dehydration of the pulp varies with the apical canal diameter, which may affect the quantity of DNA obtained.<sup>11</sup> Once the deciduous tooth is exfoliated the inner layer of dental pulp undergoes degeneration, necrosis and putrefaction over a period of few weeks to months. The usefulness of pulpal tissue remains after a period of time remains to be investigated. Hence the present study was designed to analyze the effectiveness of using dental pulp tissue obtained from deciduous teeth stored for different time interval for gender determination using PCR technique.

In the present study, pulp tissue removal, DNA isolation and DNA quantification procedures were done in a sequential manner before the PCR analysis. On comparison of the quantity of DNA retrieved from the three groups, it was found that the highest quantity of DNA was obtained from Group 1, followed by Group 2 and the least quantity was observed on the teeth samples stored for 15 months. Similar findings were reported by Jacqueline B. Duffy et al. (1990), Ionesiy A. G (1980) and Raphael S.S (1976) who stated that as the pulpal tissue dries, there is an arrest of the necrotic and/or putrefactive processes resulting in its prolonged stability and diagnostic ability.<sup>12-14</sup> The study done by Suresh Vemuri et al. (2016), also stated that the amount of DNA quantified decreases as the number of days of storage is increased.<sup>15</sup>

The results of PCR analysis of group 1 and 2 did not show any statistical significance ( $p=0.072$ ). The PCR analysis results of extracted teeth obtained immediately after extraction showed significantly more ( $p<0.05$ ) correct interpretation than that of stored for 15 months. There was no statistically significant difference between the extracted teeth stored for three months and 15 months ( $p=0.144$ ). On prolongation of storage time the microbial load increases the infiltrates of the pulp tissue and speeds up the degradation process. This putrefies the DNA to the extent that amplification may not be possible.<sup>16, 17</sup> It was also noted that the samples analyzed immediately after extraction and after three months of storage showed zero false positive rates whereas the false positive rates increased to 33.3% in the samples analyzed after nine months of storage and to 20% in the samples analyzed after 15 months. These results could be attributed owing to several reasons such as the smaller quantity of pulp tissue collected and DNA isolated, contamination of pulp tissue while collection and other human errors such as mislabeling, mixing specimens and unspecific detection/amplification.

## Conclusion

- Determination of the gender through the pulp tissue of the teeth analyzed immediately after extraction and three months of storage in room temperature after extraction showed 100 % accuracy rate. Whereas when analyzed after 15 months of storage the accuracy rate was decreased to 86.67%.
- Samples of teeth analyzed immediately after extraction and after three months of storage had no false-positive results. Whereas when the time period of storage was increased up to 15 months the false positive results increased to 33.3%
- The effectiveness of gender determination decreased with increased duration of storage of deciduous teeth.

## Declarations:

**Conflict of Interest:** Nil

**Source of Funding:** Self

**Ethical Clearance:** Obtained from the Institutional Ethics Committee

**Ethical Statement of Human and Animal Rights:** 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 (5).

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# Role of Magnetic Resonance Cholangiopancreatography in Patients with Pancreatico-Biliary Diseases

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## Abstract

**Introduction:** Advancements in Magnetic Resonance Cholangiopancreatography (MRCP) technique like development of new pulse sequences and strong magnetic field provided significantly better imaging of pancreatico-biliary diseases with good contrast resolution without any significant artifacts. There is no use of intravenous contrast and it is free of any type of ionizing radiation. As compared to Endoscopic Retrograde Cholangiopancreatography (ERCP) which can only depict the intraluminal pathologies and associated with major complications like pancreatitis, sepsis and even death, MRCP can depict intra-ductal as well as extra-ductal pathologies & also it is not associated with any major complication.

**Aim:** The purpose of the present study is to assess diagnostic accuracy of the MRCP in patients with pancreatico-biliary diseases.

**Materials and Method:** A prospective cross-sectional study which included 50 patients with pancreatico-biliary diseases who were referred to our department for MRCP and who further underwent ERCP and/or Surgery.

**Results:** Our study consisted of patients of both sexes (14 female & 36 male) with age group ranging from 12 to 84yrs. In the present study the overall sensitivity and specificity of MRCP in diagnosing pancreatico-biliary diseases were 97.96% and 100% respectively with a positive predictive value of 100% and negative predictive value of 87.43%.

**Conclusion:** MRCP has high diagnostic accuracy and is almost equivalent to ERCP in diagnosing abnormalities of intrahepatic biliary radicles and common bile duct (CBD). MRCP should be the primary investigation of choice for diagnosis of pancreatico-biliary diseases to plan course of management. ERCP should be reserved for the cases where intervention is required.

**Keywords:** MRCP, ERCP, Pancreaticobiliary diseases.

## Introduction

In evaluation of pancreatico-biliary diseases various

imaging modalities are employed which include non-invasive techniques like Ultrasonography (USG) and Computed Tomography (CT) and various types of invasive cholangiographies. All of the above mentioned techniques have their respective limitations e.g. intraductal calculi are difficult to detect on ultrasound as well as on computed tomography (CT). Percutaneous Transhepatic Cholangiography (PTC) and Endoscopic Retrograde Cholangiopancreatography are invasive imaging techniques, traditionally used for evaluation of biliary tree. These techniques are operator dependent and

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associated with many complications and even mortality (0.1-1%) in some cases. <sup>(1)</sup>

USG is a primary screening modality in pancreatobiliary diseases and further evaluation is carried out by CT and MRCP. The evaluation of distal CBD is limited in USG where bowel gas, fluid and debris in bowel and obesity can degrade the imaging outcome. CT also has limited use in some of the pathologies, like gall bladder and biliary calculi and strictures of biliary tree. CT is less sensitive for detection of biliary calculi. Magnetic Resonance cholangiopancreatography (MRCP) has emerged as a non-invasive imaging technique that provides better visualization of the pancreatobiliary system with high degree of sensitivity and specificity. <sup>(2,3)</sup>

The calculi having high cholesterol content are not visualized on CT as their attenuation is similar to that of fluid. Mixed type of calculi are also difficult to be detected on CT as they have soft tissue attenuation. Direct demonstration of biliary strictures is not possible on CT. Dilated bile ducts showing abrupt ending/cutoff without any mass lesion indirectly suggest stricture on CT. <sup>(4)</sup>

Cholangiographic imaging modalities such as intravenous cholangiography, ERCP and PTC provide better information about extent of biliary strictures. PTC has an additional advantage of therapeutic intervention but it is invasive procedure and associated with complications like sepsis in 1-4% of cases. <sup>(5, 6, 7)</sup>

In past two decade advancements in MRCP technique like development of new pulse sequences and strong magnetic field provided significantly better imaging of pancreatobiliary diseases with good contrast resolution without any significant artifacts. The images obtained by MRCP are comparable to invasive cholangiography. There is no use of intravenous contrast and it is free of any type of ionizing radiation. As compared to ERCP which can only depict the intraluminal pathologies and associated with major complications like pancreatitis, sepsis and even death, MRCP can depict intra-ductal as well as extra-ductal pathologies. <sup>(8)</sup> The purpose of the present study is to assess diagnostic accuracy of the MRCP in patients with pancreatobiliary diseases.

## Materials and Method

About 50 patients with pancreatobiliary diseases who were referred to our department for MRCP and further undergone ERCP/Surgery were enrolled in this

study. MRCP was performed by Signa HDx 1.5 T GE MRI scanner using 8 channel Torso phased array coil after ruling out contraindications for MR examination.

MR images were obtained by SS-FSE (Single Shot Fast Spin Echo), Fast imaging employing steady state acquisition (FIESTA), SPGR and Turbo spin echo (TSE) sequences using breath holding technique.

All MRCP images were viewed by experienced radiologist blinded to the results of other imaging modalities. Patients further underwent either ERCP or surgery and were put on regular follow up.

## Results

A total of fifty patients who were clinically diagnosed as having pancreatobiliary diseases referred for MRCP were included in the present study. The incidence of Pancreatobiliary diseases were recorded to be 2.4:1 (M:F). Peak incidence of pancreatobiliary diseases was observed in the age group of >40 yrs. (66%) and least in age group of 0-18 yrs. (02%).

Six cases of carcinoma gall bladder, 04 cases of cholangiocarcinoma, 04 cases of post operative stricture and 01 case of Primary sclerosing cholangitis (PSC) were diagnosed by MRCP and further confirmed on Surgery/HPE. 18 cases of choledocholithiasis, 09 cases of chronic pancreatitis, 03 cases of pancreatic carcinoma and 01 case of Lemmel's syndrome were diagnosed by MRCP and were further confirmed on ERCP. Out of 03 cases of periampullary carcinoma MRCP erroneously diagnosed one case as benign ampullary stricture which on ERCP found out to be peri-ampullary carcinoma.

In the present study choledocholithiasis predominated (38%) followed by Chronic pancreatitis (18%), Gall Bladder carcinoma (12%) and Cholangiocarcinoma (8%).

In the present study, malignant strictures (57.7%) predominated over benign strictures (42.3%). Both benign (54%) and malignant strictures found to be common in distal CBD (33.33%). [Table-1]

In the present study the overall sensitivity and specificity of MRCP in diagnosing pancreaticobiliary diseases were 97.96% and 100% respectively with a positive predictive value of 100% and negative predictive value of 87.43%. [Table-2]

The overall sensitivity and specificity of ERCP in



diagnosing pancreaticobiliary diseases were 88.78% to 100% and 100% respectively with positive predictive value and negative predictive value both being 100%. [Table-2]

The sensitivity and specificity of MRCP and ERCP is comparable in all cases of pancreaticobiliary diseases except in cases of periamпуляр carcinoma in which sensitivity of MRCP was found to be 66.6%. [Table-3].

**Table 1: Distribution of Strictures as observed on MRCP**

1. Distribution of strictures according to type of strictures	
Type of stricture	Percentage No.of patients
Benign	42.30%11
Malignant	57.70%15
<b>Total</b>	<b>100%26</b>
2. Distribution of benign strictures according to site	
Site of stricture	Percentage No.of patients
Proximal CBD	9.09%01
Distal CBD	54.54%06
CHD	27.27%03
Left Main hepatic duct	9.09%01
<b>Total</b>	<b>100%11</b>
3. Distribution of malignant strictures according to site	
Site of Stricture	Percentage No. of patients
Right main hepatic duct	20%03
Left main hepatic duct	6.67%01
Common hepatic duct	6.67%01
Proximal CBD	26.67%04
Distal CBD	33.33%05
Hepatico-jejunostomy site	6.67%01
<b>Total</b>	<b>100%15</b>

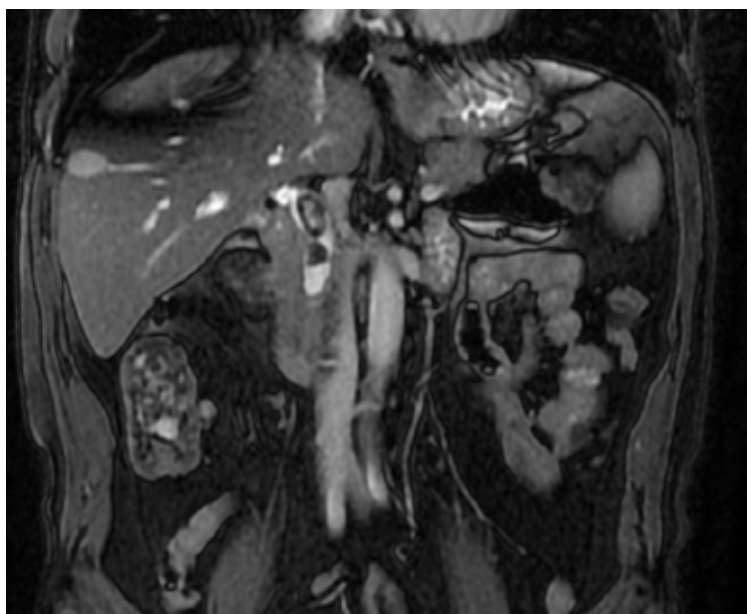
**Table 2: Sensitivity and specificity of MRCP and ERCP in the diagnosis of pancreatico-biliary diseases**

MRCP								
Diagnosis	TP	TN	FP	FN	Sensitivity	Specificity	PPV	NPV
All Pancreatico-biliary diseases	48	01	00	01	97.96%	100%	100%	87.43%
Cholelithiasis/Cholelithiasis	18	32	00	00	100%	100%	100%	100%
Malignant diseases of PB system	16	33	00	01	94.12%	100%	100%	97.06%
Chronic Pancreatitis	09	41	00	00	100%	100%	100%	100%
PSC	01	49	00	00	100%	100%	100%	100%
ERCP								
Diagnosis	TP	TN	FP	FN	Sensitivity	Specificity	PPV	NPV
All Pancreatico-biliary diseases	32	01	00	01	100%	100%	100%	100%
Cholelithiasis/Cholelithiasis	18	14	00	00	100%	100%	100%	100%
Malignant diseases of PB system	16	16	00	00	100%	100%	100%	100%
Chronic Pancreatitis	09	23	00	00	100%	100%	100%	100%

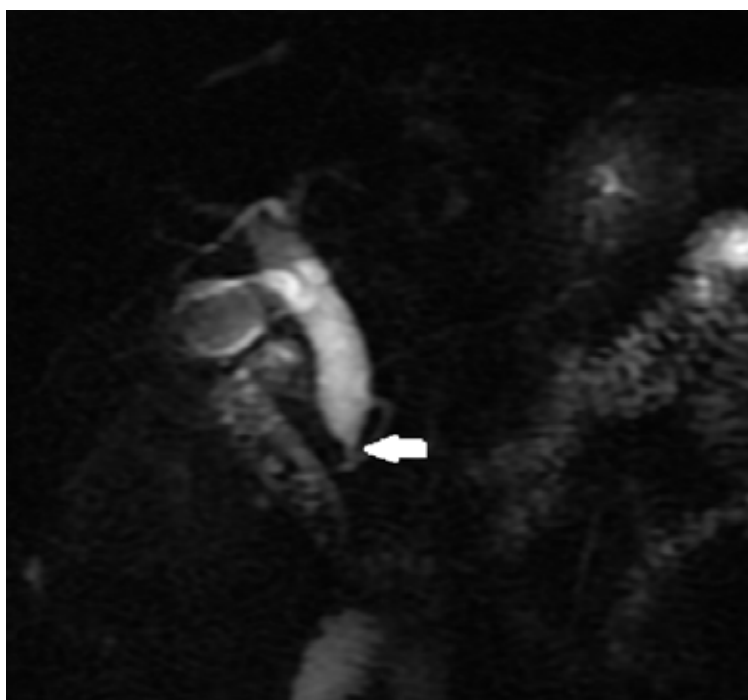
TP - True Positive, TN -True Negative, FP - False Positive, FN - False Negative

**Table 3: Comparison of MRCP to ERCP**

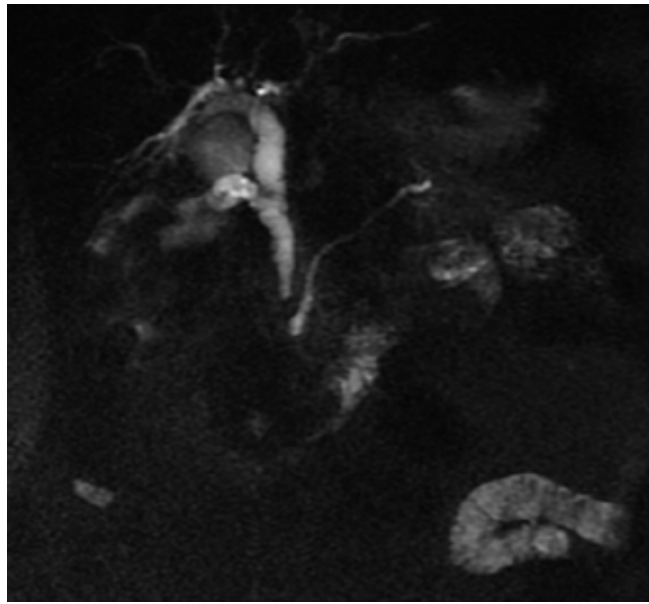
Diagnosis	MRCP			ERCP		
	Sensitivity	Specificity	Accuracy	Sensitivity	Specificity	Accuracy
All Pancreatico-biliary diseases	97.96%	100%	98%	100%	100%	100%
Choledocholithiasis/Cholelithiasis	100%	100%	100%	100%	100%	100%
Malignant diseases of PB system	94.12%	100%	98%	100%	100%	100%
Chronic Pancreatitis	100%	100%	100%	100%	100%	100%
PSC	100%	100%	100%	-NA-	-NA-	-NA-



**Fig. 1: Cor 2D FIESTA image showing T2 hypointense calculi in CBD (arrow).**



**Fig. 2: 3D MRCP image showing benign stricture of CBD.**



**Fig. 3: Thick slab Coronal MRCP image showing abrupt cutoff of CBD and PD suggestive of Peri-ampullary mass lesion.**

### Discussion

In our study, we had most of the cases between 40-60 yrs of age group, with mean age being 45.5.

In four cases of cholangiocarcinoma, MRCP provided accurate information about its extent & local spread. MRCP clearly differentiated infiltrating Carcinoma of GB from cholangiocarcinoma. In the studies conducted by Pavone et al<sup>9</sup>, Guibaud et al<sup>10</sup>, Barish MA<sup>11</sup> and Soto<sup>12</sup>, they found the sensitivity, specificity and diagnostic accuracy of MRCP ranging from 80-86%, 96-98% and 91-100% respectively for the determination of level, type and extent of obstruction of biliary system associated with cholangiocarcinoma which is consistent with results of our study.

In 3 cases of periampullary carcinoma MRCP delineated the lesion and in 2 of them it showed the local spread. In one case of periampullary carcinoma MRCP could only able to diagnose ampullary stenosis. ERCP and guided biopsy later demonstrated presence of periampullary carcinomain. In a study of 25 cases of

periampullary carcinoma, Sugita et al demonstrated the sensitivity, specificity and diagnostic accuracy of MRCP to be 88%, 100% and 96% respectively.<sup>(13)</sup>

In 3 cases of pancreatic carcinoma, MRCP clearly delineated the site, size and spread of the lesion. Results of our study are consistent with the studies of Eric Tam et al<sup>(14)</sup> & Enrique lopez and Haminem et al<sup>(15)</sup> who reported sensitivity and specificity of MRCP as 80% & 95 % respectively in cases of pancreatic carcinoma. In the present study 6 cases of Carcinoma GB were evaluated and MRCP provided accurate information about lesion, its spread and stage of the disease. Results are consistent with study of Yoshimitsu K et al, who concluded the sensitivity and specificity of MRCP close to 95-98% and 95% respectively in detection of Carcinoma GB.<sup>(16)</sup>

9 cases of chronic pancreatitis were evaluated in the present study. Main pancreatic duct is better visualized on MRCP than USG. The differentiation between chronic pancreatitis and pancreatic neoplasm is difficult on USG. The results are consistent with the study conducted by Stimac D et al, who reported sensitivity, specificity

and positive predictive value of MRCP in detection of Pancreatitis are 79%, 92% and 86% respectively.<sup>(17)</sup>

In all 19 cases of choledocholithiasis MRCP clearly showed IHBR dilatation, CBD dilatation and its caliber and calculus in CBD. Varghese et al reported sensitivity, specificity and diagnostic accuracy of MRCP in detection of choledocholithiasis as 91%, 98% and 97% respectively which is consistent with results of our study.<sup>(18)</sup>

In one case of primary sclerosing cholangitis MRCP demonstrated duct dilatation, stenosis, beading and pruning. According to study conducted by Ito et al MRCP is an effective modality for evaluating hepatobiliary diseases with specificity close to 100%.<sup>(19)</sup>

A case of peri-ampullary diverticulum causing distal CBD obstruction and symptoms of obstructive jaundice was evaluated. MRCP was able to diagnose periampullary diverticulum causing distal CBD obstruction. It was later confirmed by ERCP. Rouet J and Gaujoux s et al reported a case of obstructive jaundice caused by distal CBD compression by periampullary diverticulum.<sup>(20)</sup>

In the present study MRCP found to be highly accurate and consistent with the final diagnosis, with an overall sensitivity, specificity, positive predictive value and negative predictive value being 97.96%, 100%, 100% and 87.43% respectively. The findings are consistent with studies conducted by Christopher D Becker et al (1998)<sup>21</sup>, Vishali MD et al (2004)<sup>22</sup> and Nirhale et al (2018).<sup>(23)</sup>

**Limitation:** Small sample size is the important limitation in our study as most of the patients undergo ERCP directly after USG bypassing MRCP.

### Conclusion

Various non-invasive techniques like USG, CT, MRCP and invasive cholangiography are used in evaluation of patients with pancreatico-biliary diseases. USG is operator dependent and various factors like bowel gas restricts its use as only a primary screening modality in patients with pancreatico-biliary diseases. CT on the other hand is not very sensitive for demonstration of all types of calculi and intra-ductal pathologies of pancreatico-biliary system. Invasive method like ERCP, though regarded as gold standard in diagnosing pancreatico-biliary diseases are associated with multiple complications like pancreatitis and other co-morbidities.

In our study we evaluated the diagnostic accuracy of MRCP compared to ERCP/Surgery. We conclude that MRCP has high diagnostic accuracy and is almost equivalent to ERCP in diagnosing abnormalities of IHBR and CBD. MRCP also has added advantage to diagnose extra-ductal pathologies like cholangio-carcinoma and carcinoma of gall bladder. This study concludes that MRCP should be primary investigation of choice for diagnosis of pancreatico-biliary diseases to plan course of management. ERCP should be reserved for the cases where intervention is required.

**Sources of Funding:** No

**Conflict of Interest:** None declared

**Ethical Approval:** Not required

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# Awareness of Human Papilloma Virus Vaccination in Suburban Population

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## Abstract

**Background:** Cervix cancer is a malignant tumour present in the lowermost part of the uterus and can be prevented by HPV vaccine. HPV vaccine program will require awareness regarding HPV related diseases or disorder and benefits of HPV vaccination and knowledge in general population.

**Objectives:** To check the routine vaccination course followed by women in their daily life. To screen the women with reference to awareness of cervix cancer and its vaccination.

**Method:** This analysis is part of simple random method study carried in suburban population of Karad after ethical clearance was obtained from the institute committee 123 women were screened between age group 15 to 45 years. This was to estimate awareness of HPV with cause, symptoms, prevalence of cervix cancer and awareness of his vaccination in suburban population which were according to its conclusion.

**Result:** Out of 123 women 19% of population aware of multiple pregnancy can cause cervix cancer. 24% aware that HPV is sexually transmitted infection which can cause cervix cancer. In general population 97% of population are not aware of pap smear test, only 3% population are aware, 68% population are aware that cervix cancer is sexually transmitted, 3% know it can be transmitted by physical contact, only 53% are aware of HPV vaccine. As there is some lack of knowledge and 71% of population are not aware of HPV vaccine due to less awareness, knowledge about cervix cancer.

**Keywords:** Human papilloma virus, vaccination, suburban women, knowledge, awareness.

## Introduction

Cervix cancer is a malignant tumor arising from cervix which is an abnormal growth of cells and spread, this cancer occurs in cervix. It is sexually transmitted disease which have symptoms like pain in pelvic, pain during sexual intercourse or abnormal vaginal bleeding.<sup>1</sup>

Cervix cancer is caused by human papillomavirus infection [HPV] Genital infection by oncogenic human papillomavirus [HPV] is a necessary factor in the development of cancer of the cervix. Human papilloma virus vaccine is the vaccine that prevent infection by certain type of human papillomavirus.<sup>2</sup> Vaccine protect against either two, four or nine type of HPV. All vaccine protects against at least HPV type 16 and 18 that cause greatest risk of cervical cancer, 70% cervical cancer. [HPVs] human papillomaviruses are double stranded DNA viruses belonging to the papillomaviridae; approximately one-third infect the squamous epithelia of genital tract.<sup>3</sup>

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The vaccine requires two to three dose depending on a person age and immune status. HPV vaccine are very safe pain at the site of injection occur in about 80%

redness and swelling at site and fever may occur. <sup>4</sup>HPV are non-enveloped DNA virus that infect cells of skin and mucous membrane.

Most people who contract HPV have no symptoms and they quickly clear the virus from their bodies.<sup>5</sup>

Type of HPV vaccine

Quadrivalent vaccine

Bivalent vaccine

**Dosage:**

Adult male or female

yrs-0.5ml intramuscular

0,2,6 months

Pediatric-0.5ml

0,2,6 months

**HPV:** Adult female

25 yrs-0.5ml intramuscular 0,1,6 months

Pediatrics female-9 to 25yrs

0.5ml-intramuscular

0,1,6 months

Physical therapy given to design exercise program that combine ROM training with light resistance exercise. Therapeutic exercise aim to reduce fatigue and improve physical function.

**Materials and Methodology**

**Type of study:** Observational study

**Study Design:** Survey

**Place of study:** Krishna institute of medical sciences deemed to be university

**Sample size:**

$$n=4pq/l^2$$

$$4 \times 68.9 \times 100 / 15^2$$

$$27560 / 225 = 122.4$$

123 women to be screened from adopted village of KIMSDU, KARAD.

**Study Duration:** 6 months

**Sampling Method:** Simple random method

**Place of Study:** Karad.

**Materials:** Forms,

Pen

**Inclusion Criteria:**

1. Age group: 15 to 45 years
2. Only suburban women
3. Both employed and unemployed

**Exclusion Criteria:**

1. Subject with psychological problems
2. Subject with neurological conditions.
3. Who had suffered from cancer.

**Outcome Measures:**

Self Questionnaire

**Procedure:** After analyzing the data, it was found that there is lack of knowledge about cervix cancer in women and awareness of HPV vaccination from suburban area.

The study will be conducted among rural areas in and around Karad.

Subject will be selected per inclusion and exclusion criteria and written consent will be taken.

Subject will be explained about the procedure of study.

Then they will be asked to fill the questionnaire accordingly.

Survey will be done according to the result obtained and hence conclusion will be given.

**Results**

Out of 123 women 19% of population aware of multiple pregnancy can cause cervix cancer. 24% aware that HPV is sexually transmitted infection which can cause cervix cancer. In general population 97% of population are not aware of pap smear test, only 3% population are aware, 68% population are aware that

cervix cancer is sexually transmitted, 3% know it can be transmitted by physical contact, only 53% are aware of HPV vaccine. As there is some lack of knowledge and 71% of population are not aware of HPV vaccine due to less awareness, knowledge about cervix cancer.

### Conclusion

This survey as after analysing the data indicated that lack of knowledge about cervix cancer and HPV vaccine among women is very low. Only 53% are aware but more than 71% are not aware of HPV vaccine. Therefore, this low knowledge or awareness among women could benefit greatly from educated to uneducated women to encourage primary and secondary cervix cancer prevention programme like free vaccine camp in hospitals or health check-up in small villages or slum area. So, people are not aware of cervix cancer and its vaccination.

### Discussion

This study we find the awareness about human papilloma virus vaccination in suburban population. This project was done in 6 month with sample size 123 and age group of 15 to 45 years this subjects were taken randomly from Karad population .

This research was undertaken with the aim to find out the awareness of human papilloma virus vaccination in urban population. From this study 53%of population are aware about HPV vaccination where as 71% of population are not aware of HPV vaccine.

In this study 19% of population were literate and more then 82% of people were educated but they have lack of knowledge about cervical cancer only 30% of people were aware about cervix cancer .

They have less information about cause for repetitive infection by HPV which can be transmitted through various ways. This infection can be prevented by vaccination available thus cancer can also be prevented. this vaccination is available in health care since a decade. Only 38% population have been undergone As there is lack of knowledge regarding the cervix cancer and its vaccination especially in suburban and rural population. We can provide free health check up, camp, survey method which can be provided at their door steps easily

So, this study is conducted in suburban population to educate, create awareness and give knowledge about the cervix cancer and its vaccination.

**Acknowledgement:** We acknowledge the guidance and support from faculty of physiotherapy.

### Authors Contribution:

Mayuri T. Gotpagar conducted this study by working on protocol preparation, collecting samples, literature review for this manuscript, developed introduction section of the manuscript, together with the discussion of the study findings, collection of data and analysed the data Dr Ruchita R. Shah guided in providing a description of the background information and participated in prepration of manuscript .

**Conflict of Interests:** This author declare that there are no conflicts of interest concerning the content of the present study.

**Source of Funding:** Source of Funding is by self.

**Ethical Clearance:** Institutional ethics committee has given permission to initiate the research project entitled “AWARENESS OF HUMAN PAPILLOMA VIRUS VACCINATION IN SUBURBAN POPULATION”.

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# A Clinical Study to Compare 25 G Whitacre and Quincke Spinal Needles for Incidence of Post Dural Puncture Headache (PDPH) and Failed Spinal Anaesthesia

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## Abstract

Post dural puncture headache (PDPH) is the most distressful complication of spinal anaesthesia. The modifiable risk factors include spinal needle type and size. Thus the present study was attempted with a primary aim to compare 25G Whitacre and 25G Quincke spinal needles with respect to the incidence, onset and severity of PDPH, incidence of failed spinal anaesthesia (FSA) and the quality of block achieved (sensory and motor). The study was conducted from December 2017 to August 2019. 120 patients posted for lower abdominal and lower limb surgeries were allocated in two groups of 60 each. Patients received sub arachnoid block (SAB) with 15 mg of 0.5% bupivacaine using 25 G Whitacre needle in Group A and using 25G Quincke's needle in Group B. All the patients were evaluated for incidence, onset and severity of PDPH at 24hr, 48hrs and 72hrs after SAB, rate of FSA and quality of block using modified bromage scale and pinprick method. Demographic data was comparable in both the groups. Incidence of PDPH was 1.6% in Whitacre group as compared to 15% in Quincke's group . However the result was statistically insignificant for rate of FSA and quality of block achieved. It is concluded that pencil point 25 G Whitacre needles are associated with a lower incidence of PDPH as compared to cutting 25G Quincke spinal needle and thus should be used in a population that is at high risk of developing PDPH.

**Keywords:** Post dural puncture headache, failed spinal anaesthesia, Whitacre, Quincke.

## Introduction

Spinal anaesthesia, also known as subarachnoid block (SAB) was first discovered by J. Leonard Corning in 1885. It is one of the most routinely used technique for surgeries of lower abdomen and lower limbs. It is preferred over general anaesthesia for having advantages like rapid onset, easy technique, excellent operating

conditions, better analgesia, maintenance of airway patency and requires short stay in post anaesthesia care unit (PACU) but is not devoid of complications.

Post dural puncture headache (PDPH) defined as bilateral, frontal, occipital headache which extends to the neck and shoulders and may be throbbing or constant in nature. The headache is increased by head movement, sitting or standing position and is relieved in recumbent position. Usually, headache starts 12-72 hours after dural puncture and resolves by itself within seven days or 48 hours if effective treatment is given<sup>1</sup>. PDPH is caused due to leakage of cerebrospinal fluid(CSF) from dural puncture leading to overall reduction of CSF volume. The pain is attributed to the traction that occurs on the pain sensitive structures in cranial cavity due to downward movement of brain. There are various predisposing factors for PDPH like young age, gender,

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pregnancy, lower body mass index, previous history of chronic headache. The most important preventable risk factor responsible for PDPH is related to the needle selection<sup>2</sup>. Incidence of PDPH may vary from 0.1 to 36% depending upon the type and size of spinal needle.<sup>3</sup>

According to Gaston Labat, there are two pre-requisite which are absolutely necessary to produce successful sub arachnoid block, they being; puncture of the dura mater and subarachnoid injection of an anaesthetic agent.<sup>4</sup>

Failed spinal anaesthesia (FSA) is defined as absent or partial effect of spinal block which requires conversion to general anaesthesia after waiting for 15 minutes.<sup>5</sup> Jeffrey H levy et al had reported 17% incidence of FSA, which they attributed to avoidable technical reasons.<sup>6</sup> Thus, it is necessary to identify potential pitfalls so as to decrease the failure rate by improved clinical practice.

Various mechanisms known to cause FSA include operator related causes (like incorrect positioning, inadequate dose of drug), technique related failure (like misplaced injectate, pseudopuncture), equipment related failure (like blocked needle, pencil point needle).<sup>7</sup>

To combat PDPH and FSA various experiments have been made to manipulate the various needle design components such as tip design, diameter, location of orifice, length and material. There are very few studies reported in the literature comparing 25-G Whitacre and 25-G Quincke needle.

Hence the present study was attempted to compare these two needles with respect to the incidence, onset and severity of PDPH, incidence of FSA and the quality of block achieved (sensory and motor).

#### Material and Method:

After approval from Institutional ethics committee (IEC), this study was conducted in the department of anaesthesiology, from December 2017 to August 2019 on ASA I and ASA II patients, aged 20-60 years, of either gender, who were scheduled to undergo SAB for lower abdominal and lower limb surgeries.

Pre-anaesthetic evaluation was done a day before surgery. Detailed history, physical examination, heart rate, blood pressure, routine investigations (haemoglobin, bleeding time, clotting time, liver function test, renal function test, chest Xray, electrocardiogram, fasting blood sugar and any other special investigation

depending upon the disease process were recorded in all cases pre-operatively.

During the pre-anaesthetic check up, patients were explained about the procedure of SAB, drugs and needles being used. An informed written consent of patients was taken. All the patients were kept Nil per oral overnight and premedicated with tab alprazolam (0.25mg) and tab ranitidine (150 mg) at bedtime prior to the day of surgery.

**Allocation of Groups:** 120 healthy patients were randomly allocated into two groups of 60 each and all the patients were preloaded with 15ml/kg/hr of ringer lactate in preoperative period.

Patients received SAB with 15 mg of 0.5% bupivacaine using 25 G Whitacre needle in Group A and using 25G Quincke's needle in Group B using standard midline approach in L3-L4 space, in sitting position.

After 15 minutes of SAB, quality of block was assessed using gentle pinprick for sensory block and modified bromage scale (Table 1) for motor blockade<sup>8</sup>. If the block was inadequate as per surgery then it was taken as failed spinal block and general anaesthesia was administered to the patient.

In the postoperative period all the patients were advised to maintain supine position for 24 hours and received 75mg diclofenac twice daily for three days as analgesic for surgery. The patients were followed daily for three postoperative days for incidence and severity of PDPH.

Headache after SAB was regarded as PDPH if it occurred after mobilization, aggravated by erect, sitting position, coughing, sneezing or straining, relieved by lying flat and mostly located to occipital, frontal or generalised. Table 2 describes the severity of PDPH.<sup>9</sup>

All the cases of PDPH were managed according to intensity of headache. Mild and moderate required conservative treatment however severe required active intervention.

Statistical analysis was done for all quantitative variables of each group using statistical package for the social science 21 (SPSS 21) version statistical program for Microsoft windows. Data was arranged as range; frequencies, mean  $\pm$  standard deviation ( $\pm$  SD), median and relative frequencies. Mann Whitney U test for non parametric data and Student t test for parametric

data was used for independent samples to compare the quantitative variables of the study groups. Chi-square ( $\chi^2$ ) test was done and exact test was performed (when the expected frequency was not more than 5) to compare the categorical data of the study groups. A probability value (p value) less than 0.05 was taken as statistically significant<sup>10</sup>.

### Observations and Results

Overall incidence of PDPH in our study was 8.3%. As shown in Table 3 the incidence was 1.6% in group A as compared to 15 % in group B. The p value was 0.008, which ascertains that it was significant. None of the patient complained of PDPH in first 24 hours. However when the two needles were compared for severity of PDPH, p value was 0.029 which ascertains the result was significant.

Overall incidence of FSA in our study was 7.5%. As shown in Table 4 the incidence was 11.6% in group A as compared to 3.3 % in group B. The p value was 0.083, which ascertains that it was non significant. When

the two needles were compared for quality of block that is sensory and motor level achieved, p value was 0.53 and 0.35 respectively which ascertains that there is no relation between the type of needle and quality of block achieved.

**Table 1. Modified Bromage scale**

Score	Criteria
0	The patient is able to move hip, knee, and ankle
1	Patient is unable to move hip but able to move knee and ankle
2	Patient is unable to move hip and knee but able to move ankle
3	Patient is unable to move hip, knee, and ankle

**Table 2: Severity of PDPH**

Mild	No limitation of activity and no treatment required.
Moderate	limited activity and regular analgesics required.
Severe	Patient is confined to bed and anorexic.

**Table 3: Variables for PDPH**

Sr.No.	Variables	Opts	Groups				p value	Result
			Whitacre	%	Quincke	%		
1	Incidence of PDPH	Present	1	1.6	9	15	0.0082	Significant
		Absent	59	98.3	51	85		
2	Onset of PDPH	24-48hr	1	1.6	8	13.3	0.725	Non Significant
		48-72hr	0	0	1	1.6		
		NA	59	98.3	51	85		
3	Severity of PDPH	Mild	1	1.6	7	11.6	0.029	Significant
		Moderate	0	0	2	3.3		
		NA	59	98.3	51	85		

**Table 4: Variables for FSA and quality of block**

Sr.No.	Variables	Opts	Groups				p value	Result
			Whitacre	%	Quincke	%		
1	Incidence of FSA	Present	7	11.6	2	3.3	0.083	Non Significant
		Absent	53	88.33	58	96.6		
2	Sensory level	T4	22	36.6	28	46.6	0.53	Non Significant
		T6	29	48.3	25	41.6		
		T8	9	15	7	11.6		
3	Motor Block	Mean	2.85	-	2.91	-	0.359	Non Significant
		SD	0.444	-	0.334	-		

## Discussion

The present study aims to compare pencil point needle and cutting type spinal needle for various complications of spinal anaesthesia. The objectives of the present study was to find out the incidence, onset and severity of PDPH, incidence of FSA and quality of block achieved in two groups where 25 Gauge Whitacre was used in group A and 25 gauge Quincke needle was used in group B.

Both the groups were comparable as regards to age, gender, weight and ASA status.

Our study shows a higher incidence of PDPH with Quincke as compared to Whitacre of same gauge. These results were consistent with the study conducted by Ripul Oberoi et al<sup>11</sup> in 2009, which reported 1% incidence of PDPH with 25 Gauge Whitacre needle as compared to 9 % with 25 gauge Quincke needle. A meta-analysis done by Halpern and Presto reported that pencil point needle produces a lower incidence of PDPH as compared to cutting type spinal needle.<sup>12</sup>

Anirban Pal et al<sup>13</sup> concluded that the pencil point 25G Whitacre spinal needle is responsible for lower frequency of PDPH as compared to 25G Quincke spinal needle and thus, is recommended to be used in patients at a high risk of PDPH.

Carrie suggested that the use of pencil point needle separates the longitudinal fibres of duramater without causing any serious injury and when the needle is withdrawn, fibres get back into state of close approximation thus, closing the rent and preventing any loss of CSF and PDPH.<sup>14</sup>

None of the patient in both the groups complained of PDPH in first 24 hrs. All the patients had PDPH between 24 to 72 hrs after surgery. Similar results were seen in study done by Shah et al in which patients were kept recumbent for 24 hrs after surgery<sup>15</sup>. Study done by Sumaya Syed et al also reported an onset of PDPH ranged from 24 to 72 hrs after dural puncture.<sup>16</sup>

In our study, nine patients had mild PDPH and were given conservative management in the form of adequate hydration and bed rest. All the patients responded well. However, one patient had moderate PDPH and was given analgesia with paracetamol, 15mg/kg, IV twice daily and tramadol 50mg twice daily in addition to conservative management. Epidural blood patch was discussed with this patient, but was not required.

Similar results were seen in study done by Veeresham Madhupathy et al, where maximum patient had mild intensity of PDPH and none of them suffered from severe PDPH on using 25G Whitacre and 25G Quincke needle.<sup>17</sup>

In our study, 11.6 % patients in Whitacre group and 3.33 % in Quincke group had failed spinal block. 9 patients out of 120 have experienced FSA and were given general anaesthesia for the smooth and safe conduct of surgery.

The results were consistent with the study conducted by Jawaharlal N. Ircal et al in 2016, which reported which reported 10% incidence of Failed spinal block with 25 Gauge Whitacre needle as compared to 4% with 25 gauge Quincke needle.<sup>18</sup>

In Whitacre group, occurrence of failed spinal block even after free flow of CSF indicates that appearance of CSF at the hub of needle does not guarantee that the ejection port of needle is completely within the subarachnoid space thus, leading to some leakage of local anaesthetic drug in sub dural or epidural space resulting in inadequate analgesia<sup>4</sup>.

In our study, quality of block achieved with both the needle (Whitacre and quincke) was comparable and was satisfactory for the safe conduct of surgery and similar results are seen in study done by Veeresham Madhupathy et al.<sup>17</sup>

**Limitations:** Our study had relatively small sample size in proportion to the burden of PDPH in population. Also the failure rate of Whitacre needle was high in our study as acquisition of new skill takes time but still it was considered reasonable to conduct this study to evaluate this recently introduced needle for the incidence of PDPH.

## Conclusion

From this present study, it is concluded that pencil point 25 G Whitacre needles are associated with a lower incidence of PDPH as compared to cutting 25G Quincke spinal needle and thus should be used in a population that is at high risk of developing PDPH. Both the needles are comparable in terms of incidence of FSA and quality of block achieved for the smooth conduct of the surgery. Thus, 25gauge Whitacre needle is better than 25gauge quincke spinal needle for spinal anaesthesia.

**Ethical Clearance:** Taken from Institutional ethics committee (IEC).

**Source of Funding:** Self

**Conflict of Interest:** Nil

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# Prevalence of Sacroiliac Joint Dysfunction in Middle Aged Obese Women

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## Abstract

**Objective:** The objective of this study was to find the prevalence of sacroiliac joint dysfunction in middle aged obese women. In obese women the centre of gravity of body shifts which can cause changes in gait and posture. It can cause negative impacts on the health and which in turn can alter the normal daily activities. Usually women will neglect all these discomforts. It can make the symptoms to aggravate and cause many secondary disorders. Hence it is need to make them aware of sacroiliac joint dysfunction to avoid further complications.

**Method:** The study was done in six months with a sample size of 77 participants (female) with a BMI of more than 25 and age group between 35-45 years. The participants with any congenital hip diseases or who underwent for any recent hip surgeries are not allowed. The subjects are taken in and around Karad and consent form was taken from the subjects. The procedure was carried out by assessing the sacroiliac joint by special tests.

**Result:** From 77 subjects 42 females shows positive results in special test and rest shows negative results. Which means 55% of subjects reported sacroiliac joint dysfunction.

**Conclusion:** On the basis of the results of the study, it is concluded that there is a prevalence of sacroiliac joint dysfunction in obese middle aged women. From 77 individuals prevalence of sacroiliac joint dysfunction was seen in 42 females with positive results in special test and rest shows negative results.

**Keywords:** *Sacroiliac joint dysfunction, middle age, obese women.*

## Introduction

Sacroiliac joint dysfunction is the pain experienced between the posterior iliac crest and gluteal fold<sup>1</sup>. Sacroiliac joint is a plane variety of synovial joint. The

joint is formed between the sacrum and ilium bones of the pelvis. The joint is strong as it transfers the weight from lower limb to spine with irregular elevation and depression which produces interlocking of two bones. Stability of the joint is maintained by the ligaments such as:

- Fibrous capsule
- Ventral sacroiliac ligament
- Interosseous sacroiliac ligament
- Dorsal sacroiliac ligament
- Vertebropelvic ligaments

Vertebropelvic ligaments include iliolumbar,

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sacrospinous and sacrotuberous ligament. These are accessory ligaments and plays an important role in maintaining the stability of the joint.

Sacroiliac joint is supplied by three branches of posterior division of internal iliac artery, i.e. iliolumbar, lateral sacral and superior gluteal arteries. Nerve supply include the superior gluteal, ventral and lateral branches of dorsal rami of first and second sacral nerves<sup>1,2</sup>.

Obesity is a condition characterised by the accumulation of fat in the body<sup>3</sup>. The incidence of obesity has increased in recent decades and becomes a major 54BK health challenge. There are many evidences which shows obesity causes many musculoskeletal disorders mainly in lower limbs<sup>4</sup>. Now a days obesity is common among women. It causes many negative impacts on the health of the women<sup>5</sup>.

Obesity can be measured by calculating body mass index (BMI). BMI is calculated as;

$$\text{Weight (kg)/height (m}^2\text{)}$$

A BMI value is in the range of  $<18.5 \text{ kg/m}^2$  is defined as underweight, a BMI of  $18.5\text{-}24.9 \text{ kg/m}^2$  is normal weight,  $25\text{-}29.9 \text{ kg/m}^2$  is overweight,  $30\text{-}34.9 \text{ kg/m}^2$  is obese class 1,  $35\text{-}39.9 \text{ kg/m}^2$  is obese class 2 and  $40$  or  $> 40 \text{ kg/m}^2$  is obese class 3<sup>6</sup>.

Sacroiliac joint is one of the strained joint in the body which causes many discomforts. SI joint dysfunction is the pain experienced between the posterior iliac crest and gluteal fold which can be radiate to posterior thigh also. SI joint dysfunction is the commonest cause of low back pain in adult age group. In obese women there are chances of sacroiliac joint dysfunction as the weight increases the centre of gravity of the body shifts. It will cause alteration in the gait, posture etc<sup>1</sup>.

The stability and instability of the joint depends on the ligaments<sup>7</sup>. Due to the increase in abdominal fat there are chances to alter the stability of the joint which in turn can make dysfunction<sup>1</sup>. The dysfunction can be either unilaterally or bilaterally<sup>8</sup>. It can be evaluated by palpatory method<sup>7</sup>. It includes the various the special tests of sacroiliac joints such as:

- Distraction test
- Compression test
- Patrick's test

- Flamingo test
- Gaeslen's test<sup>9</sup>.

Hence the purpose of study is to find the prevalence of sacroiliac joint dysfunction in obese women.

## Methodology

A cross sectional study was done to assess the prevalence of sacroiliac joint dysfunction in obese women. Obese women with age group between 30-40 years are included after obtaining consent form. The study was approved by ethical committee. This study was done with a sample size of 77 females in and around Karad. Special tests for sacroiliac joint was done for assessment criteria. Detailed examination with special tests along with physical examination were done. The special tests include distraction test, compression test, flamingo test, Patrick's test and Gaeslen's test. Statistical analysis of the recorded data was done by using the software SPSS version 20. Arithmetic mean & standard deviation was calculated for each outcome measure. Arithmetic mean was derived from adding all the values together and dividing the total number of values. MS Excel was used for drawing various graphs with given frequencies and the various percentages that were calculated with the software.

## Result

### 1. Distraction Test

**Table 1: Results of Distraction test**

Sr.No	Result of test	Total	Percentage
1.	Positive	41	53%
2.	Negative	36	47%

Interpretation- Above table represents positive and negative test results of distraction test. Out of 77 subjects 41 (53%) show positive test result and 36 (47%) show negative result.

### 2. Compression Test

**Table 2: Results of Compression test**

Sr.No	Result of test	Total	Percentage
1.	Positive	42	55%
2.	negative	35	45%

Interpretation- Above table represents the positive and negative test result of compression test. Out of 77



subjects 42(55%) shows positive and 35(45%) shows negative test result.

### 3. Flamingo Test

**Table 3: Results of Flamingo test**

Sr.No	Result of test	Total	Percentage
1.	Positive	3	4%
2.	negative	74	96%

**Interpretation:** Above table represents the result of Flamingo test out of 77 subjects 3(4%) subjects shows positive and 74(96%) shpws negative test result.

### 4. Gaeslen’s Test

**Table 4: Results of Gaeslen’s test**

Sr.No	Result of test	Total	Percentage
1.	Positive	42	55%
2.	negative	35	45%

**Interpretation:** Above table represents the result of Gaeslen’s test. Out of 77 subjects 42(55%) shows positive and 35(45%) shows negative test result

### 5. Patrick’s Test

**Table 5: Results of Patrick’s test**

Sr.No	Result of test	Total	Percentage
1.	Positive	42	55%
2.	negative	35	45%

**Interpretation:** Above table represents the result of Patrick’s test. Out of 77 subjects 42(55%) subjects shows positive and 35(45%) shows negative test result.

## Discussion

Obesity is a condition characterised by the accumulation of fat in the body . The incidence of obesity has increased in recent decades and becomes a major health challenge. Obesity causes many musculoskeletal disorders mainly in lower limbs, one of the common ignored joint is sacroiliac joint. Usually middle aged women are more obese and this can cause many negative impacts on the health of the women.

The aim of the study is to find the prevalence of sacroiliac joint dysfunction in middle aged obese women.

The objectives of this study is to find the prevalence and create awareness about sacroiliac joint dysfunction in obese middle aged women. The participants include middle aged obese women. The study was carried out and result was drawn by using the special tests of sacroiliac joint .

The study was done in six months with a sample size of 77 participants (female) with a BMI of more than 25 and age group between 35-45 years. The participants with any congenital hip diseases or who underwent for any recent hip surgeries are not allowed. The subjects are taken in and around Karad and consent form was taken from the subjects. The procedure was carried out by assessing the sacroiliac joint by special tests..

The participants was selected according to the inclusion and exclusion criteria and after taking consent form we did special tests on them. Special tests include distraction test, compression test, flamingo test, Patrick’s test and Gaeslen’s test.

Dysfunction include pain, gait problems and associated difficulties.

Sacroiliac joint dysfunction in obese women occurs due to over strain to the joint .

When there is a increase in weight, Centre of gravity shifts which can cause changes in gait and posture. This makes the joint into more difficulties include ligament strain and joint compression .

The greater the increase in weight more the dysfunction. According to the previous studies carried out to see the Prevalence of Sacroiliac Joint Dysfunction in Postpartum Women –A Cross Sectional Study by Paneri Ghoke it was proven that sacroiliac joint dysfunction occurs due to shift of centre of gravity. This study partially supports to this article that is there will be SI joint dysfunction in obese women occurs due to shift of centre of gravity.

Hence there is significance in sacroiliac joint dysfunction. So it is necessary to study about the prevalence of sacroiliac joint dysfunction in middle aged obese women and to create awareness in them to avoid the further damage.

## Conclusion

On the basis of the results of the study, it is concluded that there is a prevalence of sacroiliac joint dysfunction

in obese middle aged women. From 77 individuals prevalence of sacroiliac joint dysfunction was seen in 42 females with positive results in special test and rest shows negative results.

**Conflict of Interest:** There were no conflicts of interest in this study

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

**Source of Funding:** Self funding

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# Eradication of *Helicobacter Pylori* Infection Using Triple Drug Therapy: A Hospital Based Observational Study in Sikkim

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## Abstract

**Introduction:** *Helicobacter pylori* infection is the important cause of various gastrointestinal. Variable resistance to treatment has been reported. This study was conducted to assess eradication rate of *h pylori* infection using the standard clarithromycin triple therapy.

**Method:** This retrospective observational study was conducted in Central Referral Hospital, Sikkim Manipal Institute of Medical Sciences. 100 consecutive patients in a period of one year from 2016-2017 who were found positive for *H pylori* infection by rapid urease test (RUT) or histology or both were included in the study. Assessment of the eradication of *H pylori* was carried out after 8 weeks of treatment using 14 days of clarithromycin containing standard triple regimen.

**Results:** Out of 100 patients, 63 were males and 37 were females. Mean age of the patients was 38 years. Overall eradication rate was found to 63% after 8 weeks of treatment. Patients with gastric ulcer disease had worst eradication rate and it was statistically significant. [p=0.0143, OR 4.29(1.33-13.79)]. Out of these patients, eradication rate for *H pylori* was higher in duodenal ulcer patients than gastric ulcer patients. [p=0.0069, OR 6.5(1.6751-25.7798)]. We found eradication rate of 63% in our study similar to these studies. 7-10 days of triple therapy containing clarithromycin is reported to have around 90% eradication rate. (6) Of late, 7-10 days triple therapies have shown unacceptably low cure rates. We found eradication rate of 63% in our study similar to these studies.

**Discussion:** Triple therapy, a recommended first-line treatment of *H. pylori* infection is found to be one of the most effective eradication in Asia and Africa. Seven days administration of a PPI, amoxicillin or metronidazole and clarithromycin is well-tolerated and improves patient's compliance. 7-10 days of triple therapy containing clarithromycin is reported to have around 90% eradication rate.

**Keywords:** *H pylori*, gastric ulcer, eradication, triple regime.

## Introduction

*Helicobacter pylori* infection is the important cause of various gastrointestinal diseases like gastritis, peptic ulcers, gastric adenocarcinoma and mucosa

associated tissue lymphoma. This infection of stomach induces chronic inflammation. Production of ammonia by this urease producing bacteria and release of biochemicals such as proteases, vacuolating cytotoxin A and phospholipases are believed to contribute to its inflammatory and carcinogenic potential. Inflammation induced due to this bacterium causes various manifestations.<sup>1</sup> Although eradication of this infection is a debatable issue,<sup>2</sup> this remains central to the management of these illnesses.

Variable resistance to treatment has been reported in different parts of the world and eradication rate

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of the standard triple therapy is found to be as low as <80% or even less. This may be due to emergence of clarithromycin-resistant strains of *H. pylori*.<sup>3</sup> Eradication close to 90% is acceptable. Diverse data are available in India where eradication rate using legacy triple therapy having clarithromycin is found to be low in some studies while some has shown high response rate.<sup>4</sup> A PPI, clarithromycin and amoxicillin or metronidazole containing triple therapy for 14 days remains a recommended treatment option in regions where *H. pylori* clarithromycin resistance is known to be <15% and in patients with no previous history of macrolide exposure for any reason. There is no treatment regimen which guarantees 100% cure of *H. pylori* infection. Indeed, there are currently only few regimens which consistently achieve eradication rates exceeding 90%.<sup>5</sup> This hospital based observational study was conducted to assess eradication rate of *h pylori* infection using the standard clarithromycin triple therapy in a north eastern part of India.

### Method

This retrospective observational study was conducted in Central Referral Hospital, Sikkim manipal institute of medical sciences. It is a tertiary care hospital in Gangtok, Sikkim. 100 consecutive patients in a period of one year from 2016-2017 who found positive for *H pylori* infection by rapid urease test (RUT) or histology or both were included in the study. Informed written consent was taken and approval from the Institutional Ethical Committee was sought. Inclusion criteria being patients >12 yr of age, presenting with dyspepsia or symptoms such as malena, weight loss and anaemia and completed 14 days treatment of triple therapy. Patients previously treated for *H. pylori* infection or who gave a clear history of using proton-pump inhibitors or

antibiotics within the past four weeks of endoscopy, refused consent or did not complete treatment due to any reason were excluded. Two biopsy samples each from the corpus and antrum were taken and subjected to RUT and histology. Infection was considered to be positive if either of two or both the tests were positive for the infection. The details of the patients and the findings were noted. Assessment of the eradication of *H pylori* was carried out after 8 weeks of treatment using 14 days of clarithromycin containing standard triple regimen. To confirm eradication, again two biopsy samples each from the corpus and antrum of the patients were taken and subjected to RUT or histology. Any one or both the tests positive were taken as positive test. Since CRH-SMIMS is the only tertiary care and medical college hospital in this remote north-eastern region of India, it caters to all the four districts of Sikkim.

### Results

The study was conducted in 100 patients who completed 14 days clarithromycin containing triple therapy. Out of those 100 patients, 63 were males and 37 were females. Mean age of the patients was 38 years. Overall eradication rate was found to 63% after 8 weeks of treatment. Gastritis was the most common finding in upper GI endoscopy in pretreatment group (N=37) whereas GERD and gastro esophageal growth was seen only in 1-1 patient. Gastric ulcer was seen in 15 patients and duodenal ulcer was present in 30 patients. Eradication rate of various GI manifestations was assessed. Patients with gastric ulcer disease had worst eradication rate and it was statistically significant. [p=0.0143, OR 4.29(1.33-13.79)] . Out of these patients, eradication rate for *H pylori* was higher in duodenal ulcer than gastric ulcer patients. [p=0.0069, OR 6.5(1.6751-25.7798)].

**Table 1. Upper gastrointestinal lesions and Helicobacter pylori eradication in studied population**

Endoscopic finding	n=100	Hpylori+Ve n=37 M=21 F=10	Hpylori-ve n=63 M=42 F=27	Eradication Rate (%)	P value	OR(95%CI)
Gastritis	37	12	25	67.56%	0.46	0.7(3.107-1.7131)
Antroduodenitis/duodenitis	13	6	7	53.84%	0.46	1.5(.4780-5.0160)
Gastric ulcer	15	10	5	33.33%	0.0143	4.29(1.33-13.79)
Duodenal ulcer	30	7	23	76.66%	0.6083	0.40(0.1539-1.0699)
Growth	1	1	0	0%	0.3155	5.2(0.2072-131.47)
GERD	4	1	3	75%	0.6065	0.55(0.0557-5.5447)

## Discussion

Triple therapy, a recommended first line treatment of *H pylori* infection is found to be one of the most effective eradication in Asia and Africa. Seven days administration of a PPI, amoxicillin or metronidazole and clarithromycin is well tolerated and improves patients compliance. 7-10 days of triple therapy containing clarithromycin is reported to have around 90% eradication rate.<sup>6</sup> Of late, 7-10 days triple therapies have shown unacceptably low cure rates.<sup>7</sup> Standard first-line triple therapy of two antibiotics and a proton pump inhibitor (PPI) failed to show consistent efficacy in various studies.<sup>8</sup> We found eradication rate of 63% in our study similar to these studies. Rapid metabolism of PPIs, antibiotic resistance and poor patient compliance are the probable causes of eradication failure.<sup>9</sup> However the major cause of eradication failure appears to be clarithromycin resistance.<sup>10</sup> According to a systemic review the rate of clarithromycin resistant strains worldwide ranged from 49% in Spain to 1% in The Netherlands.<sup>11</sup> Different ways have been recommended in to improve eradication rate of triple therapy like duration of treatment, effect of PPI on gastric acid secretion and using alternative regimens. One study has reported Esomeprazole to have more anti-secretory effects than other PPIs. Sequential and quadruple bismuth therapy has shown better eradication as compared to triple therapy.<sup>12</sup> A meta analysis trial in west asia suggested that 10-day Bismuth-Furazolidone/Metronidazole quadruple therapy, 14-day Clarithromycin-containing hybrid therapy and 14 day quadruple therapy including a proton pump inhibitor + Bismuth + Tetracycline (500 mg QID) + Metronidazole (500 mg TDS) are an effective first line options.<sup>13</sup> As per review article, bismuth-based furazolidone or clarithromycin containing quadruple therapies, hybrid regimen and concomitant therapy seem to be appropriate options among first line eradication regimens. 10-14 days course of Clarithromycin containing triple therapy has shown to be a good eradication therapy in Iran if local *H pylori* resistance to clarithromycin is known to be less than 15%.<sup>14</sup> According to one article, in regions with low ( $\leq 15\%$ ) clarithromycin resistance, 14 day hybrid (or reverse hybrid), 10-14 day sequential, 7-14 day concomitant, 10-14 day bismuth quadruple or 14 day triple therapy can achieve a high eradication rate ( $>90\%$ ) in the first line treatment of *H pylori* infection whereas in areas with high ( $>15\%$ ) if no recent data of local antibiotic resistances of *H. pylori* strains are available, universal high efficacy regimens such as 14 day hybrid (or reverse hybrid), concomitant or bismuth

quadruple therapy can be adopted.<sup>15</sup> So in nut shell, it is still acceptable to employ a standard triple based therapy in areas with low clarithromycin resistance ( $<15\%$ ) to achieve eradication rate more than 90%, but it should be abandoned in areas with high clarithromycin resistance.

Quinolone based triple therapy can be effective in the first line therapy of *H pylori* infection.<sup>16</sup> Despite that, quinolonebased triple therapy is generally not recommended as first line therapy due to concerns about the rising prevalence of quinolone resistant strains.<sup>17</sup>

The prevalence of *H pylori* varies with different geographical locations, with high infection rates in the population in developing countries. In India, it is found to be over 80% in rural areas. The *H pylori* positivity in one study population was 61.85 %.<sup>18</sup> Only one prevalence study available in this part of India which showed relatively low prevalence of this infection.<sup>1</sup>

Treatment needs to be individualized on the basis of host polymorphisms, antibiotic resistance, demographic factors and co morbidity. Sequential therapy can be an alternative to the conventional triple therapy as first line therapy. Levofloxacin based triple therapy or a bismuth containing quadruple therapy can be employed as rescue treatment if the standard triple therapy or sequential therapy also fails. A levofloxacin based triple therapy is an acceptable alternative to metronidazole salvage. An empirical triple or quadruple therapy can be employed in case of unavailability of culture guided antimicrobial sensitivity data.<sup>3</sup>

## Conclusion

Since no studies are conducted in this part of India to show exact clarithromycin resistance, we used only standard triple therapy to eradicate *H pylori* in our patients. More studies especially comparative studies needs to be conducted using different regimes to assess clarithromycin resistance and to achieve good eradication rate of *H pylori* in this region.

**Conflict of Interest :** None

**Source Of Funding :** Self Funded

**Ethical Clearance :** Taken.

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# Unmet Need for Family Planning among Women of Reproductive Age Group in a Rural Area of Kanchipuram District, Tamil Nadu

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## Abstract

**Background:** Population of the world is in an increasing trend and India accounts for 17.5% of the global population. As Indian women have different levels of awareness and acceptance of family planning, it may lead to their unmet need for family planning.

**Objective:** To assess the unmet need for family planning and its determinants among women of reproductive age group in a rural area of Kanchipuram District, Tamil Nadu.

**Materials and Method:** A cross sectional study was conducted among 140 women of reproductive age group 15- 45 years in Pulipakkam village of Kanchipuram District over a period of three months (April - June 2019). Data collection was done using a pretested semi- structured questionnaire by personal interview method. The households were selected by simple random sampling. Data analysis was done using SPSS 16V. Association between variables were computed by chi-square test with 5% level of significance.

**Results:** Of the 140 study participants, 132(94.3%) of them were married and 133(95%) of the women were homemakers. The overall prevalence of unmet need for family planning was 16.42%. 69.56% women mentioned fear of side effects as the commonest reason followed by husband's disapproval(13.04%) and cultural/ religious beliefs (8.69%).

**Conclusion:** The prevalence of unmet need for family planning is high among the women of Pulipakkam village, which may lead to unwanted pregnancies and pose a serious threat to the mother, family and society.

**Keywords:** Family planning, Unmet need, Women of reproductive age.

## Introduction

Global population is expected to reach 9 billion by the year 2050 and India being the second most populous country accounts for 17.5% of the global population.<sup>1</sup>

Family planning services improve the quality of lives of people and their economic welfare. Indian women have different levels of awareness and acceptance of family planning due to various social and cultural beliefs.<sup>2</sup> NHFS – III (2005- 6) revealed that contraceptive prevalence rate was 56% compared to 48% in the past decade. A declining trend in contraceptive prevalence was reported by NFHS- IV(2013-14) as 54%. Female sterilization is the most preferred method of contraception in India which is about 76% in Tamil Nadu.<sup>3</sup> According to WHO the advantages of family planning include: Prevention of pregnancy related health risks in women, reducing infant mortality, helping to prevent HIV/AIDS,

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empowering people and enhancing education, reducing adolescent pregnancies, slowing population growth etc.<sup>4</sup> Unmet need for family planning is, “Those women who are fecund and sexually active but are not using any method of contraception and report not to have any more children or want to delay the birth of their next child”.<sup>5</sup> It is a crucial indicator for achieving the target of universal access to family planning. It also denotes the gap between women’s reproductive intentions and their contraceptive behavior. Prevalence of contraception complements unmet need for family planning. Globally advances in family planning has lead to a decline in prevalence rates of unmet need for family planning, while it is increasing in developing countries like India. Tamil Nadu was reported to have prevalence rates of 10.1% and hence this study was attempted.<sup>6</sup>

**Objective:** To assess the unmet need for family planning and its determinants among women of reproductive age group in a rural area of Kanchipuram District, Tamil Nadu.

### Materials and Method

A cross-sectional study was conducted among women of reproductive age group (15- 49 years) residing at Pulipakkam village of Kanchipuram District over a period of 3 months (April – June 2019). The sample size was estimated as 140, based on the prevalence of unmet need for family planning 31%, from Prasad et al.<sup>4</sup> Complete sampling frame was obtained after which the households were selected by simple random sampling. Women of reproductive age group (15- 49 years) and those willing to participate in the study were included after getting informed written consent. Locked houses and eligible women who were not available in the house during data collection were excluded. Ethical approval was sought from the Institutional Ethics Committee of Karpaga Vinayaga Institute of Medical Sciences and Research centre. Data collection was done using a pretested semi structured questionnaire containing sociodemographic profile, awareness, perceptions and practice of family planning method by personal interview method. Data was entered in Microsoft Excel and analyzed using SPSS 16v. Descriptive statistics such as mean, standard deviation, frequency and percentage were calculated. The association between variables were computed by chi-square test with 5% level of significance.

### Results

Data was obtained from 140 study participants

with mean age  $31.82 \pm 6.97$  years. Table 1 describes that 134(94.3%) of them were married and majority belonged to Hindu religion 120(85.71%). 54(38.57%) were educated up to High school while 3(2.14%) were illiterates.

Table 2 shows that major sources of information on contraception were from family members 67(47.85%) and doctors/health care workers 60(42.85%). Current contraceptive usage was found to be 58(41.42%). The decision on selection and usage of contraceptive method were from self/husband in around 102(72.85%).

Unmet need for family planning was present among 14(10%) women in the age group of 26- 35 years compared to 7(5%) and 2(1.42%) in the women of age group 15- 25 years and 36- 49 years respectively. The association between unmet need for family planning and age of the participant was found to be statistically significant ( $p = 0.02$ ).

14(10%) women with 1 child had high unmet need for family planning compared to 9(6.42%) women with 2 children. The association between unmet need for family planning and number of children born to the study participant was statistically significant ( $p = 0.001$ ) (Table 3).

Figure 1 describes the most common reason of unmet need for family planning as the fear of side effects (69.56%), husband’s disapproval (13.04%) and cultural/religious beliefs (8.69%).

**Table 1 Distribution of participants based on socio demographic characteristics**

Distribution of Participants	Frequency (n) (n-140)	Percentage (%)
<b>Marital status</b>		
Unmarried	3	2.14
Married	132	94.30
Separated	2	1.42
Widow	3	2.14
<b>Religion</b>		
Hindu	120	85.71
Muslim	13	9.28
Christian	7	5.01
<b>Education</b>		
Illiterate	3	2.14
Primary school	13	9.28



Distribution of Participants	Frequency (n) (n-140)	Percentage (%)
Middle school	28	20.01
High school	54	38.57
Higher secondary	21	15
Graduate and above	21	15
<b>Occupation</b>		
Home maker	133	95
Working women	7	5

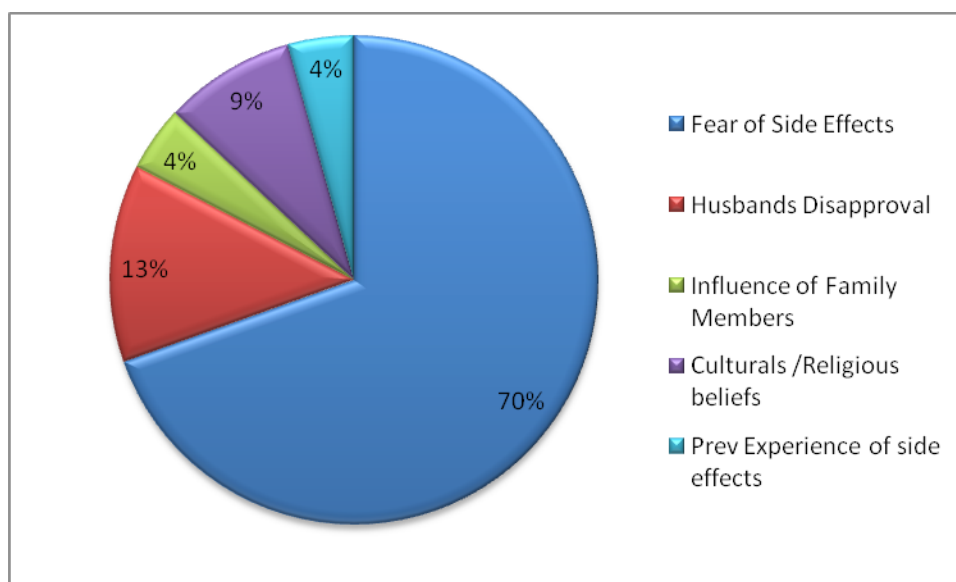
**Table 2 Distribution of study participants based on contraceptive use**

Distribution of study participants	Frequency (n) (n- 140)	Percentage (%)
<b>Source of information</b>		
Family members	67	47.85
Friends/Neighbors	55	39.28

Distribution of study participants	Frequency (n) (n- 140)	Percentage (%)
Doctors/Health care workers	60	42.85
Media	32	22.85
Others	8	5.71
<b>Contraceptive usage</b>		
Ever used	108	77.15
Never used	32	22.85
Unmet need	23	16.42
<b>Current contraceptive use</b>		
Yes	58	41.43
No	82	58.57
<b>Decision on selection and usage of contraceptive method</b>		
Self/husband	102	72.86
Doctors	34	24.29
Relatives/friends	4	2.85

**Table 3 Association between unmet need for family planning and sociodemographic characteristics of the study participants**

Unmet need for family planning	Present n (%) (n-140)	Absent n (%) (n-140)	Total n (%)	$\chi^2/p$ value
<b>Age of the participant</b>				
15 – 25 years	7(5)	22(15.71)	29(20.71)	$\chi^2 = 6.16$ p = 0.02
26 – 35 years	14(10)	55(39.28)	69(49.28)	
36 – 49 years	2(1.42)	40(28.57)	42(30)	
<b>Age on marriage</b>				
15 – 18 years	1(0.71)	30(21.42)	31(22.14)	$\chi^2 = 5.31$ p=0.07
19 – 23 years	14(10)	61(43.57)	75(53.57)	
24 – 30 years	7(5)	23(16.42)	30(21.42)	
<b>Educational status</b>				
Primary school and below	0	16(11.42)	16(11.42)	$\chi^2 = 5.16$ p=0.07
Middle school	3(2.14)	25(17.85)	28(20)	
High school and above	20(14.28)	76(54.28)	96(68.57)	
<b>Per capita income (in INR)</b>				
<1000	0	3(2.14)	3(2.14)	$\chi^2 = 2.98$ P = 0.22
1000 – 1999	2(1.42)	26(18.57)	28(20)	
>2000	21(15)	88(62.85)	109(77.85)	
<b>Number of children born to the participant</b>				
1 child	14(10)	30(21.42)	44(31.42)	$\chi^2 = 14.92$ p=0.001
2	9(6.42)	50(35.71)	59(42.14)	
3 and more	0	37(26.42)	37(26.42)	



**Figure 1** Reasons for unmet needs of family planning (n- 23)

## Discussion

Unmet need for family planning is a useful measure of gap between the women's reproductive desires and provision of health services. Assessment of this indicator is an important analytical tool which serves as a benchmark in policy making. This indicator also shows the country's compliance with reproductive health rights of its population.<sup>5</sup>

The overall prevalence of unmet need for family planning was 16.42% in this study and a much varying prevalence were found in other studies of about 12.7%, 31%, 36.7%, 42% respectively.<sup>(9, 4, 12, 7)</sup>NFHS -4<sup>8</sup> data shows prevalence of unmet need for family planning in Tamil Nadu as 10.1%, which is lower compared to the present study.

Out of the total 140 study participants in this study, 38.57% were educated up to High school which was similar to a study by Prasad et al<sup>4</sup>. However in Jahan et al 40% women had only primary level of education and it was observed that increase in level of education lead to increased awareness.<sup>3</sup>

Major source of information on contraceptive method were from family members (47.85%) in the current study, compared to government health facilities in a study by Prasad et al<sup>4</sup>.

It was observed that 41.42% of the study participants were currently using contraceptive method, whereas it

was higher 51.7% in Prasad et al<sup>4</sup>. Findings by Gupta et al revealed a much higher prevalence of about 62%.<sup>1</sup>

Fear of side effects was the most common reason of unmet need for family planning among 69.56% of study participants in this study, similar to Valekar et al.<sup>7</sup> This was followed by other reasons such as husband's disapproval (13.04%) and cultural/religious beliefs (8.69%) in the present study. Family interference and cultural/religious restrictions were identified as the most common reasons in a study by Sahasrabuddhe et al,<sup>11</sup> while it was found to be the fourth and third most common reason in the present study.

In this study, higher prevalence of unmet need for family planning was found among 10% of study participants in the age group of 26-35 years, compared to younger age groups and women >35 years in other studies.<sup>4,9</sup>

In the current study, age and number of children born to the participant were significantly associated with unmet need for family planning. However, in Sabat et al significant association between unmet need for family planning and age, education of women, age at marriage, number of living children, contraceptive knowledge and inter-spousal communication were observed.<sup>12</sup>

**Limitation:** In depth interviews may give better insight on unmet need for family planning in the study area.

## Conclusion

The prevalence of unmet need for family planning was found to be high among women of Pulipakkam village, which may lead to unwanted pregnancies and pose a serious threat to the mother, family and society.

**Recommendation:** Health education to the women of reproductive age group regarding family planning methods and health seeking behavior can be enhanced to reduce the unmet need for family planning.

They can also be motivated to utilize the services provided by health care workers.

**Funding:** No funding sources.

**Conflict of Interest:** None declared.

**Ethical Approval:** The study was approved by the Institutional Ethics Committee (KIMS/PG/2019/41).

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# Prevalence of Generalised Joint Laxity During Various Phases of Menstrual Cycle in Physically Active Women

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## Abstract

**Objective:** To find the prevalence of generalized joint laxity due to menstrual cycle in physically active women

**Methodology:** The study group consisted of 90 women having regular (28 days) menstrual cycle, aged between 18-30 years, who exercised for min of 1-3 hrs per day for 5-6 days a week for at least 3 months were selected. BEIGHTON score was used to measure generalised joint laxity. The score was taken on 1st day, 10-13<sup>th</sup> day and 20-23<sup>rd</sup> day of menstrual cycle.

**Results:** The results showed that there was no significant difference in generalised joint laxity during various phases of menstrual cycle (p value >0.9999) whereas extremely significant difference was found when compared with individual sport (p value <0.001)

**Conclusion:** On the basis of this study, it was concluded that, there is no significant difference in the joint laxity during various phases of menstrual cycle in physically active women. However generalized laxity studied during various phases of menstrual cycle in females playing different sports was extremely significant.

**Keywords:** Generalised, joint, laxity, menstrual cycle, physically active women.

## Introduction

Flexibility is the ability of a joint or series of joint to move through an unrestricted, pain free range of motion. Flexibility is a very important consideration when profiling a patient for specific job or activity. Flexibility should be specific to a job or activity in which the patient wishes to take part or it may be position specific. In sports activity flexibility plays a vital role as

it makes the muscle warm and pliable, allowing them to stretch further. But any alteration in the flexibility will hamper the performance of the individual. To assess the flexibility the ROM of the joints should be taken (Passive ROM). PROM gives an idea that a joint lie in normal range, hypermobile or hypo mobile. While considering the ROM one should keep in mind that the hypermobility in one joint does not necessarily mean hypermobility in other joints of the body. It is also important to realize that hypo mobility or hypermobility are not necessarily pathological states.<sup>1</sup>

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Joint hypo mobility is decreased in the normal movement of the joint or body part. Hypo mobile joints are more susceptible to muscle strains, pinched nerve syndromes and paratenonitis resulting from overstress. It has three types:

1. Myofascial hypo mobility which results from the

adaptive shortening or hypertonicity of the muscles or from posttraumatic adhesions or scarring.

2. Pericapsular hypo mobility has capsular or ligamentous origin and may result from adhesions, scarring, arthritis, fibrosis or tissue adaptations. Restriction may be in all directions but may not be same amount in each direction.
3. Pathomechanical hypo mobility occurs as a result of joint trauma (micro or macro) leading to restriction in one or more joint range of motion.<sup>1</sup>

Joint hypermobility is a feature observed in individuals who have joint range beyond normal limits. It may also cause pain in the joints and muscles particularly towards the end of the day and after physical activity.<sup>1</sup> It is also associated with the osteoarthritis, ligament sprain, chronic low back pain, disc prolapse, spondylolisthesis, joint effusion which is mostly caused by lack of control of the joint.<sup>3</sup> In these individuals if strength and endurance are not at appropriate level to support the joints the joints are more unstable and are subjected to injuries. Additionally, joint laxity is more common in younger population than in older ones, more common in females than in males of the same age, more common in American Indians, followed by Africans and Caucasians. It is more common in physically active individuals as compared to non-active individuals.<sup>2</sup>

Menstrual cycle is the biological phenomena occurring regularly in healthy women. Such phenomena have cyclic characteristics which occurs as a direct result of variations in hormone concentrations which are secreted and regulated by pituitary-hypothalamic-ovarian axis and involves a complex interaction of estrogen, progesterone, relaxin and testosterone. Typically, each menstrual cycle spans 28 days, beginning with the follicular phase from days 1-9 during which estrogen predominates, followed by the ovulatory phase spanning days 10-14, where estrogen continues to prevail and reaches its peak the cycle ends with the luteal phase extending from days 15-28 during which the progesterone levels surpass that of estrogen levels. Relaxin is secreted during the follicular and luteal phases, reaching its peak during the luteal phase.

Lastly testosterone fluctuates throughout the cycle and contributes to formation of estrogen. Changes in levels of these hormones during menstrual cycle is main reason for change in flexibility. It is also proposed that these hormones directly act on collagen metabolism, which in turn alters the ligament property, this explains some alteration in flexibility during menstrual cycle.<sup>4</sup>

Another reason for joint laxity is collagen secretion. Collagen is present throughout the body in skin, ligaments etc. If collagen is weaker than it should be, tissues in the body will be fragile, which will make ligaments and joints loose and stretchy as a result, joints can extend further than usual.<sup>5</sup>

Hence the assessment of joint laxity during menstrual cycle becomes a necessity. Various scores are used to measure laxity. Special tests for specific joint can also be elicited to find particular joint laxity. Carter and Wilkinson have developed a five point (5 point) scale system.<sup>1</sup> The patient who meets all the criteria is said to exhibit general joint hypermobility. Beighton and Horan developed a nine point (9 point) system which has good reliability and validity and is modification of the Carter and Wilkinson scale.<sup>1,6</sup> In this score the patient who scores 4 or more than 4 points is said to have generalized joint hypermobility.

Till date no study has been conducted on joint laxity during menstrual cycle. So it is important to find out the prevalence of joint laxity during menstrual cycle in physically active women so as to help physiotherapists to focus more on the strength and endurance of those individuals with laxity by employing exercises which would provide stability and reduce the chances of further damage or injuries.

## Methodology

### Result

1. **Age Distribution:** Age group of all participants was between 18 to 25 years. The mean age of the participants in the study was 21 years.
2. **Beighton Score:**

**Table 1: Comparison of DAY 1, DAY 10-13 and DAY 20-23 of BEIGHTON SCORE test score within group.**

Total Population	Day 1 Mean+SD	Day 10-13 Mean+SD	Day 20-23 Mean+SD	P Value	Interference
90	4.94+2.48	5.13+2.48	5.13+2.48	0.831	Not Significant

**Interpretation:** The table also shows the comparison of mean and standard deviation at Day 1, Day 10-13 and Day 20-23 values of the population.

In the Population the mean of Beighton score test score at day 1 was 4.94+2.48, Day 10-13 score was

5.13+2.48 and at Day 20-23 was 5.13+2.48. The f Value by ANOVA MEASURES test was 1.625. The P value by REPEATED ANOVA MEASURES test was found to be 0.831 which is not significant.

**3. Exercise wise difference in joint laxity:**

**Table 2: Comparison of joint laxity according to various sports within the group.**

Type of exercise	Total no of population	Day1 SD	DAY 1 t value	Day10-13 SD	Day 10-13 t value	Day20-23 SD	Day 20-23 t value	P value	Interference
Swimming	11	0.30	19.06	0.30	19.06	0.30	19.06	<0.001	Extremely significant
Walk	23	0.45	18.29	0.45	18.29	0.45	18.29	<0.001	Extremely significant
Gym	8	0.28	19.12	0.28	19.12	0.28	19.12	<0.001	Extremely significant
Aerobics	8	0.23	19.28	0.23	19.28	0.23	19.28	<0.001	Extremely significant
Cricket	2	0.14	19.46	0.14	19.46	0.14	19.46	<0.001	Extremely significant
Others (playing combined sports, volleyball, basketball, tennis)	34	0.48	17.80	0.48	17.80	0.48	17.80	<0.001	Extremely significant
Yoga	1	0.10	19.52	0.10	19.52	0.10	19.52	<0.001	Extremely significant
Badminton	3	0.18	19.40	0.18	19.40	0.18	19.40	<0.001	Extremely significant.

**Interpretation:** The table also shows the comparison of t value and standard deviation at Day 1, Day 10-13 and Day 20-23 values of the population. It shows joint laxity in various sports activities. The values of which are taken by performing UNPAIRED T TEST and the p value is <0.001 which is considered as extremely significant.

**Discussion**

The purpose of this study was to find the prevalence of generalised joint laxity during various phases of menstrual cycle. Many studies have been conducted on joint laxity in ACL and various players but no study was conducted on generalised joint laxity during various phases of menstrual cycle.

Our study included age group between 18-25 years and the mean age was 21 years.

In our study Beighton score was calculated in 90 females to find generalised joint laxity during various phases of menstrual cycle. The score was compared with various days of menstrual cycle, Day 1 corresponds to menstrual phase where oestrogen and progesterone levels are at their lowest<sup>4</sup>. Day 10-13 correspond to peak oestrogen surge (follicular phase) and Day 20-23 correspond to peak progesterone level (luteal phase)<sup>4</sup>. The score shows no significant difference in generalised joint laxity during various phases of menstrual cycle when tested with the help of ANNOVA measure (P=0.831)<sup>4</sup>. A study by Ned A. Heitz, was done with the purpose to investigate the prevalence of Anterior Cruciate Ligament laxity in females in conjunction with estrogen and progesterone surges during normal 28-30 days menstrual cycle. This study included 7 females with regular 28-30 days menstrual cycle with age group between 21-32 years. Serial oestrogen and progesterone

levels were measured via radioimmunoassay procedure to identify the follicular and luteal phases of subject's menstrual cycle and to determine periods of peak hormonal surges and ACL laxity was measured using knee arthrometer. A significant difference was noted in ACL laxity when comparing baseline oestrogen and progesterone levels using repetitive ANNOVA measure, (P=0.48 peak and baseline oestrogen comparison), (P=0.006 peak and baseline progesterone comparison). The probable reason for this difference could be their study included female subjects, but our study included only the females who were physically active, moreover they worked on very less sample size whereas our study included a large sample size.

In our study we tried to find laxity with relation to a specific sport. In the players who swim, walk, gym, badminton players, perform aerobic exercises and yoga, cricketers and others the laxity was found to be significantly high by performing unpaired T test (P=<0.001). In David J. Magee. Orthopedic Physical Assessment, they stated that there is great importance and variation in flexibility according to various sports; lower limb flexibility is more in ones who walk or run, upper limb flexibility is important in badminton players, swimmers, whereas overall flexibility is essential in activities like yoga, gym, others, cricket<sup>1</sup>. In next study by William C. McMaster found a correlation between shoulder laxity and interfering pain in competitive swimmers, it included 40 senior national and elite swimmers with average age group 17.5 the study was conducted by performing sulcus sign and anterior and posterior manual provocation test in sitting and recumbent positions which showed 95% confidence level between the clinical examination score and presence of interfering pain<sup>9</sup>. In another study by Todd S. Ellenbeckner found Medial Elbow joint laxity in professional baseball pitchers, A Bilateral Comparison Using Stress Radiography, study was conducted by selecting 40 uninjured professional baseball players and Telos GA-IIIE stress radiograph device as assessment tool which concluded that there is significant bilateral difference in medial elbow joint laxity(P=<0.01)<sup>10</sup>. The probable reason for the difference in laxity according to various sports could be muscle power, muscle tone, extensibility of the skin, age, genetic makeup, day to day stresses on the joint.

### Conclusion

On the basis of this study, it was concluded that,

there is no significant difference in the joint laxity during various phases of menstrual cycle in physically active women. However generalized laxity studied during various phases of menstrual cycle in females playing different sports was extremely significant.

**Conflict of Interest:** There were no conflicts of interest.

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

**Funding:** No funding.

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# Prevalence of Respiratory Problems Related to Cold Storage Industry Workers Working in Fish Processing Units

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## Abstract

**Background:** As we know working in cold storage industry for long period of time i.e. for almost 8 to 9 hours may cause various health problems in the workers as the climate inside is very cold as compared to the climate outside the industry. Due to this extreme climate change we can see various respiratory problems in the industry workers as cough, dyspnea, dryness of throat etc. Bioaerosols containing seafood allergens is also the factor which affects the respiratory system.

**Objective:** To find out the prevalence of respiratory problems related to cold storage industry workers in seafood processing units.

**Methodology:** An observational study was carried out using a cross sectional study design. The study was conducted in and around Karad, Maharashtra. Study was conducted using sample size of 98[n= 75 4pq/l] workers working in cold storage industry, which was carried out for 6 months. The inclusion criteria was of age group 30 to 50 years male as well as female workers, with exclusion criterion of patients having COPD, hypotension and grade 4 dyspnea.

**Result:** There were respiratory problems present in the workers working in cold storage and was significantly seen in age group of 30 to 50 years. It was calculated according to the activity, symptom and impact score.

**Conclusion:** After analyzing the data, it was found that there is a prevalence of respiratory problems in cold storage industry workers working for 8 to 9 hours in fish processing unit.

**Keywords:** Cold storage industry workers, respiratory problem, age group 30 to 50 years.

## Introduction

**Fish Processing Units:** A cold storage industry is a building for storing goods as well as used to manufacture, import export goods. It is widely used to store perishable

items such as fruits, vegetable, fish etc. It keeps the products at a set temperature, which keeps them fresh and makes them last longer. There is direct exposure of cold indoors i.e. inside the cold storage where the fishes are kept at a temperature of 0 to -10 degree Celsius. The fishing and fish processing industry premises have to be kept below 10 degree Celsius and sometimes even in freezers.<sup>1</sup> The fish processing workers have different tasks as freezing the fish, cutting, filleting etc. Workers there work almost for 8 to 10 hours every day.<sup>2</sup> Thus, cold indoor workplaces can expose the workers to very extreme cold conditions. Therefore constant cold exposure to the workers may lead to significant health risk factors. As the temperature difference outside the

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fish processing unit differs from the temperature inside the unit we can see more health risks due to extreme temperature changes.<sup>2</sup>

**Pathophysiology:** Hypersensitivity is a reaction that induces reproducible symptoms and signs, initiated by exposure to a defined stimulus. It is differentiated into IgE and non-IgE allergic and non-allergic hypersensitivity. Allergy causing IgE antibodies are produced by B-cells against a specific allergenic protein. These antibodies bind onto receptors on cells as mast cells and basophiles, causing the release of mediators as histamines, enzymes etc.<sup>3</sup>

**Respiratory Problems:** The health problems among fish processing workers have been attributed to low temperatures, bio aerosols containing seafood allergens, toxins like ammonia and poor ergonomic practices. These commonly result in respiratory problems. From these hazards the main problem is seen in the respiratory condition of the worker.<sup>2</sup>The common problems seen are asthma, rhinitis, breathlessness, cough, wheezing and dryness of throat.<sup>4</sup> There are various changes seen in the functioning of the lungs as the ventilator capacity parameters are significantly lower than predicted and forced expiratory flow(FEF) indicating obstructive changes in the smaller airways leading to all the respiratory changes. The inspiration of cold and dry air shows symptoms in upper and lower expiratory tracts.<sup>4</sup>

Aerosolisation of the seafood during processing has been identified as a high risk activity for immunological sensitization, hypersensitivity, respiratory symptoms, breathlessness and work related asthma. Despite high levels of automation in workplaces, workers may still be at high risk of developing health problems due to inadequate local exhaust ventilation systems.<sup>2</sup> There is variability of exposure to aerosols with allergen concentrations ranging from 2ng/m<sup>3</sup> to 1000ng/m<sup>3</sup>. Manual and automated processing can produce high levels of inhalable bio-aerosols.<sup>2</sup>

There is higher risk of occupational allergic asthma

associated with exposure to aerosols arising from bony fishes. Bioactive agents in bio-aerosols as allergens, enzymes and microbial toxins give rise to irritative respiratory symptoms when inhaled. Symptoms of asthma may develop after only a few weeks or months. Symptoms are worse at work and improve during holidays. We can also see irritant induced asthma due to exposure to high concentrations of irritants as sulphite preservatives or ammonia used as refrigerant.<sup>3</sup>

**Material and Methodology**

An observational study was carried out using a cross sectional study design. The samples were selected using the simple random sampling method. The study was conducted in and around Karad, Maharashtra. Study was conducted using sample size of 98[n= 75 4pq/l] workers working in cold storage industry, which was carried out for 6 months. The inclusion criteria was of age group 30 to 50 years male as well as female workers, with exclusion criterion of patients having COPD, hypotension and grade 4 dyspnea.

**Outcome Measures:** The outcome measure used for this study was

St. George’s Respiratory Questionnaire

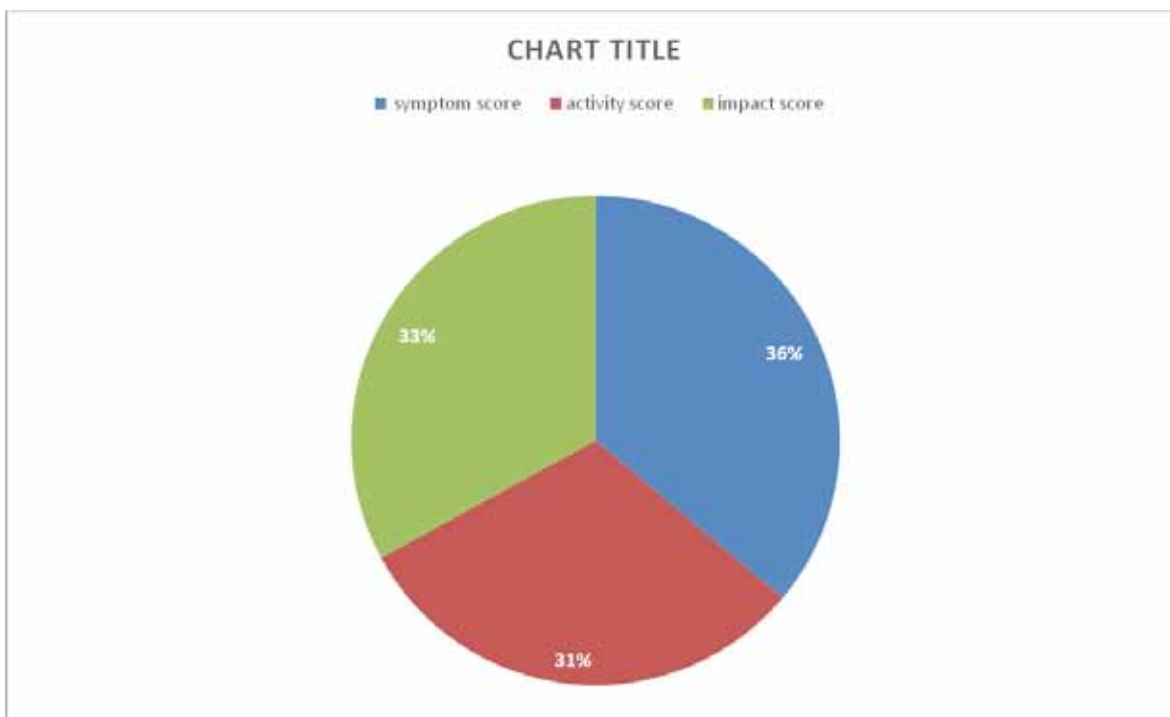
The St.George’s Respiratory Questionnaire aims to evaluate the respiratory problems in cold storage industry workers. It is an easily self-administered questionnaire that evaluates respiratory symptoms and their effect on body.

**Statistical Analysis:** Statistical analysis of the recorded data was done by using the software SPSS version20.

98 subjects were successfully completed by giving them the questionnaire. The result showed that mean age of the workers in age group 30 to 50 years is 41.87 and SD was 6.27. The mean values of symptom, activity and impact score 6.61,5.65 and 6.03, (SD) was 5.88, 5.48 and 5.77 respectively [Table 1].

**Table No. 1: Symptom, activity and impact score**

	Mean ± SD	T Value	P Value	Interference
Age 30-50 Years	41.87 ± 6.27	66.092	<0.0001	Extremely Significant
Symptom Score	6.612 ± 5.88	11.120	<0.0001	36%
Activity Score	5.65 ± 5.48	10.199	<0.0001	31%
Impact Score	6.03 ± 5.77	10.33	<0.0001	33%



**Pie chart 1 shows the percentage for Symptom, Activity and Impact score i.e. symptom percentage is 36%, activity is 31% and impact score is 33%.**

**Table No. 2: Symptom Score with SGRQ Total score**

	Mean ± SD	T Value	P Value	Interference
Age 30-50 Years	41.87 ± 6.27	66.092	<0.0001	Extremely Significant
Symptom Score	6.612 ± 5.88	11.120	<0.0001	Extremely Significant
SGRQ Total Score	18.29±16.55	15.472	<0.0001	Extremely Significant

**Table No. 3: Activity Score with SGRQ Total score**

	Mean ± SD	T Value	P Value	Interference
Age 30-50 Years	41.87 ± 6.27	66.092	<0.0001	Extremely Significant
Activity Score	5.65 ± 5.48	10.199	<0.0001	Extremely Significant
SGRQ Total Score	18.29±16.55	15.472	<0.0001	Extremely Significant

**Table No. 4: Impact Score with SGRQ Total Score**

	Mean ± SD	T Value	P Value	Interference
Age 30-50 Years	41.87 ± 6.27	66.092	<0.0001	Extremely Significant
Impact Score	6.031 ± 5.77	10.33	<0.0001	Extremely Significant
SGRQ Total Score	18.29 ± 16.55	15.472	<0.0001	Extremely Significant

### Result

The workers working in cold storage industry for more than 8 hours/day show the highest percentage of symptom score.

### Discussion

The purpose of the study was to find the Prevalence of respiratory problems in cold storage industry workers working in fish processing unit. Many studies have been

conducted on problems in musculoskeletal system faced by the workers, skin symptoms but very few studies have just focused on the area of respiratory problems. As the workers working in cold storage industry are exposed to cold temperature as well as allergens. This type of cold temperature and allergens leads to various respiratory problems. The aim of this study was to find the problems they face while working in cold storage industry according to the scores.

A study was carried out to see Health problems related to working in extreme cold conditions indoor by Hugo Piedrahita the purpose of this study was to identify health problems among workers performing cleaning, maintenance and machine operation tasks inside the cold storage rooms with temperatures between -43 degree Celsius and -62 degree Celsius in a freeze drying coffee company.

Our study included 98 subjects from which all were male participants from 30 to 50 years. We have calculated their various scores according to symptoms, activity and impact from which symptom score of the worker was 36%, activity score was 31% and finally the impact score was 33%. Where in an another study of cold exposure and health effects among frozen food processing workers there the study was limited and not significant. A study done by Anamai Thetkathuek. Another study carried out by Mohamed Jeebhay which concentrated on allergies in seafood processing workers.

According to the questionnaire used the total percentage of score with SGRQ was 70%. Out of which the symptom score with relation to SGRQ total score was 27% i.e. according to symptom seen the workers 27% respiratory problems were noticed the activity score with relation to total score was 24% and lastly the impact score with relation to total score was 25%. According to the percentages seen, in our study we did not report any kind of severe respiratory problem which will hamper their activities while working in cold storage industry.

In our study we also found out symptom, activity and impact score with relation to working hours, all the 98 participants had working hours ranging in between 5 to 10 hours.

Previous articles focused on all the health problems which were related with the workers working in fish

processing unit. Our project concentrated mainly to check the symptoms, activity and impact of working in fish processing units.

## Conclusion

After analysing the data, it was found that there is a prevalence of Respiratory problems in cold storage industry workers working in fish processing unit.

**Conflict of Interest:** There is no conflict of interest concerning the interest of study.

**Source of Funding:** This study is self funded.

**Ethical Clearance:** The study was approved by institutional ethical committee of KIMSUDU.

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# Prevalence of Musculoskeletal Disorders in Food Stall Workers

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## Abstract

**Background:** Musculoskeletal disorders are group of disorders that affect the musculoskeletal system involving nerve, tendon, muscle supporting structure. individuals working at the street food stalls do not have the even slightest knowledge about these things. Due to the nature of their work they cannot afford to take breaks and stop to stretch and walk around. Also their financial status does not permit them the liberty to take days off and rest. keeping in mind the work load of this target group it is important to rule out the musculoskeletal abnormalities faced by them. The aim of this study is to determine prevalence of musculoskeletal disorders among food stall workers.

**Methodology:** An observational study was conducted in 93 food stall workers Karad. The inclusion criteria was the both male and females who willing to participate and with work experience of more than 5 years. the outcome measures were nordic questionnaire.

**Result:** According to result of present study the low back pain symptoms have the highest rate with 41% of preventing performance of normal work during there regular food stall work, this symptoms are followed by knee problems 31%, neck problem 20%, shoulder problem, 19% elbow problem, wrist/hand problem 8%, upper back 6% and ankle/feet problem 4%.

**Conclusion:** The conclude that the low back pain was more prevalent in food stall workers of Karad which is attributed to the nature of their work followed by prevalence of other musculoskeletal problems.

**Keywords:** Food stall workers, musculoskeletal, low back pain.

## Introduction

Musculoskeletal Disorders are condition that can affect your muscles, bone and joints. Musculoskeletal disorder are emerging common health problem among workers due to intensive manual work. Musculoskeletal

disorder include shoulder pain, tenosynovitis, carpal tunnel syndrome etc. Back pain is the most common reason for sick absence from work. Musculoskeletal disorders include symptoms such as pain numbness and tingling sensation<sup>2</sup>. Occupation with maintained posture and repetitive work task can be reason for neck and shoulder complaint heavy physical work and motor vehicle driving is common reason for low back pain.<sup>1</sup>

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Symptoms of musculoskeletal disorders include: Pain, stiffness, swelling. Causes include: Age, Occupation, Activity level, Life style, Family history. Work related Musculoskeletal Disorder have been described as the most notorious and common cause of severe long term pain and physical disability that affect millions of workers in this field across the world. Musculoskeletal disorders contributed 3.4% and 1.7%

towards the total disease burden in the developed and developing countries respectively. Although these disorders are not fatal, but there is a chance of developing into serious injuries if ignored<sup>1</sup>.

These people generally have fixed working hours. They also belong to a class that has greater exposure to simple knowledge of ergonomics. They can identify what physical symptoms they are experiencing and can judge if and when they need to visit a health professional. However, individuals working at the street food stalls do not have the even slightest knowledge about these things. Due to the nature of their work, they cannot afford to take breaks and stop to stretch and walk around. Also, their financial status does not permit them the liberty to take days off and rest. This only worsens their condition and can lead to severe consequences that could have been easily avoided. The lack of insight into what is wrong with their body and how to deal with it does nothing to help.<sup>4</sup>

Work at food stalls is usually physically demanding that may develop symptoms of various musculoskeletal disorders such as in the back, lower limb, neck and upper limbs. Workplace risk factors that affect any joint and muscle in the body may include, forceful hand exertion, improper working station, improper working posture, prolonged standing, unsuitable tools/equipment's, inappropriate space of work and time patterns. Musculoskeletal disorders are more often associated with habitual tasks that contribute to gradual tissue damage. These are caused primarily by the performance of work and by the effects of the immediate environment in which work is carried out.<sup>6</sup> The symptoms may vary from discomfort and pain to decreased body function and invalidity.

Restaurant workers have to maintain standing posture with long working hours and repetitive movements of upper limb. There is a need of developing effective preventive strategies including training and education. It is important that the workers need to understand which body movements and postures contribute to discomfort and the severity of musculoskeletal disorders.<sup>3,4</sup> These disorders also show some symptoms which mainly include pain, numbness, discomfort and tingling in the affected area and can differ in severity from mild and periodic chronic and debilitating conditions.<sup>3</sup> This has some proven work-related causal component like cumulative trauma disorders, repetitive strain injury. This has also some consequences which are mainly

seen in musculoskeletal disorders which include long term sick leave, hospitalization, workers' compensation claims and claims costs.<sup>7</sup>

## Material and Methodology

This was a study to find the prevalence of musculoskeletal disorders in food stall workers. The study was carried out in Krishna College of Physiotherapy, Karad. An approval for the study was obtained from the protocol committee and ethical committee of KIMS DU. Individuals were approached and those fulfilling the inclusive criteria were selected. The purpose was explained and the study was performed by taking consent of each candidate through a consent form. 93 food stall workers were taken from in and around areas of Karad for the study. The inclusive criteria were both males and females willing to participate and those who have work experience of more than 5 years. The exclusive criteria were the individuals who had undergone recent fractures, having severe systemic illness, recent history of trauma, polyarthritis, rheumatoid arthritis or any other arthritic condition or any psychiatric illness. Standardized Musculoskeletal Nordic Questionnaire was the major outcome measure to assess the musculoskeletal disorders in food stall workers. The total score was calculated and statistical analysis and interpretation was done for each candidate to find out the prevalence of musculoskeletal disorders in food stall workers.

### Statistical Analysis

For sample size following formula was used

$$n = 4pq/l^2$$

$$n = 93$$

The unpaired T test was used. Statistical analysis of the recorded data was done by using the software SPSS version 20. The p value is less than 0.001 which is significant.

## Result

According to the result of the present study, the low back pain symptoms have the highest rate with 41% of preventing performance of normal work during their regular food stall work. These symptoms are followed by knee problems 31%, neck problem 20%, shoulder problem 19%, elbow problem, wrist/hand problem 8%, upper back 6% and ankle/feet problem 4%.

**Table 1: Joint wise Musculoskeletal problems in study**

Joint Name	Subject No
Neck	22
Shoulder	16
Upper Back	8
Elbow	16
Wrist/Hand	10
Lower Back	43
Knees	33
Ankles/Feet	6

Interpretation- Above table represents total 93 subjects. Out of 93 subjects, 22 have neck pain,16 have shoulder pain,8 have upper back pain,16 have elbow pain,10 have wrist/hand pain,43 have lower back pain,33 have knee pain and 6 subjects have ankles/feet pain.

**Table No. 2: Age wise distribution of musculoskeletal problems in various joints (as per standardized Nordic questionnaire)**

Joint Name	Age Group (in years)				
	20-30	31-40	41-50	51-60	61-70
Neck Pain	9	6	2	5	0
Shoulder Pain	4	5	3	3	1
Upper Back Pain	3	1	2	1	1
Elbow Pain	7	4	2	3	0
Wrist/Hand Pain	5	2	2	0	1
Lower Back Pain	15	10	6	10	2
Knees Pain	5	12	3	10	3
Ankles/Feet Pain	2	1	1	2	0

Interpretation- 31 subjects found with lowerback pain in 20-50 years of age group because of prolonged standing hours,20 subjects found with knee pain because it's the weight bearing joint,12 was found with shoulder pain because of repetitive actions and heavy lifting. 16 was found with neck pain because of continuous flexion of neck and repetitive side rotational movements of neck. 13 subjects found with elbow pain because of repetitive actions of elbow, 9 subjects were found with wrist/hand pain, 6 subjects were found with upper back pain because heavy lifting and abnormal posture, only 4 subjects available with ankle/feet pain because of most weight bearing.

In 51-70 years of age group not more subjects are available but there is also more number of subjects with lower back pain 12 are available,13 subjects are with knee pain, only 2 subjects available with ankle/feet

pain, only 1 subject is available with wrist/hand pain in this age group,5 subjects available with neck pain, 4 patients available with shoulder pain, 2 subjects with upper back problem was present and 3 subjects was available elbow problems this will caused because of prolonged standing work the work with high physical demands and decreased efficiency because of aging and bad ergonomically habits.

**Discussion**

The main purpose if this study is to find the Prevalence of Musculoskeletal Disorders in The Food Stall Workers in Karad City. The objectives are to identify the musculoskeletal disorders in food stall workers in Karad city and to assess the severity of problems according to the standardized Nordic musculoskeletal questionnaire.

Musculoskeletal disorder is emerging common



health Musculoskeletal Disorders are condition that can affect your muscle problem among workers Due to intensive manual work Musculoskeletal disorder include shoulder pain, tenosynovitis, carpal tunnel syndrome etc. Back pain is the most common reason for sick absence from work. Musculoskeletal disorders include symptoms such as pain numbness and tingling sensation.

A total of 93 subjects were approached. Out of 93 subjects, 33 were in 20-30 age group, 25 were in 31-40 years of age, 14 were in 41-50 years of age, 17 were in 51-60 years of age and 4 were in 61-70 years of age group. Out of 93 subjects, 90 were male subjects and 3 were female subjects. Out of 93 subjects, 22 have neck pain, 16 have shoulder pain, 8 have upper back pain, 16 have elbow pain, 10 have wrist/hand pain, 43 have lower back pain, 33 have knee pain and 6 subjects have ankles/feet pain<sup>1</sup>.

31 subjects were found with lower back pain in 20-50 years of age group because of prolonged standing hours, 20 subjects found with knee pain because being the weight bearing joint, 12 was found with shoulder pain because of repetitive actions and heavy lifting, 16 were found with neck pain because of continues flexion of neck and repetitive side rotational movements of neck, 13 subjects found with elbow pain because of repetitive actions of elbow, 9 subjects were found with wrist/hand pain, 6 subjects were found with upper back pain because heavy lifting and abnormal posture, only 4 subjects available with ankle/feet pain because of most weight bearing<sup>3</sup>.

In 51-70 years of age group not more subjects are available but there is also more number of subjects with lower back pain (12) available, 13 subjects with knee pain, only 2 subjects available with ankle/feet pain, only 1 subject is available with wrist/hand pain in this age group, 5 subjects available with neck pain, 4 patients available with shoulder pain, 2 subjects with upper back problem were present and 3 subjects were suffering from elbow problems. These were seen because of prolonged standing work the work with high physical demands and decreased efficiency because of aging and bad ergonomical habits<sup>6</sup>.

The subjects mostly taken in this study were mostly hawkers selling vadapav, bhel and Chinese food and this food stall had more work in prolonged standing and repetitive actions of upper limb. Less female subjects were available in this study because in India, more

females are not involved in this type of work, since this is considered as taboo in India. Also, there are many reasons of less participation of females in this field like family problems, bad myths about this field, security issues, unsafe working environment, night working hours, high physical demands.

This worker is under very tremendous pressure and workload because of there is less manpower available and also, they have mental and physical stress to maintain food quality. Because of these stresses they are more prone to musculoskeletal as well as mental disorders<sup>7</sup>.

## Conclusion

According to result of present study the low back pain symptoms have the highest rate with 41% of preventing performance of normal work during there regular food stall work, this symptoms are followed by knee problems 31%, neck problem 20%, shoulder problem, 19% elbow problem, wrist/hand problem 8%, upper back 6% and ankle/feet problem 4%.

**Conflict of Interest:** The authors declare that there are no conflicts of interest concerning the content of present study.

**Source of Funding:** Self-funded

**Ethical Clearance:** Letter

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# Quality of Life in the Individuals Undergone Coronary Artery Bypass Surgery with Internal Mammary Artery Graft and Saphenous Vein Graft: A Comparative Study

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## Abstract

**Background:** Coronary artery bypass graft surgery is the mainstay of treatment in Coronary artery diseases. Most commonly used grafts for CABG are saphenous vein grafts (SVG) and internal mammary artery (IMA) grafts. Post-operative HRQOL of the patients undergone CABG is generally improved. However, there is paucity of literature as far as QoL of patients by comparing two different grafts is concerned. This study focuses on the differences in the QoL of the patients undergone CABG with IMA and SVG.

**Material and Methodology:** In this cross-sectional study, 80 patients undergone CABG with IMA and SVG between October 2018 and April 2019 were enrolled. Patients were given SF-36 Questionnaire to fill. Results were obtained and their QoL was compared.

**Result:** QoL was found to be decreased in the patients undergone CABG with SVG than those with IMA. A decline of 22.63% in physical functioning, 33% in role physical, 30.33% in role emotional, 22.63% in vitality was found. Mental health showed decline of 21.1% and social functioning declined by 17%. Pain and general health declined by 15.88% and 24% respectively.

**Conclusion:** CABG with IMA has led to more satisfactory outcomes for physical functioning, role physical, role emotional, vitality, mental health, social functioning, pain and general health.

**Keywords:** Coronary artery bypass graft, internal mammary artery graft, saphenous vein graft, QoL, SF-36 Questionnaire

## Introduction

It is nearly been 40 years since the introduction of Coronary artery bypass graft in humans. The first reported coronary artery bypass graft surgery using

internal mammary artery was performed by R. Goetz using the sutureless technique in 1960. V. Kolessov (1964) performed the first sutured bypass grafting using internal mammary graft. From 1962-1967 CABG using autogenous saphenous vein grafts were performed by D. Sabistan (1962), H Garret (1946), D. Kann (1966) and F. Favalaro<sup>1</sup>. Coronary artery bypass surgery was first performed in India in 1975 about 13 years after its advent in 1962<sup>2</sup>.

The heart is a muscular organ that supplies blood to all parts of the body. The heart tissue receives the blood from two coronary arteries, known as the left main coronary artery and the right coronary artery. The left main coronary artery divides into the left anterior

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descending artery (LAD) and the left circumflex artery (LCX), which supplies blood to the left ventricle and the left atrium. The right coronary artery and its smaller branches supply the blood to the right atrium, right ventricle, SA node and AV node<sup>3</sup>.

When one or more of these arteries get narrowed or blocked, blood and oxygen supply is reduced and the myocardium is damaged. Coronary artery diseases (CAD) like atherosclerosis or arteriosclerosis interrupt the blood flow in the coronary arteries. An estimated 47 million Indians had CAD in 2010<sup>4</sup>. Cardiovascular diseases has become the leading cause of morbidity and mortality in India during last 3 decades<sup>5</sup>. Various medical and surgical interventions have been developed to open occluded blood vessels and to restore the normal blood flow of the coronary arteries<sup>4</sup>. The surgical approaches include Coronary artery bypass graft surgery and percutaneous coronary intervention.

The CABG surgery and PCI are the treatment options in the patients with ischemia and multi-vessel coronary artery disease. Recovery from PCI is much faster than from CABG<sup>9</sup>. The PCI approach requires long term, dual antiplatelet treatment to achieve satisfactory results<sup>10</sup>. Comparisons of CABG and PCI have provided a conflicting information. For years experts have debated over the optimal treatment for the patients with multi-vessel CAD. In fact the recent report of comparative effectiveness of revascularization strategies trial (ASCERT) has rekindled the professional debate<sup>9</sup>. However, no difference in the mortality was evident between the method after 1 year. But the adjusted all-cause mortality after 4 years was lower with CABG than with PCI<sup>9</sup>. As the diffusion and complexity of the coronary disease increases the long term benefit of CABG over PCI becomes more apparent and meaningful<sup>10</sup>.

The Coronary Artery Bypass Graft surgery (CABG) is the mainstay of the treatment in CAD. During CABG, a healthy artery or vein from patient's body is grafted to the blocked coronary artery. This creates a new passage and oxygen-rich blood is routed around the blockage to the heart muscle. The common grafts used during CABG include grafts from internal mammary artery (IMA/Internal thoracic artery), radial artery, gastroepiploic artery, inferior epigastric artery and saphenous vein<sup>6</sup>.

Saphenous vein grafting became the most common technique for nearly two decades after 1967. However, in 1986, F. Loop et.al reported that the long term survival

rate of CABG was significantly higher when internal mammary artery graft rather than saphenous vein graft was used<sup>1</sup>. These grafts show progressive closure at the end of first year and has long term failure rate of almost 50% at 10years<sup>7</sup>. SVGs fail despite optimal mechanical therapy because of their unique inherent biological behavior.

Internal mammary artery (IMA) grafts are the most common arterial grafts used in CABG. The IMA grafts have been associated with long term patency and improved survival rate when compared with SVGs. The superiority of IMAs over SVGs can be attributed to its higher resistance to the development of atherosclerosis<sup>8</sup>.

The health related QoL (HRQOL) in the patients undergone CABG is improved when compared to preoperative QoL. Six months after CABG, QoL significantly improved both in men and women<sup>11</sup>. However, men have better QoL when compared with women. Many international surveys have confirmed that HRQOL generally improves after cardiac surgery; however the QoL does not improve in a linear pattern for all the patients. This is mainly due to the presence of co-morbidities<sup>12</sup>.

According to a survey the health related QoL is generally improved after CABG surgery<sup>12,17</sup>. Most of the studies are restricted to the short term follow-up. However there is paucity of literature as far as the QoL of the patients by comparing two different grafts is concerned. Six months post CABG health related QoL is not well confirmed between the saphenous vein graft and the internal mammary artery graft. The physiotherapists play an important role in improving the health related QoL in the patients' undergone CABG surgery. Physiotherapist follow a general cardiac rehabilitation protocol for post-surgical Coronary artery bypass graft surgery patients. This study focuses on finding the differences in the QoL of the individuals undergone CABG with internal mammary artery graft and saphenous vein graft. A physiotherapist can thus modify the post-operative rehabilitation protocol as per the requirements of the graft.

## Methodology

A total of 80 subjects between the age group of 45 and 65 years, willing to participate in the study were chosen using simple random sampling method from Krishna Hospital and Medical Research Centre, Karad. An ethical clearance certificate for the study was obtained

from Institutional Ethical Committee of Krishna Institute of Medical Sciences ‘Deemed to be’ University, Karad. The individuals who fulfilled the inclusion criteria were chosen. However the patients undergone ‘OFF-PUMP’ CABG for the second time or for triple vessel disease were excluded. A written consent was obtained from the individuals. Subjects who have undergone ‘ON-PUMP’ CABG surgery between the month of October

2018 and April 2019 with internal mammary artery graft and saphenous vein graft underwent a test using SF-36 Questionnaire. An observational study was carried out and data was collected and results were obtained. Results for both the groups were compared for the differences in their health related QoL.

**Data Presentation, Analysis and Interpretation:**

**Table No. 1: Age-wise distribution in the study:**

Age	Internal Mammary Artery Graft (Number of participants)	Saphenous Vein Graft (Number of participants)
45-55 years	15	16
56-65 years	25	24
Total	40	40

**Table No. 2: QoL according to the Age**

Graft	Age		Significance
	45-55 years	56-65 years	
Internal Mammary Artery Graft (mean score)	283.54	248.93	Significant
Saphenous Vein Graft (mean score)	164.92	153.33	Not significant

**Table No. 3: Gender wise distribution in the study**

Gender	Internal Mammary Artery Graft (Number of participants)	Saphenous Vein Graft (Number of participants)
Male	29	28
Female	11	12
Total	40	40

**Table No. 4: QoL according to the Genders**

Graft	Gender		Significance
	Male	Female	
Internal Mammary Artery Graft (mean score)	259.70	247.72	Not significant
Saphenous Vein Graft (mean score)	161.92	148.75	Not significant

**Table No. 5: Comparison of QoL in accordance to scales**

Scales	Internal Mammary Artery Graft (Mean±Sd)	Saphenous Vein Graft (Mean±Sd)	Significance
Physical Functioning (Mean)	692.5±102.875	466.25±121.628	Extremely significant
Role Physical (Mean)	225±95.407	92.5±76.418	Extremely significant
Role Emotional (Mean)	161±81.769	70±68.687	Extremely significant

Scales	Internal Mammary Artery Graft (Mean±Sd)	Saphenous Vein Graft (Mean±Sd)	Significance
Vitality (Mean)	216.75±71.625	126.25±41.799	Extremely significant
Mental Health (Mean)	273±67.869	167.5±57.768	Extremely significant
Social Functioning (Mean)	122.375±24.547	88.375±25.730	Extremely significant
Pain (Mean)	109.625±27.042	77.875±26.455	Extremely significant
General Health (Mean)	295±65.094	175±47.704	Extremely significant

**Table No. 6: Overall QoL Score**

Internal Mammary Artery Graft	261.90625
Saphenous Vein Graft	157.96875

### Discussion

The health related quality of life implicates the unique personal perception the way in which people assess their own health and non-medical aspects of life. Short Form-36 questionnaire is one of the forms of measurement of QoL. It consists of 36 questions. The reliability and validity of SF-36 questionnaire for Physical Health is 0.83 and for Mental Health is 0.85. SF-36 questionnaire is also adapted to make it suitable for its use in India<sup>13</sup>. The components which are included in SF-36 are physical functioning, role physical, role emotional, vitality, mental health, social functioning, pain and general health.

A total number of 80 subjects participated in the study. The participants with the age between 45 and 55 years were lesser. This could be ascribed to the higher prevalence of CABG for coronary artery diseases in the elder age group. When a correlation between age and QoL was assessed, it was found out that the QoL in both IMA and SVG was better in the individuals between 45 and 55 years of age. An unequal number of participants for each age group could also be the reason for difference in the scores. The availability of lesser number of participants in the age group of 45-55 years could be attributed to the lower incidence of coronary artery diseases in this age group as compared to the elder age group. However the contributing factor for poor QoL in the 56-65 years of age group could be pre-existing comorbidities, duration of the disease, ageing process, increased levels of depression, decreased survival probability.

The study included 57 male participants and 23 female participants. The mean score for QoL in

individuals undergone CABG with IMA and SVG was found to be better in males. Previous studies state that men are more likely to receive CABG with internal mammary artery. A lower average score of QoL in women can be linked with delayed revascularization procedures for Coronary Artery Diseases. However, another reason for varying scores in both the groups could be lined to male predominance in this study.

In our study, men had higher scores in every domain of the QoL questionnaire as compared to the women. The lower scores in the women can be attributed to more limited physical and psychological gain and higher graft occlusion rate than in men, also their poor participation in the cardiac rehabilitation program which have proved to have a great effect on QoL in the post-operative period<sup>20</sup>.

There was a decline in the overall QoL of the individuals undergone coronary artery bypass graft surgery with SVG than those with IMA graft. A decline of 22.63% in physical functioning, 33% in role physical, 30.33% in role emotional and 22.63% in vitality was found. The mental health showed a decline of 21.1% while 17% decline in social functioning. Pain component and general health showed a decline of 15.88% and 24% of decline respectively. It could be mostly attributed to the unmodified risk factors and the progression of existing co-morbidities.

Some limitations must be taken into consideration while interpreting the results of our study. One of the limitations of this study was that no pre-operative data regarding the QoL using SF-36 questionnaire was made available. Therefore, it was difficult to compare the post-operative results as a baseline was not established. The present study was conducted at a single institution, therefore generalization of the result may be limited. Another limitation in our study was the lesser number of sample size; an unbiased data for the QoL between the men and the women could not be carried out as unequal number of men and women were included in the study.

Finally the SF36 is a generic QoL questionnaire and not disease-specific, although it has been reported that it is sensitive to detection of changes in health-related QoL variables in patients with coronary artery disease after CABG surgery.

### Conclusion

After analyzing the data, it was established that the QoL was much improved in the individuals undergone CABG with IMA. On comparing an overall score of SF-36 Questionnaire, a decline of 23.76% in the QoL was found in the individuals undergone CABG with SVG.

Thus concluding that the QoL was much improved in individuals undergone CABG with IMA graft than in the individuals undergone CABG with SVG after a period of 6 months of surgery.

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

**Ethical Clearance:** An ethical clearance certificate was obtained from the Institutional Ethical Committee of Krishna Institute of Medical Sciences Deemed to be University, Karad.

**Acknowledgements:** The authors would like to express their special gratitude towards all the patients that participated in the study. We would also like to thank our families and institution for their everlasting support which enabled us to continue our research activities.

**Source of Funding:** Self.

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# Evaluation of Hypermetropia in School Children of Visakhapatnam

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## Abstract

**Background:** Refractive errors are the most common visual disorders and one of the causes of blindness affecting the school going children worldwide. It is a preventable and treatable condition if detected early. Hypermetropia or long sightedness is an uncommon refractive error of the eye which is often neglected in the screening tests. If left undetected or treated, it may lead to strabismus. The present study is aimed to detect the prevalence of hypermetropia in school going children of Visakhapatnam, Andhra Pradesh.

**Materials and Method:** A total number of 1632 students from 6<sup>th</sup>-10<sup>th</sup> class were screened for hypermetropia. After taking necessary permission from the school authorities, two government and four private schools were enrolled in the study.

**Results:** The refractive errors were observed in 291 pupils (17.83%). The prevalence of hypermetropia was 4.35% and was seen in 71 students. Girls were being more affected than boys. Maximum prevalence of 20.51 % was reported in 12 year age group and minimum prevalence of 9.37 % in 9 & 15 years age group.

**Conclusion:** Though hypermetropia is not a common cause among refractive errors, screening tests should be included in the routine visual checkups at schools to diagnose and treat at an early stage to prevent the child from future visual morbidity. The study group was explained about the deleterious effects of the refractive errors, measures to prevent and advised to take an Ophthalmic consultation.

**Keywords:** Hypermetropia, school children, screening, prevalence, strabismus, visual morbidity.

## Introduction

Hypermetropia or hyperopia is a refractive error of the eye where the parallel light rays focus behind the macula lutea without accommodation resulting in unclear retinal image. Untreated hypermetropia may lead to amblyopia and esotropia. Inability of the eye muscles to cope with this stress results in poor word definition and impairment of reading. The need for screening is linked to the indeterminate effect of hyperopia on learning<sup>[1,2]</sup>. Refractive errors, especially hypermetropia may go undiagnosed for a long time<sup>[3]</sup>. A study made by Kleinsteinetal<sup>[4]</sup>revealed the prevalence of hypermetropia in American children aged 5-17 years was 12.7%. Midelfartetal<sup>[5]</sup> concluded the prevalence to be 13.2% among 20-25 years old individuals. In India, a

study done by Dandonnaetal<sup>[6]</sup> report hyperopia in atleast one eye to be 0.8% with no significant predictors. Among the refractive errors the literature states that myopia<sup>[7,8]</sup> is the most common cause followed by hypermetropia and astigmatism. Research is scanty for the prevalence of hypermetropia in school children in Andhra Pradesh. Timely correction of hypermetropia may prevent the visual morbidity. Hence the present study is done to determine the prevalence of hypermetropia in school going children in Visakhapatnam, Andhra Pradesh.

## Materials and Method

Six schools, two government and four private, from different regions of Visakhapatnam city were approached to conduct the study. With the consent from

the authorities, 1632 students from classes 6<sup>th</sup> -10<sup>th</sup> were registered for the study. The age of students ranging from 9-15 years. There were 909 boys and 723 girls. Each school was visited on the intimated date during its working hours. With the assistance of the class teacher the preliminary data like name, age, gender, class, socio-economic status was collected.

External examination was done with torch to detect any diseases of the adnexa and anterior segment of the eye. Simultaneously cover test was done to assess the muscle balance. Visual acuity of each eye was tested separately with snellen's chart hung at a distance of 6 meters from the student. When the student was unable to read 6/6 on snellen's chart, a pin hole test was done and visual acuity was recorded to note the improvement if any.

Vision of the children who were using glasses were tested both with and without glasses. As a routine, near vision test, with the standard near vision charts, was carried out at a distance of 33cm. Individuals who had visual acuity less than 6/6 on snellen's chart and who were symptomatic were referred to the ophthalmologist for further treatment.

## Results

When 1632 students were examined the refractive errors were seen in 291 pupils. Hypermetropia was observed in 71 students in which 39 were girls and 32 were boys. When the economic status was related with the occurrence of hypermetropia the low socio economic group was found to have more prevalence. The following

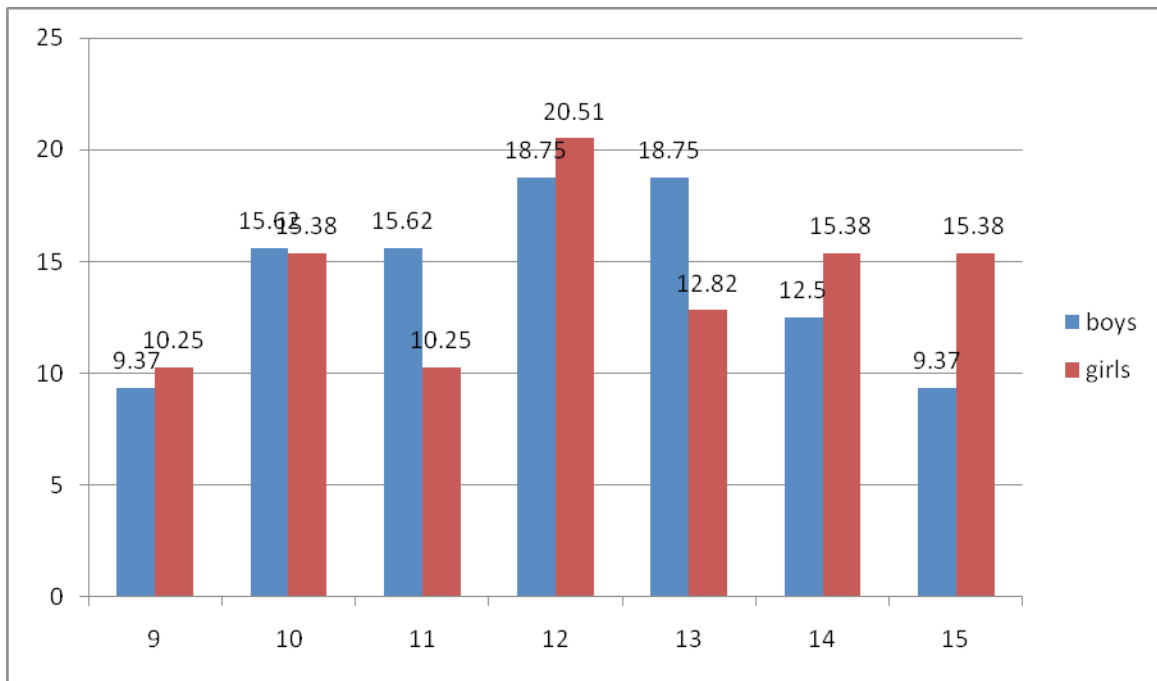
results were tabulated and represented graphically.

## Discussion

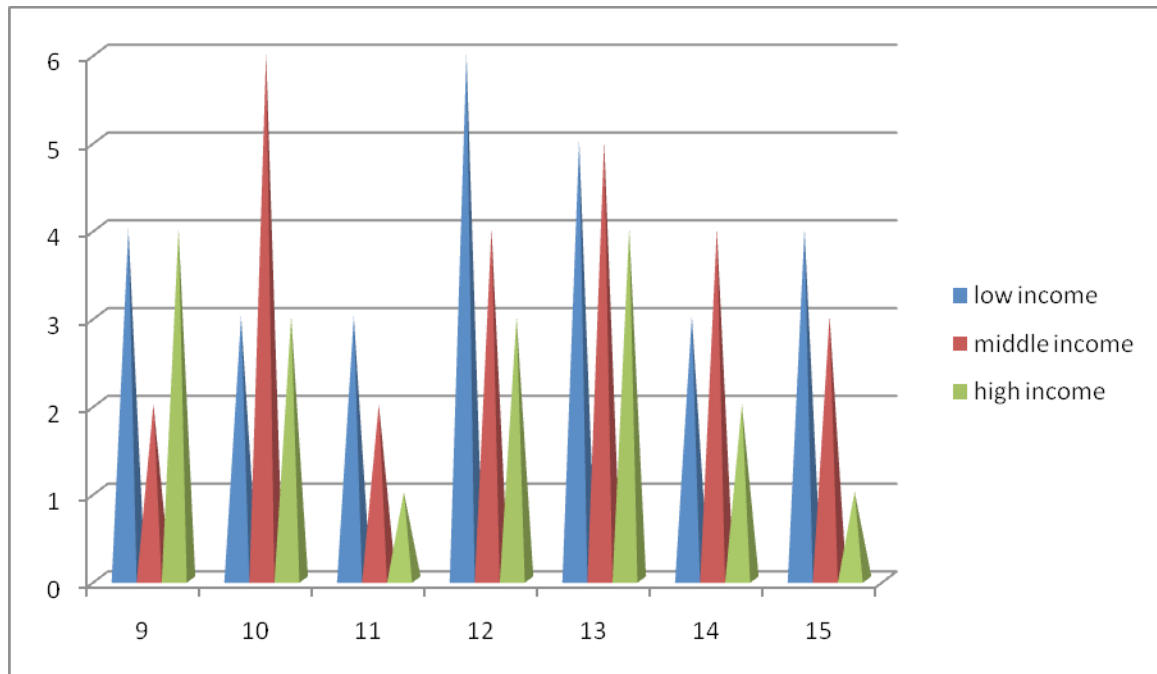
The refractive error is an avoidable cause of visual impairment. Tests for long sightedness or hypermetropia are not found in most school screening programmes<sup>[9]</sup>. Many studies<sup>[10,11,12]</sup> report myopia to be the most common refractive error followed by hypermetropia and astigmatism. Undiagnosed and untreated hyperopia may lead to strabismus or amblyopia. The diagnosis and treatment of the refractive errors is not only simple but also the most effective forms of eye care. The present study is done to illustrate the prevalence of hypermetropia in school going children in Visakhapatnam. The most common age group affected by the refractive errors is 9-15 years age. The maximum prevalence of 20.51% hypermetropia is seen in 12 years age group and a minimum of 9.37% is observed in 9 and 15 years age group. Girls are more affected by hypermetropia with a prevalence of 5.39% than boys. The study reports hypermetropia as a least common cause of refractive errors with a total prevalence of 4.35%. When the socio economic status was considered the highest prevalence of hypermetropia was observed in low income group of 12 years age. This shows that measures need to be taken to screen and diagnose hypermetropia in the routine visual screening tests performed at schools. The simple and easy measures to correct the hypermetropia will save the child from future visual morbidity. The results were discussed with the study group and advised them to take the Ophthalmologist consultation.

**Table 1: Age wise prevalence of hypermetropia with reference to gender**

Gender	No of children examined	No of children with hypermetropia	Age in years								Prevalence %
			9	10	11	12	13	14	15	Total	
Boys	909	32	3	5	5	6	6	4	3	32	3.52
Girls	723	39	4	6	4	8	5	6	6	39	5.39
Total	1632	71	7	11	9	14	11	10	9	71	4.35



**Graph 1: Percentage of prevalence of hypermetropia in different age groups**



**Graph 2: Age wise prevalence of refractive errors with reference to economic status**

**Conclusion**

Hypermetropia is one of the causes of refractive errors which commonly affects school going children of 9-15 years age. Girls reported to be affected more in number when compared to boys. Measures to detect hypermetropia in the visual screening tests at schools

were emphasized to prevent the future visual morbidity of the child

**Acknowledgements:** Nil

**Conflict of Interest Statement:** Nil

**Funding:** Nil

**Ethical Clearance:** Taken from GIMSR ethical committee.

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# An Observational Study to Understand the Features of “Syllabi” of Under Graduate Physiotherapy Education in Western and Central India

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## Abstract

**Introduction:** The level of education for physical therapists should reflect the current and future needs and expectations of professional practice and society. The syllabus of the Bachelors of Physiotherapy Program in Northern India is variable. Therefore, through our study, we would assess the existing contents and features of syllabi of various universities conducting Under-graduate Physical Therapy education program in Western and Central India and throw a light whether they are diverse or in consonance to each other.

**Aim:** To study the contents and features of various syllabi for Under-graduate Physiotherapy Education conducted by various Universities of Western and Central India

**Methodology:** There are 34 universities conducting Undergraduate Physiotherapy program in Western and Central India, 31 universities were found suitable out of which data of 24 universities could be collected. The data was collected by personal visit, from official website of universities, via e-mail and by other sources. The data collected includes course scheme – syllabus, transcript, subject credits and examination scheme

**Results:** The results of this study show that features of syllabi in these universities differ on the basis of total number of academic hours, subject allocation in various years, number of theory and practical hours allotted, percentage weight age of hours, maximum marks and percentage weight age of marks of each subject.

**Conclusion:** This study concludes that syllabus of the Bachelors of Physiotherapy program in Western and Central India is variable. The variability is not seen in the program structure rather in: Total number of subjects, Curriculum hours allotted to each subject, Subject allocation in various years, Examination system—annual or semester system, Maximum marks allotted to a subject in the university examination scheme, Total academic hours in a year, Hours allotted for clinical training.

**Keywords:** *Physiotherapy Education; Syllabus, Curriculum, syllabus Examination.*

## Introduction

Etymologically syllabus means a ‘label’ or a ‘table of contents’. The American Heritage dictionary defines syllabus as outline of a course of study.<sup>1</sup>

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Littlefield (1999a) suggested that a syllabus serves seven purposes. It sets the tone for a course, motivates students to set lofty, but achievable goals, serves as a planning tool for faculty, structures students’ work over the course of the semester, helps faculty plan and meet course goals in a timely manner, serves as a contract and is a portfolio artifact for tenure, promotion, or job applications.<sup>2,3</sup>

The lead educator for the course and, contingent upon the school and other perceived bodies are in charge of creating and keeping up course syllabi.<sup>4</sup>

Non-intrusive treatment has kept on advancing and to react to the requirements of society, with physical advisors currently rehearsing in an assortment of clinical settings with remarkable degrees of expert duty.<sup>5</sup>

Physical specialists are associated with advancing wellbeing, health and wellness through hazard factor distinguishing proof and the execution of administrations to lessen chance, moderate the movement of or avert useful decrease and handicap and improve cooperation in picked life circumstances.<sup>6</sup>

The degree of training for physical advisors ought to mirror the present and future needs of expert practice and society and changes in exercise based recuperation jobs and capacities just as changes in the enactment that directs non-intrusive treatment practice.<sup>7</sup>

A curriculum is one of the most important assets of higher education. A well developed curriculum is essential for effective learning.<sup>8</sup> The expert physical specialist instruction educational program has two parts: pedantic and clinical. The pedantic part incorporates study hall and research facility encounters including central (natural, physical and social) sciences, clinical sciences and exercise based recuperation sciences. The instructive segment is intended to give understudies the learning, aptitudes, dispositions and practices that are required for section into the act of active recuperation.<sup>6</sup>

“Contents and features of ‘syllabi’ for under graduate physiotherapy education in northern India – A cross sectional study” by Nidhi Kalra et.al; with an objective to study the contents and features of various syllabi for Under graduate Physiotherapy education conducted by various Universities and Institutes of Northern India with special focus on Orthopaedics and relevant subjects. This study concludes that syllabus of Bachelors of Physiotherapy program in Northern India is variable.<sup>10</sup>

The training for physiotherapy contrasts from nation to nation and even from state to state inside a nation. Recollecting the physiotherapy rehearsed in importance to social, financial, social and political settings of a nation in the meaning of physiotherapy and thus the instruction likewise varies in like manner. The instruction is offered in Bachelor’s, Master’s and Doctorate level.<sup>12</sup>

‘World Confederation of Physical Therapy’ (WCPT) which regulates physiotherapy profession by setting the standard of the profession worldwide working

in collaboration with national, regional and state level physiotherapy associations which works with the same motive.<sup>12</sup>

WCPT unmistakably referenced the clinical routine with regards to physiotherapist vary as per the social, monetary, social and political settings of the nation and thus the instruction likewise, yet the educational program for the principal physiotherapy training which gives the title physiotherapist will constantly fulfill the guideline set by WCPT. Along these lines, a benchmark for educational plan is required, that is met by every college leading undergrad physiotherapy instruction program. This benchmark would fill in as a contribution to the general population who are directing the course and to see the irregularities in the syllabi.<sup>11</sup>

There exist diversity in the curricula development, design, content, delivery, assessment, evaluation and review process among all the government and deemed universities offering post graduate physical therapy program in India, thus a dynamic and common physiotherapy curriculum across India is needed.<sup>12</sup>

Therefore through this study, we would assess the existing contents and features of syllabi of various universities conducting Under-graduate Physical Therapy education program in Western and Central India and throw a light whether they are diverse or in consonance to each other.

## Methodology

There are 34 Universities conducting Undergraduate Physiotherapy program in Western and Central India, 31 of which were found suitable for data collection, out of which data could be collected from 24 universities.

The data was collected by personal visits, from the official website of universities, via e-mail and other sources (Head of department, faculty, students and alumni). The data collected includes course scheme-syllabus, transcript and examination scheme.

### The collected data was categorized as:

- Number and title of subjects
- Subjects allocation in various years
- Theory and practical subjects and hours
- University and Non-University Examination Subjects

- Percentage weightage of the academic hours of each subject
- Maximum marks allotted to each subject
- Percentage weightage of maximum marks allotted to each subject in the University Examination
- The total number of academic hours in each year of all the universities

**Data Analysis:** The data was analyzed using the software SPSS version – 21.0 with the help of a qualified statistician. The mean and standard deviation of the hours, of the percentage weightage of hours in an academic year and the percentage weightage of total marks in the examination scheme were calculated using this software.

### Result

**Table 1: Types of Universities**

Code	Type of University	No. of Universities
1	State	7
2	Deemed	7
3	Private	10
4	Central	0

Out of 24 universities, 19 universities follow annual system, comprising of 4 academic years; 5 universities follow semester system with 2 semesters in each of the academic year, thus total of 8 semesters. One of the university follows a system in which 4 academic years are divided into 3 professional years where 1<sup>st</sup> and 3<sup>rd</sup> year consists of 3 terms (semesters) in each while the 2<sup>nd</sup> year comprises of 2 terms (semesters).

**Table 2: Semester System Variation**

BPT Year	Maximum No of Hours	Minimum No of Hours
1 <sup>ST</sup> (Semester 1 & 2)	1232	864
2 <sup>ND</sup> (Semester 3 & 4)	1090	912
3 <sup>RD</sup> (Semester 5 & 6)	944	816
4 <sup>TH</sup> (Semester 7 & 8)	914	768
<b>Total</b>	<b>4180</b>	<b>3360</b>

The variation has been seen on the basis of total hours in an academic year in the universities which follow Semester and Annual system. [Table 2 and Table 3].

The numbers of hours allotted for Clinical Training vary on the basis of number of hours as well as the year in which it starts. Some universities start clinical training from 2<sup>nd</sup> academic year whereas others from 1<sup>st</sup> academic year itself. Maximum number of hours is 2750.

**Table 3: Annual System Variation**

BPT Year	Maximum Hours	Minimum Hours
1 <sup>ST</sup>	1120	610
2 <sup>ND</sup>	1350	545
3 <sup>RD</sup>	1000	400
4 <sup>TH</sup>	1050	540
<b>Total</b>	<b>4520</b>	<b>2095</b>

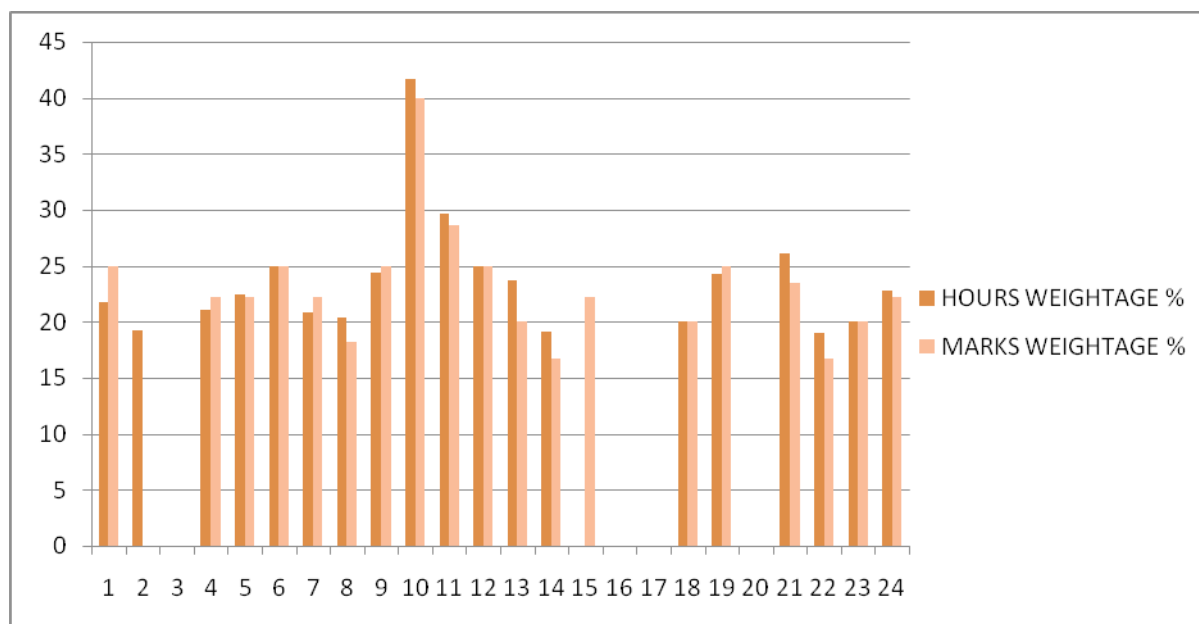
However, all 24 universities have a compulsory 6 month internship after completion of 4 years of tutelage. A variation is seen in the total number of hours and weeks allotted for clinical internship (varying from 24 weeks to 27 weeks). Maximum number of hours is 1440 and minimum number of hours is 1014.

All the subjects were analyzed in this study and the variations in Orthopaedics and Physiotherapy in Orthopaedics were seen as follow

**Clinical Orthopaedics:** It is a University Examination Subject at 15 universities (taught in third year of 7 universities; in second year of 4 universities, in fifth semester of 3 universities and in fourth year of 1 university). It is a theory subject in 6 universities and both theory and practical subject in 9 universities. Maximum number of hours allotted being 200 and minimum hours being 80. Mean hours are  $125 \pm 31.908\%$ , mean hour weightage is  $16.41 \pm 4.053\%$  and mean marks weightage is  $18.37 \pm 4.056\%$ .

It is taught in combination with Surgery as a University Examination subject at 4 universities in third year of 3 and fourth-fifth semester of 1 university respectively.

**Physiotherapy in Orthopedic Conditions:** It is a University Examination Subjects in 20 universities in fourth year of 14 universities, in seventh semester of 2 universities, in fifth-eighth semester of 1 university and in third year of 3 universities. It is both theory and practical subject in all 20 universities. Maximum number of hours is 260 and lowest number is 135. Mean hours are  $172.68 \pm 36.32\%$ , mean hour weightage is  $23.50 \pm 5.213\%$ . Mean marks weightage is  $23.14 \pm 5.128\%$ .



**Graph 1: Variation in the mean hour weightage and mean marks weightage of subject Physiotherapy in Orthopedic Conditions**

## Discussion

The result of this study depicts the current trends in the “syllabi” of Bachelor’s of Physiotherapy program in the UGC recognized universities of western and central India.

Throughout the Western and Central India the Bachelor’s of Physiotherapy program is of four and a half years, where 4 years are academic years and 6 months are of internship.

**First Year:** The University Examination subjects in the first year of these universities are Anatomy, Physiology, Biochemistry, Biomedical physics, Biomechanical Modalities, Psychology and Sociology along with Non-University subjects like Introduction to Physiotherapy, Computer application, English and Communication Skills and First Aid and Emergency Care in a few universities.

**Second Year:** The University Examination subjects in the second year of these universities are Pathology, Microbiology, Pharmacology, Psychiatry, Biomechanics, Exercise Therapy and Electrotherapy, along with Non University Examination subject like Radiology in a few universities.

**Third Year:** The University Examination subjects

in the third year of these universities are mainly General Surgery, Medicine, Clinical Neurology, Clinical Orthopaedics, Clinical Cardio-pulmonary disorders and Clinical Neurology, Physical Diagnosis.

Manipulative Skills and Physical Diagnosis & Prescription along with Non-University Examination subjects like Obstetrics and Gynaecology, Dermatology, Paediatrics, Ophthalmology, Physical Diagnosis and Manipulative Skills in a few Universities.

**Fourth Year:** The University Examination subjects in the fourth year of these universities are Physiotherapy in Orthopaedic conditions, Physiotherapy in Neurological conditions, Physiotherapy in General medical and surgical condition, Physiotherapy in Cardio-pulmonary conditions, Bioengineering, Rehabilitation Medicine, Community PT & Rehabilitation, Sports Physiotherapy and Research & Biostatistics, along with Physiotherapy in Hand conditions, Geriatric Physiotherapy in a few Universities. The Non University Subjects in the fourth year are Administration and Physiotherapy Ethics, Seminars and Institutional Visits. Some of the Universities have Research Project as a University Examination subject.

The subjects of Clinical Orthopaedics and Physiotherapy in Orthopaedic conditions also show a



lot of variation in terms of allotment in years, theory hours, practical hours and examination scheme. It is a University Examination Subject in 15 universities in 3<sup>rd</sup> year of 7 universities, in 2<sup>nd</sup> year of 4 universities, in 5<sup>th</sup> semester of 3 universities and in 4<sup>th</sup> year of 1 university. It is taught as along with surgery in 4 universities. It is taught along with Sports Sciences in 2 universities.

Physiotherapy in Orthopaedic conditions is a University Examination Subjects in 20 universities in 4<sup>th</sup> years of 14 universities, in 7<sup>th</sup> semester of 2 universities, in 5<sup>th</sup>-8<sup>th</sup> semesters of 1 university and in 3<sup>rd</sup> year of 3 universities.

The duration of clinical training varies on the basis of number of hours allotted as well as the year from which it starts. Some Universities begin clinical practice from the 1<sup>st</sup> academic year itself, whereas others from 2<sup>nd</sup> or 3<sup>rd</sup> academic years respectively.

The duration of Internship period is same in all the Universities, i.e. of 6 months, variation ranging from 24 weeks to 27 weeks. A variation also exists in the total number of working days and hours during the internship period amongst the universities.

The results of this study clearly show that the contents and features of the syllabi of these universities differ on the basis of total number of academic hours, subjects allocation in various years, number of theory and practical hours allotted, percentage weightage of hours and marks of each subject.

There exists a greater variation in the maximum and minimum number of hours in the universities who adopted annual examination system than the ones with semester system.

A variation exists in the course content of all the subjects. There is no specific standard specification about the hours that should be spent for different domains of the course content.

A variation is also observed in between the Universities of the Western Zone and Central zone of India.

Presently there are numerous Government (Central & State), Private and Deemed Universities offering Physiotherapy Education Program. Ironically there is no consensus in the curricular design, contents, examination scheme and academic hours. There is no autonomous body present to regulate, monitor, develop uniform

curriculum and accredit the educational institution offering such programs, adding to further diversity in the Physiotherapy education.<sup>14</sup>

Like the American Physical Therapy Association Education Committee along with the Commission on Accreditation of Physical Therapy Education (CAPTE) accredits educational institutions offering physical therapy education programs in America and the Australian Council for Physiotherapy Regulating Authorities (ACOPRA) Australia, we don't have such autonomous bodies to regulate education programs in Australia we don't have such autonomous bodies to regulate educational institutions offering Physical Therapy education programs in India.<sup>14</sup>

There exists a need for standardization of curriculum of Physiotherapy education in India.<sup>12</sup>

Hence through this study and keeping in mind the study previously conducted on Northern India, there does exist a major diversity in the existing contents and features of syllabi of various universities conducting Under-graduate Physiotherapy education program in Western and Central India.

#### **Limitations of the Study:**

1. Study was restricted only to the Western and Central India.
2. Content of individual subject was not extensively compared.
3. The Examination scheme of each subject was not exclusively compared.

#### **Scope of Future Research:**

1. This type of study can be done in other parts of India.
2. Extensive research on Individual subject content can be done.
3. The effect of the content of curriculum on Physiotherapy competency.
4. Study can be conducted on credit hours.
5. Inter Zone comparison can also be done.

#### **Conclusion**

This study concludes that syllabus of the Bachelors of Physiotherapy Program in Western and Central India is variable.

**The variability is not seen in the program structure but rather in:**

- Total number of subjects,
- Curriculum hours allotted to each subject,
- Nomenclature of the subjects,
- Subject allocation in various years,
- Examination System – annual or semester system,
- Total academic hours in a year
- Maximum marks allotted to each subject
- Hours allotted for Clinical Training
- Hours allotted for Clinical Internship.

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

**Source of Funding:** Self

**Conflict of Interest:** Nil

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# A Study to Evaluate the Effectiveness of Self-Instructional Module on Knowledge Regarding the Beneficial Effects of Yoga in Mental Health among 3rd-Year B.Sc. Nursing Students in Selected Nursing Colleges at Bangalore

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## Abstract

**Background:** Yoga is a battle where convention and higher duty a formidable difference is placed. Order and chaos are delted with an understanding of one's self needs and desires, which places a person in the universal health in the broad picture. Yoga teaches how to lead a life detached from egoistic behaviour and bring meaning in life. Predisposing view of yoga gives physical, mental and spiritual wellbeing. The educational proliferation to illuminate yoga's history, types, contraindication and misconceptions and benefits of yoga inmental health taken into consideration in this study where the students of B.Sc nursing 3<sup>rd</sup> year provided with a self-instructional module. **Objective** of the study was to assess the knowledge of the yoga and its benefits on mental health among nursing students before and after the implementation of self-instructional module and to find an association between the interventional scores with selected demographic variables among B.Sc Nursing 3<sup>rd</sup>-year students. **Methodology** educational research, based on quasi-experimental one group pretest & posttest design was conducted. A total of 50 subjects selected via convenient sampling were tested for effectiveness of the self-instructional module. Assessment of difference in the knowledge scores represented the effectiveness of SIM. The **results** showed that in the aspects of the history, types, contraindication and misconceptions and benefits of yoga the mean knowledge scores before the intervention were 2.64±1.05, P<0.05, 2.82±1.55, P<0.05, 1.82±0.99, P<0.05, 3.64±2.08 P<0.05 respectively and 5.08±2.12, P<0.05, 5.28±2.05 P<0.05, 3.52±2.05 P<0.05 and 7.54±3.84 P<0.05 after intervention. The **conclusion** shows that self-instruction module enhanced the knowledge of 3rd-year B.Sc nursing students on yoga and its benefits on mental health. The overall mean difference between pretest and post-test knowledge score was 15.86±10.74P>0.05. Hence, it suggests that educational research is necessary time and again to improve the knowledge of student nurses regarding various yoga techniques and its benefits towards mental health.

**Keyword:** Knowledge, Self Instructional Module, Beneficial effects of Yoga in mental health, nursing students.

## Introduction

Health is a blessing; a healthy body can produce a healthy mind and spirit.<sup>1</sup> Despite today's robust economy the convergence and potentially adverse consequences of many health care sectors may lead to improper health care delivery to the current population.<sup>2</sup> National survey

results conclude that yoga users were found to benefit from musculoskeletal and sound mental health.<sup>3</sup> Yoga has the potential to help the individuals as a supportive/ adjunct treatment, which is relatively cost-effective, provides a life-long behavioural skill, enhances self-efficacy and self-confidence.<sup>4</sup>

The word Yoga means “unity or oneness” and derived from the Sanskrit word “Yuj” which means “to join”.<sup>5</sup> Yoga generally referred to as spiritual discipline comprising an approach to “enlightenment” and “self-realisation”.<sup>5</sup> The positive effects of yoga reduce stress, provides sound sleep, reduces cortisol levels, gives a sense of well-being, helps in spiritual growth, reduces anxiety, improves agility and slows down the ageing process.<sup>6</sup> Health science programs can be demanding and stressful for many students, leading to high levels of stress.<sup>7</sup> Research suggests that yoga, humour and reading are simple, effective method to help reduce stress among students.<sup>7</sup> Nursing students being part of the health science program are also prone to get burn out. Hence the researcher incorporated to assess the knowledge of nursing students regarding the beneficial effects of yoga in mental health.

## Materials and Method

**Research Approach:** In this research, an evaluative research approach was used.

**Research Design:** One group pre and post quasi-experimental design were used.

### Variables under the study

**Independent Variable:** A self-instructional module on beneficial effects of yoga in mental health

**Dependent Variable:** Knowledge of the students studying in 3<sup>rd</sup> year B.Sc Nursing regarding the effectiveness of yoga

**Demographic Variables:** The attributes in this study are age, gender, religion, family income, food habits, area of living.

**Settings of the study:** The present study was conducted in Adarasha college of nursing, Kacharakanahalli, Bangalore, Karnataka.

**Sample:** In this study the sample comprised of students studying in 3<sup>rd</sup> Year B.Sc Nursing

**Sample Size:** In this study the sample size was 50

**Sampling Technique:** Non-probability convenient sampling was used to select the samples

## Criteria for sample selection

### Inclusion Criteria:

- Students who are willing to participate
- Students who are available during the period of data collection
- Students who are studying in 3<sup>rd</sup> year B.Sc Nursing including retained students

### Exclusion Criteria:

- Students who do not adhere to inclusion
- Students who provide unreliable/incomplete data
- Students who give no data

### Description of the tool:

The instrument consists of the following

- a. **Demographic Variables:** Demographic variables included age, gender, religion, family income, food habits, area of living
- b. **Self-instructional module:** A self-instructional module was prepared with the following components introduction, history of yoga, types of yoga, contraindications and misconceptions and benefits of yoga on physical and mental health.
- c. **Structured knowledge questionnaire:** this part consists of 32 items to assess the knowledge regarding the beneficial effects of yoga among 3<sup>rd</sup>-year B.Sc Nursing students.
- d. **Scoring and interpretation:** Scoring was 1 for correct and 0 for the wrong answer and hence the level of scoring prescribed as 0-16 being an inadequate level of knowledge, 17-24 moderate level of knowledge and more than 25-32 adequate level of expertise.

**Analysis and Findings:** The data were analysed using both descriptive and inferential statistics which included organization data in master sheet, frequency and percentage for analysis of demographic data, mean/standard deviation of pretest and posttest, pair ‘t’ test is used to test the significance difference in the knowledge score between pretest and posttest performance, association measured by chi-square test between pretest and posttest with selected demographic variables.

**Table 1: Frequency and percentage distribution of demographic variables. N=50**

SI No	Sample characteristics	Category	Frequency	Percentage
1	Age	19 – 20	26	52
		21 – 22	20	40
		23 – 24	4	8
2	Gender	Male	22	44
		Female	28	56
3	Religion	Hindu	20	40
		Muslim	3	6
		Christians	27	54
4	Family income	Below 20000	23	46
		21000 to 50000	18	36
		Above 50000	9	18
5	Food habits	Vegetarian	11	22
		Non-Vegetarian	22	44
		Mixed	17	34
6	Area of living	Rural	15	30
		Semi-urban	17	34
		Urban	18	36

Table 1 depicts that majority of 3<sup>rd</sup> year B.Sc Nursing students n=26(52%) were in the age group of 19 to 20 years, n=28(56%) were females, n=27(54%) were Christians, n=23(46) had income below 20000, n=22(44) had non vegetarian food habit and n=18(36%) lived in urban area.

**Table 2: Paired ‘t’ test value between pretest and posttest knowledge scores.**

Aspects	Max score	Range	Respondent Knowledge		
			Mean	SD	Paired ‘t’
Pretest	32	3 – 14	10.44	7.23	19.94 P<0.05 (2.021) ‘t’ = 1,
Posttest	32	18 – 30	25.62	9.13	

Table 2 depicts the overall mean of the posttest knowledge score (25.62) is higher than overall way of pretest score (10.44). The mean difference being (15.18). The paired ‘t’ value at df (49) obtained is 1.0 significant at 0.05 level. Therefore the null hypothesis is rejected and the research hypothesis is accepted. Hence the self-instructional module was found to be effective.

**Table 3: Aspect wise mean knowledge scores of the pretest and posttest.**

Aspects		Maximum	Range	Mean	SD	Paired ‘t’
Introduction	Pretest	5	1-5	3	1.18	12.53
	Posttest	6	4-6	5.34	1.96	
History	Pretest	5	1-5	2.64	1.05	49.3
	Posttest	6	4-6	5.08	2.12	

Types	Pretest	5	1-5	2.82	1.55	8.83
	posttest	6	4-6	5.28	2.05	
Contraindications and misconceptions	Pretest	4	1-4	1.82	0.99	12.14
	Posttest	4	3-4	3.52	2.05	
Benefits of yoga in physical and mental health	Pretest	8	1-8	3.64	2.08	5.53
	Posttest	10	6-10	7.54	3.84	

Table 3 depicts overall mean knowledge scores, which reveals that the posttest knowledge scores on beneficial effects of yoga on mental health were highest, i.e. (26.76) is higher than overall mean of pretest scores (13.92). The mean difference is 12.84. The paired ‘t’ value at df (49) obtained is 17.05 significant at 0.05 level. Paired ‘t’ test values are found to be substantial

between pretest and post-test for all the aspects of knowledge scores of 3<sup>rd</sup>-year B.Sc nursing students regarding beneficial effects of Yoga on mental health at 0.05 level of significance. Therefore the null hypothesis is rejected and the research hypothesis is accepted. Thus the self-instructional module is effective in improving the knowledge of 3<sup>rd</sup>-year B.Sc nursing students.

**Table 4: Association between demographic variables and pretest knowledge scores.**

Demographic Variables	Category	Respondents knowledge						Total	$\chi^2$	P-value
		Inadequate		Moderate		Adequate				
		n	%	n	%	n	%			
Age	19 – 20	10	20	16	32	0	0	26	15.48	0.003
	21 – 22	18	36	2	4	0	0	20		
	23 - 24	0	0	4	8	0	0	4		
Gender	Male	10	20	12	24	0	0	22	1.8	0.61
	Female	18	36	10	20	0	0	28		
Religion	Hindu	12	24	7	14	0	0	19	2.13	0.77
	Muslim	11	22	7	14	0	0	18		
	Christian	5	10	8	16	0	0	13		
Family Income	Below-20000	5	10	8	16	0	0	13	2.16	0.82
	21000-50000	11	22	7	14	0	0	18		
	Above-50000	12	24	7	14	0	0	19		
Food Habits	Vegetarian	6	12	5	10	0	0	11	0.25	0.99
	Non Vegetarian	14	28	8	16	0	0	22		
	Mixed	11	22	6	12	0	0	17		
Area of living	Rural	10	20	5	10	0	0	15	2.02	0.84
	Semi urban	10	20	7	14	0	0	17		
	Urban	8	16	10	20	0	0	18		

Table 4 depicts that n=10(20%) were between (19–20) years of age, n=18(36%) were of (21–22) years of age with inadequate knowledge level. n= 16(32%) were between (19–20), n=2(4%) were of (21–22) years of age

and n=4(8%) were between (23–24) years of age with moderate knowledge level. Further the association of age at the level of 0.05 was found to be significantly associated with pretest levels of knowledge p<0.05

(0.01). The remaining demographic variables Gender, religion, family income, food habits, area of living  $P > 0.05$ , i.e. (0.61), (0.77), (0.82), (0.99) and (0.84) respectively, Hence these demographic variables are not significantly associated with pretest level of knowledge.

### Conclusion

The self-instruction module enhanced the knowledge of 3<sup>rd</sup>-year B.Sc nursing students on yoga and its benefits on mental health. The overall mean difference between pretest and post-test knowledge score was  $15.86 \pm 10.74$   $P > 0.05$ . Hence, it suggests that educational research is necessary time and again to improve the knowledge of student nurses regarding various yoga techniques and its benefits towards mental health.

### Discussion

Distribution of demographic variables shows that majority of 3<sup>rd</sup> year B.Sc Nursing students  $n=26$  (52%) were in the age group of (19 to 20) years,  $n=28$  (56%) were females,  $n=27$  (54%) were Christians,  $n=23$  (46) had income below 20000,  $n=22$  (44) had non vegetarian food habit and  $n=18$  (36%) lived in urban area. The overall mean of the posttest knowledge score (25.62) is higher than overall way of pretest score (10.44). The mean difference being (15.18). The paired 't' value at df (49) obtained is 1.0 significant at 0.05 level. Therefore null hypothesis is rejected and the research hypothesis is accepted. Hence the self-instructional module was found to be effective.

Overall mean knowledge scores, which reveals that the posttest knowledge scores on beneficial effects of yoga on mental health were highest, i.e. (26.76) is higher than overall mean of pretest scores (13.92). The mean difference is 12.84. The paired 't' value at df (49) obtained is 17.05 significant at 0.05 level. Paired "t" test values are found to be substantial between pretest and post-test for all the aspects of knowledge scores of 3<sup>rd</sup>-year B.Sc nursing students regarding beneficial effects of Yoga on mental health at 0.05 level of significance. Therefore the null hypothesis is rejected and the research hypothesis is accepted.

Under association of demographic variables and pretest scores,  $n=10$  (20%) were between (19–20) years of age,  $n=18$  (36%) were of (21–22) years of age with inadequate knowledge level.  $n=16$  (32%) were between (19–20),  $n=2$  (4%) were of (21–22) years of age and  $n=4$  (8%) were between (23–24) years of age with

moderate knowledge level. Further the association of age at the level of 0.05 was found to be significantly associated with pretest levels of knowledge  $p < 0.05$  (0.01). The remaining demographic variables Gender, religion, family income, food habits, area of living  $P > 0.05$ , i.e. (0.61), (0.77), (0.82), (0.99) and (0.84) respectively, Hence these demographic variables are not significantly associated with pretest level of knowledge.

**Conflict of Interest:** There is no conflict of interest

**Ethical Clearance:** Taken from institutional research committee "Columbia College of Nursing, Bangalore".

**Source of Funding:** Self funded research.

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# Gender Wise Difference in Presenting Signs and Symptoms of Stroke: Observational Study

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## Abstract

**Objective:** The objective of this study was to find the various presenting signs and symptoms of stroke, in association of presenting signs and symptoms with age, sex and to establish the correlation in gender.

**Method:** All patients with first ever stroke and of both ischaemic and haemorrhagic stroke with age group of 40 to 60 years, subjects were of Karad. Signs and symptoms were collected from the medical records, patient themselves and their relatives. Differences were calculated using standard deviation.

**Results:** The total of 260 cases were taken for the study, 130 were male and 130 were female. The presenting signs and symptoms of stroke were differed in gender. Women were most commonly seen with generalised weakness ( $p=0.0076$ ) and headache ( $p=0.0152$ ). Men were most commonly seen with pain ( $p=0.0001$ ), nausea ( $p=0.0060$ ), fever ( $p=0.0081$ ).

**Conclusion:** This study concluded that, there were gender differences in signs and symptoms of stroke and due to lack of awareness many people ignored the signs and symptoms of stroke by making it less important.

**Keywords:** Stroke, signs, symptoms, age, gender difference.

## Introduction

Stroke is defined by the 'World Health Organisation' as the clinical syndrome consisting of rapidly developing clinical signs of focal (or global) disturbance of cerebral functions with symptoms lasting for 24 hours or longer or leading to death, with no apparent cause other than vascular origin.<sup>8</sup>

**There are two major categories of stroke:**

**A. Ischemic Stroke:** This is the most common type of

stroke, 80% of individuals are affected by these. It is caused by a clot or other blockage within an artery leading to the brain. It is further divided into two types:

- 1. Thrombotic Stroke:** If blood clots from inside of the arteries of the brain, then it leads to thrombotic stroke.
- 2. Embolic Stroke:** If blood clotted in other parts of the body's arteries subsequently entering the brain, it leads to embolic stroke.

**B. Hemorrhagic Stroke:** It is caused by the blood vessel in the brain interrupting in result of blood leaking into the brain.<sup>9</sup>

**Early Warning Signs of Stroke:**

1. Sudden numbness or weakness of face, arm, or leg; especially on one side of the body.
2. Sudden confusion, trouble speaking or understanding.

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3. Sudden trouble seeing in one or both eyes.
4. Sudden trouble walking, dizziness, loss of balance or co-ordination
5. Sudden severe headache with no known cause.<sup>9</sup>

**Risk Factors:** Risk factors for stroke can be categorized as modifiable and nonmodifiable Age, sex and race/ethnicity and genetics (family history) are nonmodifiable risk factors for both ischemic and haemorrhagic stroke, while hypertension, smoking, diet, hypercholesterolemia, diabetes mellitus, obesity and physical inactivity are some of the more commonly reported modifiable risk factors.<sup>10</sup>

A number of stroke risk factors are specific to women such as early menopause (before 42years of age), pregnancy, birth, first 6 weeks of postpartum especial in older women, preeclampsia and etc.<sup>9</sup>

The correlation between the age and the stroke is that the risk for stroke increases with age, which means women have a increase risk of stroke. Although women have a lower age-adjusted stroke incidence than men. However, this reversed in the older ages, women live longer and at the oldest age have an elevated risk compared to men and making them more prone to die from stroke. Mostly many women's are unaware of their atypical signs and have increased delay to treatment. More women than men die from stroke each year because older women outnumber older men.<sup>1</sup>

As the stroke is the leading cause of death and disability. The estimated adjusted prevalence rate of stroke range, 84-262/100,000 in rural and 334-424/100,000 in urban areas (approximately).<sup>2</sup>

### Materials and Method

- Assessment chart
- Writing Material
- Computer for online accessing

#### Methodology

**Type of Study:** Observational study

**Study Design:** Survey

**Sample Size:** Supposed to be 260 Subjects.

**Study Duration:** 6 months.

**Place of Study:** Karad.

Estimation of Sample size- Formula:  $n=4(SD)^2/(M \times E)$

By assuming SD=14.5, M=73, E=0.025

N=260

#### Inclusion Criteria:

- Patients with both haemorrhagic and ischaemic stroke.
- Patients with first ever stroke.
- Both male and female data.
- Age: 40-60 years

#### Exclusion Criteria:

- Neurological ill patients other than stroke
- Patients with Transient Ischaemic Attack.

#### Outcome Measures:

- Signs and symptoms of stroke.

#### Procedure:

- An approval for the study was obtained from the protocol committee and institutional ethical committee of Krishna Institute of Medical Science 'Deemed to be University'
- Department of medicine, neurosurgery has been explained about the topic make them aware for sample that are required to conduct the study.
- Subjects taken for my study was from indoor as well as outdoor.
- On the day of enrolment, subjects were undergone detailed assessment to fulfil inclusion and exclusion criteria.
- As the subject fulfilled the criteria they were explained about the study and detailed information was given to them.
- **They were explained about:**
  1. Pattern of study
  2. Need of study
  3. Information generated out of the study
  4. Importance about the information generated
  5. Its effect on general population.
- Consent was taken detailed, information was

gathered and statistical analysis was then done in order to derive conclusion.

### Statistical Analysis and Result

**Statistical Analysis:** According to the standard deviation and the pearsons test we calculated the p value of each sign and symptom and every sign and symptom has a different p value with significance.

**Result:** The results shows that in 50%(130) of female subjects were having pain 33%, generalized weakness 64%, ataxia 37%, headache 60%, language disorder 42%, visual disturbance 35%, weakness 45%, drowsiness 43%, dizziness 44%, nausea 38%, seizure 38%, dyspnoea 45%, loss of consciousness 44% and

fever 43% and in 50% (130) of male subjects were having pain 67%, generalized weakness 36%, ataxia 63%, headache 40%, language disorder 58%, visual disturbance 65%, weakness 55%, drowsiness 57%, dizziness 56%, nausea 62%, seizure 62%, dyspnoea 55%, loss of consciousness 56% and fever 57%. In 260 subjects the p value of each sign and symptom is <0.0001 and was considered extremely significant.

Therefore, result of this study is that there are differences by gender in presenting signs and symptoms at presentation of stroke and suggest that there should be focus of stroke prevention education and awareness of signs of symptoms of stroke should be given to decrease the rate of stroke.

**Table No. 1: Representation of signs and symptoms of stroke in males and females.**

Signs and Symptoms	Female (%) n=130	Male (%) n= 130	P Value
Pain	33	67	0.0001
Generalized weakness	64	36	0.0076
Ataxia	37	63	0.0104
Headache	60	40	0.0152
Language disorder	42	58	0.0179
Visual disturbances	35	65	0.0001
Weakness	45	55	0.0049
Drowsiness	43	57	0.0169
Dizziness	44	56	0.0104
Nausea	38	62	0.0060
Seizure	38	62	0.0399
Dyspnoea	45	55	0.0490
Loss of Consciousness	44	56	0.0058
Fever	43	57	0.0081

### Discussion

Stroke is the leading cause of mortality and impairment, because many people are unaware of presenting signs and symptoms of stroke that are different in male and female. This project was done in 6 months with sample size 260. This research was undertaken with the aim to study the gender difference in presenting signs and symptoms of stroke. This observational study of presenting signs and symptoms of stroke in gender difference was conducted on 260 subjects, amongst

which 130 were female (50%) and 130 were male (50%). This shows that there is a difference in presenting signs and symptoms of stroke in male and female.

Prior consent was taken from the patients suffering from stroke in hospitals. The outcome measure for this study was: signs and symptoms of stroke.

Headache and generalized weakness were most commonly seen in female as sign and symptom. Pain, nausea and fever were most commonly seen in male as

sign and symptom. Other signs and symptoms including ataxia, language disorder, visual disturbance, weakness, drowsiness, dizziness, seizure, dyspnoea and loss of consciousness were also seen in stroke patients.

**CONCLUSION:** Following the hospital based study, it was concluded that there are various signs and symptoms of stroke such as pain or generalized weakness are the most common seen in the patients as an early sign or symptom of stroke. There are also different signs and symptoms like headache which is mostly seen in the females as a warning before the stroke and fever seen in the male as a warning before the stroke and due to lack of awareness many people ignore the signs and symptoms of stroke by making it less important.

**Conflict of Interest:** There is no conflict of interest.

**Ethical Clearance:** An approval for the study was obtained from the protocol committee and institutional ethical committee of Krishna Institute of Medical Science 'Deemed to be University'

**Source of Funding:** Self.

**Acknowledgement:** Krishna college of physiotherapy. Neurology department of Krishna hospital.

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# An Evaluation of Quality Aspects of Primary Health Centre (PHCs) Laboratory Using National Quality Assurance Standards (NQAS) Tool in Hassan District, Karnataka

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## Abstract

The Primary Health Centre (PHC) is the nearest point of contact that should be accessible to the public for availing health care services. The ability of a PHC to provide quality healthcare is determined by the laboratory support along with the infrastructure attached to them.

**Objectives:** To determine various shortcomings in the PHCs laboratory services utilizing National Quality Assurance Standards (NQAS) tool.

**Method:** For the same, National Quality Assurance Standards (NQAS) tool is used in this study. 24 PHCs laboratory (from 134) in Hassan district were selected from 8 taluk as which formed a study population. Various quality factors among 7 domains were subjected to reliability testing and principal component analysis (PCA).

**Results:** The dengue serology was not done in more than 45% of laboratories. Referral pattern was inadequate in more than 90%. Only 37.5% followed SOPs. With reference to testing procedure and charts for biological reference range (0.723) and reporting of tests within given duration was (0.677). Kaiser-Meyer-Olkin measure of sampling adequacy value was 0.417 ( $P < 0.001$ ). Also, for support service component, three factors yields Cronbach's alpha=0.712

**Conclusion:** Recruitment of qualified laboratory technician and training them to quality work is very important. Not only that, financial input with maintenance of equipment and work ethics towards quality in diagnostics is imperative for case management in primary health care.

**Keywords:** PHCs, laboratory services, principal component analysis, Quality standards.

## Introduction

The Primary Health Centres (PHC) are the cornerstone of rural health services and it should be as nearer as possible and accessible to public in Indian

public health system. These centers are established to provide comprehensive health care including preventive, promotive, curative and other health care services.<sup>1</sup> Under National Rural Health Mission (NRHM), the highest priority was given not only for providing quality health care by introducing Indian Public Health Standards (IPHS), but also it must be sensitive to the needs of the community.<sup>2</sup>

Laboratory facilities are essential component of PHCs and they are often accessed more than the PHC could cater for their design.<sup>3,4</sup> The ability of a PHC to provide quality healthcare is determined by the

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laboratory support along with the infrastructure attached to them.<sup>5</sup> In areas where sufficient physicians and drugs are available, developing laboratory facilities have become a priority.<sup>2</sup>

In this regard, National Quality Assurance Standards (NQAS) takes note of all these areas, thereby providing a department wise score card with areas of improvement.<sup>6</sup> NQAS is a comprehensive and evidence based tool with specific objectives. The areas covered ranging from service provision to quality management and outcomes that received high priorities under the same.<sup>6</sup>

**Objectives:** This study was taken up to determine various shortcomings in the PHCs laboratory service utilizing National Quality Assurance Standards (NQAS) tool.

**Materials and Method**

**Study design:** A Cross-sectional study done among laboratories of primary health center after obtaining Institutional Ethics committee approval regarding quality related variables such as service provision,

patient rights, inputs, support services, clinical services, infection control and quality management.<sup>6</sup>

**Study procedure and Data collection:** Hassan district (Karnataka) has 8 taluks. Out of 134 PHCs in Hassan district, two to three PHCs were selected in each taluk based on the inclusion criteria. 24PHCs were considered as our study population. These PHCs were personally visited by investigators to assess their laboratory inputs and infrastructure based on NQAS tool. Thus data obtained from 24 PHCs laboratories were analyzed using SPSS software 22 version.

PHCs covering maximum populations in each taluk, with fully established laboratories that are functional for more than 2 years, were included in the study. PHCs which did not have a Medical officer posted during the study period were excluded from the study. Scoring under NQAS:0-no availability of services,

- 1 Availability of services with poor maintenance and utility
2. Availabilty of services with proper maintenance and utility.

**Findings:**

**Table 1: Various Factors of Service Provision, Input and Support Service and Clinical Services in PHCs (n=24)**

Factors	0a	1	2
PATHO-urine routine & RBS	2(8.3)	5(20.8)	17(70.8)
Hematology	0	15(62.5)	9(37.5)
Rapid serology	0	13(54.2)	11(45.8)
Emergency (24*7) lab services	19(79.2)	1(4.2)	4(16.7)
Microscopy -MP, sputum	2(8.3)	16(66.7)	6(25)
Water quality tests (orthotoludine, H2S)	0	15(62.5)	9(37.5)
One lab technician	2(8.3)	4(16.7)	18(75)
Training of lab technician for usage of equipment's	3(12.5)	4(16.7)	17(70.8)
Microscope	3(12.5)	2(8.3)	19(79.2)
Sahli's heamoglobino meter	3(12.5)	3(12.5)	18(75)
Equipment breakdown maintenance	10(41.7)	10(41.7)	4(16.7)
Calibration of equipment's	10(41.7)	10(41.7)	4(16.7)
Referralcenter & form	6(25)	16(66.7)	2(8.3)
Charts for biological reference range	10(41.7)	13(54.2)	1(4.2)
Charts for testing procedure	11(45.8)	13(54.2)	0
Retaining of reports & their prompt retrieval	1(4.2)	17(70.8)	6(25.0)
Reporting of tests within given duration	1(4.2)	5(20.8)	18(75.0)

**Note:** NQAS scoring<sup>a</sup>: (0 = no availability of services, 1 = availability of services with poor maintenance and utility, 2 = availability of services with proper maintenance and utility.

Around 70.8 percent of the total laboratories provide services at Out Patient Department (OPD) timings, but the remaining 29.2 percent of laboratories are depending on other peripheral centers or higher centers for required services. 75 percent of the laboratories had full time lab technicians. Out of these, 70.8 percent were fully trained to operate the equipment's at their respective laboratories. Only 13 of the 24 laboratories had allotted adequate lab space according to the guidelines. 20.8 percent of the laboratories lacked a fully functional and well-maintained microscope. Support services for equipment breakdown maintenance was done in 16.7

percent. The same number of laboratories also carried out calibration of these equipment's as per guidelines. More than 67 percent of laboratories did not provide sample IDs for the samples collected for testing at the laboratories. Referral forms were not used in 91.7 percent of the laboratories and requisition and reporting forms were not used in 87.5. 87 percent labs did not properly instruct ASHA and ANMs for sample collection. Charts for biological range of a given test for reporting the result was absent in almost all the labs. 75% of them provided reports promptly within the given duration of time.

**Table 2 Procedures done in PHC's for infection control and specific quality management factors (n=24)**

Different procedures	0	1	2
Antiseptic soap availability	2(8.3)	9(37.5)	13(54.2)
Display of Hand washing technique	5(20.8)	4(16.7)	15(62.5)
Availability of running tap water	3(12.5)	14(58.3)	7(29.2)
Proper cleaning of procedure site with antiseptics	2(8.3)	19(79.2)	3(12.5)
Availability of lab aprons, gloves, masks	14(58.3)	8(33.3)	2(8.3)
No reuse of disposable gloves, masks	16(66.7)	2(8.3)	6(25.0)
Proper decontamination & cleaning of instruments	2(8.3)	19(79.2)	3(12.5)
Training of staff for spill management	3(12.5)	20(83.3)	1(4.2)
Proper disposal by use of color coded plastic bags, segregation	0	11(45.8)	13(54.2)
Disposal of needles	1(4.2)	8(33.3)	15(62.5)
Internal assessment at periodic interval, corrective measures taken	5(20.8)	14(58.3)	5(20.8)
Cross validation of lab tests	5(20.8)	19(79.2)	0
Assessment visit by district quality assurance unit at periodic interval	11(45.8)	13(54.2)	0
Availability of standard operative procedures	10(41.7)	5(20.8)	9(37.5)
Staff aware of SOP	3(12.5)	12(50.0)	9(37.5)

For infection control, only 54.2 percent used antiseptic soaps for hand wash. Around 29.2 percent had running tap water. Out of 24 PHCs Laboratory, 62.5 percent of the laboratories had displayed hand washing technique. 87.5 percent of labs did not follow cleaning of procedure sites with antiseptics and proper decontamination and cleaning of instruments after every procedure. Aprons, gloves and masks were not used in 22 of 24 labs studied. Complete training of staff on spill management has not yet been conducted. 54.2 percent laboratories segregated and disposed waste in color coded plastic bags, while 62.5 percent disposed used needles properly.

Only 37.5 percent laboratories were aware that they had standard operative procedures and to be followed. Only 8.3 percent of them had maintained the confidentiality of the report they provided and all the labs were providing services at free of cost for all Below Poverty Line (BPL) card holders.

The 24 PHCs laboratory data were analyzed. The different domains of National quality assurance standards such as service provision (9 factors), patient rights (3 factors), laboratory inputs (9 factors), support services (3 factors), clinical services (8 factors), infection control (10 factors) and quality management (5 factors)

were considered as independent variables. To estimate internal consistency reliability among various factors of composite score and also as an indicator of consistency- Cronbach's alpha parameter statistic was preferred. After subjecting first domain or constructs-service provision to check reliability- for 9 items (factors), Cronbach's alpha was 0.854 with mean score for availability of laboratory tests for STDs and essential tests for ante natal care as 1.83 (SD 0.38) and emergency (24x7) laboratory services mean 0.38 (SD 0.770) consisting of nine items under input in laboratories, Cronbach's alpha was 0.901. Similarly, with reference to infection control ten items domain, reliability was 0.70 among various factors.

Further, since there were too many factors in data set, we attempted by Principal Component Analysis (PCA) on the 47 items (factors) and also to overcome collinearity problems among predictor variables to reduce them down to a subset of influential factors among independent variables. To start with, we selected oblique rotation method of PCA and found many factors were uncorrelated and changed over to varimax rotation. Also, we kept Eigenvalue greater than 1 throughout our analysis.

When clinical service components were subjected to factor analysis, mean and standard deviation values for components such as reporting of tests within given duration (1.71,0.550). correlation matrix showed none of the factors in the range of -0.8 to + 0.8, but chart for testing procedure and charts for biological reference range (0.723) and referral center and reporting of tests within given duration was (0.677). Kaiser-Meyer-Olkin measure of sampling adequacy value was 0.417 ( $P < 0.001$ ). Total variance to the extent of 77.65% in clinical services components were shared by 3 factors such as standards maintained for requisition and reporting, referral center and details with their forms and samples identification particulars etc. Another important domain under NQAS based collected data was infection control in laboratories. Through factor analysis, 10 components were considered and showed mean value more than 1.4

for 4 factors. In comparison, correlation matrix between antiseptic soap availability and proper disposal by use color coded plastic (0.784). In addition, disposal of needles, display of hand-washing technique, availability of running tap water, availability of laboratory aprons, gloves and mask, proper cleaning procedure, no reuse of disposable gloves and masks etc. and training of staff for spill management showed more than 0.55 correlation. KMO value is 0.56 and  $P < 0.001$ . Around 74.52% total variance between factors were explained by 3 factors alone. In contrast, quality management domain consisting of 5 factors, high correlation between cross validation of laboratory tests and internal assessment, assessment visit by district quality assurance unit at periodic interval and staff aware of standard operating procedure ranging from 0.79 to 0.86. Bartlett's test of sphericity chi-square value was 72.95 ( $P < 0.001$ ); total variance of 83.97% was explained by two factors alone. Rotation component matrix revealed high factor loading of two constructs consisting of availability of SOPs and staff awareness and internal quality check and cross-validation.

Scree plot: To decide whether or not an eigenvalue is large enough to represent a meaningful factor, the scree plot graph was plotted of eigenvalue on (Y-axis) against the factor with which it is associated (X-axis). This graph has a very characteristic shape with a sharp descent followed by a tailing off. The cut-off points for selecting factors is at the point of inflexion of the curve where the slope of the line changes dramatically. In figure 1. about clinical services, the point of inflexion occurs at the third data point (factors), therefore, we would extract two factors. Thus, retain only factors to the left of the point of inflexion. also, it is recommended to retain all factors with eigenvalues greater than 1 which represent the amount of variation explained by a factor. Similarly, in figure 2. about infection control, the point of inflexion was noticed at the third data point and in figure 3. Representing quality management- the point of inflexion occurs at second point.

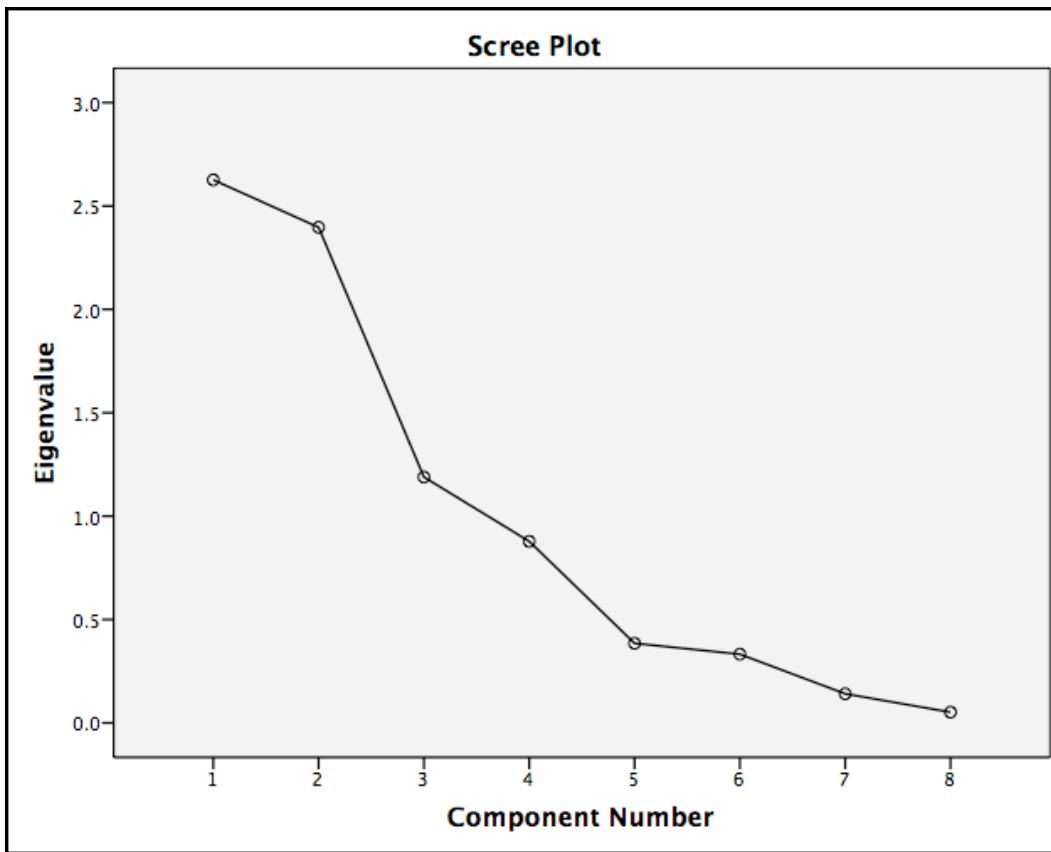


Figure 1: Clinical Services

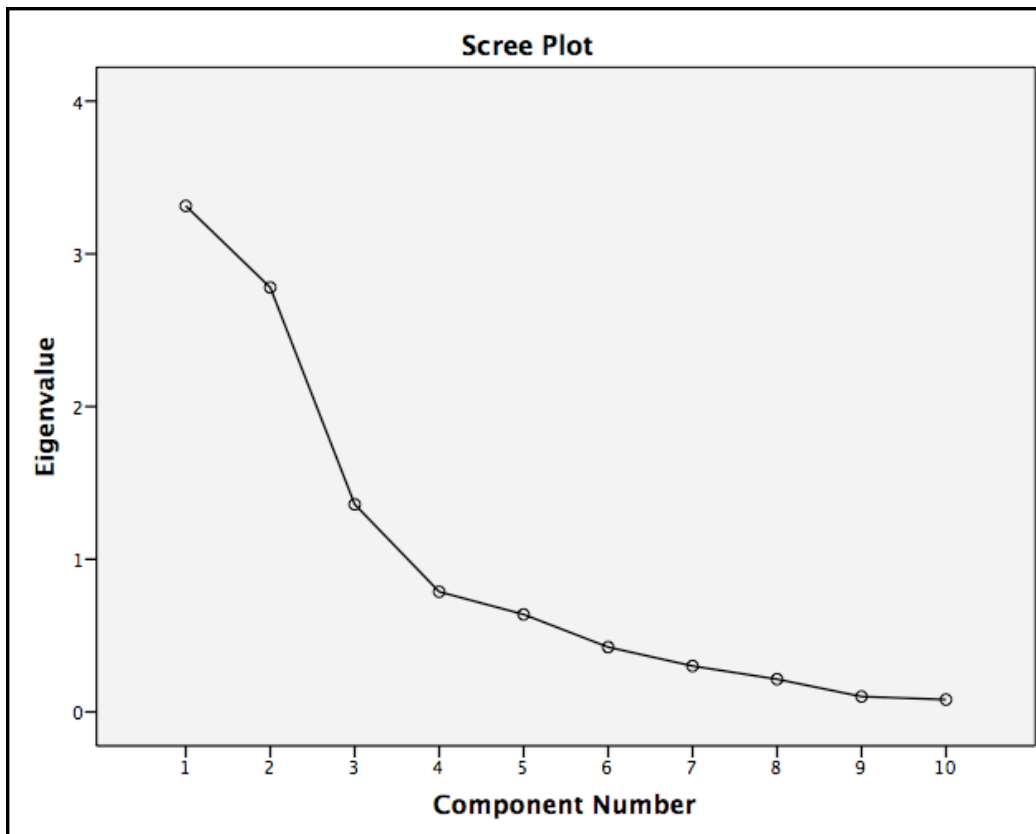
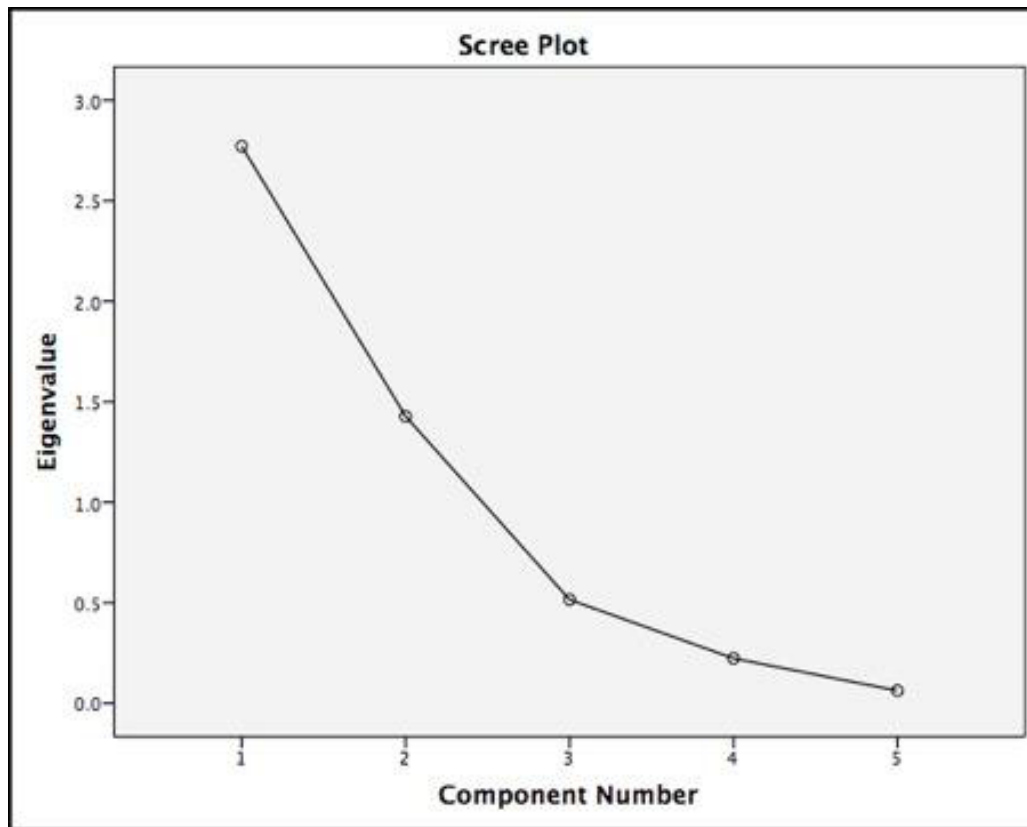


Figure 2: Infection Control





**Figure 3: Quality Management**

### Discussion

The ministry of health and family welfare (MOHFW) has prepared a comprehensive system of the quality assurance which can be operationalized through the existing public health institutions up to primary health center level. This quality assessment tool is utilized by 18 different departments including laboratory services. Meanwhile, assessment of the quality at public health facilities is based on general principles of integrity, confidentiality, objectivity and replicability. For our study, we chosen laboratory services (department) among others for obvious reasons that there is a paucity of information for quality aspects of PHCs laboratory services although different types of services provided by these diagnostics set up. Mainly to look at quality attributes, study was conducted in 24 PHCs laboratory in Hassan district of Karnataka. Through our data analysis, around 30percent of laboratories were depending on higher centers for referral and diagnosis. Not more than 50 % laboratories were doing serology test for dengue fever cases along with malfunctioning of microscopes due to poor supportive infrastructure in majority

(around 75%) of centers. Similar deficiencies were found in George M study<sup>2,7</sup>. In contrast, comparing to Jain and Rao study<sup>7</sup>, our study revealed that more than 75% laboratory technicians were working in PHCs. Also, these laboratories had hemoglobinometer and glucometer for daily routine usage.

Not more than 30 % of laboratory had running tap water. Surprisingly in majority of PHCs, staff including in labs were not using protective devices. But around 50% of hospital waste segregation practice was seen. In Idris and Bayoumi study<sup>8</sup>, personnel protection devices were used in 36.4% such as laboratory coat, 6 (18.2%) personnel used gloves with every procedure and 25 (75.8%) washed their hands regularly with antiseptics. 63% of PHCs laboratory removed infectious material regularly to avoid infection. But in our study, only two laboratories used aprons and other protective clothing's etc. More than 60% in our study didn't had hand washing instructions displayed. Also spill management technique was not taught to majority of lab technicians and others in PHCs. In Hassan and Khan<sup>9</sup>, Zaman and Laskar<sup>10</sup> study, glucometer were available and basic test for malaria and

tuberculosis were done in more than 50% of PHCs<sup>7,9,10</sup>. Whereas in Devane and Deshpande study, it was less than 50%.<sup>5</sup> In Idris and bayoumi study, around 15% had spill management SOPs in their labs. In our study, only 37.5 percent laboratories were aware that they had standard operative procedures and to be followed. More than 80 percent of laboratories did not carry out internal assessment for quality management at periodic intervals nor did they carry out corrective measures adequately. As mentioned in results section, through factor analyses, we attempt to understand correlation between various factors involved in quality aspects of PHCs laboratory and its intricacies in routine functioning and able to understand by building constructs of quality factors.

**Conclusion:** As comprehended through our study, recruitment of laboratory technician is imperative and training them to the purpose is all the more important. Adequate financial input with sufficient resources is the prime necessity to address quality aspects of PHCs laboratory. For sustainability of services, maintenance of equipment with continuum of work etiquette and periodic quality assessment by concerned medical staff should be the top priority.

**Conflict of Interest:** No conflicts of interest.

**Source of Funding:** No funding sources.

**Ethical Clearance:** The study was approved by the Institutional Ethics Committee of Hassan Institute of Medical Sciences, Hassan, Karnataka in the year 2019.

**Acknowledgement:** I would take this opportunity to thank The DHO Dr K.M Sathish Kumar and DHO Office personnels, Hassan District for giving us the permission to conduct the study. Cooperation of the respective medical officers, the laboratory staff and other supporting staff were immensely appreciable. I would like to thank my colleagues Dr Shreya and Dr Sukrutha for the data they provided on the article. My Co investigators Dr. Maliakel Steffi Francis and Dr Mahesha KC who have always been helpful as a team at all phases of the study.

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# Effectiveness of Planned Teaching Programme on Knowledge and Perception about Organ Donation

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## Abstract

Organ donation is when a person allows an organ of their own to be removed and transplanted to another person, legally, either by consent while the donor is alive or dead. The present study aimed to assess the effectiveness of planned teaching programme on knowledge and perception about organ donation among nursing students studying at selected nursing college in Pune city. Design of the study is quantitative-one group pre-test post-test design. A total 100 participants were selected for the study to find out the effectiveness of planned teaching programme on knowledge and perception about organ donation among nursing students studying at selected nursing colleges in Pune city. The data of this study were collected by self-structured questionnaire by purposive sampling method. The questionnaire had three sections, to gather information regarding demographic variables, knowledge on organ donation and perception toward organ donation. The study revealed that planned teaching programme is effective to increase the knowledge and perception on organ donation among nursing students.

**Keywords:** Organ Donation, knowledge and Perception, Nursing Students, Tissue, Organ.

## Introduction

To understand Organ Donation, it is first important to understand Organ Transplantation. A transplant is a medical procedure where one person's dysfunctional organ or tissue is replaced by that of healthy persons, thus restoring its function. In certain cases, despite major advantages in medical science, transplant is the only alternative.<sup>(1)</sup>

Transplants are one of the biggest achievements of modern medicine and can save or greatly enhance the lives of other people. However, they depend completely on donors and their families consenting to organ or tissue donation. One donor can save the life of several people, restore the sight of two others and improve the quality of life of many more and give them another chance to live.<sup>(2)</sup>

A transplant can only take place if there is an organ available from a donor. While most organs that are transplanted are from deceased donor, patients may also receive organs from living donors. Living persons

can donate kidney, portion of liver, lungs, pancreas, intestines and blood and still continue to live a normal life. According to the law, however, the prerogative on the decision for deceased donors eventually rests with the next of kin of the deceased.<sup>(1)</sup>

For organ recipients, a transplant often means a second chance at life. Vital organs such as the heart, pancreas, liver, kidneys and lungs can be transplanted to those whose organs are failing. For some an organ transplant means no longer having to be dependent on costly routine treatments to survive. It allows many recipients to return to a normal lifestyle.<sup>(1)</sup>

In the 50 years since the first successful organ transplant, thousands of recipients of a transplanted kidney, heart, pancreas, liver, or other solid organ in the United States and throughout the world have had their lives extended and their health enhanced as a result of organ transplantation.<sup>(1)</sup>

The organ donation and transplantation system strive to honour the gift of donated organs by fully

using those organs to save or improve the quality of the lives of transplant recipients. As a result of advances achieved through basic and clinical research over the past several decades, organ transplantation has become the optimal treatment for many end-stage organ-specific diseases. However, there are not enough donated organs to meet the demand. Furthermore, some organs may not be recovered, some recovered organs may not be transplanted and some transplanted organs may not function adequately, all of which exacerbates the imbalance between the supply and the demand of organs. A determination that an organ is not suitable for transplantation is based on a variety of factors, such as the health of the deceased donor, the cause of death, or functional or anatomic abnormalities found in a potential donor or donor organ. To date, organ transplantation research has focused almost exclusively on transplant recipients and on finding ways to improve transplantation processes and post-transplant health outcomes. Improvements that increase the number and improve the quality of organs that are available for transplantation have been slow to come, with most of them having been developed through innovations in local practice standards. Conducting research in deceased organ donors and on organs that have been recovered from deceased donors has emerged as one means to identify new method to improve the quality and increase the quantity of organs that can be successfully transplanted and thus, hopefully, expand the number of people receiving an adequately functioning organ. <sup>(3)</sup>

**Statement of the Problem:** “A study to assess the effectiveness of planned teaching programme on knowledge and perception about organ donation among nursing students studying at selected nursing college in Pune city.”

#### **Objectives of the Study:**

1. To assess the Knowledge & Perception regarding Organ Donation among Nursing students studying at selected Nursing colleges in Pune city.
2. To evaluate the effectiveness of Planned Teaching Programme on Knowledge & Perception regarding Organ Donation, among Nursing Students studying at Selected Nursing College in Pune City.
3. To associate the Pre-test score with demographic variables among Nursing Students studying at Selected Nursing College in Pune City.

#### **Operational Definitions:**

**Effectiveness:** According to the study, a result produced by agent, action or force, to the extent to which something succeeds to organ donation. In this study effectiveness means improving the knowledge through planned teaching programme regarding organ donation by which result may differ between pre and post test score.

**Planned:** According to the study, Making an arrangement in advance to provide knowledge to the students regarding organ donation.

**Teaching:** According to the study, to give information to the students regarding organ donation.

**Programme:** According to the study, things which are planned to achieve a desired outcome of the research study.

**Organ:** According to the study, a part of the body designed to perform particular functions.

**Donation:** According to the study, Giving a new life to someone by donating an organ.

#### **Hypothesis:**

##### **Null Hypothesis:**

$H_{01}$  = There is no significance difference between pre-test score and post-test score, regarding “Organ Donation” among nursing students studying at selected nursing college in Pune city.

$H_{02}$  = There is significance difference between pre-test score and post-test score, regarding “Organ Donation” among nursing students studying at selected nursing college in Pune city.

**Research Design:** The research design is the master plan specifying the method and procedures for collecting and analysing the needed information in a research study. <sup>(4)</sup>

The research design used in this study was quasi experimental one group pre-test post-test design is used to determine the effectiveness of planned teaching programme on knowledge and perception regarding organ donation before and after the planned teaching programme among nursing students.

**Population:** According to Polit and Beck (2012) “A population is the entire aggregation of cases in which a researcher is interested.”<sup>(5)</sup>

The population selected for the study included nursing students studying at selected nursing colleges in Pune city.

**Sample and Sampling Technique:** In this study the sample considered of 100 nursing students of who fulfilled the sampling criteria. In that selection process, population of interest was selected. In sampling technique, purposive sampling method was used.

**Inclusion Criteria:**

1. Willing to participate in the study.
2. Available at the time of study.

**Exclusion Criteria:**

1. Those who are not willing to participate
2. Those who are absent during data collection

**Tool Preparation:** Tools are the instruments, or a device used to measure the concept of interest in a research project that a researcher used to collect a data. It is a strategy or system used to gather information from participants, programmed and other elements of the evaluation.<sup>(6)</sup>

In this research, the tool was given to 10 experts for validation, also the necessary corrections were done as per the experts advice.

**Development of Tool:**

**The tool was developed based on:**

- Related review of literature (NACO guidelines books, journals, reports and articles, published and unpublished studies) were reviewed and used to develop the tool.
- Guidance and consultation with the guide and subject experts

**Description of the tool:**

**A tool consists of two sections as follows:**

**Section I:** Demographic variables (age, gender, parent’s income, religion, academic level, information, sources, qualification.)

**Section II:** Self-structured questionnaire to assess

the knowledge and perception among the nursing students regarding organ donation.

**Content Validity:** The tool was given for validation to 10 experts and after the validation, the experts had suggested to do the necessary changes in the demographic data where the income of the parents, qualification and residence was added. In the section II, few questionnaire were added on knowledge and in section III, few questions were added based on perception in view of experts.

**Reliability:** The test retest was used to establish a reliability of structure questionnaire and perception scale. To calculate reliability we have used Karl Pearson co-relation coefficient and the value was For knowledge  $r=0.89$ , for perception  $r=0.93$ , the value was satisfactory.

**Data Collection:** Pre-test was done followed by planned teaching programme and then post-test score has achieved.

**Description of demographic variable:** The data shows, the number of sample was 1(1%) in the age group of 15-17 years, 49(49%) of students were between age group of 18-20 years, 46(46%) students were between age group of 21-23 years and 4(4%) of students were between 24 and above.

Regarding gender, 28 (28%) students were male and 72(72%) students were female.

Regarding parents income, 12(12%) belongs to below 10,000 income group, 40(40%) of students belongs to 11,000-40,000 income group, 33(33%) of students belongs to 41,000-80,000 income group and 15(15%) of students belongs to 81,000 and above income group.

Regarding religion, 58 (58%) of students were Hindu, 32(32%) of students were Christian, 3(3%) were Muslim and 7(7%) of students belongs to other category.

Regarding academic level, 32(32%) students were 1<sup>st</sup> year, 28(28%) students were 2<sup>nd</sup> year, 20(20%) students were 3<sup>rd</sup> year and 20(20%) students were 4<sup>th</sup> year.

Regarding sources of information, 39(39%) students got information through mass media, 54(54%) students got information through health professionals, 6(6%) students got information through family members and relatives and 1(1%) student got through other sources.

Regarding qualification of parents, 30(30%) were having qualification of below 10<sup>th</sup> class, 49(49%) were having graduation degree, 12(12%) were having post-graduation degree and 9(9%) post-graduate and above.

Regarding residence, 81(81%) belongs to urban community and 19(19%) were belongs to rural community.

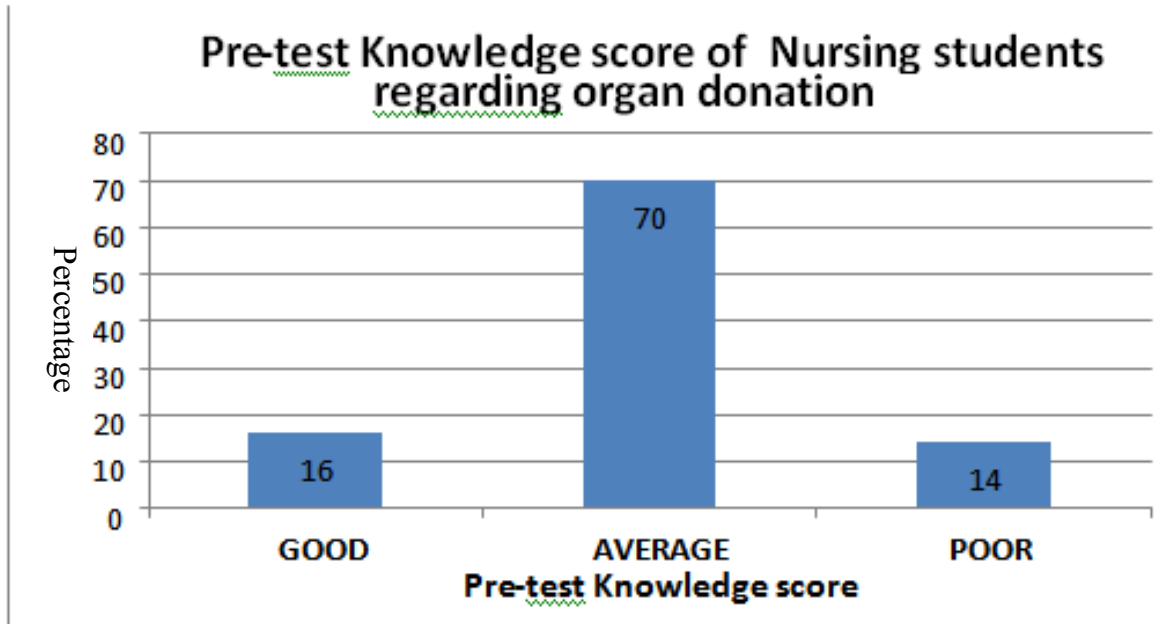


Figure 1: Distribution of sample according to Pre-test knowledge score of Nursing Students regarding organ donation.

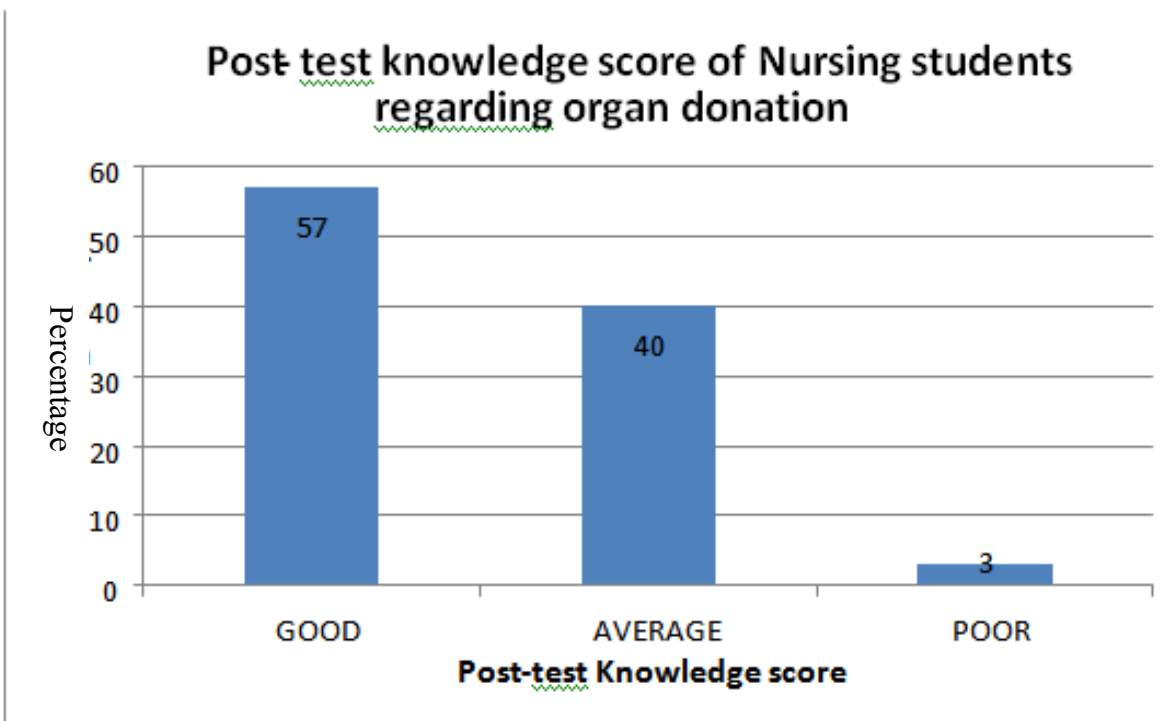


Figure 2: Distribution of samples according to the Post-test knowledge scores of Nursing Students regarding organ donation.

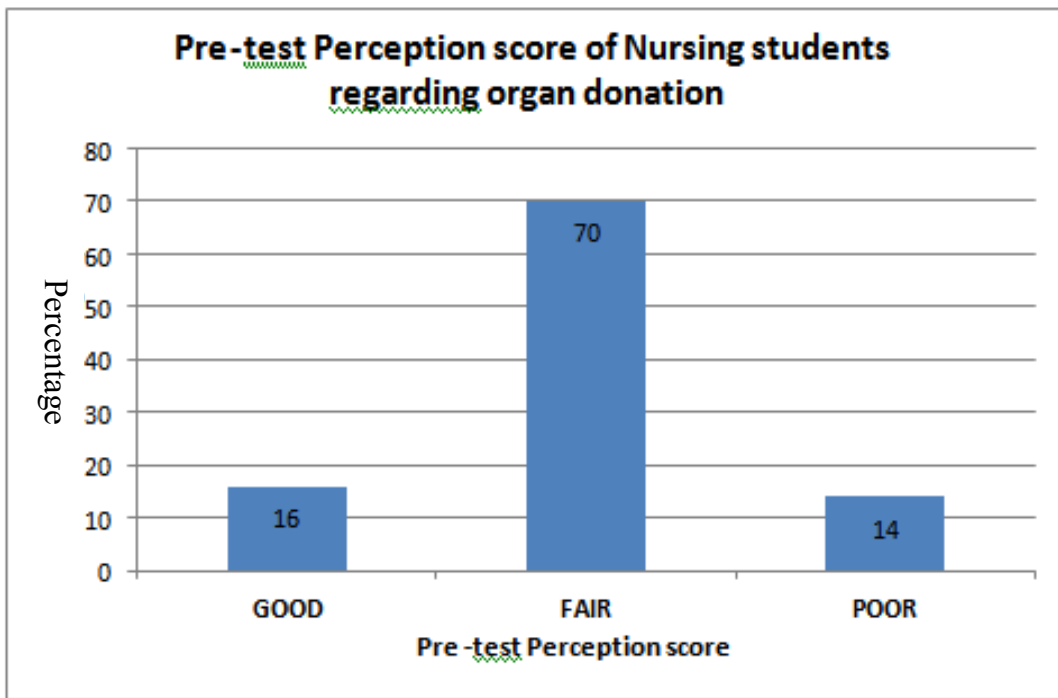


Figure 3: Distribution of samples according to the Pre-test perception scores of Nursing Students regarding organ donation.

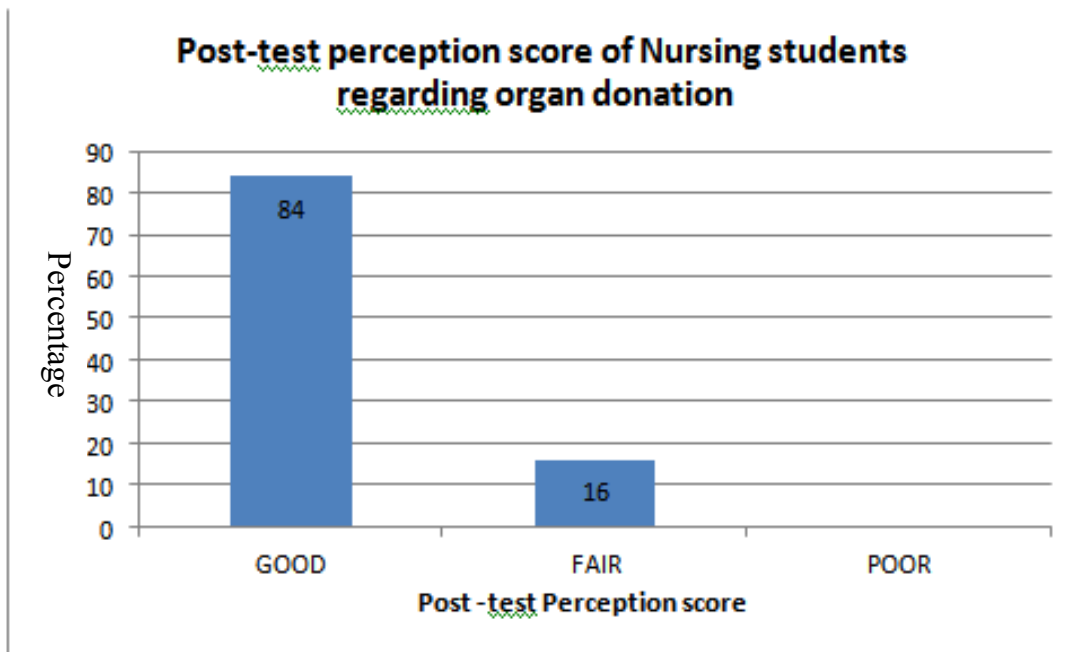


Figure 4: Distribution of samples according to the Post-test perception scores of Nursing Students regarding organ donation.

**Comparison of the Pre-Test and Post-Test Knowledge and Perception Score on Organ Donation among the Nursing Students:** To test the statistical significant difference between the mean pre-test and post-test knowledge and perception score on organ donation among nursing students, the following null

hypothesis was stated:

The data Shows that the pre-test knowledge mean score regarding organ donation was 8.25 and the post-test knowledge mean score was 10.82 with the mean difference of 2.57.

The pre-test perception mean score regarding organ donation was 58.66 and post-test perception mean score was 61.33 with the mean difference of 2.67.

The mean post-test knowledge score is higher than the mean pre-test knowledge score, similarly the mean post-test perception score is higher than the mean pre-test perception score, regarding organ donation among the Nursing Students at selected Nursing colleges in Pune city.

In order to find out the significant difference between the mean of pre-test and post-test knowledge scores of the samples regarding organ donation, paired t-test was computed. The paired t-test value is 7.57. The calculated value is higher than the table value, hence the null hypothesis was rejected and the research hypothesis was accepted.

Hence the researcher concluded that the gain in knowledge is through planned teaching programme and not by chance.

In order to find out the significant difference between the mean of pre-test and post-test perception scores of the nursing students regarding organ donation, paired 't'-test was computed. The paired t-test value is 2.19. The calculated value is higher than the table value, hence the null hypothesis was rejected and research hypothesis was accepted.

Hence the researcher concluded that change in perception is through planned teaching programme and not by chance.

**Association of the Pre-test Knowledge and Perception Score of Nursing:** Students with Demographic Variables on Organ Donation

To identify the association between the pre-test knowledge and perception score on organ donation among nursing students and the selected demographic variables.

The Fisher's exact test is carried out to find out the association between the knowledge and perception on organ donation among the nursing students of the selected colleges of Pune city and with the demographic variables.

The Result shows there is a significance association between the academic level and pre- test knowledge score among the nursing students. But there was no

association between gender, age, income, religion, sources of information, parents qualification and residence.

**Recommendation:** Keeping in view the finding of the present study, following recommendation was made:

- A comparative study can be done between B.Sc. and M.Sc. nursing students regarding organ donation.
- A similar study can be conducted with large number of sample.
- The study can be done by using video assisted teaching.

### Conclusion

The planned teaching programme was found to be very effective in improving the knowledge among nursing student regarding organ donation. The knowledge and perception regarding organ donation was improved by planned teaching as it is found that post-test score is higher than pre-test score. Being a nursing student our responsibility is to try to make each citizen of India aware of organ donation by organizing various means of health education programme.

### Ethical Clearance:

1. The study proposal was sanctioned by the symbiosis college of nursing ethical committee.
2. Permission obtained from the Director of the symbiosis college of Nursing.
3. Study was explained to participant and informed consent was obtained from them.
4. Confidentiality of collected data has maintained.

**Source of Funding:** Self

**Conflict of Interest:** There is a need for creating awareness and to provide good knowledge and perception regarding organ donation. Even in this era many people are dying because of unavailability of organ. so researcher must be able to provide good knowledge and perception regarding organ donation in every schools, colleges, universities and even to the community people.

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# Hyperglycaemia and Inflammation are Prime Factors to Persuade Endothelial Dysfunction in Patients with Type 2 Diabetes Mellitus

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## Abstract

**Introduction:** Inflammation and hyperglycaemia are known factors to influence on endothelial dysfunction (ED) in type 2 diabetic subjects. Endothelial dysfunction is a first stage indication for the development of atherosclerosis. Hence, ED plays a major role to enhance pathological changes and progression of micro and macrovascular complications in type 2 diabetes.

**Aim and Objective:** The study has been designed to assess inflammation, glycemic control and endothelial function in type 2 diabetic subjects, which makes us to understand the cause of endothelial dysfunction in T2DM.

**Materials and Method:** Sixty type 2 diabetic subjects with the age of 39 – 60 years and 60 healthy controls with the same age group were enrolled in this study. Fasting and post-prandial blood samples were collected to estimate Fasting and post-prandial blood sugar, lipid profile, inflammatory markers (like hsCRP & fibrinogen) and nitric oxide (NO) for endothelial function.

**Result:** The present study was identified significant high level of fasting and post-prandial blood sugar, lipid profile, fibrinogen and hsCRP in type 2 diabetic subjects. The study also found reduced NO level in type 2 diabetic subjects than healthy control, which indicates that significant correlation of hyperglycaemia and inflammation with endothelial dysfunction in type 2 diabetes.

**Conclusion:** We have found that significant elevation of inflammation and glucose level (hyperglycaemia) might play a major role to develop endothelial dysfunction in type 2 diabetic subjects, it further extends the process of pathogenesis and development of vascular complications.

**Keywords:** *Hyperglycaemia, Endothelial Dysfunction (ED), Inflammation, Nitric Oxide (NO).*

## Introduction

Type 2 diabetes mellitus is known to be a hyperglycaemia due to insulin resistance.

Hyperglycaemia itself a factor to cause inflammation and vise-versa. Several studies have been stated that higher level of inflammatory factors {such as high sensitivity C-reactive protein (hsCRP), interleukin-6 (IL-6) and tumor necrosis factor- $\alpha$  (TNF- $\alpha$ )} are associated with insulin resistance and type 2 diabetes mellitus.<sup>1</sup>

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Inflammation is a common factor to cause complications in diabetic patients. Where cytokines are inducible factors to produce free radical, which are secreted by inflammation. These free radicals damage major biological molecules present in all the tissues of

our body, which can lead to complications in diabetic subjects. Hence, inflammation is an influential factor to cause atherosclerosis and cardiovascular events through endothelial dysfunction in diabetic subjects.<sup>2,3</sup>

Since, both hyperglycaemia and inflammation are forerunners to develop endothelial dysfunction, the study has been designed to assess the inflammation and endothelial dysfunction in subjects with uncontrolled type 2 diabetes mellitus.

## Materials and Methods

The cross-sectional study was done on 120 subjects with the age group of 39 to 60 years. Among these 60 were type 2 diabetic subjects who were undergone regular treatment at Govt. hospital and VMKV medical College, Salem, Tamil Nadu. The remaining 60 subjects are sex and age matched healthy controls.

**Selection Criteria:** Type 2 diabetic subjects who were undergone regular treatment at Govt. hospital and VMKV medical College without any complications are included in the study. Type 2 diabetic subjects with lifestyle modification (such as smoking and alcohol), complications (like kidney disease, liver disease, hypertension and cardiovascular complications) and subjects with lipid lowering drugs were excluded from the study.

**Ethical Clearance:** The ethical clearance was obtained from institutional ethical committee at VMKV Medical College, Salem, Tamil Nadu.

**Sample Collection:** 5ml of venous blood sample was collected after 12 hours overnight fasting and obtain informed consent from each subject. 1ml of blood sample was transferred to fluoride tube for estimation of sugar, 1ml in sodium citrate tube for fibrinogen and nitric oxide and 2ml in plain tube for hsCRP and lipid profile.

Fasting and post-prandial blood sugar, lipid profile, fibrinogen and hsCRP were measured by using commercially available standard kits. Fully-autoanalyzer was used to estimate these parameters. Where LDL and VLDL are calculated by using standard Friedewald's formula. BMI is calculated by using formula = weight (kg)/Height<sup>2</sup> (meters). Nitric oxide was measured by kinetic cadmium reduction method in spectrophotometer.

**Statistical Analysis:** The study data was statistically analyzed by using SPSS software version 20; Mean and standard deviation was done by Microsoft excel. The

statistical significance of variables between the groups was performed by "Kruskal Wallis" test. 'p' value <0.05 was considered to be statistically significant.

## Result

Table 1 shows significantly high level of BMI (Body Mass Index), fasting and post-prandial blood sugar compared to healthy controls. But there was no significant difference in the age between the groups.

Significantly high level of triglyceride, LDL-c and VLDL-c were observed in type 2 diabetic subjects than healthy control (Table 2). However, no significant difference in the level of total cholesterol and HDL-c are identified between the groups.

Present study was assessed inflammatory markers like fibrinogen and hsCRP and these are found to be significantly elevated in type 2 diabetic subjects than healthy control (Table 3). The study also focused on endothelial dysfunction, which is an initial stage to develop pathological condition. However, we have found significantly lower level of NO in type 2 diabetic subjects compared to healthy controls (Table 4).

## Discussion

Diabetes mellitus is a complex disorder which initiates long term complications, but it may occur earlier in subject with uncontrolled condition. The major factors which initiate the pathological changes and development of complications in type 2 diabetes such as BMI, hyperglycaemia, dyslipidemia, hypertension, inflammation, oxidative stress and endothelial dysfunction.<sup>4</sup>

Hyperglycaemia itself a major factor to cause complications in diabetic subjects.<sup>5</sup> The present study has identified significantly high level of fasting and post-prandial sugar levels in type-2 diabetic subjects than healthy control. This shows that the present study diabetic subjects are uncontrolled in condition. Earlier studies have shown significant relation between poor glycemic control and risk of morbidity and mortality in type 2 diabetic subjects.<sup>6,7</sup> Studies has determined that reduced hyperglycaemia decreases the onset and progression of microvascular complications, but glucose control on cardiovascular complications remains uncertain.<sup>8,9</sup> Another study stated that hyperglycaemia is associated with heart failure, where levels of glucose metabolites are associated with glucose mediated

modifications that affect cardiac pathology.<sup>10</sup> The reason behind hyperglycaemia in diabetic subjects might be due to lack of physical exercise and high calorie intake or irregular in their anti-diabetic treatment.

**Body mass index (BMI):** As we know BMI is a foremost risk factor to cause diabetes and its complications. It is one of the major risk factors for cardiovascular events.<sup>11</sup> Nevertheless, a recent study has reported that BMI has nonlinear association with all-cause mortality with lowest risk in the overweight men and women.<sup>12</sup> The present study has shown significantly higher level of BMI in type 2 diabetes. A recent systematic and meta-analysis study has evaluated low mortality risk in overweight (BMI>25kg/m<sup>2</sup>) and high mortality risk in underweight (BMI<18.5 kg/m<sup>2</sup>) and a similar mortality risk in obese (BMI>30 kg/m<sup>2</sup>) in type 2 diabetic subjects.<sup>12</sup> Earlier study has stated that high BMI level in type-2 diabetic subjects are due to increased intake of diet owing to scared about hypoglycemia, who treated with hypoglycemic drugs or insulin.<sup>13</sup> Hollander P stated that high level of BMI in diabetes is due to low physical activity and high intake of calories.<sup>14</sup> Hence, in the present study elevated level of BMI was observed in type 2 diabetes due to high intake of calories to afraid with hypoglycemic drugs and or insulin treatment.

**Lipid Profile:** Dyslipidemia is commonly seen in type-2 diabetes mellitus and a significant factor to develop micro and macrovascular complications.<sup>15</sup> The present study has found significant higher level of triglyceride and LDL in type-2 diabetic subjects compared to healthy control. But we have not found any significant difference in the level of total cholesterol and HDL between the study groups. An earlier study has reported that significant elevated levels of total cholesterol, triglyceride and LDL and decreased level of HDL in type-2 diabetic subjects.<sup>16</sup> BMI has shown positive relationship with LDL and inverse relationship with HDL.<sup>17</sup> Poor glycemic control or hyperglycaemia might play a major role to develop dyslipidemia in diabetic subjects.<sup>18</sup> It was also evaluated that elevated levels of triglyceride and LDL are causes for vascular complications in diabetic subjects.<sup>19</sup> LDL is more susceptible to get oxidize and produce oxidized-LDL complex, which damage endothelial cells and causes endothelial dysfunction. Inflammation occurs in endothelium due to oxidized-LDL particles and releases inflammatory cytokines which further damage the endothelium and causes vascular complications.<sup>20</sup> The present study type-2 diabetic subjects have dyslipidemia;

this might be due to lack of physical exercise, high intake fat diet and uncontrolled blood glucose level.

**Inflammation:** Inflammation is commonly found in type 2 diabetes mellitus or Inflammation itself is a factor to cause diabetes mellitus. In diabetes, hyperglycaemia promotes inflammation via induction of cytokine (IL-6, TNF- $\alpha$  etc) production from several cells including monocytes and adipocytes. These cytokines enhance the production of fibrinogen and hsCRP, which acts as inflammatory markers. In another mechanism interaction of glycosylated proteins with their receptors causes oxidative stress and proinflammatory response.<sup>21,22</sup> However, the present study was identified significant elevation of fibrinogen and hsCRP in diabetic subjects than healthy controls. It indicates inflammation in diabetic subjects, which may causative factor for future complications. Recent study has stated that high glucose level cause dramatic elevation of inflammatory cytokines and chemokines, these cytokines are corresponding to increase free radical production and causes tissue damage in the body. In another system, increased inflammation in macrophages leads to complications in diabetic subjects.<sup>23</sup> Several other cross-sectional studies had found significant association between type-2 diabetes and high level of inflammatory markers such as CRP, IL6 and TNF-  $\alpha$ .<sup>24</sup> Since in our study we have found significant elevation of hsCRP and fibrinogen in type 2 diabetic subjects, there will be a possibility to get complications. Hence, these subjects should be sensibly monitor to reduce complications by avoiding endothelial dysfunction via inflammatory cytokines. The reason behind elevation of inflammatory markers in the present study diabetic subjects might be due to hyperglycaemia and oxidative stress.

**Endothelial dysfunction (ED):** Endothelial dysfunction indicates imbalance between vasodilation and vasoconstriction and its factors generated from endothelial cells. Nitric oxide (NO) is the major significant factor for vasodilator and acts as marker for estimating endothelial function. Endothelial dysfunction was identified as the first significant clinical correlation factor of atherosclerosis. It is clearly associated with oxidative stress and future development of atherosclerosis. Endothelial dysfunction and atherosclerosis are directly related to the development of cardiovascular disease.<sup>25</sup>

The present study has shown significant reduction in endothelial function by decreased level of NO in diabetic subjects. An earlier study has witnessed that endothelial

dysfunction was identified in both peripheral and coronary circulation of type 2 diabetic subjects.<sup>26</sup> Endothelial dysfunction has been proposed to be associated with microangiopathy and atherosclerosis in both type 1 & type 2 diabetes mellitus.<sup>27</sup> In diabetic condition, chronic hyperglycaemia induces the development of endothelial dysfunction through significant increased production of reactive oxygen species (ROS) or free radicals.<sup>28</sup> In other hand, inflammation and oxidative

stress plays a role to cause endothelial dysfunction. As we know oxidative stress, inflammation and endothelial dysfunction are interrelated components and linked with insulin resistance and type 2 diabetes mellitus and also to the development of cardiovascular disease.<sup>29</sup> In our study, reduced endothelial function in diabetic subjects was observed, this might be due to hyperglycaemia or poor glycemic control and inflammation in the diabetic subjects.

**Table 1: Baseline Characteristics of Study Groups**

Basic parameters	Controls (n-60)		Type 2 Diabetic Subjects (n-60)		Significance “p” value
	Mean	SD	Mean	SD	
Age	49.30	10.27	50.85	10.23	0.365
BMI	20.48	0.81	25.12	6.41	0.000*
FBS	87.62	9.95	159.85	68.49	0.000*
PPBS	119.65	6.07	277.98	85.90	0.000*

Data analysis mentioned as Mean±SD, \* ‘p’ value <0.05 represents statistically significant.

**Table 2: Lipid profile level in subjects between control and T2DM**

Parameters	Control (n-60)		Type 2 Diabetic Subjects (n-60)		Significance “p” value
	Mean	SD	Mean	SD	
T. Cholesterol	183.05	36.59	194.76	40.30	0.066
Triglyceride	121.30	67.57	161.86	66.87	0.000*
HDL-c	41.65	9.28	41.05	8.05	0.876
LDL-c	117.14	35.52	186.20	42.21	0.000*
VLDL-c	24.26	13.51	32.37	13.44	0.000*

Data analysis mentioned as Mean±SD, \* ‘p’ value <0.05 represents statistically significant.

**Table 3: Inflammatory markers in subjects between control and T2DM**

Parameters	Control (n-60)		Type 2 Diabetic Subjects (n-60)		Significance “p” value
	Mean	SD	Mean	SD	
Fibrinogen	149.71	99.52	686.82	82.79	0.000*
hsCRP	0.51	0.39	1.53	0.97	0.000*

Data analysis mentioned as Mean±SD, \* ‘p’ value <0.05 represents statistically significant.

**Table 4: Status of endothelial dysfunction in subjects between controls and T2DM**

Parameters	Control (n-60)		Type 2 Diabetic Subjects (n-60)		Significance “p” value
	Mean	SD	Mean	SD	
NO	18.56	9.69	13.83	8.00	0.009*

Data analysis mentioned as Mean±SD, \* ‘p’ value <0.05 represents statistically significant.

## Conclusion

We have found endothelial dysfunction and inflammation in hyperglycemic diabetic subjects. This proves that both hyperglycaemia and inflammation might play a significant role in the development of complications via endothelial dysfunction in type-2 diabetic subjects.

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# Echocardiographic Study to Assess Left Ventricular Function in Cases of Acute Myocardial Infarction with Comparison between Non ST Elevation Myocardial Infarction and ST Elevation Myocardial Infarction

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## Abstract

**Background:** Myocardial Infarction is one of the leading cause of deaths & mortality worldwide. Echocardiography is the key investigation in cases of myocardial infarction and confirms the presence of regional wall motion abnormality, presence of left ventricular dysfunction and to assess ejection fraction, as left ventricular ejection fraction has both therapeutic and prognostic significance.

**Aims and Objective:** To Assess Left Ventricular Function In Case of Acute Myocardial Infarction With Comparison Between Non ST Elevation Myocardial Infarction And ST Elevation Myocardial Infarction.

**Material and Method:** Fifty consecutive patients of STEMI and NSTEMI admitted from the outdoor patient department / emergency ward /cardiology unit in MMIMSR Mullana, Ambala, were considered for the study.

**Study Design:** A prospective, observational, clinical study.

**Study Duration:** December 2017–July 2019.

**Result:** A statistically significant difference between two groups was observed for ventricular dimensions (LVIDD and LVPWd), EF%/FS/CO, In this study smoking emerged as a major risk factor with preponderance of inferior wall MI in patients with no other cardiovascular risk factor.

**Conclusion:** In this study STEMI was more common in younger age group with male preponderance. LVEF/CO/ left ventricular dimension were more compromised in STEMI than NSTEMI. Left ventricular dysfunction after acute myocardial infarction predicts long term mortality and reduced LVEF may prompt greater consideration of invasive treatment and to guide care strategy.

**Keywords:** Echocardiography, left ventricular function, acute myocardial infarction, smoking.

## Introduction

Myocardial infarction is one of the commonest conditioning hospitalized patients in our country.

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Mortality rate of acute Myocardial Infarction is approximately 30% with more 32% of all deaths in 2017 is due to myocardial infarction.

Classically E.C.G in STEMI, ST elevation occurs in 2-3 hours, T wave inversion occurs within 8-12 hours and develops pathological Q wave over next 18-24 hours to days later. In case of NSTEMI, ST segment depression more than 1 mm, 0.08 sec after J point T wave inversion.



**Echocardiographic and left ventricular systolic function:** Echocardiography is helpful in the assessment of systolic dysfunction include left ventricular systolic volume, left ventricular ejection fraction(LVEF), assessment of diastolic dysfunction/ filling pressure E:A Ratio and left atrial volume<sup>1-2</sup>.

LVEF is generated by using the Simpson' Biplane method<sup>3</sup>, left ventricular ejection fraction identified with echocardiography have been well validated<sup>4</sup> and gives important information on the relationship between the location and size of RWMA present, ECG location and size, the status of the patient, complication and survival<sup>5</sup>.

**Echocardiography and Diastolic Dysfunction:** When diastolic dysfunction precedes systolic dysfunction<sup>6</sup>, it has been validated as an early indication of CCF after an AMI<sup>7</sup>. Diastolic dysfunction can be graded as 4 main grades. GRADE 1/ -Mildly impaired diastolic dysfunction with abnormal relaxation pattern. GRADE 2/- Moderately impaired diastolic dysfunction with pseudo normal relaxation pattern. GRADE 3 AND GRADE 4 – Are severely impaired diastolic dysfunction with restrictive relaxation pattern. GRADE 3 is reversible while grade 4 is not.<sup>8</sup>

Our aim is to do the Echocardiographic assessment of left ventricular function in patients of acute myocardial infarction and compare the function in between patients of STEMI and NSTEMI. This assessment will lead to know that, how intensive management is required for both types of myocardial infarction – STEMI/NSTEMI.

#### **Aims and Objectives:**

- Echocardiographic Study To Assess Left Ventricular Function In Cases of Acute Myocardial Infarction With Comparison Between Non ST Elevation Myocardial Infarction And ST Elevation Myocardial Infarction

#### **Materials and Method**

Fifty consecutive patients of STEMI and NSTEMI admitted in MMIMSR, Mullana, Ambala were considered for the study.

**Study Design:** A Prospective, Observational, Clinical Study

**Study Duration:** December 2017-July 2019

#### **Inclusion Criteria:**

1. Patients age more than 18 year and less than 80 years.
2. First time presented with myocardial infarction.

#### **Exclusion Criteria:**

1. Previous history of Myocardial Infarction.
2. Those who denied for admission and further treatment.

Diagnosis of acute myocardial infarction was considered if atleast two of the following criteria are satisfied :

1. Chest pain typical of MI, i.e lasting more than 20 minutes and not relieved by nitrates or rest
2. Elevation of serum cardiac enzymes level, i.e CPK-MB, Trop-T/I and LDH.
3. Electrocardiography changes-

#### **Diagnostic criteria for STEMI- any of the following:**

1. New ST elevation at the J point in to contiguous leads of >0.1 mv in all leads other than leads V2-V3. For leads V2-V3 the following cut points apply  $\geq 0.2$ mv in men  $\geq 40$  years,  $\geq 0.25$  mv in men <40 years or  $\geq 0.15$ mv in women
2. Other conditions which are treated as ST elevation MI
  - New or presumed new LBBB
  - Isolated posterior myocardial infarction

#### **Diagnostic criteria for NSTEMI: Any one of the following:**

1. New horizontal or down sloping ST segment depression  $\geq 0.5$  mm in at least two anatomically contiguous leads.
2. T wave inversion  $\geq 1$ mm in atleast two anatomically contiguous leads. These leads must have evident R waves or R waves larger than S waves

2. **D Echocardiography:** Echocardiographic assessment was done by using model VIVID-Ecolour Doppler echocardiography machine of GE. Echocardiographic assessment was done in M mode two dimensional and Doppler mode using colour flow mapping.

**Statistical Tools Employed:** The statistical analysis was done using SPSS (Statistical Package for Social Sciences) Version 21.0 statistical Analysis Software. The values were represented in Number (%) and Mean±SD.

**Results**

The present study in which a total of 25 patients with confirmed diagnosis of ST-elevated myocardial infarction (Group I) and a total of 25 patients with confirmed diagnosis of non-ST-elevated myocardial infarction (Group II) were enrolled.

**Table 1: Comparison of Demographic and Anthropometric profile of patients enrolled in the study**

SN	Characteristic	Group I (STEMI) (n=25)	Group II (NSTEMI) (n=25)	Statistical Significance
1.	Mean Age±SD (Range) in years	54.08±9.55 (38-70)	56.12±7.20 (42-68)	t'=0.843; p=0.398
	Age <50 years	10 (40.0%)	8 (32.0%)	c2=0.347; p=0.556
	Age > 50 years	15 (60.0%)	17 (68.0%)	
2.	<b>Gender</b>			c2=0; p=1
	Male	18 (72.0%)	18 (72.0%)	
	Female	7 (28.0%)	7 (28.0%)	
3.	Mean BSA±SD (m2)	1.63±0.11	1.66±0.10	t'=1.165; p=0.250

Age of patients ranged from 38 to 70 years. Mean age of patients was 54.08±9.55 years and 56.12±7.20 years respectively. Though the proportion of those aged <50 years was higher in Group I (40%) as compared to that in Group II (32%) yet this difference was not significant statistically (p=0.556).

In both the groups majority of patients (72%) were males and remaining 28% were females. The male-to-female ratio was 2.57:1.

Mean body surface area of patients in Group I was 1.63±0.11 m<sup>2</sup> as compared to 1.66±0.11 m<sup>2</sup> in Group II.

**Table 2: Comparison of Left Ventricular Dimensions between two study groups (mm)**

SN	Parameter	Group I (n=25)		Group II (n=25)		Statistical Significance	
		Mean	SD	Mean	SD	t'	p'
1.	LVIDd	45.52	9.28	40.84	6.64	2.050	0.046
2.	LVIDs	34.28	10.66	31.12	5.55	1.315	0.195
3.	IVSd	8.99	1.85	9.67	1.77	-1.329	0.190
4.	IVSs	11.30	1.52	11.02	1.96	0.572	0.570
5.	LVPWd	8.94	1.74	10.03	1.51	-2.372	0.022
6.	LVPWs	11.90	1.84	11.82	1.52	0.168	0.867

Statistically, no significant difference was observed between two groups for any of the left ventricular dimensions except for LVIDd and LVPWd. Mean LVIDd was found to be significantly higher in Group I (45.52±9.28 mm) as compared to that in Group II

(40.84±6.64 mm) (p=0.046) whereas LVPWd was found to be significantly lower in Group I (8.94±1.74 mm) as compared to that in Group II (10.03±1.51 mm) (p=0.022).

**Table 3: Comparison of Left Ventricular Volumetric measurements between two study groups (ml)**

SN	Parameter	Group I (n=25)		Group II (n=25)		Statistical significance	
		Mean	SD	Mean	SD	't'	'p'
1.	EDV	104.16	36.33	93.24	17.04	1.361	0.180
2.	ESV	57.58	37.32	51.56	14.80	0.749	0.457
3.	SV	46.44	17.11	42.08	11.62	1.054	0.297

In Group I, mean left ventricular volumetric measurements like EDV, ESV and SV were 104.16±36.33, 57.58±37.32 and 46.44±17.11 ml respectively as compared to 93.24±17.04, 51.56±14.80 and 42.08±11.62 ml respectively in Group II. On comparing the data between two groups, the difference was not found to be significant statistically for any of the three volumetric measurements (p>0.05).

**Table 4: Comparison of Left Ventricular Functional measurements between two study groups**

SN	Parameter	Group I (n=25)		Group II (n=25)		Statistical significance	
		Mean	SD	Mean	SD	't'	'p'
1.	EF(%)	42.00	10.02	50.12	10.63	-2.780	0.008
2.	FS (%)	21.65	5.55	24.84	5.37	-2.066	0.044
3.	E:A	1.04	0.44	0.97	0.29	0.641	0.525
4.	DT(msec)	150.6	22.58	141.40	31.75	1.181	0.244
5.	IVRT(msec)	97.74	13.99	99.89	7.09	-0.686	0.496
6.	HR(b/min)	75.16	14.04	81.04	15.21	-1.420	0.162
7.	CO(L/min)	2.98	0.69	3.45	0.83	-2.167	0.035

It was observed that mean ejection fraction, fractionated shortening and cardiac output was significantly lesser in Group I as compared to that in Group II (p<0.05).

**Table 5: Distribution of cases in two groups according to Regional Wall Motion Abnormalities**

SN	RWMA Abnormality	Group I (n=25)		Group II (n=25)	
		No.	%	No.	%
1.	Anterior wall	10	40	4	16
2.	Inferior wall	14	56	3	12
3.	Lateral wall	0	0	0	0
4.	No RWMA	1	4	11	44
5.	Multiple*	0	0	7	28

c<sup>2</sup> = 25; p<0.001; \*Multiple – 3 cases having anterior+inferior wall involvement and 4 cases having anterior+lateral wall involvement

None of the cases of group I had multiple wall involvement whereas in Group II, seven (28%) had multiple wall involvement. In Group I, majority (n=14; 56%) had inferior wall involvement followed by anterior wall involvement (n=10; 40%) and one case without any RWMA involvement. In comparison, in Group II, maximum (n=11; 44%) had no RWMA followed by

seven (28%) cases having multiple wall involvement – of these three cases had anterior+ inferior wall involvement while four cases had anterior + lateral wall involvement, four (16%) had anterior wall involvement and three (12%) had inferior wall involvement. On evaluating the data statistically, the difference between two groups was found to be statistically significant (p<0.001).

## Discussion

Echocardiography was done to assess the left ventricular function, the result obtained was compared between STEMI and NSTEMI. As Echocardiography is a noninvasive test which can play an important role in recognizing cardiac dysfunction and pathology, as well as follow up response to therapy.

**Age:** The proportion of patients whose age is <50 years was higher in STEMI (40%) group 1, as compared to NSTEMI group 2 (32%). Yet the difference was not significant statistically ( $p=0.556$ ). This finding is in agreement with the previous study conducted by Good man et al<sup>9</sup> and Murphey et al<sup>10</sup> in which NSTEMI Patients group was older than the group of patients with STEMI.

**Sex:** In the present study majority of the patients in both group (STEMI and NSTEMI) i.e. 72% were male and 28% were female. The male to female ratio was 2.57:1. This study was in agreement with study done by Akram et al<sup>11</sup> in which male to female ratio was 5.25:1, other studies by Gupta et al<sup>12</sup> and Goodman et al<sup>13</sup> also reported male preponderance. But it differed from the study conducted by AlymHegazy et al<sup>14</sup> who noted that there was no significant difference in the sex factor of the patients.

**BMI:** Mean body surface area of patients in group 1 (STEMI) was  $1.63 \pm 0.11 \text{ m}^2$  as compared to  $1.66 \pm 0.11 \text{ m}^2$  in group 2 (NSTEMI). Statistically, the difference between two groups was not significant ( $p=0.250$ ).

### Risk-Factor:

**Smoking:** In the present study smoking was found to be major risk factor for Acute STEMI, Precisely Inferior wall MI (56%). In INTER HEART study<sup>15</sup> smoking is the second most important risk factor for acute MI. Another study conducted by Queck DK et al<sup>16</sup> in Malaysia found that the risk of acute MI found was 23.9% as compared to control i.e. 12.8%. Another study done by Sanger R.P et al<sup>17</sup> in year 1997-2003 observed that by implementing no smoking law at public places for six months decrease the mortality from Acute MI.

In A Retrospective study done by Vaidya CV et al<sup>18</sup> conducted in Gandhinagar in 2015 of all new patient with STEMI, smoking emerged as the most important risk factor (40.7%), followed by hypertension (20.3%) and dyslipidemia (15.3%).

**Echocardiographic Parameters:** In comparison of left ventricular function between the two study groups, statistically no significant difference was observed between two groups except for LVIDd and LVPWd. Mean LVIDd was found to be higher in STEMI Group 1 ( $40.52 \pm 9.28 \text{ mm}$ ) as compared to that in NSTEMI Group 2 ( $40.84 \pm 6.64 \text{ mm}$ ) with P value = (0.46). LVPWd was found to be lower in group 1 (STEMI) ( $8.94 \pm 1.74 \text{ mm}$ ) in comparison to NSTEMI GROUP 2 ( $10.03 \pm 1.51 \text{ mm}$ )  $P=(0.022)$ . For the remaining parameters i.e. LVIDs/IVSd/IVSs/LVPWs, there was no significant difference between the two groups ( $P>0.05$ ).

It was observed that mean EF/FS/and CO was significantly lesser in STEMI as compared to NSTEMI.

Mean EF(%) in STEMI patient was  $42 \pm 10.02$  and  $50.12 \pm 0.63$  in patient with NSTEMI in present study. Similar results were observed by Amy Leigh Miller et al<sup>19</sup> observes STEMI has low left ventricular ejection fraction compare to NSTEMI.

In our study, no significant difference between the two groups was observed for E/A RATIO, DT, IVRT and HEART RATE.

## Conclusion

In this study STEMI was more common in younger age group with male preponderance. LVEF/CO/ left ventricular dimension were more compromised in STEMI than NSTEMI. As coronary flow is severely affected in cases of STEMI. The assessment of LVEF is a core performance measure for patient of STEMI and NSTEMI, because LVEF has both therapeutic and prognostic significance. Left ventricular dysfunction after acute myocardial infarction predicts long term mortality and reduced LVEF may prompt greater consideration of invasive treatment and to guide care strategy.

In the above study, smoking has emerged as an important risk factor for acute myocardial infarction especially inferior wall myocardial infarction.

The present study highlights the immediate need to initiate measures to raise awareness about the harmfulness of smoking among the general population especially young adults. Initiative at individual and government levels are required to develop a program to control smoking especially among youth.

**Acknowledgement:** Department of Cardiology, MMIMSR, Mullana, Ambala (Haryana)

**Source of Funding:** Nil

**Conflicts of Interest:** Nil

**Ethical Clearance:** Clearance from Ethical Committee (Certificate Enclosed).

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# Takayasu Arteritis: Presentation with Renal Artery Stenosis and Left Subclavian Artery Stenosis a Rare Clinical Entity in Young Women

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## Abstract

Takayasu arteritis is rare form of chronic granulomatous vasculitis, it predominantly affects young adults, female in particular. We report an unusual case of Takayasu arteritis with renal artery stenosis and left subclavian artery stenosis, she presented in medicine OPD with persistent abdominal pain since 2 months, with discrepancy of blood pressure in upper limbs. She was also having renal bruit on examination. The diagnosis of takayasu arteritis was made using physical examination, Doppler upper limb and CT angiography.

**Keywords:** *Takayasu's arteritis, granulomatous vasculitis, Renal artery stenosis, CT Angiography.*

## Introduction

Takayasu's arteritis is a rare, an autoimmune chronic vasculitis that primarily affects the large vessel i.e. aorta and its major branches. Takayasu's arteritis is referred as pulseless disease or aorta arteritis. It is a part of granulomatous arteritis, affecting large and medium sized arteries, primarily the aorta and its major branches and proximal portions of pulmonary, coronary and renal arteries. It affects predominantly young females in about 70-80% of cases (young female arteritis). Renal artery involvement is a potential presentation of TA occurring in 60% of the patients in India.

Takayasu's arteritis was firstly clinically described by Japanese ophthalmologist<sup>1</sup> Takaysu in 1908. Most of the cases are diagnosed in females and most common age of occurrence is between 2<sup>nd</sup> decade- 3<sup>rd</sup> decade. Patients present with clinical features related to vascular insufficiency of the upper limb, weakness, claudication and fatigue in arms. On physical examination faint or absent pulse and difference of more than 10 mm Hg of systolic blood pressure between two arms<sup>2</sup>.

**Case Profile:** We present here a young female who presented with persistent abdominal pain from 2 months. On examination she was noticed to have renal artery bruit and discrepancy of Blood pressure in upper limbs. **USG Abdomen showed** Intimal thickening of abdominal aorta. No renal parenchymal changes were noted. Doppler revealed Right renal artery stenosis. **Doppler upper limbs showed** Decreased flow in left subclavian artery.

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**Figure 1: CT Angiography Showing– A. Thickening of upper abdominal aorta for a length of 6.5 cm involving the origin of B/L renal arteries., B. Right renal artery 70 percent stenosis, length of narrowed segment 1.4 cm**



**Figure 2. CT Angiography Showing– A. Diffuse circumferential inflammatory thickening and enhancement of the aortic arch., B. Diffuse thickening of the proximal part of left subclavian artery causing its mild narrowing.**

American College of Rheumatology (ACR) criteria led to the diagnosis of Takayasu arteritis. She was started on oral steroids with good clinical response. She is planned for Right renal artery angioplasty on follow up.

### Discussion

Takayasu Arteritis is a chronic inflammatory disease of unidentified etiology affecting large and medium vessel arteries. Although Takayasu Arteritis has been described all over the world, it occurs most commonly in Japan, India, China and Southeast Asia. The first case of Takayasu Arteritis was described in 1908 by Dr. Mikito Takayasu (Japanese ophthalmologist) as a wreathlike appearance of blood vessels in retina. Takayasu Arteritis affects 2nd-3rd decade of life. Female sex is affected 7-8 times more frequent than males. Takayasu Arteritis is manifested by granulomatous inflammation of the aorta and its major branches, leading to stenosis, thrombosis and aneurysm formation.

The vast majority of patients present with symptoms and signs of vascular insufficiency (from stenosis, occlusion, or aneurysm), systemic inflammation, or both. The most common presenting vascular symptoms are claudication (35%), diminished or absent pulse (25%), carotid bruit (20%), hypertension (20%), headache (20%) and asymmetrical arm blood pressures (15%). Aortic regurgitation, Stroke and vision abnormalities are present at onset in less than 10% of patients<sup>3</sup>. The 1990 ACR criterion for the classification of TA [Table 1] remains the gold standard for diagnosis<sup>4</sup>. Ishikawa categorised clinical groups based on the natural history and complications of the disease [Table 2]. The significant complications included Secondary hypertension, retinopathy, aortic regurgitation and aneurysm development, which are graded as mild/moderate or severe<sup>5</sup>. New angiographic classification of Takayasu arteritis [Table 3], categorizes based on vessel involved, aids in surgical planning but doesn't offer much in prognosis.<sup>6</sup>

**Table 1: 1990 American College of Rheumatology criteria for the classification of TA [2]**

1	Age at onset ≤ 40 years
2	Limb claudication
3	Diminished brachial pulse
4	Difference of > 10 mmHg systolic pressure between arms
5	Bruit over the subclavian artery or aorta
6	Abnormal angiogram
For diagnosis ≥ 3 criteria should be present (Sensitivity: 90.5%, Specificity: 97.8 %)	

**Table 2: Ishikawa clinical classification of Takayasu arteritis [3]**

Groups	Clinical features
Group I	Uncomplicated disease, with or without pulmonary artery involvement
Group IIA	Mild/moderate single complication together with uncomplicated disease
Group IIB	Severe single complication together with uncomplicated disease
Group III	Two or more complications together with uncomplicated disease

**Table 3: New angiographic classification of Takayasu Arteritis, Takayasu conference 1994 [4]**

Type	Vessel involvement
Type I	Branches from the aortic arch
Type IIA	Ascending aorta, aortic arch and its branches
Type IIB	Ascending aorta, aortic arch and its branches, thoracic descending aorta
Type III	Thoracic descending aorta, abdominal aorta, and/or renal arteries
Type IV	Abdominal aorta and/or renal arteries
Type V	Combined features of types IIB and IV
Involvement of the coronary or pulmonary arteries should be designated as C (+) or P (+), respectively.	



Diseases which can mimic Takayasu arteritis are rheumatic (giant cell arteritis, Cogan's syndrome, relapsing polychondritis, rheumatoid arthritis, ankylosing spondylitis, systemic lupus erythematosus, Buerger's disease, Behçet's disease), infectious (tuberculosis, syphilis,) and others (atherosclerosis, ergotism, radiation-induced damage, retroperitoneal fibrosis, inflammatory bowel disease, sarcoidosis, neurofibromatosis, Marfan's syndrome or congenital coarctation). Diagnosis is mainly based on physician examination along with a high index of suspicion. If Takayasu arteritis is suspected, it is essential to palpate peripheral pulses, listen for bruits and measure blood pressure in all four limbs. Patient is screened for an acute phase response (elevated erythrocyte sedimentation rate (ESR), C-reactive protein (CRP) and normocytic-normochromic anemia<sup>7</sup> and definitive diagnosis is confirmed on imaging. Conventional arteriography is gold standard but its invasive technique. CT and MR angiography have replaced the conventional arteriography because of noninvasive method, they are useful in early stages, follow up and prognosis. 18F-Fluorodeoxyglucose (18F-FDG) PET imaging is increasingly being used in patients with large vessel vasculitis, allowing more precise anatomic location of metabolic activity with enhanced sensitivity, particularly in the event of moderate FDG accumulation. The principal advantage of FDG PET/CT is the diagnosis of early pre-stenotic disease, an event that can be missed by intra-arterial angiography<sup>8</sup>. Majority of the patients have good response to steroids (oral prednisolone 1 mg/kg/day) with 80-90% remission but about half of the patients relapse when the drug is tapered or stopped, despite good initial response<sup>9</sup>. Immunosuppressants (azathioprine, methotrexate, MMF, etanercept and infliximab) are used in these patients that enable the dose of corticosteroids, reduce their adverse effects and increase the rate of sustained remission. The decision for intervention is based on refractory secondary hypertension, symptomatic cardiovascular disease, severe aortic regurgitation, lesions manifesting as critical limb ischemia and aneurysms prone to rupture<sup>10</sup>. Common surgical interventions are angioplasty and reconstructive surgery.

**Conclusion: Clinical signs to alert Takayasu's arteritis :**

- Hypertension in young female

- Difference in blood pressure/ pulses between two arms.
- Claudication of extremities
- Bruit over subclavian / renal artery.

The aim of this case report is to increase the awareness of this condition among primary physicians because early diagnosis and the timely intervention or treatment can lead to better outcomes in this poorly understood and less thought clinical enigma.

**Ethical Clearance:** Taken from Institutional Ethics Committee (IEC).

**Source of Funding:** Self

**Conflict of Interest:** Nil

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# A Descriptive Study to Assess the Premenstrual Symptoms and Coping Mechanisms among Health Care Professionals

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## Abstract

**Background:** Pre-menstrual syndrome (PMS) is described as combination of physiological, behavioural and physical symptoms felt by women during their secretory phase of each menstrual cycle. The need for this study was felt to find out the prevalence and various coping strategies followed during PMS. Design: A cross sectional descriptive study conducted at Maharishi Markandeshwar Institute of medical science and research, Mullana using the retrospective method.

**Method and Materials:** Total 493 subjects were enrolled out of 520. Subjects were assessed on 3 scales- socio-demographic proforma, pre-menstrual symptoms scale (PMSS) and coping method interview. Categorical variables were analyzed by Chi square test using SPSS v18. Results: 253 (51.3 %) subjects had PMS symptoms and 453 (91.9%) used coping mechanism for PMS symptoms. Age of menarche, occupation, marital status, family history and use of analgesics showed significant association with PMS. On PMSS scale- pelvic discomfort, abdominal cramps, restlessness, mood swings and irritability were the most commonly reported symptoms. Commonly used coping mechanism by the subjects was rest (69.6%) followed by hot packs (62.8%).

**Conclusion:** Proper actions shall be taken to educate and increase the awareness among the women and to provide better coping method to alleviate the symptoms of PMS. Proper pharmacological and psychological treatment should be taken which will improve the quality of life.

**Keywords:** Coping mechanism, Health Care Professionals (HCP), Pre-menstrual symptoms (PMS).

## Introduction

Pre-menstrual syndrome (PMS) is cyclic group of symptoms that occur in women typically between ovulation and the onset of the period involving women's

emotional, physical, behavioural and social health. Affected age group is between 12 to 50 years of age. 85% of women are affected due to PMS.<sup>[1]</sup>

The term coping generally refers to strategies which reduce stress. The strategies including consuming sweets, hot packs, sleeping, resting, massage, having showers and taking pain killers were the most commonly identified coping strategies.<sup>[2-4]</sup> It is not known if healthcare professionals (HCPs) use coping mechanisms to deal with PMS in this region.

## Materials and Method

This cross sectional study was conducted on healthcare professionals in Maharishi Markandeshwar Institute of Medical Sciences and Research, Mullana in

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Northern India, after taking clearance from ethical board of the medical college. HCPs between 20- 50 years before menopause, regular menstruation and willing to participate. HCPs who were lactating, with endocrinal and medical illness, receiving previous psychiatry illness or using any birth control and hormonal therapy at the time of study were excluded from the study.

After explaining the aims and objective of the study and with their consent, data was collected on 3 Scales:- socio-demographic proforma, pre-menstrual syndrome scale (PMSS)<sup>[6]</sup> and coping method interview.

**Socio-demographic proforma:** It consisted of 11 categories namely name, age, age of menarche, education status, occupation, type of locality (urban, rural) religion, use of analgesic, treatment history, family history of PMS, any co morbid illness, which are further subdivided into categories as per the need of the study.

**Pre Menstrual Syndrome Scale (PMSS):** The premenstrual syndrome scale comprised of 40 questions with three sub-scales namely, physiological, psychological and behavioural symptoms. The measurements followed scoring system as “never” was scored as “1”, rarely as “2”, sometimes as “3”, very often as “4” and always as “5” points. Scores 80 and above indicates the occurrence of PMS. Increase

in the scores reflects the PMS severity. Based on the percentage of scores - “no symptoms” (1-40), “mild” (41-80), “moderate” (81-120), “severe” (121-160) and “very severe” (161-200).

**Coping Method Interview:** This interview consisted of 15 coping method used during premenstrual period. It took only 2-3 minutes to record the responses in form of yes or no. This included alcohol, caffeine intake, smoking (nicotine) consumption, hot showers, weight and diet alteration, use of herbal medicines, sleep, listening to music, exercise, rest, hot packs, seeks physician help, crying, massage, self-medication, dietary supplements.

**Statistical Analysis:** Data gathered was checked for completeness, coded, summarised and analysed by using the data statistical packages of social service v18 (SPSS v18). Data presented as frequency and percentages. Categorical variables were analyzed using Chi square test. P value <0.05 was considered significant.

### Results

520 subjects were enrolled. 7 subjects did not provide consent to participate and 10 subjects did not fill the form completely. Finally 493 were taken up for the study.

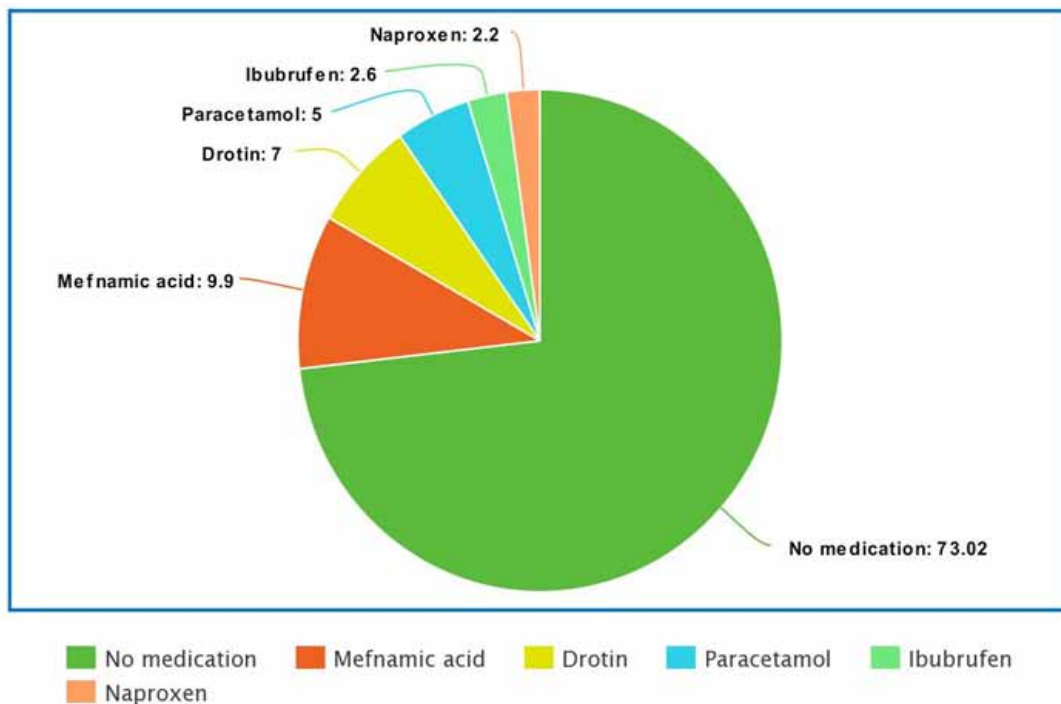


Figure 1. Various medications used by the subjects.

**Socio-demographic profile:** Among 368 graduates, 188 had PMS; out of 125 post graduates, 65 had PMS. In terms of occupation, 220 were doctors and 275 were other health care professionals including nurses and physiotherapists. Among 376 subjects were from urban background and 117 subjects were from rural area. 54.3% were unmarried and 43.4% were married showing a significant association with PMS. Among the total population, 409 were Hindu and 84 belonged to other religion (Sikh, Muslim and Christian). The population having contributory family history were 66 out of which 66.6% had PMS, which showed significant association (P=0.014).

**Factors associated with PMS:** Maximum number of subjects (n=443) had regular cycles and 50 had irregular cycles. Out of total subjects enrolled, 134 used analgesics out of which 82 (61.2%) had PMS (Fig 1). Significant association was also seen with use of analgesics (P=0.007). 23 subjects received treatment, among them 13 (56.5%) had PMS.

**Severity of PMS:** Maximum subjects 240 (48.6%) showed mild symptoms, 182 (36.9%) had moderate and 71 (14.4%) showed severe premenstrual symptoms.

**Pre-Menstrual Syndrome symptoms:**

**Table 1: Pre-Menstrual Syndrome Scale (PMSS)**

Physiological Symptoms	Present (%)	Absent (%)
Pelvic Discomfort Pain	177(35.9)	316(64.1)
Abdominal Cramps	158(32)	335(68)
Change In Bowel Habit	138(28)	355(72)
Muscle And Joint Pain	127(25.8)	366(74.2)
Generalized Aches And Pain	123(24.9)	370(75.1)
Abdominal Bloating	119(24.1)	374(75.9)
Food Cravings	117(23.7)	376(76.3)
Increased Appetite	110(22.3)	383(77.7)
Fatigue	108(22.9)	385(78.1)
Skin Changes, Rashes, Pimple	109(21.9)	385(78.1)
Nausea, Vomiting	90(18.3)	403(81.7)
Weight Gain	81(16.4)	412(83.6)
Headache	77(15.6)	416(84.4)

Palpitation	76(15.4)	417(84.6)
Dizziness/Fainting	74(15.0)	419(85.0)
Breast Tenderness And Swelling	71(14.4)	422(85.60)
<b>Psychological Symptoms</b>		
Mood Swing	167(33.9)	326(66.1)
Irritability	160(32.50)	333(67.5)
Anxiety	121(24.5)	372(75.5)
Tension	113(22.9)	380(77.1)
Easy Crying/Crying Spells	105(21.3)	388(78.7)
Loss of Concentration	102(20.7)	391(79.3)
Aggression	80(16.2)	413(83.8)
Sleep Changes	79(16)	414(84)
Depression	75(15.2)	418(84.8)
Hopelessness	73(14.8)	420(85.2)
Forgetfulness	59(12)	434(88)
Confusion	51(10.3)	442(89.7)
<b>Behavioural Symptoms</b>		
Restlessness	106(21.5)	387(78.5)
Benign Over Sensitive	97(19.7)	396(80.3)
Lack of Interest In Usual Activities	79(16)	414(84)
Social Withdrawal	75(15.20)	418(84.8)
Lack of Self Control	63(12.8)	430(87.2)
Irritational Thoughts	61(12.4)	432(87.6)
Feeling Guilty	60(12.2)	433(87.8)
Impaired Performance	59(12)	434(88)
Compulsive Behaviour	51(10.3)	442(89.7)
Obsessional Thoughts	49(9.9)	444(90.1)
Clumsiness	48(9.7)	445(90.3)
Poor Judgement	47(9.5)	446(90.5)

Maximum subjects reported pelvic discomfort (35.9%), abdominal tenderness (32%) in the form of physiological symptoms. Respondents had mood swings (33.9%) and irritability (32.5%) in the form of psychological symptoms. Among behavioural symptoms, restlessness (21.5%) and being over sensitive (19.7%) were more prevalent among the population covered. Rest all the symptoms were arranged in the descending order in their respective groups .

**Coping Mechanisms:****Table 2: Subjects using Coping Mechanism**

Coping Mechanism	No PMS	PMS	Total	P value
Yes	206 (45.5%)	247 (54.5%)	453	<0.001*
No	34 (85%)	6 (15%)	40	

Data expressed as frequency (percentage); \*P<0.05

453 subjects used the coping mechanism to alleviate premenstrual symptoms. It was found to be statistically significant (P<0.001)

**Table 3: Various Coping Mechanisms Used In PMS.**

Coping Mechanism		N	PMS-N(%)	NO PMS-N(%)	P-value
Rest	Yes	308	176(69.6)	132(55)	0.001*
	No	185	77(30.4)	108(45)	
Hot Packs	Yes	240	159(62.8)	81(33.8)	<0.001*
	No	253	94(37.2)	159(66.3)	
Sleeping	Yes	267	148(58.5)	119(49.6)	0.047
	No	226	105(41.5)	121(50.4)	
Listening To Music	Yes	250	139(54.9)	111(46.3)	0.054
	No	243	114(45.1)	129(53.8)	
Hot Shower	Yes	154	95(37.5)	59(24.6)	0.002
	No	339	158(62.5)	181(75.4)	
Diet Alteration	Yes	138	92(36.4)	46(19.2)	<0.001*
	No	355	161(63.6)	194(80.8)	
Massage	Yes	124	85(33.6)	39(16.3)	<0.001*
	No	369	168(66.5)	201(83.8)	
Dietary Supplements	Yes	119	82(32.4)	37(15.4)	<0.001*
	No	374	171(67.6)	203(89.6)	
Crying	Yes	101	81(32)	20(8.3)	<0.001*
	No	392	172(68)	220(91.7)	
Caffeine Intake	Yes	124	78(30)	46(19.2)	0.007*
	No	369	175(69.2)	194(80.8)	
Exercise	Yes	118	70(27.7)	48(20)	0.046
	No	375	183(72.3)	192(80)	
Seeks Physician	Yes	41	29(11.5)	12(95)	0.009*
	No	452	224(88.5)	228(95)	
Herbal Medicine	Yes	44	24(9.5)	20(8.3)	0.654
	No	449	229(90.5)	220(91.7)	
Alcohol Intake	Yes	14	12(4.7)	2(0.8)	0.009*
	No	479	241(95.3)	238(99.2)	
Smoking	Yes	11	10(4)	1(0.4)	0.080
	No	482	243(96)	239(99.6)	

P value  $\leq 0.05$  means significant and  $< 0.001$  is highly significant. This mark (\*) shows significant values. Rest was the most commonly used by 69.6% subjects who had PMS followed by hot packs 62.8%. Significant association was seen with alcohol intake, caffeine intake, diet alteration, rest hot packs, seeking physician, listening to music, dietary supplements, hot showers, crying and sleeping.

## Discussion

The prevalence of PMS in HCP in MMDU in this study was 51.3%. Our study showed significant association of pre-menstrual symptoms with the various socio demographic variables i.e. occupation, age of menarche, marital status, family history and use of analgesics. Pelvic discomfort and abdominal cramps was most common physical symptoms. Mood swings and irritability was common physiological symptom. Restlessness and being over sensitive most common behavioural symptoms. 91.9% used coping mechanism, rest was most commonly used followed by hot packs and then sleeping .

As per results of our study, mood swings (33.9%) and irritability (32.5%) were more commonly reported psychological symptoms. Rest being most commonly used coping mechanism. As well as significant association was seen between family history and PMS .These results were well supported by the results seen in the study conducted by Vijay et al<sup>[7]</sup>, where irritability (72.5%) and mood swings (71.7%) were most common psychological symptoms. Rest used as most common coping mechanism and association between family history with PMS was also found to be statistically significant. But most common physiological symptoms reported in their subjects was backache (74.2%), fatigue (70.6%) and acne (54.6%) whereas pelvic discomfort (35.9%), abdominal cramps (32%) were common symptoms seen in our study. This disparity might be as only undergraduates were enrolled in the above study whereas subjects enrolled in our study were undergraduates, graduates as well as post graduates, age ranging from 20 -50 years . The possible reason might be as the age increases more of physical symptoms are seen .Undergraduates may have more of acne issues due to adolescent age, as well as complaint of backache and fatigue may be due to their more of academic work.

The study conducted by Navdeep et al.<sup>[8]</sup> –in PGI –on M.Sc., BSc nursing students found that abdominal

pain (78.2%), back ache (66.1%) were most commonly seen physiological symptoms whereas pelvic discomfort (35.9%) was common in our subjects, though abdominal pain and pelvic discomfort are almost similar symptoms but as the above study was conducted only on nursing staff, so back ache may be attributed due to more of physical work done by nurses. Consistent findings regarding behavioural symptoms in the form of irritability and mood swings were seen in above and our study.

It was observed in the study conducted by Briuk et al<sup>[9]</sup> that maximum subjects used diet alteration as a coping mechanism but in our study rest was most commonly used. Significant association was observed between the diet alteration and PMS . As well as concordance results regarding the significant association between family histories in PMS were seen in above and in our study.

Among physiological symptoms breast tenderness (74.4%), headache (70.9%) and abdominal bloating (46.5%) were observed in the study conducted by Buddhabyakan et al.<sup>[10]</sup> But in our study pelvic discomfort (35.9%) was most common physiological symptoms. Above study reported effective symptoms in form of anger outburst (73.3%) and irritability (68.6%). In our study mood swings (33.9%) and irritability (32.5%) was commonly reported symptoms. The possible reason behind the difference in the symptoms might be due age group and regional difference of the subject enrolled. In the above study, use of analgesics (34.8%) and recreational activities (26.3%) were most common coping mechanism used whereas in our study rest was commonly used. Use of analgesics was not that common but was found to be statistically significant during PMS in our study.

A study by Nangashekhara et al<sup>[11]</sup> observed that 37% people had PMS among which 22% mild, 9% moderate and 5.3% showed severe symptoms. 46.7% showed mild, 36.9% had moderate and 12.4% showed severe symptoms . Sleeping (63%), rest (62.3%), listening music (38.7%) was more commonly used coping mechanism with significant association with family history . Our study too showed consistent findings regarding coping mechanism rest (69.6%) and association with family history with PMS. In the above study about (30%) of the respondent were taking paracetamol, 3% took mefenamic acid and 1% too naproxen and ibuprofen whereas in our study maximum

subject who reported PMS use to take mefenamic acid than any other medications (drotin -m, paracetamol, ibuprofen and then naproxen). The reason behind more use of mefenamic acid in our study might be as all the subject were from medical background so had better medical information regarding the use of mefenamic acid over paracetamol in PMS . As in the above study the subjects were school going, used more paracetamol then mefenamic acid. In the above study the population who had menarche at the age of 12 to 14 years reported maximum PMS .Significant association of PMS with age of menarche was observed. The finding was similar as seen in our study where the mean age of menarche was 13 to 14 years and significant association was seen with PMS, (p value of 0.002).

A study by Celenemaria et al.<sup>[12]</sup> showed the mean age of menarche was 12.4 years but in our study was 13.5 years which had significant association with PMS.

As in our study, maximum subjects showed mild PMS (46.7%) followed by moderate (36.9%). These result were well supported by Orhan et.al.<sup>[13]</sup> s study, in which (49.5%) had mild and (37.1%) had moderate symptoms of PMS.

A descriptive study conducted among 248 women to assess the premenstrual syndrome and coping behaviour showed that 79.43% had lower abdominal pain, 66.12% had backache and 52 % showed low work performance. 98.11% took hot or cold drinks as coping method.<sup>[14]</sup> Similar findings in form of lower abdominal cramps were reported in our study.

A cross-sectional by Singh et al<sup>[15]</sup>. reported fatigue (68.3%), followed by decrease interest in work (60.1%) by nearly two-third. Although irritability remained on third rank with overall prevalence of (59.9%). Though in our study irritability was mostly reported and lack of interest in work was third commonly reported symptom. Pelvic discomfort was reported more among the subjects than fatigue.

As the mean age of menarche showed significant association with PMS. Hence the adolescents must be educated regarding the symptoms and effective management of PMS. Students must be encouraged to ask for help regarding PMS and consult a concerned doctor. The administration and working authorities should address and recognise PMS issues in their female staff and must provide appropriate assistance to combat with the issue. Despite of the awareness among educated

women still there is big lacuna between consulting a doctor for their symptoms. Early diagnosis and knowledge regarding PMS symptoms among females will help in choosing appropriate coping mechanisms or treatment required.

## Conclusion

PMS is a common concern and have significant impact on the women's physiological, behaviour and psychological aspects of life. Emotional turmoil due to PMS may disturbs personal relationships to huge extent. Therefore proper measures and slight change in life style, diet modification and physical activities will help in decreasing the prevalence of PMS. Hence educational sessions, workshops concerning PMS must be conducted to disseminate more information. Further studies must be taken up to find out prevalence of PMS among the general population and other professionals.

**Ethical Clearance:** Taken from ethical board of university.

**Source of Funding:** Self

**Conflict of Interest:** Nil.

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# Fixing the Removable: A Case Report

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## Abstract

Various treatment options can be planned for a completely edentulous patient including implant fixed and removable prosthesis. But, the trident factors: mastication, phonation and esthetics should be given prime consideration while doing any dental procedure so as to achieve good prognosis. Though, prognosis depends majorly on the underlying residual bone as well as the mucosa, which helps the prosthodontist to determine the choice of a suitable prosthetic treatment option for a particular patient. Various studies over the past decade have shown the advantages of a mandibular implant overdenture rather than conventional denture - as the first treatment option for a completely edentulous mandible. An implant supported hybrid prosthesis is an acrylic resin complete fixed dental prosthesis and supported by implants might be a solution in extreme cases that the need of the restoration for esthetics, function, lip support and speech.

Therefore, this clinical report aims to present the esthetic and functional prosthetic rehabilitation of a mandibular ridge with implant supported fixed prosthesis.

**Keywords:** *Edentulous Mandible, Implants, Over Dentures, Retention, Prosthesis, Hybrid Denture.*

## Introduction

Edentulism is a form of physical impairment, as the loss of all teeth causes a disability for those who wear conventional dentures (CD), they may have difficulty in performing two essential tasks; eating and speaking.<sup>[1]</sup> Thereby, it can be said that a tooth loss is a major life event for patient's confidence and functionality.<sup>[2]</sup> Most of the complete denture wearers in spite of proper denture fabrication and lab handling are not satisfied with their mandibular dentures. Redford et al showed that over 50% of mandibular complete dentures have problems with stability and retention.<sup>[3]</sup> So, to get a satisfactory stability and improved retention mandibular

complete implant-supported over dentures and fixed hybrid prostheses can be planned.

While selecting between a fixed or a removable restoration all the following points should be considered prior to reach the final treatment plan: the available bone quantity and quality, the number, location and implant distribution, the available inter-arch distance and maxillary-mandibular relationship, the nature of the opposing occlusion, the expenses as well as the time frame required to assemble and maintain the prosthesis.<sup>[4]</sup>

The fixed-implant supported prosthesis can either be screw-retained or cemented over the implant abutments. The traditional screw-retained metal-resin prosthesis (hybrid denture prosthesis) is one of the most popular choices for prosthetic therapy in edentulous mandibles. The advantages of this prosthesis are its long track record of success and its retrievability.<sup>[4]</sup> Apart from the above mentioned advantages, hybrid prostheses can also replace soft tissue defects. However, lack of passive fit in the framework and distortion (which is possible to occur anytime during the fabrication) are major obstacles in the process of prosthesis fabrication.<sup>[5]</sup>

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A Hybrid denture is an implant-supported fixed denture where “Hybrid” refers to the fact that fixed denture is fabricated with both metal and plastic, making it a hybrid of the two. Therefore, it is a denture in the sense that it is fabricated same as a complete denture or partial denture, but it is supported by a metal frame that is screwed into the implants. Also known as “Fixed Detachable denture”

This article presents rehabilitation of a complete edentulous mandibular arch with an implant retained hybrid denture.

## Material and Method

**Case Report: Mandibular Implant-Retained Hybrid Denture:** A 46 year-old female patient reported to the Department of Prosthodontics, MM College of Dental Sciences And Research, Mullana with a chief complaint of loose lower complete denture prosthesis. The patient was unable to speak and eat properly as the lower denture was loose. History revealed that the patient was a complete denture wearer from last three years and had underwent multiple tooth extractions following dental caries and endodontic treatment. Clinical examination revealed that the patient had completely edentulous upper and lower arches [Figure 1]. The maxillary arch was U-shaped, smooth with no irregularities, no bony spicules, the mandibular ridge was found to be adequate in height but was irregular. Extraoral examination revealed that there was no facial asymmetry or mandibular deviations upon opening and closing. Mouth opening was 42 mm with sufficient inter arch space. Radiographic examination of the patient showed that patient had dense compact bone in the mandibular anterior region without any pathology. As the patient expressed unwillingness to be rehabilitated with any removable treatment option for mandibular ridge and desired for esthetic and functional rehabilitation. Therefore, conventional complete denture was planned for maxillary arch and screw retained implant-tissue supported hybrid prosthesis for the mandibular arch.

### Clinical Procedure:

**Stage I: Implant Surgery:** A full thickness mucoperiosteal flap was raised in the mandibular arch and 5 implants (Tapered self-thread, ADIN Dental Implant System Ltd, Israel) were placed in 2<sup>nd</sup> premolars and canines in both quadrants and one implant in the midline [Figure 2]. Patient was recalled after 1 week for suture removal.

**Stage II : Implant Surgery:** After a waiting period of 3 months, Stage II surgery was performed under local anesthesia in which cover screws were exposed and five healing abutments were placed [Figure 3]. Healing abutments were fastened to the implants to allow undisturbed soft tissue healing.

**Prosthetic Phase:** After 1 week, when the soft tissue has grown around healing abutments, the healing abutments were removed and impression copings were connected to the implants for the indirect impression technique. The tray was then loaded with putty and light body impression material (Zhermack Zetaplus Putty Impression Material) was injected around the impression copings and impression was made. Then, the tray was removed. The impression copings were unscrewed from the implants with the Hex Tool and along with the implant analogue were then incorporated in to the impression [Figure 4].

The implant replicas were held in place to prevent rotation of the impression copings. A thick layer of Esthetic Mask (Detax Esthetic Mask Automix) was injected around the implant analogues and impression copings till the junction of both to simulate the soft tissue around them. The healing abutments were attached to the implants and patient was sent.

In the laboratory, impression was poured and the master cast was recovered with the Implant replicas embedded in the cast. Record bases and occlusion rims were fabricated. Patient was recalled for recording of maxillomandibular relations and after obtaining the record master casts were then mounted on a semi adjustable articulator. A verification jig was fabricated on the master cast along with the castable abutments with the help of Pattern Resin (GC Pattern Resin) which verifies and ensures that the final screw-retained framework has the optimal passive seat. After taking the jig trial in mouth, the framework was waxed on the master cast and was casted later. The casted metal framework was checked in mouth and proper seating was confirmed [Figure 5]. Then, metal framework was waxed up and trial was done. The investing, flasking and processing procedures for the hybrid prosthesis were then completed. The prosthesis was finished and polished. The maxillary complete denture was flasked and processed by use of the maxillary master cast as any conventional complete denture. Maxillary conventional denture and mandibular hybrid denture were then delivered to the patient after adjustments. The hybrid

prosthesis was screw retained and composite resin was used to cover the screw access holes[Figure 6].Patient was advised to follow-up for any adjustments if needed.

**Maintenance Phase:** Patient's oral hygiene was reviewed after one month and rest were scheduled after every six months for maintenance.



**Figure-1: Completely Edentulous Maxillary And Mandibular Ridges**



**Figure-2: Implants Placed In Mandibular Ridge**



**Figure-3: Intraoral View Showing Healing Abutments**



**Figure-4: Impression Transfers Connected To Implant Analogues & Seated In Impression**



**Figure-5: Metal Framework Try-In Done**



**Figure-6: Definitive Prosthesis (Frontal View)**

## Discussion

Major advantage of a fixed detachable (hybrid) denture is that it is always held securely in place and can only be removed by the dentist. The rehabilitation with hybrid dentures has been observed to achieve greater masticatory function and psychological satisfaction than with conventional complete dentures.<sup>[6]</sup> The hybrid denture is made to leave a space between the denture and the bone to enable clean easily underneath the denture without removing. So, it is recommended to visit the dentist twice a year, to assess the condition of peri-implant tissue and bone to avoid any unforeseen complications and professional cleaning is done.

Although, occlusal forces tends to increase considerably following the placement of an implant-supported prosthesis.<sup>[7]</sup> It should be kept in mind that passive fit is the prerequisite for survival of implants in bone<sup>[8]</sup> and not achieving it leads to mechanical and biological failures.<sup>[9]</sup> Jacobs et al, stated that complete edentulism can affect speech quality due to the absence of the periodontal ligaments which is responsible for speech sensation.<sup>[10]</sup> Removable overdentures are similar to the pattern of the complete dentures, whereas the bases of fixed prostheses are generally narrower, which could explain the cause of speech adaptation problems encountered by patients.<sup>[11]</sup> Various studies showed fixed prosthesis are more successful in the mandible regarding stability, ability to chew, aesthetics and ability to speak. Thereby, making implant retained fixed hybrid denture as the treatment of choice over a removable implant overdenture.

No. of implants used to support a full denture is a debatable issue. The hybrid prosthesis is ideally placed on the largest possible number of implants, but on a minimum of 4 implants.<sup>[12]</sup> In this particular case five implants were planned i.e. in position A, B, C, D and E. As framework fabrication requires many steps, the cause of distortion in implant frameworks may be multifactorial.<sup>[13]</sup> The factors may include implant alignment, impression technique and materials, framework fabrication process, design configuration and clinician and technician experience.<sup>[13,14]</sup> Also, dimensional changes occur related to the chemical reactions of impression materials, dental stones and investment materials.

A hybrid restoration is indicated when the intra-arch distance is more than required for implant supported

fixed prosthesis.<sup>[15]</sup> In the present case, the distance present was suitable for placement of hybrid prosthesis.

Zarb and Jansson<sup>[16]</sup> stated that fixed detachable hybrid prostheses could be designed using one of the following two methods: (a) a metal framework comprises the bulk of the prosthesis and artificial teeth and a small denture base are the only non-metallic components, (b) the implant-fixed prosthesis consists mostly of an acrylic resin denture bases (wrap-around design) and artificial teeth, with a small metal framework. In the described case, the second design method was used for the superstructure.

### Advantages of hybrid denture:

1. Hybrid denture restores new teeth and gums to give a proper esthetic and facial support.
2. Unlike conventional dentures, hybrid dentures are stable
3. Implant hybrid dentures cannot be removed by patients but can be removed by the dentist for maintenance if required.
4. Are much less expensive than crowns on individual implants.

### Disadvantages:

1. Need to clean under the denture flanges and denture teeth may require maintenance overtime.
2. Passive fit of the metal substructure may require sectioning and soldering after initial fabrication.
3. Access holes must be present to allow for screw tightening or retrieval of the prosthesis which may compromise esthetics and occlusion.

## Conclusion

Every patient has unique treatment needs. Proper diagnosis and treatment plan are important but cannot be all-inclusive. A comprehensive examination, including a thorough medical & dental history, clinical examination, dental radiographs, diagnostic impressions are some important steps to a successful oral rehabilitation. It can be concluded that the rehabilitation of an edentulous mandible with the implant supported hybrid denture provides more satisfaction with the prosthesis, improved masticatory ability and nutrition, along with improvements in psycho-social aspects of life. Moreover, this clinical method is more conservative, feasible and reliable that does not require advanced

surgery. Retention & stability were found to be good upto 12 months of review.

**Conflict of Interest:** Nil

**Source of Funding:** Self

**Ethical Clearance:** Not required

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# Prevalence of Neck Dysfunction in Women Using High Heeled Footwear Working in I.T. Profession

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## Abstract

**Background:** Nowadays, high heels are very commonly used in all age groups. And in some of the I.T companies it is compulsory to wear high heels for min 8 hours per day. Therefore, its negative impact seen on women health. While wearing high heels it is difficult to maintain the balance and Center of Gravity. Therefore, postural changes seen in women during standing and walking there is increase lumbar lordosis to compensate that there is increase in cervical lordosis. These change in spinal curvature will result into the neck dysfunction.

**Objective:** To find out prevalence of neck dysfunction in women using high heeled footwear working in IT profession.

**Methodology:** An observational study was carried out using a cross sectional study design. The study was conducted in the in and around Karad, Maharashtra. Study was conducted using sample size of 95 [  $n = 4pq/L^2$  ] using high heeled footwear working in IT companies for period of 6 months. The inclusion criteria were age group 20-35 years using high heels regularly for more than 8 hours and height of footwear more than 5 cm. and exclusion criteria was women underwent recent spine surgery including cervical, thoracic or lumbar spine, any congenital deformity of spine. Any recent trauma to spine, musculoskeletal deformity e.g. Rheumatoid arthritis of cervical spine or osteoarthritic condition.

**Result:** The women those are wearing high heeled footwear for more than 8 hours/day with height of footwear >5cm suffering from mild to moderate neck disability and it is significantly seen in age group of 25-35 years.

**Conclusion:** From this study, it can be concluded that the women wearing high heels footwear for more than 8 hours/day suffering from mild to moderate neck dysfunction.

**Keywords:** High heels, height >5 cm, neck dysfunction, age group 25-35 years.

## Introduction

Nowadays, Neck pain is very common occurrence in our society which leads to significant social and economical burden.<sup>[1]</sup> There are the various types of neck pain—

**Muscle Pain:** Aching or sore neck and shoulder muscles may occur in response to over exertion or prolonged physical or emotional stress.

**Muscle Spasm:** This is sudden, powerful tightening of neck muscles. It can result from muscle injury, but it

can also occur in response to a disc or nerve problem or even emotional stress.

**Headache:** Neck related headache is most often felt in the back of the head and upper neck and usually the result of muscle tension and muscle spasm. Pain is usually dull or aching. The neck might also feel stiff or tender.

**Nerve Pain:** Irritation or pinching of the roots of the spinal nerve causes pain that may be sharp, severe or accompanied by pins or needles. Depending on the



nerve involved, the pain may shoot down to arm or even into the hand.

**Bone Pain:** Pain and tenderness in the cervical vertebrae are far less common than neck pain from the soft tissue. [2]

There are various cause of cervical pain includes abnormal position while working at job place, using high heeled footwear, sleeping in uncomfortable position, stress, change in spinal curvature, abnormal posture. Danish scientists at the National research center for the working environment in Copenhagen say that women engaged in repetitive work, mostly at computer keyboards, at bank, post office administrative offices and an industrial facility are more prone to develop the neck pain. [3] It is recognized that all soft tissue, including muscle, tendon, fascia, cartilage, nerve will fail when excessive force applied. Activities at work, daily living and recreational may often produce biomechanical force upon the body that limits the mechanical strength of the soft tissue. This described as a Repetitive Strain Injury and linked with a musculoskeletal disorder, especially those affecting the neck and upper limbs. [1]

In order to satisfy their desire to be more beautiful, in the age of Louis XIV in France, women started to wear high heeled shoe [4]. At present, high heeled shoe is regularly used by the women in all age group, in work and other setting. The studies say that women have relatively weak neck muscles, which can cause chronic fatigue syndrome related to muscular system, result in high risk of chronic neck pain. [1,5] However, previous studies have shown that the height of a heel directly affects the spine as well as other parts of the body. Therefore, consequent negative effects like ankle sprain, lower back pain, shortened Achilles tendon, decreased stride length n change in gait pattern and also increase in risk of predisposition of knee osteoarthritis. [1] It can also alter the static posture and dynamic movements of the body and is regarded as a cause of musculoskeletal problems related to spine. [6]

Walking in high heeled shoes changes the kinetic characteristics of the lower extremity joints causing a reduction in the ankle plantar flexor movement and power during stance phase of gait cycle and increase the pressure on the toe. [7]

**Change in posture due to high heels:** Walking in high heels can leads to upward displacement of centre of mass (which is usually in front of S<sub>2</sub> vertebra) and

possibly a more unstable posture. To maintain that, women's body will attempt to compensate for the balance by flexing or forward bending of hips and spine. In order to maintain balance, the calf, hip and back muscles become tense. Additionally, shock and ground reactional force can lead to increase in axial pressure onto intervertebral disc resulting in increase in erector spine muscle activation. This is because of, increase in ground reaction force with increase in height may result from decrease in subtalar joint pronation at heel strike. Due to that, increase trunk muscle activity with increase in height of shoe, which changes the posture result in discomfort of back muscles. In addition, the effect is magnified with increase in activation of erect spine muscles which contribute to compression of spine. [5] Therefore, wearing high heeled for longer period of time increase paraspinal muscle activation of lumbar and cervical spine. Therefore, at the end of the day, this muscle is excessively fatigue n strain. [1,3]

## Material and Methodology

An observational study was carried out using a cross sectional study design. The samples were selected using the simple random sampling method. The study was conducted in the in and around Karad, Maharashtra. Study was conducted using sample size of 93 [  $n = 4pq/L^2$  ] using high heeled footwear working in IT companies for period of 6 months. The inclusion criteria were age group 20-35 years using high heels regularly for more than 8 hours and height of footwear more than 5 cm. and exclusion criteria was women underwent recent spine surgery including cervical, thoracic or lumbar spine, any congenital deformity of spine. Any recent trauma to spine, musculoskeletal deformity e.g. Rheumatoid arthritis of cervical spine or osteoarthritic condition

**Outcome Measures:** The outcome measures was taken for this study were

Visual Analogue Scale (VAS)

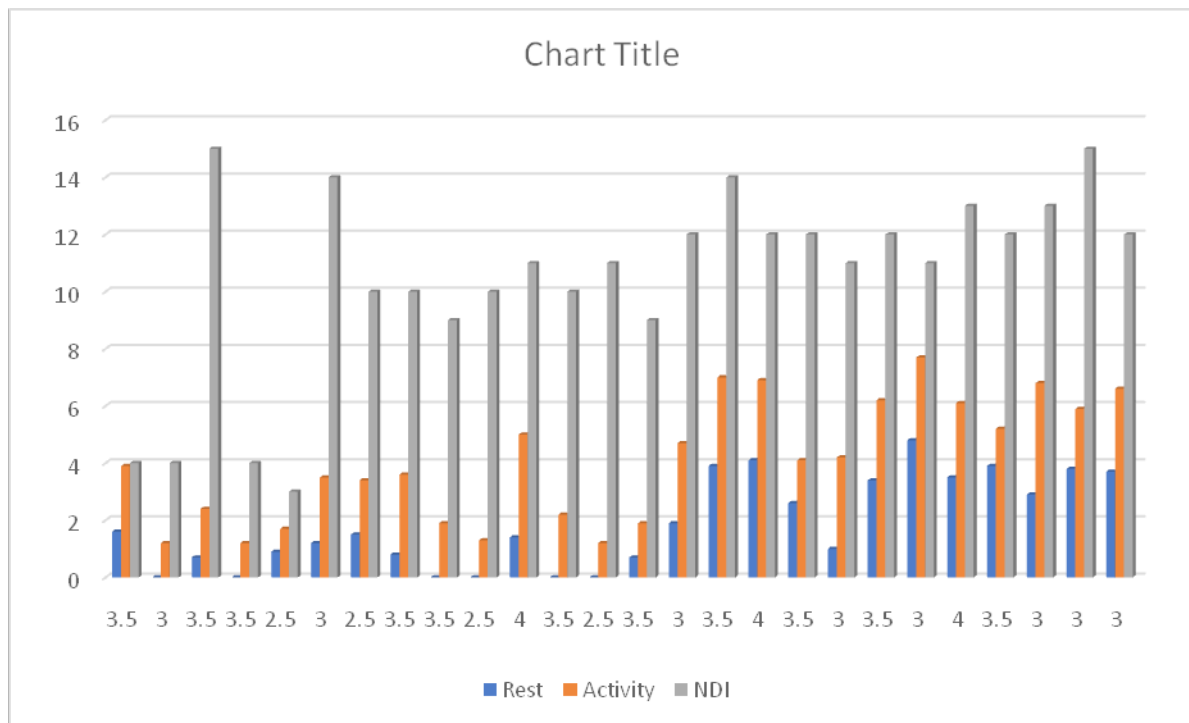
Neck Disability Index Questioner0

**Statistical Analysis:** Statistical analysis of the recorded data was done by using the software SPSS version20.

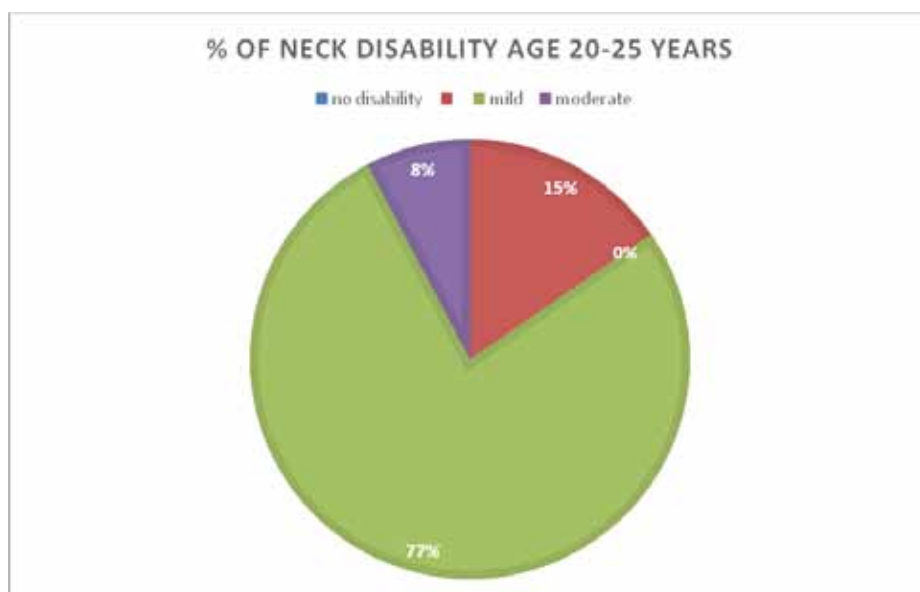
93 subjects were successfully completed questionnaires. The result showed that mean age of women in age group 20-25 years is 24.23 years and SD was 0.81. The mean values of pain at rest and activity 1.85 and 4.06, (SD) were 0.45 and 1.58 respectively [Table 1].

**Table No. 1: For female age group 20-25 years**

	Mean ± SD
Age 20-25 Yrs	24.23 ± 0.81
Height of footwear	3.25 ± 0.45
VAS - Rest	1.85 ± 1.58
Activity	4.06 ± 2.12
NDI	10.50 ± 3.35



**Graph 1 shows that the intensity of pain at rest and on activity and the neck disability score according to the height of footwear in women age group of 20-25 years.**

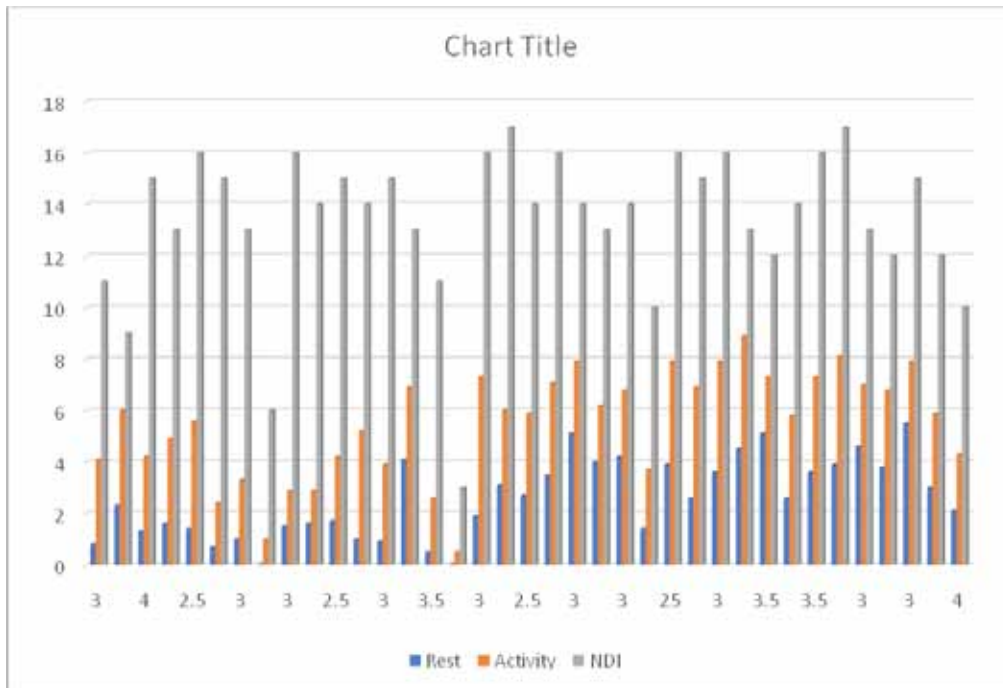


**Graph 2: It shows that the % of neck disability in women age group of 20-25 years.**

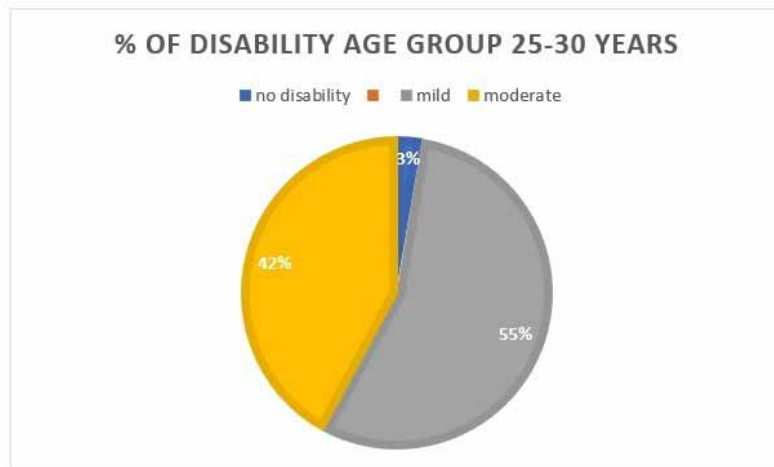
**For female age group 25-30 years**

	Mean ± SD
Age 25-30 yrs	27.91 ± 1.44
Height of footwear	3.78± 3.60
VAS – Rest	2.57 ± 1.54
Activity	5.5 ± 2.10
NDI	13.35 ± 2.95

38 subjects were successfully completed questionnaires. The result showed that mean age of women in age group 25-30 years is 27.91 years and SD was 1.44. The mean values of pain at rest and activity 2.57 and 4 and (SD) were 0.45 and 1.58 respectively [Table 1].



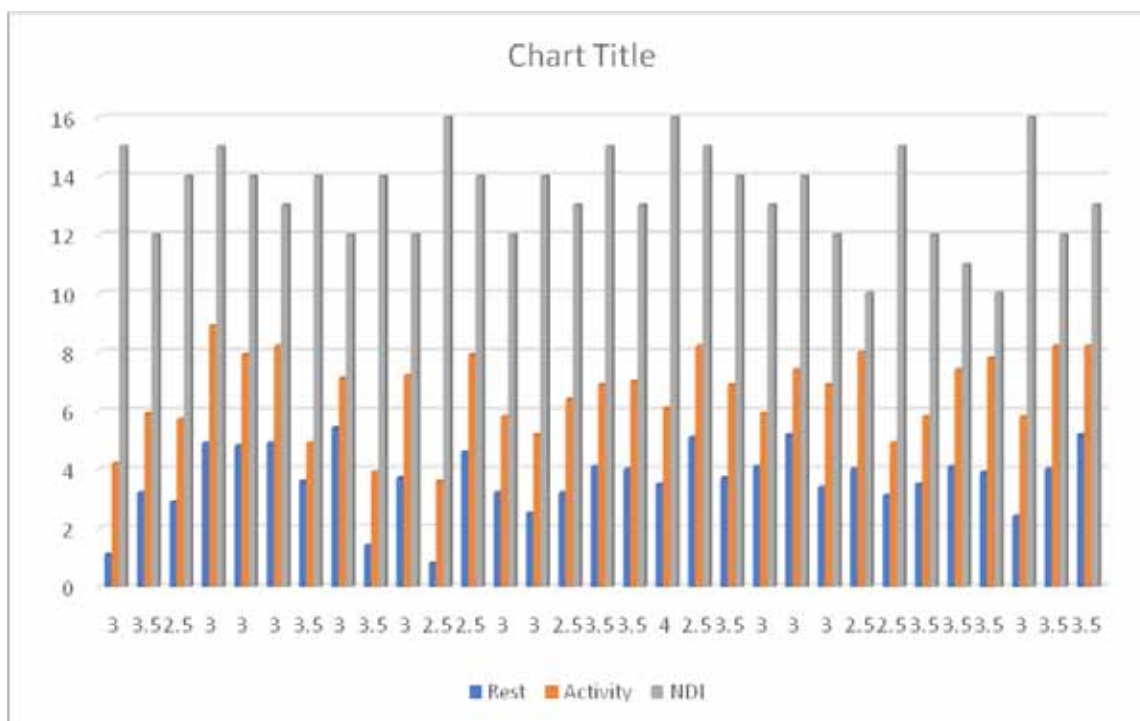
**Graph 2: It shows that the intensity of pain at rest and on activity and the neck dysfunction according to the height of footwear in women age group of 25-30 years.**



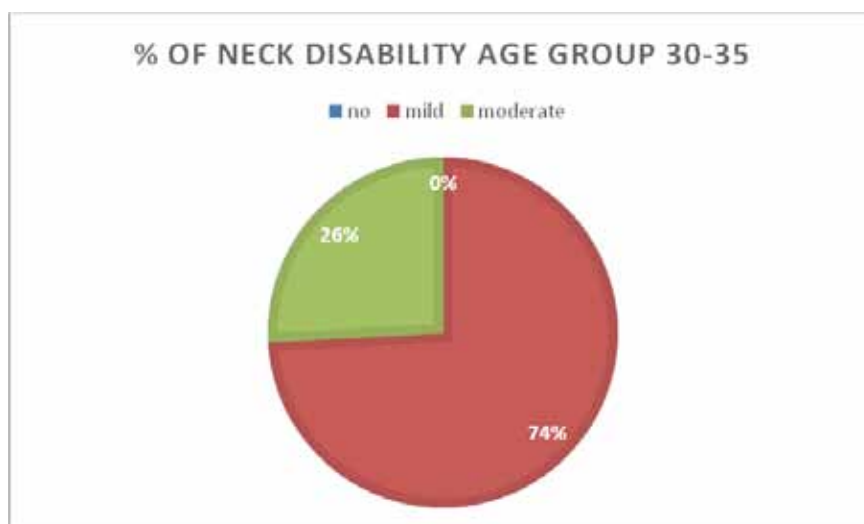
**Graph 4: It shows that the % of neck disability in women age group of 25 - 30 years.**

**For female age group 30-35 years:** 31 subjects were successfully completed questionnaires. The result showed that mean age of women in age group 30-35 years is 24.23 years and SD was 0.81. The mean values of pain at rest and activity 1.85 and 4.06, (SD) were 0.45 and 1.58 respectively [Table 1].

	Mean ± SD	T Value
Age 30-35 yrs	32.80 ± 1.42	128.27
Height of footwear	3.09 ± 0.41	41.37
VAS – Rest	3.66 ± 1.16	17.54
Activity	6.58 ± 1.39	1.39
NDI	13.38 ± 1.62	45.82



**Graph 5:** It shows that the intensity of pain at rest and on activity and the neck dysfunction according to the height of footwear in women age group of 30-35 years.



**Graph 6:** It shows that the % of neck disability in women age group of 25 - 30 years.

## Result

The women those are wearing high heeled footwear for more than 8 hours/day with height of footwear >5cm suffering from mild to moderate neck disability and it is significantly seen in age group of 25-35 years.

## Discussion

High heeled shoes have a variety of features which distinguish them from others shoes that ordinarily worn by female. While typical shoes have a heel elevation approximately 1-2 cm. High heeled shoes have heel elevation of up or greater than 7.5 cm. As the heel height increases the center of mass displace more and more anteriorly which leads to unstable posture compared to that produced by low heeled. There is increase in plantarflexion, slight increase in knee flexion and increase in lumbar lordosis to compensate that increase in thoracic kyphosis and increase in cervical lordosis. Therefore, consequent negative impact on the body so,

The aim isto study the prevalence of neck dysfunction in women using high heeled footwear working in I.T profession.

The objectives of this study were to assess the height and type of footwear and find out the negative impact on the joints and soft tissue those are wearing high heeled footwear.

This project was done in 6 months of duration with sample size 95 and age group 20-35 years. Later this group were divided into the age group between 20-25 years, 25-30 years and 30-35 years. The subjects were taken from the various I.T companies. Consent from was taken from subjects and assessment were done.

According to KISU PARK, MSc PT et.al shows that effects of walking in high heel on the muscular activity of the cervical and lumbar muscles in healthy women and the results showed a significant increase in cervical muscle activation walking in the high heels. As the body tries to maintain the posture without falling, compensatory activity of the both erector spinae and cervical paraspinals increases.

Cervical spine movement assist in maintaining the head stability in space, assist dynamic postural control and compensators the trunk motion to maintain the center of mass move posteriorly, thereby maintaining the head position above the trunk. This article partially supports my study

According to TIM WEIKUNAT et.al study, the influence of high-heel shoe on the sagittal balance of the spine and the whole body, it is proved that the wearing high heel increase the cervical lordosis to adapt to the shift of the body's center of gravity. This leads to pain and dysfunction of cervical spine.

## Conclusion

From this study, it can be concluded that the women wearing high heels footwear for more than 8 hours/day suffering from mild to moderate neck dysfunction.

**Conflict of Interest:** There is no conflict of interest concerning the content of the study.

**Source of Funding:** This study was self funded

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

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# A Study on Utilisation of Maternal Health Care Services among Primitive Tribal Women of Dakshina Kannada District, Karnataka

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## Abstract

**Introduction:** Poor accessibility and less utilization of maternal health care service leads to a high maternal mortality and morbidity among the primitive tribal women. Their socio-economic & contextual conditions have become barriers to access the reproductive and child health care services.

**Material and Method:** This was a community based descriptive cross sectional study, undertaken in 2016 with the tribal women of Dakshina Kannada district of Karnataka state. The study was conducted with the tribal women who were in reproductive age and had child less than five years of age during the time of interview.

**Results:** In the present study 68.4% respondents had their first antenatal visit in first trimester. Only 90(27.4%) respondents have taken two dosages of Tetanus toxoid and 309(93.9%) respondents consumed more than 50 Iron and Folic Acid tablets. The women who delivered in health facilities sought professional assistance largely from the ANM's/Nurses (98.2%) followed by doctors (86.9%).

**Conclusion:** The number of the ANC visits and utilisation of TT should be increased by using community outreach activities and greater promotion of the village level health workers. In this study, early registration of pregnancy found as a crucial point of RCH services hence an effort should be made to motivate the tribal women to register their pregnancy with public health care institutions.

**Keywords:** Accessibility, Maternal mortality, Reproductive health, Community.

## Introduction

The maternal health care service is a comprehensive package of Ante-natal Care (ANC), delivery care and Post-natal care services.<sup>1</sup> Findings from a number of studies in India shows that primitive tribal women tend

to be at a greater risk to adverse maternal and child health outcomes than non-tribal women.<sup>2</sup> Evidence of community and facility studies show, maternal healthcare seeking is comparatively less among tribal women than the non-tribal women in India. The proportion of deliveries among tribal women, without any ANC services is 37.8 percent which is higher compared to 22.8 percent among the non-tribal women. A large proportion of the deliveries are still taking place at home.<sup>3</sup> The reason for the disparity in maternal health care utilisation is not only a medical event rather a social phenomenon and adversely affecting most socially disadvantaged groups like Scheduled Castes and Scheduled Tribes.<sup>4</sup> Several studies have documented the factors influencing on maternal health care.<sup>5</sup> In India,

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the caste, socio-economic condition, education level, occupation, standard of living, age at marriage and perception towards infant and child mortality effects on the utilisation of maternal health care services.<sup>6</sup>

Enhancing the utilisation of maternal health care services among the socially disadvantaged group is a developmental challenge to the policy makers and the authorities in underdeveloped and developing countries. The Millennium Development Goals (MDGs) and Sustainable Development Goals (SDGs) are also have set targets to reduce the reproductive mortality and morbidities. So, the present study was carried out to examine the utilisation of maternal health care services among the tribal women of Dakshina Kannada district.

### Material And Method

The present descriptive study was conducted among the 'Koraga' women, a primitive tribal group of Dakshina Kannada district of Karnataka state, to examine their maternal health seeking behaviour and health service utilisation. Tribal women's, minimum three antenatal care visits has been considered as an indicator of maternal health care service utilisation. Sample size was determined by referring the Krejcie and Morgan's (1970)<sup>7</sup> table for sample size determination. For this anticipated Population proportion (P) was .50, confidence level set at 95% and degree of accuracy expressed as a proportion (.05). Formula is  $= \frac{X^2 NP (1-P)}{d^2 (N-1) + X^2 P(1-P)}$  where  $X^2$  is 3.841. So, the sample size for the population of 2070 primitive tribal women is 329. The data has been collected from the women who had a child of less than five year by administering pretested interview schedule. The Collected data has been analysed with the help of SPSS.

**Findings:** Majority 166(50.45%) were in the age group of 26 to 30 years and 134(40.73%) were from the age group of 31 to 35 years. The average age of the respondent women was 29.43 years. The youngest and oldest respondent's were 19 and 35 years old respectively. Most of the respondents (59.6%) women were educated up to primary level followed by 60(18.2%) had studied till high school. Only 13(4.0%) respondents had studied till the pre-university level among the tribal women. It is notable that 60(18.2%) never attended formal schooling. A Large proportion (98.2%) of the respondents was working for daily wages and a small proportion were in salaried private jobs. Regarding household income, majority were having the income within the range of

Rs.9000-10000 followed by 124(37.7%) respondents within the income level of rupees 5000 to 7000(Table No. 1).

Study shows that all the primitive tribal women have at least one ANC visit, but 241(73.3%) women weren't sure about the number of ANC visits made during their pregnancy. About 88(26.7%) women had minimum three and more than three ANC visits that were medically prescribed for the pregnant women. More than half (68.4%) of them had their first ANC visit in first trimester. Only 90(27.4%) respondents have taken two dosages of Tetanus toxoid (TT) and 309(93.9%) respondents consumed more than 50 Iron and Folic Acid (IFA) tablets. (Table No. 2).

In the present study 323(98.2%) respondents delivered in government and private hospitals while a small proportion (1.8%) had delivered at homes. The women who delivered in health facilities sought professional assistances largely from the ANM/Nurse (98.2%) followed by doctors (86.9%) and birth attendants (34.7%). The women who delivered at home have received the assistance from elder relatives and friends. (Table No. 3)

Among the respondents, 83.6% were received the Post-natal care services, predominantly from the PHC's/CHCs and 37(13.5%) from the private health clinics. Consultation with ASHA workers in one to three times during post-natal period was 43.2% and above four times was 28.9%. Majority (72.9%) of the tribal women were not aware about the Janani Suraksha Yojana (JSY) and only 142 women received financial benefits and mother kits under JSY Scheme. (TableNo.4)

### Discussion

The present study recorded that the majority of the respondents were registered and received the ANC services from the public health services. The result was found similar with the study conducted with tribal women in Kerala by Jinu Annie Jose and others (2014)<sup>8</sup> on assessing the utilisation rate of maternal health care. The coverage of ANC services has been found full among tribal women in Kerala.<sup>9</sup> Most of the women registered their pregnancy with public health facility this could be because of their intimacy with village level health workers and also found high rate of ANC service utilisation among the women who registered their pregnancy in the first trimester. Tribal women prefer to seek treatment for reproductive health from the public



health care, whereas non-tribal women rely on the private health facilities to seek treatment for their children and family Planning services. The study conducted by Jose and others (2014), found similar results that all the tribal women sought treatment from the government facilities in Kerala. Whereas, the study conducted in Madhya Pradesh reveals that very few tribal women had sought treatment from public facilities compared to the private health facilities. Women who consulted doctors at public facility were satisfied with service provided but women were unsatisfied with treatment given and test undertaken in the government health facilities.<sup>10</sup> Deb (2008)<sup>11</sup> also observed that women failed to utilise full ANC because of delay in registration of their pregnancy. The study conducted by Mohindra and others (2010)<sup>12</sup> also found similar results that tribal women were substantial users of free public health services.<sup>8</sup> IFA consumption rate and adherence to the TT injection has been found remarkable in the study. Similar to this, the study conducted with ‘Savara’ tribe of Andhra Pradesh also found high rate of IFA consumption as well as TT dosage taken.<sup>14</sup> It is found that, the ASHA Workers and ANM’s were the main source of health education and motivation to utilise the maternal health care services, thus impact of health staff is more in tribal areas. Same was found in the study conducted in the state of Rajasthan, ASHA workers and ANMs are playing vital role in achieving a full immunisation in tribal area.<sup>15</sup>

**Table 1: Distribution of respondents according to Socio-demographic variables**

Variables	Frequency (%)
Age Groups (Years)	
19-25	29(8.82)
26-30	166(50.45)
31-35	134(40.73)
Educational Status	
Illiterate	60(18.2)
Primary	196(59.6)
High school	60(18.2)
Pre-University	13(4.0)
Occupational Status	
Daily wages	323(98.2)
Salaried Private Job	6(1.8)
Household Income	
5000-7000	124(37.7)
7001-9000	78(23.7)
9001-11000	127(38.6)

**Table 2: Distribution of respondents according to antenatal care utilization**

Variables	Frequency (%)
Number of ANC visits	
Don’t Know	241(73.3%)
3	37(11.2%)
4	5(1.5%)
Above Four	46(13.9%)
Time of first ANC visit	
1st trimester	225(68.4%)
2nd trimester	104(31.6%)
TT dose taken	
Single dose	211(64.1%)
Two dose	90(27.4%)
Booster dose	28(8.5%)
IFA table consumed	
50<	11(3.4%)
50>	309(93.9%)
None	9(2.7%)

**Table 3: Distribution of respondents according to assistance during delivery**

Variables	Frequency (%)
Place of Delivery	
PHC/CHC	137(41.6%)
District Hospital	106(32.2%)
Pvt. Hospital	80(24.3%)
At home	6(1.8%)
Professional Assistance sought	
Doctor	286(86.9%)
ANM/Nurse	323(98.2%)
Birth Attendant	114(34.7%)
At home	6(1.8%)
Relative/Friends	

**Table 4: Distribution of rural respondent women according to Post-natal visits, ASHA consultation and JSY Benefits**

Variables	Frequency (%)
Post-natal visits	
Yes	275(83.6%)
No	54(16.4%)
Source of PNC Service	
PHC/CHC	238(86.5%)
Pvt. Clinics	26(9.5%)
Pvt. Hospital	11(4.0%)

Variables	Frequency (%)
Number of ASHA Consultation	
One to three times	224(71.1%)
Four to Six times	95(28.9%)
Aware about JSY	
Yes	89(27.1%)
No	240(72.9%)
Mother kit under JSY	
Yes	142(43.2%)
No	187(56.8%)

### Conclusion

The findings of this study have policy implications for enhancing the maternal health of primitive tribal women in the country. Tribal women require adequate information about the reproductive morbidity and treatment especially on ANC and PNC services. As found in the study, the early registration of pregnancy will make a greater impact in usage of maternal health care services; hence efforts should be made to motivate the primitive tribal women to register their pregnancy with public health services as soon as they come to know about their pregnancy. ASHA workers and ANMs are the primary source of maternal health hence government should design capacity building programmes to carry out their activities more effectively. Besides, awareness and promotion programme on the child immunisation, family planning and nutrition should be organised at tribal concentrated areas.

**Conflict of Interest:** None declared

**Source of Funding:** This study was not funded by any funding agency

**Ethical Clearance:** This study was approved by the Doctoral Committee of Mangalore University, Mangalore and the written consent has been taken from the each participant.

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# ABO Blood Group and its Unusual Relationship with Thyroid Disorders

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## Abstract

**Introduction:** Thyroid disorders are not so uncommon in India, it is estimated that about 42 million people are suffering from thyroid diseases. ABO Blood group classification is commonly used to denote the presence of one, both, or neither of the A and B antigens on erythrocytes.

**Objective:** To investigate the correlation of thyroid hormone abnormalities and their preponderance if any, with ABO Blood group antigens.

**Methodology:** 220 people diagnosed with thyroid gland disorders were divided into three groups based on thyroid hormone levels (Hypothyroid, hyperthyroid and euthyroid) with similar age group, sex ratio and race. ABO antigen based blood groups were assessed for people diagnosed with thyroid gland diseases and analysed.

## Result:

**ABO Blood Group:** Amongst 220 people 68 people (31%) had “A” blood group out of which people with hypothyroidism – 16(24%), with hyperthyroidism - 32(47%) and 20(29%)–euthyroid; 44 people (20%) had “B” blood group out of which people with hypothyroidism – 12(27%), with hyperthyroidism - 16(36%) and 16(36%)–euthyroid; 100 people (45.45%) had “O” blood group out of which people with hypothyroidism – 68(68%), with hyperthyroidism - 24(24%) and 8(8%)–euthyroid; 8 people (3.6%) had AB blood group out of which people with hypothyroidism - 4, with hyperthyroidism - 4 and 0–euthyroid.

**Conclusion:** Our results indicate that ABO Blood group antigens show a correlation with thyroid hormone disorders. People with BLOOD GROUP “O” are more prone for developing thyroid disorders followed by “A” and “B”. Hypothyroidism was found as the most common presentation amongst “O” blood group and Hyperthyroidism amongst “A” and “B” whereas “AB” showed no such preponderance.

**Keywords:** ABO Blood grouping, hypothyroidism, thyroid disorders, blood group related diseases.

## Introduction

Thyroid is a highly vascularized endocrine gland that

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secretes hormones responsible for metabolism–T3 (tri-iodothyronin) and T4 (tetra-iodothyronin)<sup>1</sup>. Secretion of these hormones is controlled by TSH (thyroid stimulating hormone) which is secreted by pituitary gland. There exists a negative feedback mechanism which ensures optimum blood levels of the hormones<sup>1</sup>. When the level of thyroid hormones increases in blood, a negative feedback reduces the secretion of TSH mediated by Trh and vice-versa and hence controls the levels of T3 and T4 within the optimum range<sup>1</sup>.

The thyroid hormones act on nearly every cell in

the body. They increase the basal metabolic rate, affect protein synthesis, help in regulating long bone growth, play a crucial role in neural maturation, their presence increases the body's sensitivity to catecholamines (such as adrenaline). So, any thyroid hormone disorder can affect body functions and increase morbidity in multiple ways.

Thyroid disorders is a general term representing several different diseases involving thyroid hormone levels and the thyroid gland. Thyroid disorders could occur due to various reasons

#### Etiology<sup>3,4,5,6</sup>

- Genetic - congenital hypothyroidism, congenital hyperthyroidism
- Inflammatory – infective / non infective - thyroiditis
- Autoimmune – hashimoto's thyroiditis
- Neoplastic – benign and malignant tumors
- Nutrient deficiency – Endemic goitre
- Syndromic – Pendred syndrome, Bamforth-Lazarus syndrome and brain – lung – thyroid syndrome.

Person suffering from thyroid disorder caused by any of the stated etiology can be grouped under one of the three categories based on their thyroid hormone levels.

1. Hypothyroid
2. Hyperthyroid
3. Euthyroid status

Back in 1901, Landsteiner was the first to explain about the presence of serologic variation between individuals based on their RBC cell membrane antigens and antibodies present in plasma<sup>7</sup>. He classified people based on their blood group, which depended on their RBC cell membrane agglutininogen – people with Blood group A, B, AB and O<sup>7</sup>.

ABO blood group system is controlled by genes located on chromosome number 9 and plays a vital role in modern day transfusion medicine<sup>2</sup>. Alleles which code for antigen A and B show co-dominance and act as dominant allele compared to the O antigen<sup>2</sup>. The presence or absence of the erythrocyte membrane antigen decides the blood group of the individual.

Antigen on the cell membrane is accompanied

by the presence of the anti-body in the plasma for the other antigen, for example - people with blood group A, have antigen A on the RBC membrane where as anti-B antibody in the plasma. Similarly people with blood group B have antigen B on the RBC membrane and anti-A antibody in the plasma, people with blood group O have neither A nor B antigen and hence both anti-A and anti-B antibodies are present in their plasma, people with AB blood group on the contrary have both A and B antigen and none of the antibody.

The prevalence rate of thyroid disorders in India is about 3.2%, which appears to be small but given the population of India, it is estimated to be around about 42 million<sup>8</sup>. Thyroid hormones being multifunctional are capable of causing morbidity in multiple ways if present in excess or in less amount. Hormonal imbalance not only affects the directly connected functional systems but also is proven to causes other morbid consequences like

Cardiac illness, mental health issues, myxedema, peripheral neuropathy, infertility, birth defects, osteoporosis and many more<sup>1</sup>.

Its already been established that some diseases like salivary gland tumours<sup>10</sup>, chicken pox<sup>11</sup>, malaria<sup>12</sup>, oral cancer<sup>13</sup>, haematological malignancies<sup>14</sup>, ischemic heart disease<sup>15</sup>, dental caries<sup>16</sup>, cholera<sup>17</sup> have significant association with blood groups.

The aim of the research was to investigate the correlation of thyroid hormone abnormalities and their preponderance if any, with ABO Blood group antigens. If found significant it could help in identifying population which is prone for developing thyroid disorders based on their blood group.

### Materials and Method

It was an Observational study, conducted in patients that presented to the E.N.T OPD in JSS hospital, Mysore. Ethical clearance was obtained from the ethical committee of the institute before commencement of the study.

People with newly diagnosed thyroid disorders irrespective of age and sex and etiology who willing gave consent to be the part of the study were selected. Patients with syndromic association and old cases who were already on treatment were excluded.

All the newly diagnosed thyroid disorder cases were

thoroughly examined and made to undergo relevant investigations like routine blood investigations, thyroid profile, ultrasonography (if required), FNAC (fine needle aspiration cytology) (if required) and Blood grouping (for study purpose).

People were categorised into four different groups based on their blood groups. They were further divided into sub categories based on their thyroid hormone levels and were labelled as new cases with

1. Hypothyroidism
2. Hyperthyroidism or
3. Euthyroid status

**Thyroid hormone levels taken as normal range are given below:**

**Table 1. Reference range for thyroid hormones**

TSH	0.4–4.5 mU/L
T4	4.6-12 ug/dl
T3	80-180 ng/dl

People with subclinical hypothyroidism were also considered under hypothyroid category.

Data was analysed using updated version of SPSS software.

**Results**

Amongst 220 people diagnosed with thyroid disorders, majority was formed by people with “O” blood group, i.e. 100 people (45.45%), followed by “A” and “B” blood groups with AB blood group being least common. (Table 1).

**Table 2. Frequency distribution of various blood groups in thyroid disorders.**

Blood Group	Percentage	Number of Patients
A	31%	68
B	20%	44
AB	3.60%	8
O	45.45%	100
<b>Total</b>		<b>220</b>

100 people out of 220 had “O” blood group, amongst which majority presented with hypothyroidism (68%). “A” blood group was found in 68 people and most common presentation was hyperthyroidism

(47%). 44 people out of 220 had “B” blood group and majority of them presented with hyperthyroidism as well (36%). Only 8 people had AB blood group and clinical presentation was equal for both hypothyroidism and hyperthyroidism. (Table 2)

**Table 3. Frequency distribution of thyroid hormone level status amongst people with various blood groups.**

Blood Group	HYPO	HYPER	EUTHY	Total
A	24%	47%	29%	100%
	16	32	20	
B	28%	36%	36%	100%
	12	16	16	
AB	50%	50%	0%	100%
	4	4	0	
O	68%	24%	8%	100%
	68	24	8	

Out of 220, malignant cases were 36 with highest number being seen in people with blood group A (16), followed by people with blood group O (12) and then B (8).

Most common malignancy was papillary carcinoma (24 cases) followed by medullary carcinoma (8 cases) and 4 cases of the variant -hurthle cell carcinoma was seen.

**Conclusion**

Significant correlation exists between ABO blood group thyroid disorders.

The prevalence of thyroid disorders being highest in blood group O (**p<0.05**) in Mysore.

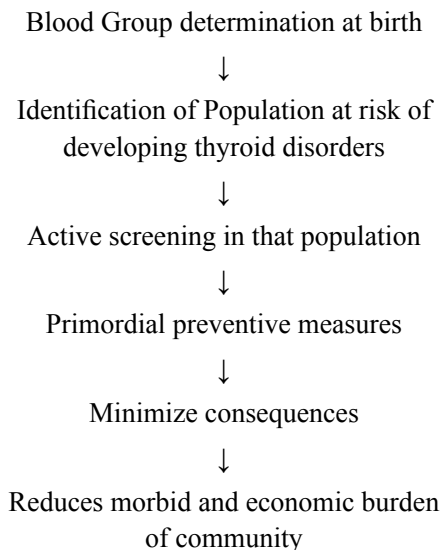
Among blood group O, HYPOTHYROIDISM being the most common presentation (p<0.05). Among people with blood group A, HYPERTHYROIDISM being the dominant one (p<0.05 for blood group A). No significant co-relation could be established between people with B or AB and thyroid disorders.

**Discussion**

Current study revealed a significant correlation between thyroid disorders and ABO blood grouping. Overall “O” blood group was most prevalent amongst people with thyroid disorders, which is in accordance with the findings of a study done in Babylon by Manar et

al<sup>9</sup>, however we found Blood group “O” to be associated with hypothyroidism and Blood group “A” and “B” to be associated with hyperthyroidism, which also supports his findings. Blood group antigens have been used as genetic markers in studies of their correlations with various diseases.

We found that people with BLOOD GROUP “O” are more prone for developing thyroid disorders followed by “A” and “B”. Hypothyroidism being most common presentation amongst “O” blood group and Hyperthyroidism amongst “A” and “B” whereas “AB” showed no such preponderance. It can, in future help in identifying the population at risk for development of thyroid disorders – specifically hypothyroidism based on blood group and hence can help in early diagnosis and treatment of the same, reducing the morbid and economic burden.



Further research needs to be done to determine the correlation between the two and also on the molecular basis responsible for the same, if at all the correlation exists.

Future molecular based research will help to find the cause of the correlation between the two and also on the molecular interventions that may be used for the prevention of the same in near future. We however hypothesize this correlation to be present because of aberrant expression of the blood group antigens on the thyroid tissue cells, which may be the cause of destruction of the same because of the antibodies present in people with blood group “O”, ultimately leading to hypothyroid state in them.

**Ethical Clearance:** Obtained from institutional

ethical committee

**Conflicts of Interest:** Nil.

**Source(s) of Support/Funds:** Nil

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# Prevalence of Tibia Vara in School Going Obese Children in and Around Karad

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## Abstract

**Objectives:** Obesity and overweight are recognized as major global problem to health. Childhood obesity is a known pioneer to adulthood health problems. Prevalence of obesity in childhood has increased more during the last three decades. In India, prevalence of obesity ranges from 4.3 to 40.9%. Obesity and overweight has a greater impact on musculoskeletal system. It mainly affects the structures of hip, knee & ankle. Severe obesity has also been linked with Tibia Vara. Progression of the deformity leads to further growth disturbances. Hence an attempt was made to review the trends of the impact of obesity and overweight on children's musculoskeletal system.

**Methodology:** There were 300 participants in the study. There were 159 female and 141 male participants. This was a study of presence of tibia vara in school going obese children. Here we evaluated the angulation of medial tibial torsion. The results were calculated in a ratio.

**Results:** Prevalence data from the study conducted in schools in and around Karad was included in analysis. As per the study there were 12.05% of male population who showed positive results in the test and rest were normal. There were 10.69% of female population who showed positive results in the test and the rest were normal.

**Conclusion:** Our review shows that there is increasing prevalence of obesity in children and there is prevalence of tibia vara in school going obese children, which is 11.33%

**Keywords:** Prevalence, childhood, obesity, overweight, tibia vara.

## Introduction

Obesity and overweight are recognized as major global problem to health. Childhood obesity is a known pioneer to adulthood health problems.<sup>1</sup> Prevalence of obesity in childhood has increased more during the last three decades.<sup>8</sup> Obesity primarily occurs due to excessive

calorie intake or insufficient physical activity or both. Also parental obesity increases risk of development of obesity in individuals in their childhood as well as in adulthood.<sup>9</sup> Obesity rates in children are increasing in every socio-economic group.<sup>1</sup>

In India, prevalence of obesity ranges from 4.3 to 40.9%.<sup>1</sup> Childhood obesity is a precursor of a metabolic syndrome, poor physical health, mental disorders, respiratory problems, & glucose intolerance, all of which can occur in adulthood.<sup>1</sup> According to the findings, children who were breast fed are at lower risk of developing childhood obesity than those with bottle fed.<sup>4</sup> Television viewing is one of the risk of gaining weight by not only promoting physical inactivity but also by increasing intake of energy.<sup>4</sup>

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Obesity is a multisystem disease which may land up into several complications. As with adults, obesity in childhood causes hypertension, dyslipidemia, chronic inflammation, increased blood clotting tendency, endothelial dysfunction & type-II diabetes, respiratory problems, gout, musculoskeletal disorders & cardiovascular disease such as asymptomatic coronary atherosclerosis which may be fatal in adolescents or young adults.<sup>2-4</sup>

Obesity and overweight has a greater impact on musculoskeletal system. It mainly affects the structures of hip, knee & ankle. According to the studies, there are several disorders which are associated with obesity. For instance, in pelvic region, during development of bones like femur, there is relative internal rotation and anteversion of head and neck of femur in relation to its condyles.<sup>2</sup> Normally the angle of head of femur is changes from 30° in childhood to 13° in adulthood. But in obese children this angle is relatively lower than the normal changes. This hampers the biomechanics and weight bearing in the children.<sup>2</sup>

Obesity also has an impact on the foot structure in children.<sup>2</sup> It affects the height of arch of the feet and causes flat and pronated feet. It is associated with increased midfoot pressure which causes disturbances in the gait.<sup>2</sup> Severe obesity has also been linked with Tibia Vara.

Tibia Vara is a growth disorder in which there is inward angulation of lower leg, resembling a bowleg.<sup>3</sup> Some previous studies suggest that, it is a disorder associated with compensatory varus deformity of the femur.<sup>11</sup> It is characterized by abnormal growth of medial aspect of proximal tibial epiphysis which can be palpated, which causes lower leg to angle inwards and abnormal medial tibial torsion.<sup>3</sup> This deformity consists of Varus, Procurvatum & Internal rotation of tibia.<sup>3</sup> This pattern results in asymmetry of disordered physeal growth most prominent in the posteromedial aspect of proximal tibial physis.

It is a progressive disorder which worsens and causes severe bowing of the legs and can affect one or both legs. It is bilateral in 60% to 80% of cases.<sup>10</sup> Tibia vara has been classified into two forms according to the age: Early or Infantile tibia vara & Late or Adolescent tibia vara. Early onset or Infantile tibia vara is diagnosed at age 1 to 3 years, when the child starts walking. Late

onset tibia vara is been further classified into: Juvenile i.e. occurring at the age of 4 to 10 years & Adolescent i.e. occurring at the age above 10 years.<sup>3</sup>

Large amount of fat in the lower limbs, especially in the thigh has been implicated as causing a varus movement on the knee contributing to medial overload. This results in increase in the compressive forces on the physis which causes the changes in the weight bearing direction forces on the upper tibial epiphysis from perpendicular to oblique.<sup>3</sup> This abnormality of the force tends to displace the tibial epiphysis in lateral direction. And also the pressure changes leads to delayed ossification & intra-articular variations.

The metaphyseal-diaphyseal angle is the angle formed by the crossing of a line through the horizontal plane of the proximal metaphysis with a line perpendicular to the long axis of the tibial diaphysis.<sup>3</sup> This angle is used to determine the degree of deformity of the proximal end of the tibia.<sup>5</sup> The angle between 9° to 16° or >16° is an angle with greater risk of progression.<sup>12</sup>

### Material and Method

Material used was Data collection sheet, Consent form, Weighing machine, Stature meter, Goniometer. Subjects were approached and selected on the basis of inclusion criteria and rest were excluded. Subjects and their caregivers were thoroughly explained about the procedure & motive of study being conducted. Written consent was taken from the participants and assent was taken from caregivers. Then, BMI was taken and the Tibial Torsion test was performed to rule out the presence or absence of Tibia Vara. The data was collected and analysed by using the software SPSS version 2.0.

### Results

#### 1. Gender distribution in study:

**Table No. 1: Gender distribution in study.**

Sr.No.	Gender	Total
1.	Male	141
2.	Female	159
	Total	300

**Interpretation:** Above table represents gender distribution of the study. Out of 300 subjects, there were 141 male subjects and 159 female subjects.

## 2. BMI wise distribution.

**Table No. 2: BMI wise distribution.**

BMI	Percentage	Mean+SD	Total
Over Weight	81%	27.19 + 2.08	243
Obese	19%	31.31+ 2.10	57
<b>Total</b>	<b>100%</b>		<b>300</b>

**Interpretation:** Above table represents distribution of obesity according to BMI. In this distribution, 243 subjects are under overweight category and 57 subjects are under obese category.

## 3. Results of Tibial torsion test.

**Table No. 3: Results of Tibial torsion test.**

Sr. no.	Gender	Positive Results
1	Male	17 out of 124
2	Female	17 out of 142

**Interpretation:** Above table represents the results of the tibial torsion test. There were 17 male subjects who showed positive results and others were normal. And there were 17 female subjects who showed positive results and others were normal.

## 4. Ratio of prevalence between male and female children.

**Table No. 4: Ratio of prevalence between male and female children.**

Sr. no.	Gender	Ratio
1.	Male : Female	6 : 5

**Interpretation:** Above table represents the ratio of prevalence of occurrence of Tibia Vara in both male and female children.

## Discussion

The purpose of this study was to find the prevalence of tibia vara in school going obese children.

Tibia Vara is a growth disorder in which there is inward angulation of lower leg, resembling a bowleg.<sup>3</sup> Some previous studies suggest that, it is a disorder associated with compensatory varus deformity of the femur.<sup>11</sup> It is characterized by abnormal growth of medial aspect of proximal tibial epiphysis which can be palpated, which causes lower leg to angle inwards and abnormal medial tibial torsion.<sup>3</sup> This deformity consists

of Varus, Procurvatum & Internal rotation of tibia.<sup>3</sup> This pattern results in asymmetry of disordered physal growth most prominent in the posteromedial aspect of proximal tibial physis.

It is a progressive disorder which worsens and causes severe bowing of the legs and can affect one or both legs. It is bilateral in 60% to 80% of cases.<sup>10</sup> There are many factors which come into picture in the etiology of causing tibia vara such as Genetic, Environmental, & Biomechanical factors.<sup>3</sup>

Large amount of fat in the lower limbs, especially in the thigh has been implicated as causing a varus movement on the knee contributing to medial overload. This results in increase in the compressive forces on the physis which causes the changes in the weightbearing direction forces on the upper tibial epiphysis from perpendicular to oblique.<sup>3</sup> This abnormality of the force tends to displace the tibial epiphysis in lateral direction. And also the pressure changes leads to delayed ossification & intra-articular variations. Progression of the deformity leads to further growth disturbances.

This study was done in 6 months of duration and was conducted in various primary schools in Karad. School children between age 6 to 11 were screened before selecting for the study. Out of 657 individuals, 357 individuals were excluded as they were not fitting in the criteria. 300 subjects were selected on the basis of inclusion criteria. Written consent and assent was taken from the participants and their caregivers. Subjects and their caregivers were explained about the procedure of the study. Tibial torsion test was performed to rule out presence or absence of Tibia Vara.

Out of 300 children, 53% i.e. 159 subjects were females and 47% i.e. 141 subjects were males. According to the results of tibial torsion test, there were 17 female subjects who showed positive result in the test performed and the remaining 142 were normal. And, there were 17 male subjects who showed positive results in the test performed and the remaining 124 were normal.

The prevalence of Tibia Vara is 11.33%, in that prevalence in male children is 12.05% and prevalence in female children is 10.69%. And the ratio of both the prevalence's is 6:5.

**The following interpretations were noted:** Total prevalence of Tibia Vara in the selected subjects is 11.33%. Prevalence of male children is 12.05%.

Prevalence of female children is 10.69%. Ratio of prevalence of occurrence of Tibia Vara in both male and female children is 6:5.

### Conclusion

According to the results of the study, it was concluded that there is prevalence of Tibia Vara in school going obese children from age group of 6-11 years. The prevalence is found more in male children than female children.

**Conflicts of Interest:** There were no conflicts of interest in this study.

**Ethical Clearance:** Ethical clearance was taken from institutional committee of Krishna institute of medical sciences.

**Source of Funding:** Self-funding.

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# A Quasi Experimental Study to Assess the Effectiveness of Drumstick Leaves (Moringa Leaves) Juice on Haemoglobin Level among Adolescent Girls

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## Abstract

**Introduction:** One of the major health issues in adolescent Girls is an Iron Deficiency Anemia, which can be reduced by consumption of Drumsticks leaves.

**Objectives:** Objectives were to determine the effectiveness of drumstick leaves (moringa leaves) juice on hemoglobin level among adolescent girls and to find the association between pre test hemoglobin level score in both groups control and experimental with their demographic variables.

**Methodology:** Samples were collected by convenient sampling technique. Blood samples were taken by using Hemocuemeter Analyzer 30. Intervention of 100ml Drumstick Leaves was provided for 21 days.

**Results:** t test (Paired) suggested that there was a significant change in hemoglobin level obtained t test value was 4.464, table value 2.042 and p value was 0.000099 at 0.05 level of significance, t test (Independent) showed that there was a significant change in haemoglobin level in both groups Control group and experimental group obtained t value was 4.157, table value 2.000 and p value was 0.000104 at 0.05 level of significance.  $\chi^2$  test was done to find out the association between Hb level (pre test) and their demographic variables that showed that there was an significant association between Hb level (pre test) and diet, religion and number of siblings, obtained Chi-square value were, for Number of sibling, ( $\chi^2=6.78$ ) Religion, ( $\chi^2=10.26$ ), diet ( $\chi^2=6.14$ ) were more than table value at 0.05 level of significance.

**Conclusion:** The study concludes that the drumsticks Leaves juice was effective in improving haemoglobin level.

**Keywords:** Haemoglobin level, Adolescent Girls, Drumstick Leaves Juice, Moringa leaves.

## Introduction

At the every stage of life the changes in health status takes place whether it can be physical, mental or social change. In today's era adolescent girls are facing many health problem in that anemia is the most Prominent one due their life style modifications like eating junk food, snacking, skipping meals, etc. Some are malnourished because of lack of knowledge regarding dietary pattern, poor socioeconomic status, low income, etc. The major Health problem in Adolescent girls is Iron deficiency Anemia. As per the Guidelines of National Health Portal Normal range of haemoglobin in

Women is 12.1gm/dl to 15.1 gm/dl, in Men is 13.8gm/dl to 17.2 gm/dl and in Children is 11 to 16 g/dl.<sup>[1]</sup> Below normal level of haemoglobin will be consider as "Iron Deficiency Anemia". According to American Society of Haematology Iron is important element to maintaining normal body functions, that includes the Production of Hb, which helps in carrying oxygen to cells and tissues. And also necessary to maintain healthy cells, skin, hair and nails. Iron from the food we eat is absorbed into the body by the cells that line the GI tract; the body only absorbs a small fraction of the iron you ingest. Then the iron is released into the blood

stream, where a protein called transferrin attaches to it and delivers the iron to the liver. Iron is stored in the liver as ferritin and released as needed to make new red blood cells in the bone marrow. When red blood cells are no longer able to function (after about 120 days in circulation), they are reabsorbed by the spleen.”<sup>[2]</sup> And According to WHO, Anaemia is a condition in which the number of red blood cells (and consequently their oxygen-carrying capacity) is insufficient to meet the body’s physiologic needs.<sup>[3]</sup> So if the person is having less than normal range of haemoglobin level and may appear pale, fatigue easily, feel tired, some may develop palpitations and will have short of breath can called anaemic. Children which are chronic anemia are mostly prone to get infection and learning issues too. According to United States Department of Agriculture Each 100 gm of drumstick leaves contains 375 kcal Energy, 25 g protein, 50 g Carbohydrate, 2000 mg calcium and 4.50mg Iron. By consumption of Drumstick leaves iron can be increased.<sup>[4]</sup> It is estimated that approximately 24.8 % world’s population are affected with an Anemia and 50% of an anaemic case is due to iron deficiency. Currently 1.62 billion populations are affected all over the world. In India Anemia is a severe health problem, because 74.3% population are affected by Anemia. Almost 58% of Antenatal women were having anemia. In Asia India contributed 80% of the antenatal and postnatal mothers died due to an anemia.<sup>[3]</sup> According to the reports of NFHS-3 and the National Nutrition Monitoring Bureau Survey (NNMBS) over 55% of adolescent girls were having anemia that is alarmingly high. In Gujarat Prevalence rate of Anaemia in the year 2015-16 was 54.9% in women, 21.7% in men and 62.6% in Children.<sup>[5]</sup>

### Objectives of the Study Were:

- To determine the effectiveness of drumstick leaves (moringa leaves) juice on haemoglobin level among adolescent girls and
- To find out the association between haemoglobin level (pre test) score in experimental and control group with selected demographic variables.

### Material and Method

Quantitative approach was utilized with quasi Experimental study. The population of students studying in selected school in Gujarat.

Samples are identified through power analysis method [Formula for power analysis:  $n = 2 (\sigma/\Delta)^2 (Z\alpha$

$$+ Z_{1-\beta})^2$$

Where, n = number of samples,  $\sigma$  = standard deviation of pilot study (1),  $\Delta$  = critical ratio (0.5),  $Z\alpha$  = error (5%) that was 1.96,  $Z_{1-\beta}$  = power (80%) that was 0.84].

By using convenient sampling technique total 64 adolescent girls (13 -19 years) for both groups were selected and randomly assigned into two groups. The Independent variable was Drumstick Leaves Juice and dependent variable was Level of Haemoglobin. Calculation of Nutritional values of Drumsticks Leaves juice was done by dietician. Blood samples were collected by using Hemocuemeter analyzer 301. Intervention was provided for 21 days (100 ml drumsticks leaves juice daily).

**Findings:** Demographic variables showed that Most of the girls in control and experimental group were of 14 years (80.6%) (59.4%) respectively, Most of the girls in Control group were belongs to Hindu religion (77.4%) and in experimental group were belongs to Muslim religion (71.9%). In both the groups Family of adolescent Girls are not having any history of anemia and no any girls were taking treatment of Iron Folic Acid. Majority of Girls in control group were taking vegetarian diet (64.5%) and in Experimental group were taking Non vegetarian diet (81.3%). Most of the girls in control group were has attained menarche at the age of 12 years (80.6%). Most of the girls in control group and experimental group were having the duration of menstruation of 27 - 29 days (71.0%) and (69.0%). Most of the girls in control and experimental group were having amount of blood loss medium (83.9%) and (96.6%). Paired t test suggested that there was a significant change in haemoglobin level of experimental group obtained t value 4.464 was more than table value ( $t = 2.042$ ) with p value 0.000099 at 0.05 level of significance, thus Research hypothesis was accepted. Independent t test revealed that there was a significant change in haemoglobin level in both groups Control and experimental, obtained t value was 4.157 more than table value ( $t = 2.000$ ) with p value 0.000104 at 0.05 level of significance.  $\chi^2$  test was done to find out the association between Pre test Hb level and demographic variables that revealed that there was an association between pre test Hb level and diet, religion and number of siblings, obtained Chi-square value were, for Number of sibling, ( $\chi^2 = 6.78$ ) Religion, ( $\chi^2 = 10.26$ ), diet ( $\chi^2 = 6.14$ ) were more than table value and at 0.05 level of significance.

### Conclusion

The study concludes that The Drumstick Leaves Juice is Effective in improvement of Haemoglobin level.

**Conflict of Interest:** Nil

**Source of Funding:** Nil

**Ethical Clearance:** Ethical consideration was taken from ARIP- Institutional ethical Committee (2017-2019), Charotar University of Science Technology on 10<sup>th</sup> May 2019. Proposal ID: ARIP/IEC/19/25

**Statement of Informed Consent:** Informed consent was acquired from the participants

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# Use of Biodentine™ for Vital Pulp Therapy in Children: Three Case Reports

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## Abstract

There has been a paradigm shift from “extension for prevention” to “prevention of extension” in the clinical approach of various treatment options for carious teeth. The choice of material often poses a challenge while considering vital pulp therapy in primary and young permanent teeth. Tricalcium silicate materials are believed to have superior properties when used in vital pulp therapy. Here, we report three individual cases of asymptomatic, carious, primary and young permanent teeth, which have been treated with Biodentine™ as a pulpotomy or pulp capping agent. Successful clinical and radiographic features were demonstrated at a 6-month follow up. The aim of this article is to highlight the properties of Biodentine™ and its reliability as a material of choice in vital pulp therapy in primary and young permanent teeth.

**Keywords:** Dental pulp capping; Pulpotomy; Silicate cements; Tricalcium silicate

## Introduction

The ultimate goal of vital pulp therapy is the induction of reparative tertiary dentin formation. The success rate is not only dependent on appropriate case selection, but also on the material used as a capping agent. Calcium hydroxide has been the material of choice for many decades, to augment pulp healing and dentine repair. However, there are several demerits of using this material that include tunnel defects formed beneath dentinal bridges, inadequate sealing and increased solubility in tissue fluids.<sup>1</sup>

With the advent of calcium silicate-based materials, management of deep carious lesions has gained a whole new perspective. Mineral Trioxide Aggregate (MTA), introduced by Torabinejad M in 1993, is recognised as an alternative gold standard material for conservative pulp vitality treatments. Its ability to form a dentinal bridge to protect the pulp more effectively than calcium hydroxide makes it a suitable pulp-capping material.<sup>2</sup> However, MTA has shortcomings when used as a capping agent, particularly in children, such as its prolonged setting time, handling properties and possible discolouration of teeth. Other biomaterials have been introduced to overcome some of these limitations. One such tricalcium silicate cement is Biodentine™ (Septodont, Saint-Maur-des-Fossés, France), introduced in 2009, which is a second-generation hydraulic calcium silicate cement. Its reduced setting time aids in an immediate permanent restoration without material deterioration, making it appropriate for use in children.<sup>3</sup>

This article reports three cases where Biodentine™ was used for pulpotomy, indirect pulp capping and direct pulp capping, all aimed at preserving the vitality of the teeth.

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## Case Reports:

**Case Report 1: Pulpotomy:** A 6-year-old boy reported to the Department of Pediatric and Preventive Dentistry with the chief complaint of decay in the lower right back region of the jaw, with no history of pain or swelling with respect to the same tooth. Clinical examination revealed caries involving dentin with respect to 84. On radiographic examination, the radiolucency extended up to the inner third of the dentine, in close proximity to the distal pulp horn. After discussing the various treatment options, the parent consented to a Biodentine™ pulpotomy, followed by a full coverage permanent restoration.

After administration of local anaesthesia, rubber dam was placed to isolate the tooth. The access cavity was prepared with a #330 round diamond bur mounted on a high-speed handpiece with copious water spray. A sharp, 33L Endo excavator (Hu-Friedy) was used to amputate the coronal pulp till the canal orifices. The pulp chamber was then thoroughly irrigated with sterile normal saline to ensure the removal of any pulpal tags and dentinal debris. Moist cotton pellets were applied with light pressure over the amputated pulp stumps for 5 minutes to achieve haemostasis.

Biodentine™ (Septodont, Sant-maur-des-fosses, France) was mixed as per the manufacturer's instructions to obtain a creamy consistency and placed over the pulpal floor and root canal orifices. A ball burnisher was used to lightly condense the mix to achieve a thickness of 2-3 mm. After 15 minutes of Biodentine™ hardening, it was etched with the glass ionomer liquid. The glass ionomer cement (Fuji IX, GC, Japan) was used to restore the access cavity. (Figure 1A) At the 7-day follow up, the tooth was evaluated for post-operative pain and swelling, following which it was restored with a preformed stainless steel crown.

The patient was reviewed after 1, 3 and 6 months (Figure 1B) during which the tooth was asymptomatic, both clinically and radiographically.

**Case Report 2: Indirect Pulp Capping:** A 12-year-old girl reported to the Department of Pediatric and Preventive Dentistry for a routine dental check-up. Clinical examination revealed a deep carious lesion with respect to 26. On radiographic examination, the occlusal radiolucency was approximating the pulp (Figure 2A). There was no periapical radiolucency or widening of the lamina dura. After discussing the various treatment

options, the parent consented to an indirect pulp capping with Biodentine™.

After the administration of local anaesthesia, the tooth was isolated with a rubber dam. Carious enamel and dentin was removed with a #330 round diamond bur mounted on a handpiece following which a sharp, small sized spoon excavator was used to excavate remaining infected dentin, leaving behind firm affected dentine over the pulp chamber. The cavity was irrigated with normal saline to ensure complete removal of debris.

Biodentine™ (Septodont, Sant-maur-des-fosses, France) was mixed as per the manufacturer's instructions to obtain a creamy consistency and placed over the pulpal floor and root canal orifices. A ball burnisher was used to lightly condense the mix to achieve a thickness of 2-3 mm. After 15 minutes of Biodentine™ hardening, it was etched with the glass ionomer liquid and the glass ionomer cement (Fuji IX, GC Corporation, Japan) was used as a base. The cavity was restored with a light-cured resin composite (Filtek™ Z350 XT, 3M ESPE, U.S.A.) to restore the functional anatomy of the tooth.

The patient was reviewed after 1 (Figure 2B), 3 and 6 months (Figure 2C) and she reported that the tooth was asymptomatic. At the 1 month follow up visit, radiographic evaluation revealed dentine bridge formation over the pulpal chamber. Clinically and radiographically there were no signs and/or symptoms of endodontic disease associated with 26 and it elicited a positive response when tested for pulp vitality.

**Case Report 3: Direct Pulp Capping:** A 10-year-old boy reported to the Department of Pediatric and Preventive Dentistry with a chief complaint of food lodgement in the upper left back tooth, with no other associated symptoms. Clinical examination revealed a deep carious lesion with respect to 26. On radiographic examination, 26 showed radiolucency involving enamel, dentine and in close proximity to the pulp (Figure 3A). No periapical radiolucency or widening of lamina dura was noted. After discussing the various treatment options, the parent consented to a pulp capping procedure with Biodentine™, which would be direct or indirect, as decided upon by the operator depending upon the thickness of remaining healthy, unaffected dentine.

After administration of local anaesthesia, rubber dam was placed to isolate the tooth. Carious enamel and dentin was removed with a #330 round diamond bur mounted on a handpiece. A sharp, small sized spoon



excavator was used to excavate any remaining infected dentin, in the process of which a sterile mechanical exposure of the pulp chamber was encountered. A bright red coloured pin-point bleed was noticed. The cavity was irrigated with sterile saline and a moist cotton pellet was placed over the pulpal wall for 2 minutes after which the bleeding arrested.

Biodentine™ (Septodont, Sant-maur-des-fosses, France) was mixed as per the manufacturer's instructions to obtain a creamy consistency and placed over the pulpal floor and root canal orifices. A ball burnisher was used to lightly condense the mix to achieve a thickness of 2-3 mm. After 15 minutes of Biodentine™ hardening, it was etched with the glass ionomer liquid and the glass

ionomer cement (Fuji IX, GC Corporation, Japan) was used as a base. The cavity was then restored with a light-cured resin composite (Filtek™ Z350 XT, 3M ESPE, U.S.A.) to restore the functional anatomy of the tooth.

The patient was reviewed after 1 month and on radiographic evaluation, a dentine bridge was seen to be formed over the roof of the pulp chamber (Figure 3B). The patient was recalled at 3 and 6 months (Figure 3C) and reported that the tooth was asymptomatic. Clinically and radiographically there were no signs and/or symptoms of endodontic disease associated with 26 and it elicited a positive response when tested for pulp vitality.



**Figure 1: Pulpotomy. (A) Immediate post-operative radiograph. (B) Six-month follow up radiograph.**



**Figure 2: Indirect pulp capping. (A) Pre-operative radiograph. (B) One-month follow up radiograph; formation of dentine bridge over the pulpal roof. (C) Six-month follow up radiograph.**



**Figure 3: Direct pulp capping. (A) Pre-operative radiograph. (B) One-month follow up radiograph; formation of dentine bridge over the pulpal roof. (C) Six-month follow up radiograph.**

**Table 1. Composition of Biodentine™.**

Powder	Liquid
Tricalcium silicate	Water
Zirconium oxide	Calcium chloride
Calcium carbonate	Water soluble polymer
Iron oxide – to give the colour	

### Discussion

Tooth structure may be lost either by dental caries, trauma or tooth wear and is often replaced by inert dental materials to replace the bulk of the tooth. The hydraulic nature is characteristic to all calcium silicate cements. Their applicability in areas that cannot be completely isolated from body fluids gives them an advantage over the other routinely used materials.

Biodentine™ is available as a capsule-ampoule system, containing the powder and liquid respectively. Its composition is as shown in Table 1.<sup>3</sup> Hydraulic calcium silicate stimulates the recruitment of the cells of the pulp to differentiate into odontoblasts to promote dentinogenesis, by upregulation of transformation factors<sup>4</sup> Calcium carbonate in the powder provides a site for nucleation, for crystal growth and mineralisation.<sup>5</sup> Zirconium oxide provides adequate radiopacity and accounts for stability, ensuring no leaching out and thereby no discolouration externally, as opposed to the materials containing bismuth oxide.<sup>3</sup>

The setting reaction between the tricalcium silicate

and water results in the formation of a hydrated calcium silicate gel and calcium hydroxide.<sup>6</sup> This gel precipitates around the calcium carbonate, which in turn provides a site for nucleation and strengthens the microstructure.<sup>7</sup> This precipitate resembles hydroxyapatite crystals. The calcium hydroxide which is released as a by-product of the hydration reaction makes this material ideal for use as a pulp capping material, for apexification, apexogenesis and regenerative endodontic procedures. Calcium hydroxide dissociates into calcium and hydroxyl ions that are responsible for its favourable properties like its high antibacterial property.

The choice of material is important for successful clinical outcome.<sup>3</sup> Materials used to seal the remaining pulp in vital pulp therapies must have a good sealing property. Any leakage may result in postoperative sensitivity and secondary caries, compromising the success of the treatment. Koubi et al<sup>7</sup> assessed the in vitro marginal integrity and reported Biodentine™'s performance to be equivalent to that of resin modified glass ionomer cement. The hydroxyapatite crystals at the surface of Biodentine™ cement have the potential to increase its sealing ability eliminating the specific preparation of the dentinal walls, which is a pre-requisite for most other materials.<sup>8</sup>

The duration of a clinical procedure is of critical importance while treating children. The initial setting time of Biodentine™ is said to be 9 to 12 minutes.<sup>3</sup> This can be attributed to the inclusion of calcium chloride, which accelerates the setting time.<sup>5</sup> A decreased setting

time is one of the most clinically relevant advantages of Biodentine™ and it was thus preferred over other capping materials in the aforementioned case reports.

An important physical property of this material is its compressive strength. It is crucial to the success of a hydraulic cement used in vital pulp therapy. It signifies the ability of the material to withstand the masticatory forces to resist external impacts.<sup>8</sup> Biodentine exhibited a compressive strength of 170 MPa after 24 hours and a significant increase to 340 MPa post exposure to moisture for 28 days as concluded by Naziya et al.<sup>9</sup>

The most desirable property of any material used in vital pulp therapy, is its potential to induce dentinogenesis. Biodentine™ has shown to bring about an increased secretion of TGF-β1 from human dental pulp stem cells.<sup>10</sup> A well-arranged layer of odontoblasts and odontoblast-like cells is found to form tubular dentin under the osteodentin. Several in vitro and in vivo studies have shown that the dentin bridge formation and root dentin formation is more homogenous than that formed by calcium hydroxide-based materials.<sup>11</sup> It has successfully been used as a pulp capping agent in not only accidental exposure of healthy pulp, but also carious or traumatic exposure of the pulp.<sup>12</sup> This property substantiates the use of Biodentine™ as a direct pulp capping agent in the case reported herewith.

Shortcomings of this material, such as the discolouration of restorations have been reported in literature. A study by Lipski et al observed a yellowish discolouration of restorations which they attributed to the lower abrasive wear resistance, porosity of Biodentine™ and the absorption of dyes from saliva.<sup>1</sup> Discolouration of restorations was not encountered in the cases reported above.

Considering its properties and advantages, Biodentine™ was chosen as the material of choice in the management of the above-mentioned cases.

### Conclusion

As seen from the above case reports, the dentinal bridge was seen to be formed within a month of application of Biodentine™. It offers a valuable alternative intervention to maintain the vitality of dental pulp in teeth with deep seated carious lesions. Its physico-mechanical and handling properties along with a shorter setting time allows for its clinical use as a conventional dentine substitute. More clinical studies need to be

conducted to validate these observations. Conservative techniques that improve treatment outcomes in cariously involved primary and young permanent teeth should be encouraged.

**Acknowledgements:** The authors would like to extend their gratitude to the Department of Pedodontics and Preventive Dentistry at A. B. Shetty Institute Memorial of Dental Sciences, Mangalore, Nitte (Deemed-to-be) University for extending their support and resources needed for the study.

**Conflict of Interest:** Nil

**Source of Funding:** Self-funded

**Ethical Clearance:** Taken from the institution ethical committee, after obtaining individual consent from each of the patients reported in the above mentioned case reports.

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# Effect of Weight Bearing Exercises on Flexibility among Asymptomatic Middle Aged Women

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## Abstract

**Background:** Weight bearing exercise in which the body works against the force of gravity and the feet and legs carry a person's weight like walking, jogging. The benefits of weight bearing exercise needs to be educated in order to eliminate potential health risk factors.

**Objectives:** Objectives of the study were to find out the effect of weight bearing exercises on flexibility among asymptomatic middle aged women with respect to different age group.

**Material and Method:** In this experimental study, 50 subjects were assessed using weight bearing lunge test and single limb stance duration.

**Results:** Statistical analysis of weight bearing lunge test and single limb stance duration were found to be extremely significant with a p value of <0.0001 and 0.0025.

**Conclusion:** The study concluded that weight bearing exercise is significantly effective on flexibility among asymptomatic middle aged women. There is significant increase in weight bearing lunge test and single limb stance duration among asymptomatic middle aged women after the intervention thus Alternate Hypothesis accepted.

**Keyword:** *Weight bearing exercises, flexibility, weight bearing lunge test, single limb stance duration, asymptomatic middle aged women.*

## Introduction

Exercise-induced mechanical loading can have potent effects on skeletal form and health. Both intrinsic and extrinsic factors contribute to bone structure and function. Osteoporosis is a significant health problem which needs compulsory physical activity guidelines. The benefit of weight bearing exercises needs to be educate in order to eliminate potential health risk.

Although weight-bearing activity are important in maintaining overall health and may contribute to maintenance of healthy bone.<sup>2</sup> Exercise is associated with improvements in bone mineral density, Particularly at load-bearing sites and might play a role in reducing fragility fractures associated with osteoporosis, either by increasing the accumulation of bone mass during childhood growth or by decreasing the rate of bone loss following the attainment of peak bone mass. Although weight bearing in nature, endurance running exercise has been associated with deleterious effects on bone in some population. The benefits of short duration, high-impact exercise on bone, many people partake in longer-duration endurance exercise for recreational, competitive, or occupational purposes.<sup>3</sup> Weight-bearing exercise led to significant increase above baseline in bone mineral content which were maintained with continued training

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in older, postmenopausal women. With reduced weight-bearing exercise, bone mass reverted to baseline level.<sup>4</sup> Weight-bearing exercise on bone mineral accretion, coupled with other adaptations to the exercise (i.e. increased strength and functional capacity), could effectively reduce the incidence of falls and osteoporotic fracture.<sup>5</sup> Although weight-bearing physical activity is known to be superior to non-wearing bearing activity to increase the bone mass.<sup>6</sup>

### Aim and Objectives

**Aim:**

- To determine the effect of weight bearing exercises on flexibility among asymptomatic middle aged women.

**Objectives:**

- To find out the effect of weight bearing exercises on flexibility among asymptomatic middle aged women with respect to different age group.
- To find out the effect of weight bearing exercises on flexibility among asymptomatic middle aged women with respect to BMI and Hip waist.

### Materials and Methodology

- Type of study- Experimental study
- Study Design-Comparative
- Place of Study- Karad
- Sample formula –  $n = 4pq/L^2$
- Sample size – 50
- Sampling Method- Convenience sampling method
- Study duration- 3 months

**Materials Required:**

- Data collection sheet
- Pen
- Paper
- Inch tape

**Selection Criteria:**

**Inclusion Criteria:**

- Age group 40-50 years
- Only rural women
- Both employed or unemployed

**Exclusion Criteria:**

- Women with chronic illness, who are dependent for ADL, Psychiatric disorder, long term hospitalization in the past 6 months.
- Women with any form of physical disability.

**Outcome Measures:**

- Weight bearing lunge test.
- Single limb stance duration.

**Procedure:**

- Individual will be selected as per the inclusion and exclusion criteria.
- They will be informed about the study and consent will be taken.
- Pre treatment assessment will be done and baseline data will be collected.
- Pre assessment will be done by using selected outcome measures.
- Following exercise protocol will be selected for 20 minutes.
- Weight bearing exercises in which 5 minute warm up session 10 minutes weight bearing exercises and 5 minutes cool down will be given for the patients for 4 weeks.
- Post assessment will be taken after using selected outcome measures.

**Findings:**

**1. Weight Bearing Lunge Test (Comparison Using Paired T-Test):**

**Table 1. Weight bearing lunge test**

PRE interventional Mean SD	10.821.612
POST interventional Mean SD	12.221.718
P value	<0.0001
Interference	Extremely Significant

**2. Single Limb Stance Duration (Comparison Using Paired T-Test)**

**Table 2. Single limb stance duration**

PRE interventional Mean SD	26.822.708
POST interventional Mean SD	28.382.311
P value	0.0025
Interference	Extremely Significant

## Result

Within the group statistical analysis shows that there was significant increase in weight bearing lunge test and single limb stance duration. The mean pre intervention of weight bearing lunge test was 10.821.612 with significantly increased to 12.221.718 post intervention with p value <0.0001. The mean pre intervention of single limb stance duration was 26.822.708 with significantly increased to 28.382.311 post intervention with p value 0.0025.

## Discussion

This project was done in 3 months with sample size 50.

This research was undertaken considering all the mentioned points and the aim to determine the effect of weight bearing exercises on flexibility among asymptomatic middle aged women.

Jessica Padykula perform a study in which they concluded like bone, muscles are active tissues and women tend to lose 5 to 7 pounds of muscle every decade if they are not doing some sort of strength training or weight-bearing exercise, explains Wheeler. "Decrease muscle mass slow down metabolism women must maintain or increase lean muscle mass".

With aging, bones can become very weak and fragile. It often occurs in women after menopause, this bone-thinning disease puts people at a greater risk for broken bones, which can seriously limit mobility and independence.

In this study 50 women were selected randomly with help of inclusion and exclusion criteria. Aims and objectives of the study was explained to the women and informed consent was taken. The pre-interventional outcome measure was taken. Later the women trained for 4 weeks with weight bearing exercises.

Weight bearing exercise in which the body works against the force of gravity and the feet and legs carry a person's weight like walking, jogging. When bones are put under strain, this triggers specialized cells to build bone strength.

After four weeks post outcome measures was taken.

The study was carried out and the result was drawn by using weight bearing lunge test and single limb stance duration as the outcome measures. 50 subjects (women)

were undertaken for the study. The age group was between 30-50 years and mean age was 41.264.985. Study place was Karad. Data collection sheet and consent form was taken. In weight bearing lunge test, the pre interventional mean was 10.821.612 which was increased to a mean of 12.221.718 post intervention. The p value be Paired t test was found to be <0.0001 which is extremely significant. The mean of single limb stance duration pre intervention was 26.822.708 which was increased to a mean of 28.382.311 post intervention. The p value be Paired t test was found to be 0.0025 which is extremely significant.

Thus the studies shows that there is effect of weight bearing exercises on flexibility among asymptomatic middle aged women.

## Conclusion

On the basis of the results of our study, it was concluded that weight bearing exercises was significantly effective on flexibility among asymptomatic middle aged women.

**Conflict of Interest:** There is no conflict of interest concerning the content of the study.

**Source of Funding:** This study was funded by Krishna institute of medical sciences deemed to be university Karad.

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

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# Effectiveness of Health Counselling on Self-care Practices among Chronic Kidney Disease Patients Undergoing Hemodialysis: A Quasi Experimental Study

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## Abstract

**Background:** Kidneys are the organs that perform various functions to clean the blood and remove excess water from the body and help in maintaining the chemical balance in our body. Chronic Kidney Disease (CKD) occurs when the kidneys are mutilated or cannot clean blood as healthy kidneys. Hemodialysis is done to remove waste electrolytes from blood.

**Methodology:** Quasi experimental time series research design was used to evaluate the effectiveness of health counselling on self-care practices among CKD patients undergoing hemodialysis in selected hospital of Dehradun, Uttarakhand. Simple Random Sampling was used to select total 68 CKD patients who were undergoing hemodialysis. A Structured practice checklist regarding self-care practice containing 38 items was administered to collect the data. Health counselling was given after pretest on day 1<sup>st</sup> followed by post test on 7<sup>th</sup>, 15<sup>th</sup> and 30<sup>th</sup> day.

**Result:** The health counselling on self-care practices of CKD Patients undergoing Hemodialysis was significantly effective in improving self-care practices as mean of self-care practices score of study participants at pre-test, on 7<sup>th</sup> day, 15<sup>th</sup> day and 30<sup>th</sup> day after intervention. There was significant increase in the self-care practices of study participant, repeated measure ANOVA showed F value was 97 and p value was 0.000. This showed that there was significant improvement in self-care practice, therefore the health counselling was effective.

**Conclusion:** The study concluded that if health care professionals collaborate and identify the needs of CKD Patients undergoing hemodialysis and provide them health counselling regarding self-care practices, they will have better self-care practices.

**Keywords:** Chronic kidney disease, hemodialysis, self-care practices.

## Introduction

Chronic Kidney Disease (CKD) is an enormous public health issue which continues to rise. It was the

12<sup>th</sup> widespread reasons for death, resulting in 1.1 million deaths worldwide. Generally CKD mortality rate has augmented by 31.7% round the last 10 years, causing it one of the fastest growing reasons for death, beside diabetes and dementia. CKD is the 17<sup>th</sup> prominent cause of yearly loss of life world-wide, an upsurge of 18.4% since 2005 and the third biggest surge of any major reason of death.<sup>1</sup>

Diabetes and hypertension are major disease in India, which contributes to about 40-60% cases of CKD. Diabetes in geriatric population has increased up to 7.1%

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and in population residing in urban area (age > 40 years). In India, rising in prevalence of these diseases, the prevalence rate of Chronic Kidney Disease is also rising. CKD is accountable for soaring rate of morbidity and mortality and also is an economic burden on society and government. Because of its cost along with complexity of treatment, the availability of good care to patients in India is very few. In India, CKD prevalence in adult population is 0.785% or 7852/million. The prevalence of CKD in India makes it a worrying challenge requiring of serious efforts to check it.<sup>2</sup>

In India, the prevalence of patients who are undergoing hemodialysis is increasing but it is observed that these patients are not cognizant about home based self-care activities. Thus, it is necessary to know the patients self-care management level.<sup>3</sup>

### Material and Method

Quasi experimental time series research design was used to evaluate the effectiveness of health counselling

on self-care practices among CKD patients undergoing hemodialysis in Himalayan hospital, Dehradun, Uttarakhand. 68 CKD patients were selected by simple random sampling technique.

A structured practice checklist was used to collect the data and by interviewing one to one to obtain information regarding socio-demographic data and self-care practices of CKD patients undergoing hemodialysis. The test-retest method was used to find out the reliability of practice checklist and it was established as  $r = 0.82$ .

In order to get free and true response, the participants were explained about the purpose of the study and assurance regarding confidentiality of their response was also provided. After explaining the research study, informed consent was taken from study participants and data was collected by using structured practice checklist by an interview method regarding self-care practices of the study samples. The pretest was done on 1<sup>st</sup> day followed by health counselling and post test was done on 7<sup>th</sup>, 15<sup>th</sup> and 30<sup>th</sup> day of intervention.

### Findings:

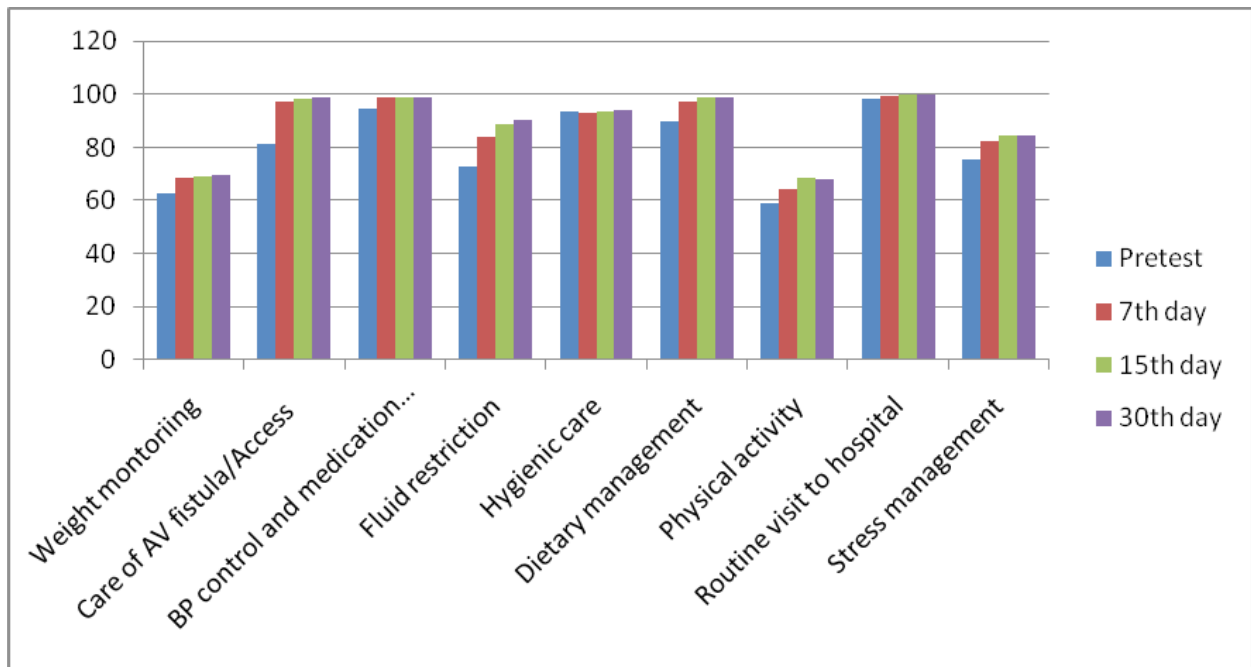
**Table No. 1: Comparison of pre-test and post-test self-care practice score of CKD patients undergoing hemodialysis.**

Pre-test	Post-test			F	P value
1 <sup>st</sup> day (M±SD)	7 <sup>th</sup> day (M±SD)	15 <sup>th</sup> day (M±SD)	30 <sup>th</sup> day (M±SD)		
92.84±5.6	102.87±4.5	105.09±4.2	105.59±3.7	97	.000**

Table No. 1 depicts that the mean of self-care practices score of study participants in pre-intervention, after 7<sup>th</sup> day, 15<sup>th</sup> day and 30<sup>th</sup> day after intervention (4 levels).

Repeated Measure ANOVA was performed to find the difference in the scores between 4 levels of

assessment. There was significant increase in the self-care practices of study participants as F value was 97 and p value was 0.000 at  $p < 0.05$ . This table revealed that there was significant improvement in self-care practices on 7<sup>th</sup> day, 15<sup>th</sup> day and 30<sup>th</sup> day after intervention.



**Fig 1: Domain wise Self-care practices of CKD patients undergoing hemodialysis**

Figure No. 1 depicted that there was improvement in all the domains of self-care practices such as weight monitoring, care of AV fistula/access, BP control and medication adherence, fluid restriction, dietary management, physical activity, stress management except hygienic care and routine visit to hospital. Hence, this showed that there was slight improvement in the post-test self-care practices as compared to pre-test self-care practices

**Association between pre-test practice score and selected variables:** There was significant association between the pre-test practice score with educational status at the level of  $p < 0.05$ .

### Discussion

The result of the current study shows that there was significant improvement in domains of self-care practices such as weight monitoring, care of Arteriovenous fistula (AV fistula)/ access site, blood pressure control and medication adherence, fluid restriction, dietary management, physical activity, stress management except hygienic care and visit to hospital from pre-test, on 7<sup>th</sup> day, 15<sup>th</sup> day and 30<sup>th</sup> day and Findings of the study were similar to the study conducted by **Bahadori M et al (2014)** to find the effectiveness of an interventional program on self-care model on health-related quality

of life in patients undergoing hemodialysis. The result revealed that mean and standard deviation of participants parameters with weight and BP had been improved significantly after the educational intervention compared to pre-intervention ( $p < 0.001$ ). Also, BP and physical activity has improved after the intervention.<sup>4</sup>

Regarding the association it was found the pre-test score was significantly associated with educational status at the level of  $p < 0.05$ . In contrast, study by **Roy J et al (2017)** showed that pretest practice score was not significantly associated with selected demographic variables.<sup>5</sup>

### Conclusion

The study concluded that if health care professionals collaborate and identify the needs of CKD Patients undergoing hemodialysis and provide them health counselling regarding self-care practices, they will have better self-care practices.

**Conflict of Interest:** None

**Source of Funding:** Self

**Ethical Clearance:** Research proposal with the data collection tool was presented in front of research committee and for approval prior permission from

hospital were obtained. Confidentiality was maintained throughout the study. Ethical clearance was obtained from the ethical committee.

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# A Study on the Assessment of Knowledge of Interns in a Tertiary Care Hospital on Revised National Tuberculosis Control Programme and DOTS Guidelines

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## Abstract

**Background:** About 8 million cases of Tuberculosis occurs annually. With 2.5 million cases occurring in India, making it one of the high burden countries. Most of the cases go undetected resulting in a high mortality rate. With the launch of RNTCP and DOTS the awareness, diagnosis and treatment has increased considerably. Interns being the first contacts as health care providers for patients, must be sensitised to the latest diagnosis and treatment modalities.

**Objectives:** To assess the awareness and knowledge of interns in the tertiary hospital regarding the TB disease, RNTCP and DOTS guidelines.

**Materials and Method:** A cross sectional study was conducted among the interns of a medical college using a pre-validated, per-tested, structured questionnaire. 115 interns participated in the study. Frequencies and percentages of data collected was analysed.

**Results:** The knowledge regarding TB, Diagnosis, RNTCP and DOTS and definitions were found to be 90.85%, 94.8%, 70.96%, 82.6% respectively. Out of which the knowledge was found to be 39.25%, 40.5%, 30.62% and 34.5% respectively among males and 51.1%, 54.2%, 40.34%, 48% respectively among females. Also, it was found that the knowledge was 67.6%, 69.5%, 51.84%, 60.8% respectively among the age group of 20-22 years and 23.9%, 25.2%, 19.14%, 21.7% among 23-25 years respectively.

**Conclusion:** This study reveals that the awareness and knowledge of interns regarding TB disease, RNTCP and DOTS were fairly good. Further enhancement of knowledge on recent updates, guidelines and treatment is necessary.

**Keywords:** TB disease, RNTCP, DOTS, interns, knowledge.

## Introduction

“Tuberculosis is a communicable disease that is a major cause of ill health and one of the leading causes

of death worldwide”<sup>(1)</sup>. It accounts to one fifth of global TB cases and has been listed under top 30 high burden countries list as per Global Tuberculosis report of 2019<sup>(1)</sup>. According to The World Health Organisation an incidence of 2.69 million cases along with a mortality rate of 32% was seen during the year 2018.<sup>(2)</sup> WHO estimated that 5% of TB patients are also co-infected with TB<sup>(3)</sup>. HIV has further increased the incidence of TB<sup>(4)</sup>. With TB being the leading cause of death among patients with HIV/AIDS<sup>(5)</sup>. It is estimated that out of the Indian population that is infected with TB bacteria, majority is

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by latent bacteria and not active TB<sup>(6,7)</sup>. Furthermore, the occurrence of MDR and XDR TB has increased significantly. Inappropriate and incomplete prescription and treatment are one of the major risk factors for the spread of TB and development of resistance. According to the Global TB report of 2019 the incidence rate of MDR TB was found to be 9.2% per 1 lakh population.

<sup>(1)</sup> Out of the total MDR/RR TB 2.8% were new cases and 14% were previously treated.<sup>(1)</sup> The diagnosis and treatment of tuberculosis has been modified several times since the National Tuberculosis Control Programme in 1992 that aims to reduce the TB burden in India<sup>(8,9)</sup>. The revised National Tuberculosis Control Programme was launched in March 1997<sup>(10)</sup>. It initiated services for HIV/TB, MDR-TB, XDR-TB with both the diagnosis and treatment being free. Proper and early diagnosis plays a crucial role in lowering the burden of the disease<sup>(11,12,13)</sup>. Interns are the first contacts for the patients in the health care system. Therefore, their knowledge regarding TB disease, diagnosis and management have to be regularly assessed and updated. Many reports have documented relationships between poor knowledge among interns and treating physicians with high incidence rate<sup>(14)</sup>. There are limited studies carried out in India on this public health issue. This study assesses the knowledge regarding TB disease, RNTCP and DOTS among interns.

**Aim and Objectives:** To assess the awareness and knowledge of TB disease, RNTCP (Revised National Tuberculosis Control Programme) and DOTS (Directly observed Treatment short course) guidelines among interns of a tertiary health care centre in Chennai.

### Methodology

A cross sectional study was conducted among the interns of a Tertiary care centre, Chennai. The study was conducted in a suburban area of Chennai. The duration of the study was 3 months (January-March 2019). By universal sampling method all the interns in this study duration were included in the study. Those willing to participate in the study were selected for the study and were enrolled as study participants of the study. Thus, totally 115 interns were enrolled in the study and written Informed consents were obtained before interviewing the interns. A pre-tested pre – validated and structured questionnaire consisting of 24 questions for testing the knowledge on the definition, symptoms, diagnosis and treatment of Tuberculosis was used for the interview. The questionnaires were distributed to all participants after obtaining informed consent. The data was collected

and was entered in Microsoft Excel and analysed using SPSS 22. The frequencies and percentages of the data collected were analysed. This study has attained the Ethical clearance from the Institutional Ethical committee.

### Results

A total of 115 interns were enrolled in the study out of which 50 (43.4%) were males and 65 (56.5%) were females. Also 84(73%) interns were within the age group of 20-22 years and 31(26.9%) interns were within the age group of 23-25 years.

With regard to TB disease 114 (99.1%) students had correctly responded that the chief symptom of TB was cough for greater than 2 weeks. Similarly 114 (99.1%) students had correctly answered that the chief mode of transmission was by droplet infection. For the question regarding the reporting of TB disease, 101(87.8%) students had correctly answered that TB disease should be reported. A total of 89 (77.4%) students had correctly responded to the question that about 10-15 healthy individuals get infected by smear positive cases annually.

On diagnosis 100 (87%) students answered that two is the total number of sputum to be collected. For the question regarding the Investigation of choice for TB 114(99.1%) interns correctly responded with sputum microscopy. Also 114 (99.1%) students correctly responded the morning sample as the most important timing for sputum collection. For the questions regarding the number of categories and phases with respect to RNTCP only 91 (79.1%) and 106 (92.2%) could correctly answer it to be 2 and 2 respectively.

Regarding the duration of treatment 89 (77.4%) students correctly responded with Category I-6 months and Category II-8 months. However only 46 (40%) students could correctly answer to the question regarding the number of times DOTS therapy given in a week as every day. For the question regarding prophylaxis of a child less than 6 years to a mother with active PTB only 76 (66.1%) could correctly responded as Isoniazid. Regarding the definition of MDR-TB, XDR-TB, Default and Relapse 87 (75.7%), 101 (87.8%), 101 (87.8%), 76 (66.1%) students answered correctly.

It was found that the knowledge regarding TB disease, diagnosis, RNTCP and definitions were to be 39.25%, 40.5%, 30.62% and 34.5% respectively among males and 51.1%, 54.2%, 40.34%, 48% respectively

among females (as shown in Table 1). The knowledge was found to be adequate but comparatively higher among females than males. Also, it was found that the knowledge was 67.6%, 69.5%, 51.84%, 60.8% respectively among the age group of 20-22 years and

23.9%, 25.2%, 19.14%, 21.7% among 23-25 years respectively(as shown in Table2). The age group of 20-22 showed higher levels of knowledge compared to the age group of 23-25 years.

**Table 1: Relationship between Gender and correct responses on TB disease among the study participants**

Variables	Gender		Total
	Male	Female	
	No: (%)	No: (%)	No: (%)
<b>Regarding TB</b>			
Symptoms	50(43.5%)	64(55.7%)	114(99.1%)
Transmission	50(43.5%)	64(55.7%)	114(99.1%)
Reporting	43(37.4%)	58(50.4%)	101(87.8%)
Infection rate	40(34.8%)	49(42.6%)	89(77.4%)
<b>Regarding Diagnosis</b>			
Samples Number	43(37.4%)	57(49.6%)	100(87%)
Investigation	49(42.6%)	65(56.5%)	114(99.1%)
Timing	48(41.7%)	65(56.5%)	113(98.3%)
<b>Regarding RNTCP and DOTS</b>			
Categories	40(34.8%)	51(44.3%)	91(79.1%)
Phases	42(36.5%)	64(55.7%)	106(92.2%)
Duration	39(33.9%)	50(43.5%)	89(77.4%)
Dosage	24(20.9%)	22(19.1%)	46(40%)
Chemoprophylaxis	31(27%)	45(39.1%)	76(66.1%)
<b>Regarding definitions</b>			
MDR TB	36(31.3%)	51(44.3%)	87(75.7%)
XDR TB	43(37.4%)	58(50.4%)	101(87.8%)
Relapse	42(36.5%)	59(51.3%)	101(87.8%)
Default	38(33%)	53(46.1%)	91(79.1%)

**Table 2: Relationship between Age and correct responses on TB disease among the study participants**

Variables	Age (Years)		Total
	20-22	23-25	
	No: (%)	No: (%)	No: (%)
<b>Regarding TB</b>			
Symptoms	84(73%)	30(26.1%)	114(99.1%)
Transmission	85(73.9%)	29(25.2%)	114(99.1%)
Reporting	75(65.2%)	29(25.2%)	101(87.8%)
Infection rate	67(58.3%)	22(19.1%)	89(77.4%)

Variables	Age (Years)		Total
	20-22	23-25	
	No: (%)	No: (%)	No: (%)
<b>Regarding Diagnosis</b>			
Samples Number	73(63.5%)	27(23.5%)	100(87%)
Investigation	84(73%)	30(26.1%)	114(99.1%)
Timing	83(72.2%)	30(26.1%)	113(98.3%)
<b>Regarding RNTCP and DOTS</b>			
Categories	67(58.3%)	24(20.9%)	91(79.1%)
Phases	79(68.7%)	27(23.5%)	106(92.2%)
Duration	65(56.5%)	24(20.9%)	89(77.4%)
Dosage	33(28.7%)	13(11.3%)	46(40%)
Chemoprophylaxis	54(47%)	22(19.1%)	76(66.1%)
<b>Regarding definitions</b>			
MDR TB	67(58.3%)	20(17.4%)	87(75.7%)
XDR TB	73(63.5%)	28(24.3%)	101(87.8%)
Relapse	75(65.2%)	26(22.6%)	101(87.8%)
Default	65(56.5%)	26(22.6%)	91(79.1%)

## Discussion

In this study, it is revealed that the knowledge and awareness of interns regarding TB disease, RNTCP and DOTS guidelines are fairly good. It also showed that the Interns had less knowledge regarding recent updates and guidelines. Therefore, there is a need to enhance and update their knowledge. Furthermore, it is also noted that there is a decrease in knowledge among the interns of age group 23-25 years compared to the age group of 20-22 years.

A study done by Dinesh Mehta et al<sup>(8)</sup> on the knowledge regarding Tuberculosis, its management and national tuberculosis Control Programme among medical students and interns revealed very poor knowledge. It showed a significant lack of basic knowledge. The number of sputum samples required for diagnosis under RNTCP was responded correctly only by 57% of the students. While in this study 87% of the students responded correctly. The correct categorisation of TB patients was done only by 56% of the students. While in this study 91% of the students responded correctly.

According to a study done by Abdurehiman T<sup>(3)</sup> et al on the knowledge about TB Management and

RNTCP guidelines among interns and postgraduates also revealed very poor knowledge. The number of sputum samples required for diagnosis under RNTCP was responded correctly by 70% of the interns and 80% of the post graduates. It also showed that post graduates has a higher knowledge compared to interns.

A study conducted by Dr. Bassi et al<sup>(11)</sup> has revealed inadequate knowledge of interns towards management of pulmonary tuberculosis under RNTCP. The investigation of choice under RNTCP was answered correctly by 90% of the students. While in this study 99.1% of the students have answered correctly. Even though RNTCP and DOTS have been successful programmes, there is a lack of knowledge among interns.

## Conclusion

Knowledge and awareness regarding TB disease, RNTCP and DOTS guidelines among intern doctors were fairly good. Further enhancement of knowledge regarding key aspects of RNTCP and updated guidelines are necessary.

**Recommendations:** With the launch of RNTCP and DOTS the awareness, diagnosis and treatment of TB has improved significantly. Awareness and knowledge



of the treating physicians also plays a crucial role. The Interns were revealed to have fairly low knowledge. RNTCP training could be included in the curriculum for all interns. Recent updates, guidelines and treatment should be updated on a regular basis. Interns could also rotate and oversee activities in a DOTS clinic.

**Acknowledgement:** We thank all the study participants for cooperating in the study.

**Declaration**

**Funding:** Nil

**Conflict of Interest:** None declared

**Ethical Approval:** The study was approved by Institutional Ethical Committee.

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# Effectiveness of Home Based Cognitive Training Programme on Quality of Life and Caregiver Burden among Elderly Persons with Mild Cognitive Impairment in Selected Community Settings of Puducherry

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## Abstract

Ageing is a complex process that decreases the ability of different body systems. It effects both physical and psychological functions and decreases the quality of life. When elderly people were weak physically, this will increase the caregiver burden. Home based cognitive therapy was found to be effective in the management of cognitive functions in the elderly patients. The present study was conducted at selected community settings of Puducherry. A total of 314 elderly participants were recruited for the study after obtaining the written informed consent. After recruiting, the participants were randomly grouped into two groups that is control and intervention groups with 157 participants in each group. Home based cognitive training program was administered to the intervention group individuals. The results of the study supports that the home based cognitive training programme is beneficial in the management of elderly population with mild cognitive impairment. There was significant improvement in the quality of life of the elderly patients and also significant decrease in the care givers burden followed by the intervention. The study recommends further detailed studies in this area to adopt the home based cognitive training programme along with routine medical treatment.

**Keywords:** Cognition, Home based cognitive training program, Quality of life, Caregivers.

## Introduction

Ageing is a complex process that decreases the ability of different body systems. It effects both physical and psychological functions and decreases the quality of life. When elderly people were weak physically, this will increase the caregiver burden.<sup>1</sup> Increase in the age increases the probability of Decline in the

cognition functions deteriorates the general health and decreases the quality of life. Home based cognitive therapy was found to be effective in the management of cognitive functions in the elderly patients.<sup>2</sup> In the patients with cognitive impairment, the major cognitive functions affected are attention, spatial memory and verbal memory.<sup>3</sup> These cognitive domains play a very important role in day today life of an individual. Home based cognitive therapy is simple and effective therapy that helps to restore majority of the cognitive functions.<sup>4</sup> It is easy to apply and patient friendly as he does not need to stay in the hospital. It decreases the financial burden on the patient and his care givers. Hence, the stress experienced by the care givers of the elderly person will be relieved.<sup>4</sup> It also reduces other burdens like time

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and effort of the care givers. Earlier studies reported multiple benefits followed by the intervention. Though drug therapies are available, there are not able to restore the cognitive functions effectively and also associated with side effects.<sup>5</sup> Hence, there is a need for alternative therapy like home based cognitive therapy. The present study was undertaken to observe the efficacy of the home based cognitive training programme on quality of life and caregiver burden among elderly persons with mild cognitive impairment in selected community settings of Puducherry.

## Materials and Method

**Study Design:** Experimental study

**Study Setting:** The present study was conducted at selected community settings of Puducherry.

**Study Participants:** A total of 314 elderly participants were recruited for the study after obtaining the written informed consent. Convenient sampling technique was used in the selection of the participants. The following criteria were used while recruiting the participants.

### Inclusion Criteria:

1. Client with Age  $\geq$  60
2. Client whose score in MMSE greater than 20
3. Clients who are a permanent resident of the locality for at least in the past 6 months.
4. Clients who are willing to participate in the study

### Exclusion Criteria:

1. Clients with significant neurological deficit
2. Client who are in antidepressants
3. Clients with history of alcohol abuse
4. Clients with significant physical disability

After recruiting, the participants were randomly grouped into two groups that is control and intervention groups with 157 participants in each group.

### Home Based cognitive Training Programme:

Each training session comprised the following steps

1. **Orientation in time and space:** Performed using external aids such as a calendar and the day's newspaper, whereby participants determined the current day, month and year.

2. **Presentation of the Names:** Participants and the researcher presented their names. Verbal associations were elicited between the person's name and their appearance.

3. **Visual and Auditory Attention Exercises:** The visual attention task entailed identifying details in photographs, letters or figures amongst several stimuli spread out on a single printed sheet, as well as spotting differences between two similar photographs, among other activities. The auditory attention exercises included tasks such as detecting words in songs and identifying whether two consecutively repeated sequences of numbers or words matched or differed.

4. **Memory Exercises Using Visual Aids:** The categorization strategy with ecological tasks was used, i.e. simulated activities of daily living, graded from simple to more complex. Grocery items were used in the early stages of training progressing to supermarket item lists only, by the end of training.

5. **Transfer Task:** Practical tasks from activities of daily living were used, such as to the supermarket, giving and checking change, etc. The older adults were expected to calculate the total cost of the purchase and offer change or check the change received.

Cognitive training was given to all eligible subjects individually two sessions weekly continuously for a period of 1 month i.e. a total of 8 sessions. Each session will take approximately 1 hour.

**Ethical Considerations:** The present study protocol was approved by the institutional human ethical committee. The study was conducted as per the guidelines of ICMR.

**Data Analysis:** Data was analysed using SPSS 20.0. Data was expressed in frequency and percentage and mean and SE. Paired and unpaired t test was used to observe the significance of difference. Probability value less than 0.05 was considered as significant.

## Results

Results were presented in table no 1. There was a significant decrease in the care giver burden in the experimental group when compared with the control group. There was a significant improvement in the quality of life in the individuals of experimental group when compared with control group.

**Table 1: Care giver burden and quality of life of control and experimental groups.**

S.No.	Parameter	Group	Mean±SE	Paired 't'-test		Un paired 't'-test	
				Con- pre test -1st post test	Experimental pre -1st post	Con- pre test- experimental pre test	Control post - experimental post
1.	Care giver burden	Control pre test	55.36±0.45	t=2.22 p=0.03*		t=1.98 p=0.048*	t=60.11 p<0.001***
		Control 1st post test	53.87±0.49				
		Experimental pre test	54.14±0.43	t=65.55 p<0.001***			
		Experimental 1stpost test	19.61±0.29				
2.	Overall Quality of life	Control pre test	180.88±1.67	t=0.678 p=0.498		t=0.272 p=0.785	t=42.73 p<0.001***
		Control 1st post test	182.36±1.82				
		Experimental pre test	180.24±1.64	t=48.03 p<0.001***			
		Experimental 1stpost test	279.73±1.37				

\*P<0.05 is significant; \*\*P<0.01 is significant: \*\*\*P<0.001 is significant

## Discussion

The present study was undertaken to observe the efficacy of the home based cognitive training programme on quality of life and caregiver burden among elderly persons with mild cognitive impairment in selected community settings of Puducherry. The results of the study supports that the home based cognitive training programme is beneficial in the management of elderly population with mild cognitive impairment. There was significant improvement in the quality of life of the elderly patients and also significant decrease in the care givers burden followed by the intervention. The study recommends further detailed studies in this area to adopt the home based cognitive training programme along with routine medical treatment. It was reported that about 15 million people are providing care giving to the elderly population.<sup>6,7</sup> Interestingly, majority of these care givers are family members who are sparing their time and losing their earnings and undergoing immense stress. Further, hospitalization is most common in the elderly patients with impairment of cognition.<sup>8</sup> During hospitalization, physical, psychological, social and financial aspects of burden is involved.<sup>9</sup> Impairment of cognition in elderly persons is most common and further if untreated, it can be converted as severe diseases like Alzheimer's disease.<sup>10</sup> The available drugs and other medical treatments are costly and difficult to afford them by the average individual. Hence, the need for a non-pharmacological therapies are essential for the

management of the impairment of cognitive functions.<sup>11</sup> Home based cognitive training program was considered as essential and better therapy in the management of the cognitive decline as it does not have contra indications and affordable.<sup>12</sup> Earlier studies reported that home based cognitive training program improves the quality of life of the participants.<sup>13</sup> It also increases the memory and cognition of the patients so that their dependency on the care givers will be decreased. This will reduce the burden on the care givers.<sup>14,15</sup> Interestingly, home based cognitive training program was found to be very effective in improving the cognition in both the healthy and patients with cognitive decline.<sup>16-18</sup> The present study agrees with earlier studies as we have observed improvement in the quality of life and decline in the care givers burden.

## Conclusion

The results of the study supports that the home based cognitive training programme is beneficial in the management of elderly population with mild cognitive impairment. There was significant improvement in the quality of life of the elderly patients and also significant decrease in the care givers burden followed by the intervention. The study recommends further detailed studies in this area to adopt the home based cognitive training programme along with routine medical treatment.

**Conflicts of Interest:** None declared.

**Source of Funding:** Self-funding

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# Prevalence of Groin Injury in Recreational Male Football Players

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## Abstract

**Objectives:** The objective of this study was to find out the occurrence of respective types of groin injury on the basis of duration of play and their age and their severity. On the basis of palpation and resisted manoeuvre's assessment was done. Severity was graded on the basis of Hip and Groin Outcome Score (HAGOS).

**Method:** There were total 143 subjects, out of which 100 subjects were participants of this study. This was a study on presence of groin injury in recreational male football players. Here we evaluated presence of groin injury, classified them into their respective types and assessed their severity using HAGOS questionnaire.

**Result:** There is a relation between groin injuries and recreational male football players. Groin injury is found more within the age group 21-23 years as compared to 24-26 years. Also, groin injury was seen more in individuals who played for 4-7 days compared to those who played for 1-3 days.

**Conclusion:** There is prevalence of groin injury in recreational male football players.

**Keywords:** Groin injury, football, recreation, HAGOS, adductor, iliopsoas, abdominal.

## Introduction

Football is a contact sport that has been played all over the world. In India, football has gained recognition just recently. The craze for football has spread like wildfire and many young adults have taken a liking to this sport. However most of the players only play for recreation. Such recreational players are those who play only for enjoyment and not to compete in any leagues.<sup>1</sup>

The term 'adductor related groin pain' first originated in the literature in 1997.

**Definition of Injury:** According to the Injury Consensus Group of federation Internationale de Football Association (FIFA).(2006), an injury is defined as any physical complaint sustained by a player that results from a football match or football training, irrespective of the need for medical attention or time loss from football activities.<sup>2</sup>

**Definition of Groin Injury:** Groin injuries are defined as any physical symptom in the groin related to participation in soccer training or match play, incapacitating the player while playing soccer or demanding special medical attention.<sup>3</sup>

## Classification<sup>4</sup>:

There are three major subheadings.

- Adductor-related groin injury

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Pain on palpation and pain on resisted adduction of legs.

- Iliopsoas related groin injury

Pain on palpation and pain with resisted hip flexion.

- Abdominal groin injury

Pain on palpation and pain with abdominal flexion against resistance.

To be classified as a groin injury, a set of two tests need to be positive.

**Causes<sup>5</sup>:**

- Jumping too quickly
- Sudden restriction to hip adduction leading to abduction of hip
- Snapping psoas
- Hip pathology
- Stress fractures
- Hamstring muscle strain
- Activities requiring speed and acceleration changes

**Risk Factors<sup>6</sup>:**

- Previous groin injury
- Higher level of play
- Reduced hip adduction strength (absolute)
- Reduced hip adductor strength relative to abductor strength
- Lower levels of training
- Inadequate warm up

**Clinical Features<sup>7</sup>:**

- Tenderness
- Swelling
- Increase in local skin temperature
- Pain on abduction
- Restriction of hip range of motion

**Mechanism of Injury<sup>8</sup>:** Groin injuries occur most commonly in non-contact situations (71%). Here, a rapid muscle contraction during a rapid muscle lengthening is the fundamental mechanism. A quick reaction to a change in play, such as sudden change in direction,

running, kicking etc. were the common modes of injury.

**Prevalence<sup>6,9</sup>:** Groin injuries make up 2-5% of all sports-induced injuries.

Groin injuries comprise of 10-18% of all football injuries.

Prevalence of groin injuries in male cub football is 4-19% of all injuries. It was reported in 2002, that about 9.5% of all male football players had groin injuries.

**Methodology**

In this study 143 individuals were approached of which 100 were chosen according to the inclusion criteria in the city of Karad. The motive and procedure of the study was thoroughly explained to them. Appropriate consent was taken from the subjects. Soft tissue palpation and HAGOS pain questionnaire are the outcome measures that were used. A questionnaire was provided to the subjects to assess the type, incidence, severity, duration and other characteristics of pain. Next, the groin was palpated and tested for signs of injury.

- For Adductor-related groin pain

Palpation and resisted adduction of legs was performed

- For Iliopsoas related groin pain

Palpation and resisted hip flexion was performed

- For Abdominal groin pain

Palpation and abdominal flexion against resistance was performed

**Data Presentation, Analysis and Interpretation**

**1. Prevalence of Groin Injury:**

**Table No. 1: Distribution of Groin Injury**

	Groin Injury	Percentage
Present	61	61 %
Absent	39	39%
Total	100	100%

**Interpretation:** From table no. 1 it is suggested that among 100 individuals playing football for recreation, groin injuries were found in 61 individuals. Hence the prevalence that was found to be 61%.

**2. Distribution of Groin Injury in Accordance to Types of Injury:**

**Table No. 2: Distribution of Groin Injury in accordance to type of injury.**

	Adductor		Iliopsoas		Abdominal		Total
	Add	Add + IP	IP	IP + Add	ABD	ABD+IP	
		28	6	12	6	8	
Total	34		18		9		61

(ADD-adductor, ABD- abdominal, IP- Iliopsoas):

**Interpretation:** From table no.2, it was observed that out of 34 individuals with adductor related groin injury maximum 28 suffered from adductor related injury alone and remaining 6 suffered from both adductor and iliopsoas related injury. Out of 18 individuals suffering from iliopsoas related injury, 12 suffered from iliopsoas related injury alone. Also, out of 9 individuals suffering from abdominal related injury, 8 suffered from abdominal related injury alone and 1 suffered from both iliopsoas and abdominal related injury.

**3. Distribution of groin injury in accordance to the dimensions of HAGOS questionnaire:**

**Table No. 3: Distribution of groin injury in accordance to dimensions of HAGOS**

Subtypes	Mean Score ± SD
Symptoms	51.98 ± 7.26
Pain	55.43 ± 5.71
Physical functions	59.18 ± 7.70
Sports	30.26 ± 3.92
Physical activity	17.92 ± 5.95
Quality of life	46.39 ± 5.09

**Interpretation:** From table no.3 its observed that, the mean score of ‘symptoms’ was 51.98, ‘pain’ was 55.43, ‘physical function’ was 59.18, ‘sports and recreation’ was 30.26, ‘physical activity’ was 17.92 and ‘quality of life’ was 46.39

**4. Association between duration of play and the dimensions of HAGOS questionnaire:**

Subtypes	Mean Score ± SD	Spearman’s Correlation	
		r-Value	p-Value
Symptoms	51.98 ± 7.26	-0.3846	<0.0001(S)
Pain	55.43 ± 5.71	-0.3887	<0.0001(S)
Physical functions	59.18 ± 7.70	-0.3028	0.0022(S)
Sports	30.26 ± 3.92	-0.3246	0.0010(S)
Physical activity	17.92 ± 5.95	-0.1847	0.0658(NS)
Quality of life	46.39 ± 5.09	-0.3598	0.0002(S)

**Interpretation:** Table No. 6 shows, the association between severity of injury assessed by individual domains of the HAGOS questionnaire and the duration of play by Spearman Rank Correlation Test. For ‘Symptoms’ of injury it was found to be (-0.3846) with

a p-value of <0.0001 which was extremely significant. For ‘Pain’ it was found to be (-0.3887) with a p-value of <0.0001 which was extremely significant. For ‘Activity of daily living’ it was found to be (-0.3028) with a p-value of 0.0022 which was significant. For ‘Sports and

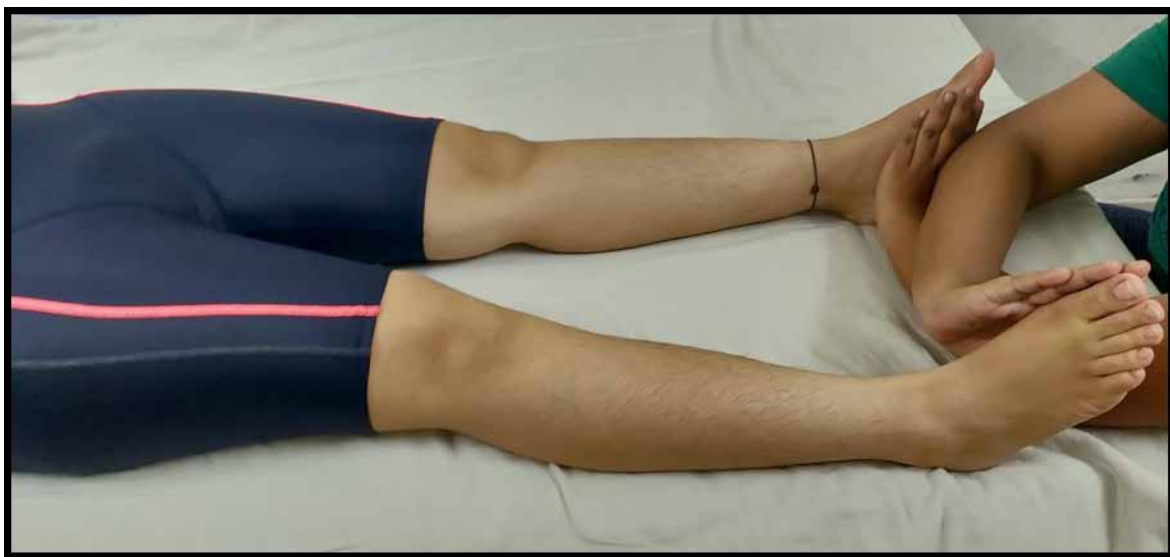


Recreation' it was found to be (-0.3246) with a p-value of 0.0010 which was significant. For 'Physical Activity' it was (-0.1847) with a p-value of 0.0658 which was not significant. For 'Quality of Life' it was (-0.3598) with a p-value of 0.0002 which was significant.

**Illustrations:**



**Figure 1: Palpation of iliopsoas muscle**



**Figure 2: Functional testing of adductors**

**Discussion**

The aim of this study is to study the prevalence of groin injuries in individuals who play football for recreation. The objectives of this study were to determine which of the types of groin injuries is more common in recreational players i.e. adductor, abdominal, iliopsoas and to determine the severity and duration of groin injuries. An effort to find the association between duration of play and severity of injury was also made.

A study reported that groin injuries occur due to insufficient training, reduced adductor range of motion and due to any previous groin injuries.

In this study, 100 individuals who played football for recreation (all male) were taken. It was found that, 61 individuals (61%) had groin injury; in which a maximum of 34 individuals (55.74%) suffered from adductor related groin injury, 18 individuals (29.51%) suffered from iliopsoas injury and the remaining 9(14.75%) suffered from abdominal injury. A reason for this may be that the adductor group of muscles is the primary adductor of the hip. Also, the attachment of the adductor longus muscle gives it a disadvantage during multidirectional movements of the hip making this group of muscles most likely to be injured. The iliopsoas muscle is the only link between the spine and

the lower limb which may make it more susceptible to strain compared to the abdominals. A previous study done in male professional football players over a period of 2 years found that adductor related groin injury was the most common entity (68%) followed by iliopsoas (12%) and abdominal related groin pain(9%).<sup>10</sup>

Also, the injuries found in this study were divided into various groups. Out of 34 individuals suffering adductor related injury, 28 had purely adductor injuries and remaining 6 had both adductor and groin injuries. From the 18 individuals who had iliopsoas groin injury, 12 had purely iliopsoas injury. Out of the 9 individuals with abdominal related injury, 8 had purely abdominal injury and remaining 1 had both abdominal and iliopsoas injury.

A reason for these injuries occurring together may be because the adductor and iliopsoas muscles are the commonly injured muscles so any severe trauma may have caused both these groups to get injured together. Since both iliopsoas and the abdominal muscles have a link with the spine, they may suffer injury together.

Individuals in the age group of 21-30 years were included in this study, out of which 70 individuals were in the (21-23) age group and 30 individuals were in the (24-26) age group. This age group consisted of those who played recreational football and did not have any training or experience in professional football.

It was clear that out of these 61 individuals with injury, groin injury was found to be more prevalent in the age group of 21-23 years (42) and the least was seen in the age group of 24-26 years (19). The cause due to which groin injury was found more in the age group of 21-23 years might be due to an imbalance in the sample size with the class 1 sample size being significantly greater than class 2. This might have led to a higher positive result.

Individuals who played for 1-3 days in a week (39) had a lesser prevalence of groin injury than those who played for 4-7 days per week (61). The individuals with groin injury who played for 1-3 days had a prevalence of 42.6% and those who played for 4-7 days had a prevalence of 57.4%. This may be due to the fact that greater play time proportionally increases the risk for injury. It may also be due to the imbalance in the sample size as greater duration of play leads to better conditioning as compared to lesser duration of play.

The groin injuries were assessed using the HAGOS questionnaire. It is suggested that the HAGOS questionnaire be used by considering its domains individually rather than calculating a cumulative score. Its individual dimensions were tested and it was found that 'physical activity' was affected the most with a mean score of 17.92 followed by 'sports and recreation' with a mean score of 30.26. 'Quality of life' was moderately affected with a mean score of 46.39. 'Symptoms' had a mean score of 51.98, 'pain' had a mean score of 55.43 and 'physical function' had a mean score of 59.18.

There is a greater affection of physical activity probably due to the hip being one of the most used joints and any physical activity will be affected by the hip. Also, any change in a person's routine is quickly noticed and has a significant impact on them.

Association between duration of play and the severity of injury was calculated. This too was done with considering individuals domains of the HAGOS questionnaire. The association for 'symptoms' and 'pain' was found to have a p-value of (<0.0001) which was extremely significant. The association for physical function had a p-value of (0.0022) and for 'sports and recreation' the p-value was (0.0010). Thus, both these associations were significant. For 'Physical Activity' the p-value was (0.0658) which is not significant and for 'quality of life' the p-value was (0.0002) which was significant.

The reason for the association between duration of play and symptoms, pain, physical function, sports and recreation and quality of life may be due to the fact that when individuals play for a shorter period of time, the body is not conditioned well enough and hence any injury causes sudden and severe pain which is manifested as an increase in the severity of the symptoms. This in turn causes a decrease in the physical function, participation abilities and consequentially decreases the quality of life.

This study found a prevalence of groin injuries in recreational male football players and it was found to be statistically significant. Thus there is a need to focus on the preventive as well as treatment measures for such players as most of the factors causing injury in these individuals are easily reversible.

## Conclusion

On the basis of the results of the study, it was

concluded that there is prevalence of groin injury in recreational male football players. Groin injury was found more within the age group of 21 to 23 years as compared to the other age group of 24 to 26 years. Individuals playing for longer durations were found to have more injuries as compared to those who played for lesser periods of time. A significant association was found between the duration of play and severity of injury.

**Conflict of Interest:** There were no conflicts of interest in this study

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

**Source of Funding:** Self

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# Effectiveness of Psychoeducation Program on Knowledge among Adults of Selected Area of Dehradun, Uttarakhand

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## Abstract

**Background:** Mental health awareness delivers a wide range of knowledge and encompasses recognition and help-seeking behaviour. Mental health services should be assessed at ground level to monitor its delivery. Different means of communication can be used to highlight the mental health issues.

**Methodology:** Quantitative research approach with quasi pre-post-test control group design was adapted for present study. Total 126 adults were selected through systematic random sampling. The tools administered consisted of baseline data and structured knowledge questionnaire. Descriptive and inferential statistics were used for analyses.

**Result:** This study showed that the psychoeducation program on mental health awareness significantly improved in knowledge score from baseline mean  $13.79 \pm 3.76$  to  $16.51 \pm 2.77$ ;  $p < 0.05$  post intervention which was quantified by structured knowledge questionnaire.

**Conclusion:** The study reported that psychoeducation program was effective in enhancing the awareness among adults.

**Keywords:** Psychoeducation, mental health, awareness.

## Introduction

The life cycle of the human being is a continuous process, which consists of a series of development in the human body. The modifications in the build develop with various stages of the life cycle. The adult is the stage of life at which an individual attains the physical and mental maturity.

Mental health awareness delivers a wide range of knowledge and encompasses recognition and help-seeking behaviour. A study conducted in Zambia (2010)

revealed that stigma and discriminating to the mentally ill client is still present in the community.<sup>1</sup> In a study in Tehran (2011) people reported that people suffering from mental illness are discriminated and not accepted in the community.<sup>2</sup>

In India, WHO reported that mental health problem has as high burden as, 2443 DALYs per 100,000 population. The suicide rate is 21.1 per 100,000 population.<sup>3</sup> In Uttarakhand, the incidence rate of postpartum depression was 11% among mothers and the prevalence rate of depressive disorder was 6% as per 2014 report. These beliefs and attitudes are a potential barrier to seeking optimal professional help.

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## Material and Method

The quasi pre-post-test control group method was implemented with systematic sampling technique in

the study. Study was done on all the adults of Bhogpur and Ghamandpur village of Doiwala block, Dehradun, Uttarakhand. Total samples was 126, for each group 63 samples were assigned. The data was collected through knowledge questionnaire to assess the knowledge of mental health awareness and demographic details was obtained through baseline data. Samples of the experimental group received the psychoeducation program on the pre-test day. Post-test was taken after seven days from participants of both groups. The tools were structured questionnaire of mental health awareness which contains 25 question in which each correct response have given one mark and zero mark for wrong response. Scoring of tool were determined as 0-8 average, 9-16 good, 17-24 V. good.

**Results**

In the study it showed that samples have good level of knowledge regarding mental health awareness. The mean post test score was higher than pre-test score of psychoeducation program, which concluded that psychoeducation program was effective.

**Findings:** In an experimental group out of 63 samples the majority 30.15%of the adults stayed in the age set of 31-40 years. 58.7% were females, 57.1% were residing in the joint family. Maximum of the sample 33.3 % had secondary education. Family income of majority 69.84 % of the sample was between Rs 5000-10000. 65.07% were married, 95.2% followed the Hindu religion. Whole sample 100% had reported that they don't have any source of information regarding mental health and also don't have any past history of mental illness.

In the control group out of 63 sample, the majority 33.33%of the adults fell in the age series of 41-50 years, 69.1% were females, 60.3% were residing in the joint family. Most of the sample 39.7 % had secondary education. Family income of majority 63.5% of the samples were between Rs 5000-10000. Most of the samples 65.07% were married, the majority of the samples 85.7% followed the Hindu religion. 100% samples reported that they never suffered with mental illness and didn't have any source of information regarding maintenance of mental health.

**Table 1: Effectiveness of psychoeducation program among the group**

Group	Pre-test Mean ± SD	Post-test Mean ± SD	Mean difference	't' value	p- value
Experimental n=63	13.79 ±3.76	16.51±2.77	2.714	8.23	0.001*
Control n=63	12.44 ±3.90	12.40±3.17	0.048	0.177	0.860

df<sub>125</sub>, p <0.05 Significant \*

Table 1 presented that post-test mean knowledge score of the experimental group increased from baseline 13.79 ±3.76 to 16.51±2.77. The mean difference between the two means was 2.714 which had interpreted that post mean knowledge score was increased, which

were compared to each other by applied paired t-test and got the t value 8.230 and p-value was **0.001**, which was highly significant level of significance at **p<0.05**. So, it could be inferred that psychoeducation program was effective to upgrading the awareness of mental health.

**Table 2: Pretest score and post-test score comparison between groups**

Knowledge Score	Experiment (n=63)	Control(n=63)	't' value	Mean Difference	p value
	Mean ± SD	Mean ± SD			
Pretest	13.77 ± 3.736	12.45 ± 3.937	1.92	1.32	0.06
Post-test	16.48 ± 2.75	12.35 ± 3.18	7.79	4.13	0.001*

df<sub>125</sub>, p <0.05 Significant \*

Table 2 illustrate that the post-test mean knowledge score of the experimental group was 16.48 and control group was 12.35. Difference between the two means were 4.13, which were compared to each other by independent sample 't'- test and its value was 7.79 at p

value of **0.001**, which was highly significant and it was tested statistically at **p <0.05 level**. Therefore it could be concluded that psychoeducation program was effective in the experimental group.

**Table 3: The association between pre-test levels of knowledge with the baseline data**

S.No.	Baseline data	Average	Good	V. Good	$\chi^2$	df	p	
1.	Age (Years)	21-30	6	22	09	18.39	6	0.005*
		31-40	8	19	12			
		41-50	13	10	5			
		51-60	15	5	2			
2.	Gender	Male	6	34	11	0.232	2	0.890
		Female	8	53	14			
3.	Family type	Nuclear	11	44	9	5.656	2	0.102
		Joint	3	43	16			
4.	Education	No formal education	1	21	5	7.767	6	0.256
		Primary education	2	20	6			
		Secondary education	7	26	4			
		Graduation and above	4	20	10			
5.	Family income	5000-10000	8	59	18	2.882	4	0.577
		10001-15000	4	20	2			
		15001-20000	2	8	5			
6.	Marital status	Married	6	28	13	3.468	2	0.177
		Unmarried	8	59	12			
7.	Occupation	Private Job	6	29	6	6.912	6	0.329
		Government Job	1	8	5			
		Own Business	3	10	1			
		Other Homemaker, Unemployed	4	40	13			
8.	Religion	Hindu	13	78	22	0.033	2	0.983
		Muslim	1	9	3			

Table 3 shows illustrated that no significant association among baseline data and knowledge score was found except with age group of adults. It was

tested on level of significance at  $p < 0.05$ . So, It could be inferred that there was an association between age group and knowledge score

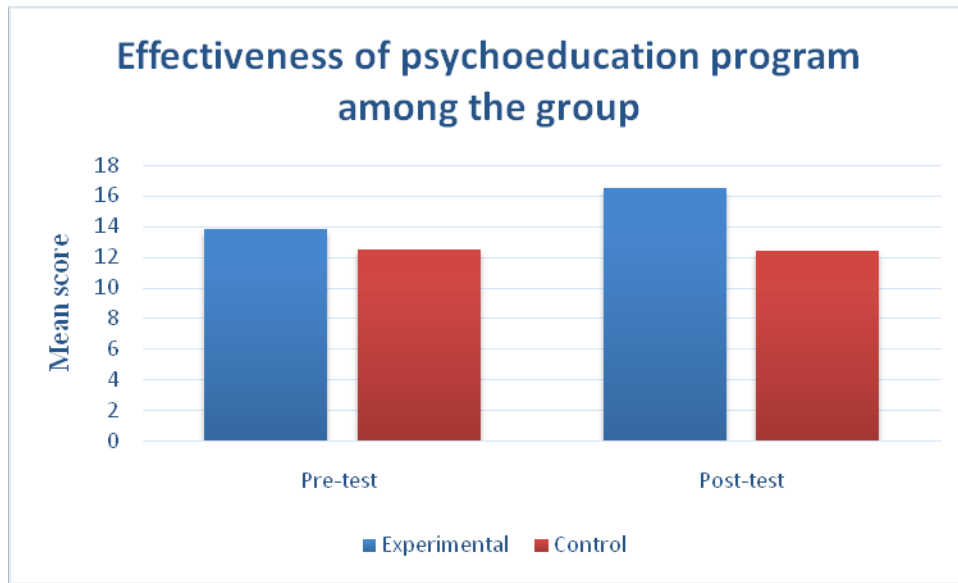


Figure 1: Effectiveness of psychoeducation program among the group.

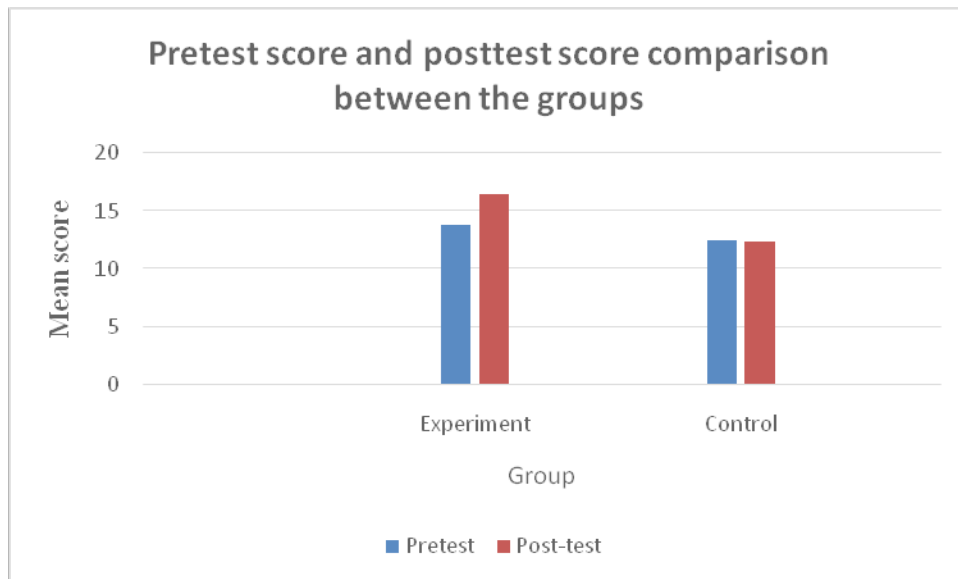


Figure 2: Pretest score and posttest score comparison between the groups

### Discussion

The study aims to teach the community people about how to maintain mental health and its benefits which can promote and prevent mental illness. A total of 63 samples were selected in each group, through the systematic random sampling techniques. The discussion was done according to objectives and with supportive study

**Effectiveness of psychoeducation program:** The study showed that the post-test knowledge score was comparably higher in experimental group than post-

test knowledge score in control group and the post-test mean knowledge score was comparably higher than pre-test knowledge score in experimental group. Therefore it could be inferred that the psychoeducation program increased the knowledge scores of adults.

The results of this research study were supported by **Chisholm K, Patterson P, Torgerson C, Turner E, Jenkinson D, Birchwood M. 2016** done a study on contact impact on adolescent mental health knowledge and mental illness stigma. The purpose was to examine whether the contact in intergroup in count to education

was extra operative than education unaccompanied in dropping the mental illness stigma in youngsters. The schools were randomized, the random allocation done through concealed method for the samples selection, total of 769 applicants were included in the study. Results of the study reported that applicants knowledge based stigma in the education unaccompanied condition upgraded significantly which was more than applicants in the contact and condition of education,  $-0.65$ , 95% CI ( $-1.13$  to  $-0.17$ ).  $p=0.008$ ,  $d=0.05$ . The intermediation on education executed in dropping mental illness stigma, encouraging knowledge of health and individual who experiences mental health disorders.<sup>4</sup>

**Association between baseline data and pretest knowledge score:** The present study explored statically that age group and knowledge score of adults had the association. Similar studies also were done on age group and knowledge.

**Yu Y, Liu Z-wei, Hu M, et al (2015)** done a study on literacy on mental health among adults. A multistage cluster sampling method was adopted. Total of 2052 subjects was included for the study. The research study aims to identify knowledge of mental health. The result explored that younger age and higher education were the major components of mental health.<sup>5</sup>

### Conclusion

The study established on psychoeducation program stated that it was effective and efficient in enhancing the knowledge level of adults. The study also explored that there was an association between age and knowledge level of mental health among adults.

**Ethical Consideration:** Administrative agreement was attained from principal Himalayan College of Nursing, SRHU. The ethical permission was taken from the ethical committee of SRHU than written consent of the participants was taken before doing the collection of data.

**Source of Funding:** Self

**Conflict of Interest:** Nil

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# Prevalence of Tarsal Tunnel Syndrome During Third Trimester of Pregnancy

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## Abstract

**Objectives:** Pregnancy may be associated with pedal oedema, ligament laxity and arch drop. Some pregnant females faces problem of varicosities. Ultimately these problems may leads to compression of posterior tibial nerve and may cause Tarsal Tunnel Syndrome. Pedal oedema, arch drop and varicosities are the causative factor for tarsal tunnel syndrome. It may leads to complication such as continuous pain in tarsal tunnel just behind the medial malleolus.

This study was conducted to find out the presence of tarsal tunnel syndrome during third trimester of pregnancy in Karad.

**Methodology:** The study group consisted of 150 women. A prevalence study was conducted among females of third trimester of pregnancy. Females were selected on the basis of inclusion and exclusion criteria. They were assessed by performing dorsiflexion-eversion test and triple compression test. The data was collected and analysed accordingly.

**Result:** Data from one fifty females were obtained and analysed. The symptoms of tarsal tunnel syndrome were found more within the age group of 21-30 years of age. Multiparous females were more prone to developed tarsal tunnel syndrome as compared to primiparous females. Prevalence of tarsal tunnel syndrome was 34.48% in primiparous females and 45.65% in multiparous females.

**Conclusion:** We found out that there is a prevalence of tarsal tunnel syndrome during third trimester of pregnancy in Krishna hospital, Karad.

**Keywords:** *Third trimester of pregnancy; Multiparous females; Primiparous females; Tarsal tunnel syndrome.*

## Introduction

Pregnancy is a time of nine months or so, for which a woman carries a developing embryo and fetus in her womb<sup>1</sup>.

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During pregnancy there is progressive anatomical, physiological and biochemical changes not only occurred in genital organs but also to the systems of body. Variable amount of weight gain is constant phenomenon in pregnancy<sup>12</sup>. Weight gain that occurs in pregnancy is related to fetal growth<sup>7</sup>. The women may lose weight in early weeks of pregnancy because of nausea or vomiting. After that weight gain is progressive until the last 1 or 2 weeks, when the weight remains static. The total weight gain of approximately 11 kg during the course of a singleton pregnancy for a woman is normal. This 11 kg has been distributed to 1 kg in first trimester, 5 kg in second trimester and remaining 5 kg in third trimester<sup>12</sup>.

The presence of oedema of the legs is common in pregnancy. Oedema occurs due to increased accumulation of fluid in the tissue space mainly below the uterus. It is due to – 1. Increased venous pressure of the inferior extremities. 2. Diminished colloid osmotic tension due to hemodilution<sup>12</sup>.

In pregnancy, there is increase in Relaxin, Progesterone and Estradiol levels that leads to greater ligamentous laxity<sup>8</sup>. The combination of increased weight on joints and greater laxity can lead to permanent structural changes in foot during pregnancy. Some studies have reported that during pregnancy, there is increase in foot length, width. This increased foot width causes downward movement of the head of the talus in the context of body weight and it also has relaxin effects on the arch and the subtalar joint<sup>10</sup>. It leads to flattening of the pedal architecture<sup>1</sup>. During pregnancy, there is also increased in hindfoot pronation and center of pressure on the foot shifts posteriorly for the compensation of increased anterior abdominal mass.

The combination of ligamentous laxity in the arch, increased body mass and the posterior shift in the center of pressure during pregnancy leads to change in length of ligaments supporting the arch, which leads to loss of arch height. This loss of arch height has been correlated to calcaneal inversion or eversion which causes excessive pronation of foot. Some studies concluded that pregnancy appears to be associated with a permanent loss of arch height and greater arch drop and this is more significant in the first pregnancy<sup>10</sup>. Some studies reported that varicosities had been associated with pregnancy<sup>11</sup>. Perhaps these changes in the feet may result in increased risk for musculoskeletal disorders in women such as tarsal tunnel syndrome due to above mentioned causes like weight gain, oedema of the leg and loss of height of the arches of the feet, varicosities<sup>1,10,12</sup>.

Tarsal Tunnel is a narrow fibro-osseous space located in the medial aspect of the ankle, which is posterior to the medial malleolus. It is bounded superiorly by the flexor retinaculum and inferiorly by the medial walls of the distal tibia, talus and calcaneus. It contains tibialis posterior tendon, flexor digitorum longus tendon and flexor hallucis longus tendon. Posterior tibial nerve, artery and vein run together through this tarsal tunnel<sup>11</sup>. It is an enclosed structure. The posterior tibial nerve, a branch of sciatic nerve, lies in the posterior compartment of lower leg deep to the soleus muscle. It passes deep to the flexor retinaculum between the medial malleolus and

the calcaneus within the tarsal tunnel<sup>2</sup>.

Tarsal tunnel syndrome is a focal compressive neuropathy of the posterior tibial nerve or one of its branches within the tarsal tunnel<sup>4</sup>.

#### **Causes:**

Extrinsic causes—poorly fitting shoes, repetitive actions of dorsiflexors and plantar flexors during sprinting and jumping; trauma such as talus and calcaneus fracture, ankle sprain; anatomic-biomechanical abnormalities such as flat foot, tarsal coalition, valgus or varus foot deformity; post-surgical scarring, metabolic diseases such as diabetes mellitus, hypothyroidism, acromegaly, obesity, osteoporosis; generalized lower extremity oedema, systemic inflammatory arthropathies<sup>3,5,6,11</sup>.

Intrinsic causes—tendinopathy, tenosynovitis, perineural fibrosis, osteophytes, hypertrophic retinaculum, space-occupying or mass effect lesions such as varicose veins, ganglion cyst, lipoma, neoplasm and neuroma<sup>3,5,6,11</sup>.

A characteristic feature of Tarsal Tunnel Syndrome includes poorly localised paraesthesia, dysesthesia and hyperaesthesia. It radiates from the retro-malleolar region to either sole, heel or digits of the forefoot or combination of these areas<sup>2</sup>. The main complaint is pain which is over the tarsal tunnel. Pain radiates to the arch and plantar foot which is sharp shooting in nature. Presence of numbness on the plantar surface of foot, Radiating pain and paresthesia occurs along the distribution of the posterior tibial nerve. Patient presents with pain and tingling or burning sensation with extremes of dorsiflexion and eversion. There is tenderness on deep palpation of the tarsal tunnel<sup>5</sup>. Some atrophy may be seen of the abductor hallucis muscle<sup>9</sup>. The symptoms may vary depending on whether the entire posterior tibial nerve is compressed or its branches that is lateral or medial plantar branches. It has temporal variation with worsening of symptoms at night<sup>5</sup>.

Symptoms may get worsen with walking, or standing, or after physical activity and improve after period of rest. The patient also experiences weakness in foot muscles. Tinel sign is positive in tarsal tunnel syndrome<sup>5</sup>.

The incidence of tarsal tunnel syndrome is higher in females as compared to males and it can occur at any age. The complications of untreated tarsal tunnel syndrome

include persistent pain, subsequent motor weakness and atrophy<sup>5</sup>.

criteria. The procedure was explained and consent was taken from those willing to participate.

### Methodology

Total 173 females were approached from Krishna Hospital, Karad, Maharashtra out of which 150 females were selected for the study who fulfilled inclusion

Here, two tests were performed. Dorsiflexion-Eversion test and Triple Compression Stress test were performed to rule out the presence or absence of Tarsal Tunnel Syndrome. The data were collected and statistical analysis was done.

### Result

#### 1. Dorsiflexion-eversion test:

**Table 1: Results of dorsiflexion eversion test**

Sr.No.	Results of test	Left	Right	Both	Total
1.	Positive	15	27	20	62
2.	Negative	28	16	44	88

Interpretation- Above table represents positive and negative test results of Dorsiflexion-eversion test on left foot, right foot and both the feet. Out of 150 subjects, test was positive in 62 subjects and negative in 88 subjects.

In 62 subjects, test were positive for 15(10%) for left foot, 27(18%) for right foot and 20(13%) for both the feet.

#### 2. Triple compression stress test

**Table 2: Results of Triple compression stress test**

Sr.No.	Results of test	Left	Right	Both	Total
1.	Positive	15	27	20	62
2.	Negative	28	16	44	88

Interpretation-Above table represents positive and negative test results of Triple compression stress test on left foot, right foot and both the feet. Out of 150 subjects, test was positive in 62 subjects and negative in 88

subjects. In 62 subjects, test were positive for 15(10%) for left foot, 27(18%) for right foot and 20(13%) for both the feet.

#### 3. Comparison of Dorsiflexion-eversion test and triple compression stress test results according to parity

**Table 3: Results of dorsiflexion-eversion test and triple compression stress test according to parity**

Sr.No.	Parity	Results	Percentage	Positive
1.	Primipara	Total		58
		Dorsiflexion-eversion test	34.48%	20
		Triple compression stress test	34.48%	20
2.	Multipara	Total		92
		Dorsiflexion-eversion test	45.65%	42
		Triple compression stress test	45.65%	42

Interpretation-Above table represents positive results of Dorsiflexion-eversion test and triple compression stress test in left foot, right foot and both the feet according to their parity. Dorsiflexion-eversion

test was positive in 20(34.48%) primiparous females and 42(45.65%) multiparous females. Triple compression stress test was positive in 20(34.48%) primiparous females and 42(45.65%) multiparous females.

#### 4. Comparison of occurrence of tarsal tunnel syndrome according to age group

**Table No. 4: Occurrence of tarsal tunnel syndrome according to age group**

Sr.No.	Age group	Results	Percentage	Mean±SD
1.	Upto 20 years	4	6.45%	19.5±0.58
2.	21-25 years	27	43.54%	23.19±1.47
3.	26-30 years	29	46.77%	28±1.41
4.	31-35 years	2	3.22%	32±0

Interpretation-Above table represents positive results of tests according to their age group. Out of 62 positive results, 4(6.45%) were upto 20 years of age, 27(43.54%) were between 21-25 years, 29(46.77%) were between 26-30 years and 2(3.22%) were between 31-35 years of age.

#### Discussion

The purpose of this study was to find the prevalence of tarsal tunnel syndrome during third trimester of pregnancy.

Tarsal tunnel syndrome is a focal compressive neuropathy of the posterior tibial nerve or one of its branches within the tarsal tunnel. Poorly fitting shoes, repetitive actions of dorsiflexors and plantar flexors, talus and calcaneus fracture, ankle sprain, flat foot, tarsal coalition, valgus or varus foot deformity; post-surgical scarring, diabetes mellitus, hypothyroidism, acromegaly, obesity, osteoporosis, generalized lower extremity oedema, systemic inflammatory arthropathies are the extrinsic causes of tarsal tunnel syndrome. Tendinopathy, tenosynovitis, osteophytes, hypertrophic retinaculum, varicose veins, lipoma and neuroma are the intrinsic causes of tarsal tunnel syndrome.

Variable amount of weight gain is constant phenomenon in pregnancy. The presence of oedema of the legs is common. Oedema occurs due to increased accumulation of fluid in the tissue space mainly below the uterus. There is increase in some hormone levels

which includes Relaxin, Progesterone and Estradiol that leads to greater ligamentous laxity. The combination of ligamentous laxity in the arch, increased body mass and the posterior shift in the center of pressure during pregnancy leads to change in length of ligaments supporting the arch, which leads to loss of arch height. This factors may lead to tarsal tunnel syndrome in pregnancy.

A characteristic feature of Tarsal Tunnel Syndrome includes poorly localised paraesthesia, dysesthesia and hyperaesthesia. The main complaint is pain which is over the tarsal tunnel. Pain radiates to the arch and plantar foot which is sharp shooting in nature. Presence of numbness on the plantar surface of foot, Radiating pain and paresthesia occurs along the distribution of the posterior tibial nerve. Tinel sign is positive in tarsal tunnel syndrome.

This study was done in six months of duration and was conducted in Karad. Females during third trimester of pregnancy were screened before selecting for the study. Total 150 females were selected on the basis of inclusion and exclusion criteria and written consent was taken. The subjects were taken from Krishna Hospital. Subjects were explained about the procedure of the study. Dorsiflexion-eversion test and Triple compression test were performed to rule out the presence or absence of tarsal tunnel syndrome.

Out of 150 females, according to dorsiflexion-

eversion and triple compression stress test, 34.48% of primiparous females showed positive results and 65.52% of females showed negative results. Occurrence of tarsal tunnel syndrome is also distributed according to age. Out of 62 positive results, 6.45% were upto 20 years, 43.54% were between 21-25 years, 46.77% were between 26-30 years, 3.22% were between 31-35 years of age. In primiparous females, out of 34.48% positive results, 10.34% were for left foot, 8.62% for right right and 15.51% for both the feet. In multiparous females, out of 45.65% positive results, 9.78% were for left foot, 23.91% for right foot and 11.95% for both the feet. According to Pearson chi-square test, p value for association between parity and tarsal tunnel syndrome was 0.121 which was not statistically significant.

**The following interpretations were noted:**

- Tarsal tunnel syndrome is more common in multiparous females as compared to primiparous females.
- Tarsal tunnel syndrome is more common between age of 21-30 years.
- Tarsal tunnel syndrome is more prevalent in right foot of multiparous females as compared to left foot.
- Tarsal tunnel syndrome is more prevalent in both legs of primiparous females as compared to left or right foot.

**Conclusion**

On the basis of the results of the study, it can be concluded that there is prevalence of tarsal tunnel syndrome during third trimester of pregnancy. Prevalence of tarsal tunnel syndrome is found more within the age group of 21-30 years of age. Multiparous females are more prone to develop tarsal tunnel syndrome as compared to primiparous females.

Prevalence of tarsal tunnel syndrome is 34.48% in primiparous females and 45.65% in multiparous females.

**Conflicts of Interest:** There were no conflicts of interest in this study.

**Ethical Clearance:** Ethical clearance was taken from institutional committee of Krishna institute of medical sciences.

**Source of Funding:** Self-funding

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# Prevalence of Poor Hand Grip Strength in Dentists

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## Abstract

**Context:** Musculoskeletal disorder are group of disorder that affect the musculoskeletal system involving nerve, tendon, muscle supporting structure. Dentists suffer a major musculoskeletal problems in day to day life due to their faulty posture. They usually work in flexed position for a longer time and repetitive moments occur. Major work is done by their hand and wrist. It may alter the hand grip strength in dentists.

**Aim:** To determine prevalence of poor hand grip strength in dentists.

**Subject and Methodology:** In this consecutive study, dentists working for 45 minutes or more were taken 40 dentists with 1 to 15 years of experience between age group of 20 to 50 years was included which considered of 75% of females and 25% of males respectively. Sphygmomanometer was the major outcome to assess the grip strength of hand in neutral, flexion and extension.

**Result:** In neutral position 68% population had poor grip strength which was in between 100-200 mm/hg. In flexion, 65%, population had poor grip strength, in between while in extension, 60% population had poor grip strength.

**Conclusion:** Poor hand grip strength was found in all three positions neutral, flexion and extension with p value of <0.0001

**Keywords:** Hand grip, Dentists, Wrist, Strength.

## Introduction

The hand, wrists are a complex series of bones, tendons and ligaments<sup>4</sup> that allows you to do anything from writing on a paper to turning a screwdriver. Mostly due to overuse and repetitive use of this complex structures as wrist there are many associated problems with it<sup>4</sup> Majorly this complex structure of hand and wrist is almost used by everyone in day to day life. But if used repeatedly and for longer time may cause some discomfort. One such profession whose bread and butter depend on their hands are the “THE DENTISTS”.

Yes so whenever we think about a dentist we just question toothache or painful treatment. No

But has anyone noticed their own problems due to overuse and repetitive use of their wrist, finger and overall abnormal posture. Dental hygienists and dental

assistances may experience hand pain in doing dental procedures. Hand pain may include throbbing, altered sensations and stiffness or diminished, altered and painful grip strength after long procedures

The physical demands and hand motions mostly aggravate the pain and altered functions in them.

Following are some examples of hand motions that aggravate hand pain and altered grip strength and grasp size<sup>5</sup>

- Gripping instruments that have slim handles such as periodontal probes explorers’ scalar, curescopes and endodontic files.
- Gripping instruments which are tight
- Gripping vibrating instruments such as rotary hand piece over a long period of time.

- Doing procedures that require torquing motions in wrist and hand such as root canals
- Doing procedures that require repetitive motion and longer period like scaling teeth.
- Using fingers while the wrist is held in non neutral position especially a flexed position for long period of time

So basically there is major alteration in the hand grip and the grip strength and which is painful so my topic is

### “Prevalence of Poor Hand Grip Strength in Dentists”

**So what exactly is grip strength<sup>4</sup>:** Grip strength is the force applied by the hand to pull on or suspend from objects and is a specific part of hand strength in application of grip strength wrist should be in neutral position. Grip strength is a general term. It is also used by animals, any professional worker referring to muscular power and force that they can generate with their hands for a proper grip the thumb, the fingers and the lumbricals (flexor digitorum profundus, MCP) the interossei (three palmar interossei, four dorsal interossei) the hypothenar (carpal ligaments, abductor digiti minimi muscle, flexor carpi ulnaris tendon) in order to perform power grip stable wrist is needed biomechanically a stable wrist prevents the dissipation of finger flexion and extensor forces as tendon moves. The human hand is the most complex structure in the body.

### Biomechanics<sup>4</sup>:

#### The wrist consists of two compound joints:

1. The radio carpal joint
2. The mid carpal joint

These together constitute wrist complex each joint proximal to wrist complex serves to broaden the placement of the hand in space and to increase the degree of freedom available to the hand .the wrist muscles appear to be design for balance and control rather than maximizing torque production. The adjustment in length tension relationship of extrinsic hand muscles that occur at the wrist cannot be replaced by compensatory movements of shoulder, elbow forearm (radioulnar joint).the wrist complex with flexion /extension around coronal axis and ulnar /radial deviation around anterior posterior axis pronation/supination may also be found especially at the radio carpal joint.

### Movements<sup>4</sup>:

- Flexion – flexor carpi radialis, flexor carpi ulnaris, Palmaris longus
- Extension- extensor carpi radialis longus, extensor carpi radialis brevis, extensor carpi ulnaris.
- Abduction – flexor carpi radialis, extensor carpi radialis longus, abductor pollicis longus, extensor pollicis brevis
- Adduction- flexor carpi ulnaris

Power – in which the object makes full contact with the palm and is moved through spaces the fingers in the power grip usually function in concert to clamp and hold an object into the palm .the fingers assume a position of sustain flexion that varies in degree with the size, shape and weight of the object.<sup>4</sup>

### Types:

#### Cylindrical Grip

#### Spherical Grip

#### Hook Griip

**Aim:** To find prevalence of poor hand grip strength in dentists.

**Objectives:** To find wrist pain in dentists

To determine poor hand grip strength in dentists

### Materials

It was an observational study comprised over a period of 24 weeks. Consecutive method was used for calculating sample size. As per sample size calculation, 38 was the actual sample size, 40 subjects were included using random sampling method for data collection. Sphygmomanometer was used to access the hand grip strength.

**Methodology:** The ethical clearance was taken from the institutional ethical committee of Krishna institute of medical sciences ‘deemed to be’ university for this study, Karad. An observational study was conducted in 40 dentists at Krishna hospital Karad. Individuals working at least 5 days per week, willing to participate. Informed consent was taken and the study was explained to the participants. The participants were accessed personally and were asked to pump the cuff



of sphygmomanometer<sup>3</sup> with their dominant hand and the readings were recorded.. The outcome measure was sphygmomanometer<sup>3</sup>

**Data Analysis And Interpretation**

**1. Age in Years**

**Table No 1**

Age in Years	
20-30	88%
31-40	10%
41-50	3%

**Interpretation:** This chart shows in 20-30 age group 88% dentists participated in 31-40 age group 10% dentists participated and 41-50 age group 3% dentists participated.

**2. Gender Wise Distribution**

**Table No 2**

Sex	
Male	25%
Female	75%

**Interpretation:** This chart shows sex distribution. Male dentists were 25% and female dentists were 75%.

**3. Working Years of Dentists**

**Table No 3**

Working Years	
1-5	90%
6-10	8%
11-15	3%

**Interpretation:** This chart shows working years. 1-5 hours 90% dentists participated, 6-10 hours 8% dentists participated and 11-15 hours, 3%

**4. Grip Strength in Dentists in Different Position<sup>3</sup>**

**Table No 4**

Grip Strength	Neutral	Flexion	Extension
Below 100mmhg	15%	20%	18%
100-200mmhg	68%	65%	60%
Above 200mmhg	18%	15%	15%
Standard deviation	50.01	48.36	47.66

Grip Strength	Neutral	Flexion	Extension
P value	<0.0001	<0.0001	<0.0001
T value	18.18	18.45	20.12
Inference	Extremely significant	Extremely significant	Extremely significant

**Inclusion Criteria:** Dentist working continuously for 45 to 60 minutes for minimum 5 days a week.

**Exclusion Criteria:**

1. Recent Fractures of wrist.
2. Any pain due to pathology in wrist.
3. Soft tissue injury of wrist.

**Limitations:**

1. There were less males in the study, so poor gender distribution.
2. The study group size was small, hence study results cannot be generalised for entire population.
3. Years of experience large no of subjects were of less age group.

**Suggestions and Recommendations**

1. This study can be done on large population.
2. This study can be made more precise with more details

**Source of Funding:** Self

**Conflicts of Interest:** Nil

**Results**

After analyzing the data, it was found that dentists had poor hand grip strength.

In neutral position 15% dentists grip strength ranged below 100 mm/hg, 68% ranged in between 100-200 mm/hg and 18% grip strength was above 200mmhg.

In flexion 20% dentists were below 100 mm/hg, 65% dentists were in between 100-200mm hg and 15% dentists grip strength ranged above 200mmhg.

In extension 18% were below 100mmhg, 60% were in between 100-200mmhg and 15% dentists grip strength recorded was above 200mmhg.

P value for all three was <0.0001 and interference was extremely significant in all three positions.

## Discussion

This study is about the prevalence of poor hand grip strength in dentists. This study was conducted to find prevalence of poor hand grip strength in dentists.

Dentistry is a profession who suffers maximum musculoskeletal problems due to their poor posture, inappropriate working patterns and faulty mechanics. maximum work is done by their wrist joint. All the major surgeries, minute procedures, scaling, etc requires there wrist and fist. There are variations in the diameter of their instruments and due to long procedures their grip strength may alter. For this purpose study about grip strength in dentists was carried out.

The objective of this study was to find out prevalence of poor hand grip strength in dentists.

The study was conducted with 40 dentists. Ethical concerns and permissions were taken in prior. outcome measures used were sphygmomanometer reliability. Grip strengths were taken in neutral, flexion and extension positions. Static study was done by A NOVA method.

This study investigated out of which 88% were of 20-30 age group 10% were of age group 31-40 and 3% were in between 41-50 years of age.

Both male and female dentists participated in the study. in which male population included 25% of dentists and female population included 75% of dentists.

Also working year was taken into consideration. In which 1-5 years 90% of the dentists were involved. 6-10 years 8% dentists were involved and 11-15 years 3% of the dentists were involved.

Grip strength was taken in three different positions neutral, flexion and extension. And also it was divided in three groups below 100mmhg (poor) in between 100-200(average), above 200(fair)

In neutral 15% (poor), 68% (average) and 18% (fair) were the grip strengths found. In flexion 20%(poor),65%(average)and 15%(fair) . While in extension 18% (poor), 60% (average) and 15% (fair) were the grip strengths found.

Standard deviation for neutral was 50.01, for flexion 48.36 and for extension 47.66. While t value for neutral was 18.18, for flexion 18.45 and for extension 20.12. p value for all three was <0.0001 and thus inference for the

study for all three positions came extremely significant.

Related study was done by DEEPTI DHARANI on prevalence of wrist pain in dentists. With sample size of 500, which included interns (57%), post graduates (29%) and staff members (14%). The results concluded that 31% dentists suffered wrist pain and 69% dentists had no pain.<sup>2</sup>

Therefore the result of present study showed poor hand grip strength<sup>3</sup> in dentists in all three positions. That is in neutral, flexion and extension with no pain.

For improvisation and to prevent and reduce this musculoskeletal injury<sup>7</sup> physiotherapeutic manipulations should be given.

## Conclusion

Prevalence of poor hand grip strength was studied in this project.

40 dentists participated in the study 88% were of 20-30 age groups, 10% were of age group 31-40 and 3% were in between 41-50 years of age.

Grip strength was taken in three positions neutral, flexion and extension also recorded as below 100mmhg, in between 100-200 mm hg and above 200 mm hg.

In neutral 15% (poor), 68% (average) and 18% (fair) population in this way grip strengths were recorded<sup>7</sup>,

In flexion 20%(poor), 65% (average) and 15%(fair) while in extension 18%(poor),60%(average) and 15% (poor) grip strength were recorded.

p value for all three was <0.0001 which was extremely significant which concludes that dentists have poor grip strength

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# Prevalence of Cervicogenic Headache in Dentists

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## Abstract

**Background:** Dentists are an important part of health professionals. They too have so much of work related stress as most of them work in an awkward posture while treating the patients. Due to lack of rest periods, ergonomics and psychological stress among them its our need to create the awareness so that they can prevent decline in their work performance and incidence of work related stress.

**Objectives:** To find the prevalence of cervicogenic headache in dentists and to create awareness of cervicogenic headache in them.

**Method:** The study was ethically been approved. In this observational study, 81 clinical practitioners between age group 30 to 60 years were included which considered of 48% of males and 52% of females respectively. The study was been conducted by taking consent of the participants through a consent form. Cervical flexion-rotation test and Neck Disability Index questionnaire were the major outcome measures to assess Cervicogenic headache in dentists.

**Result:** According to Neck Disability Index, among 81 dentists, 11% have pain intensity, 9% have difficulty in Personal care, 12% have difficulty in lifting, 13% have difficulty in Reading, 15% have headache, 8% have difficulty in concentration, 6% have difficulty in work, 10% have difficulty in driving and 8% have difficulty in sleeping respectively.

According to Cervical Flexion: Rotation test, the test was positive in 26% of males and 15% of females whereas, the test was negative in 20% of males and 39% of females.

**Conclusion:** 26.73% of dentists have Cervicogenic headache.

**Keywords:** Cervicogenic Headache, Dentists, Posture, Stress.

## Introduction

Cervicogenic headache is a clinical syndrome characterized by primarily unilateral pain that originates in the neck, typically provoked by neck movements or

pressure over tender points in the neck, with reduced range of movement of the cervical spine.<sup>1</sup>

It is a secondary headache that is characterized by unilateral headache and symptoms and signs of neck involvement.<sup>2,3</sup> These headaches are chronic in nature. They also have been found to appear from musculoskeletal dysfunction of the cervical spine (neck).<sup>4</sup> Cervicogenic headaches can imitate migranes. Therefore it might be difficult to differentiate cervicogenic headaches from the migraine headaches. The basic difference between both the headaches is, migraine headaches are rooted from the brain whereas cervicogenic headaches are rooted from the cervical spine (neck) or base of skull region.<sup>5</sup> A

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“cervicogenic episode” lasts for approximately one hour to one week. Pain is typically on one side of the face (unilateral) and often correlates with the side of the neck where there is increased tightness. Range of motion will also be affected.<sup>6,7</sup> In addition to throbbing head pain, signs and symptoms include neck pain or stiffness, nasal congestion, runny nose, facial sweating, eyelid oedema, eye pain. These are present on one-sided behind the eye, above the eye or on the head. Symptoms like pain with jaw movement, joint tenderness, popping, clicking are also present over the face, temporal or on the head.<sup>4</sup>

Common cause of cervicogenic headache is poor posture. It is also caused by inflammation or mechanical dysfunction of the upper cervical joints, ligaments and muscles.<sup>6,7</sup> Although it develops due to problems in the neck, there are many other causes which include degenerative conditions like osteoarthritis, a prolapsed disc in the neck or a whiplash injury. Other triggering conditions are falling down or playing sports.<sup>5</sup> It may also cause due to poor posture while sitting or standing at work. Based on some studies, women are four times more affected than men.<sup>8</sup>

Dentistry is demanding profession regarding concentration and quality or a condition. Most of the dentists do work in the sitting position while treating the patients in supine position. As their work area is narrow, their treatment results in a very compromised work posture.<sup>9</sup> Forward flexion and lateral rotation of the neck are the common movements adopted by them. These movements compromise the soft tissues around the neck which creates and develops imbalances. It also reduces neuromuscular efficiency. The neck and cervical spine has a musculature activity as primary stabilizers which are called as deep cervical flexors (DCR). These muscles are impaired leading to the overuse of the superficial muscles like trapezius, scalene and levator scapula which increases the above mentioned symptoms in the neck and become hypertonic with various trigger points.<sup>10</sup> So, in them cervicogenic headache can be worsened or aggravated by neck movements, sustained awkward head position of external pressure over the cervical or occipital region on the symptomatic side.<sup>2,11</sup> Also predisposing factors like lack of rest, ergonomics and psychosocial stress are common based on some studies.<sup>12</sup>

Some of the causes also include macro-trauma and micro-trauma, postural strains and degenerative joint disease. This headache has a strong correlation with a

history of trauma. But, it may also occur in its absence. Onset of headaches which originate from the cervical spine can occur at any age.

## Material and Methodology

This was a study to find prevalence of Cervicogenic Headache in Dentists. The study was carried out in Krishna College of Physiotherapy, Karad. An approval from the study was obtained from the protocol committee and ethical committee of KIMSDU. Individual were approached and those fulfilling the inclusive criteria were selected. The purpose was explained and the study was been conducted by taking the consent of of the participants through a consent form. 81 clinical practitioners was taken from Karad for study. The inclusive Criteria was both males and females in age group between 30-60 years and those who are willing to participate. The exclusive criteria was dentists with previously diagnosed cervical condition and red flags. Cervical flexion-rotation test and Neck Disability Index questionnaire were the major outcome measures to assess Cervicogenic headache in dentists. The Cervical Flexion-Rotation Test was performed on a supine lying. First, the cervical spine was passively fully flexed. The head was then rotated to the left and the right until firm resistance is encountered or pain is evoked. Positive findings included limited range of rotation before the expected range (less than 32 degrees of rotation as measured with a goniometer or at least a 10 degree loss from the expected range by visual estimation), reproduction of familiar headache pain, or reproduction of familiar neck pain. A questionnaire known as Neck Disability Index was administered to dentists in a printed format. They were explained about the study and method of filling the questionnaire. Neck Disability Index includes all the activities of daily living and, through this questionnaire the amount of disability was measured. Then, statistical analysis and interpretation was done for each candidate to find out the prevalence of cervicogenic headache in dentists.

### Statistical Analysis:

For sampling size following formula was used

$$n = \frac{4pq}{l^2}$$

$$(p=72\%, q=28\% \text{ and } L=10\%)$$

$$4 \times 72 \times 28 / 100 = 80.64$$

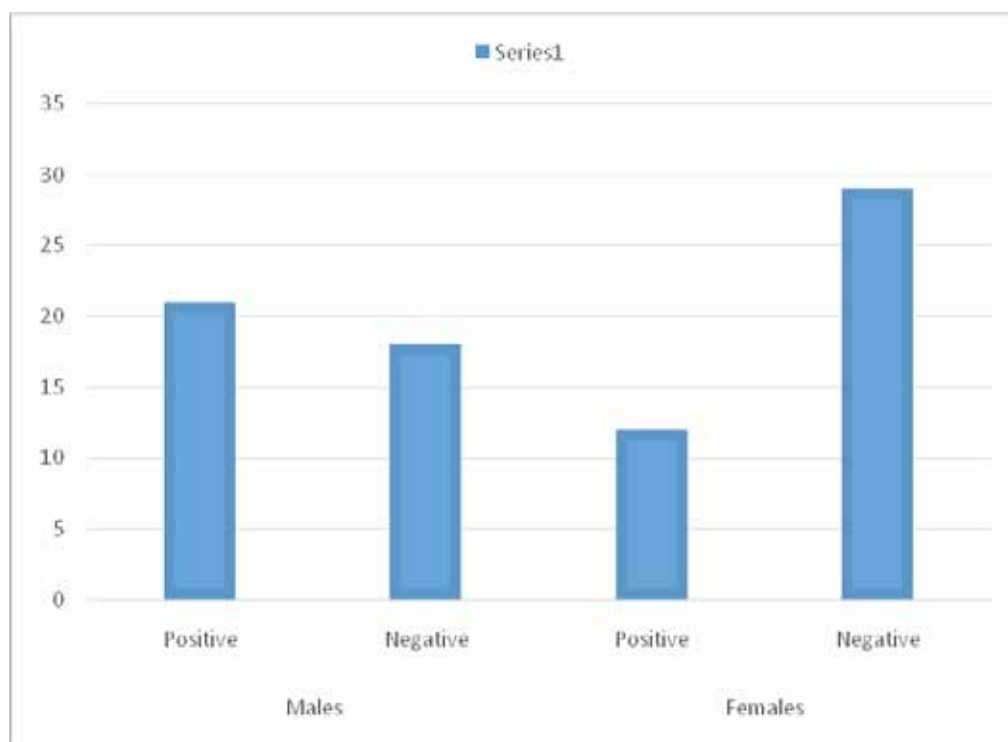
$$n = 81$$

Statistical analysis of the recorded data was done by using the software INSTAT App. Unpaired t test was used to determine p value (< 0.0001), which indicates it is extremely significant.

### Result

**Table No. 1: For Neck Disability Index**

Age	Mean ± SD	T value	P value	Interference
30-60	34.575+5.536	53.857	< 0.0001	Extremely Significant
Pain Intensity	0.937+1.095	7.659	< 0.0001	Extremely Significant
Personal Care	0.6875+1.063	5.787	< 0.0001	Extremely Significant
Lifting	0.937+1.325	6.329	< 0.0001	Extremely Significant
Reading	1.038+1.049	8.848	< 0.0001	Extremely Significant
Headaches	1.238+1.183	9.359	< 0.0001	Extremely Significant
Concentration	0.675+0.938	6.434	< 0.0001	Extremely Significant
Work	0.4500+0.7098	5.671	< 0.0001	Extremely Significant
Driving	0.8378+1.135	6.350	< 0.0001	Extremely Significant
Sleeping	0.662+0.9270	6.392	< 0.0001	Extremely Significant
Recreation	0.658+0.9042	6.470	< 0.0001	Extremely Significant
Percentage	15.126+13.568	9.972	< 0.0001	Extremely Significant



**Graph No. 1: Cervical Flexion – Rotation Test**

**Interpretation:**

**In Males:**

- 26 % test is positive
- 20 % test is negative

**In Females:**

- 15 % test is positive
- 39 % test is negative

## Discussion

This project was done in 6 months with sample size 81 and age group 30-60 years. These subjects were taken randomly from Karad population.

This research was undertaken with the aim to find out the prevalence of cervicogenic headache in Dentists.

As per the working conditions of Dentists, the posture is awkward that is forward flexion and lateral rotation for prolonged period of time. Also, they have lack of rest periods. Due to this there is an overuse of deep cervical neck flexors. So, the neck pain will be significant and common problem in them. As the term cervicogenic headache denotes the pain radiating from cervical spine leading to headache, there are possibilities of developing cervicogenic headache in Dentists as well. In this study, dental clinical practitioners of age between 30-60 years were included and the dentists with previously diagnosed cervical conditions and also symptoms of red flags were excluded.

A questionnaire known as Neck Disability Index was administered to dentists in a printed format. They were explained about the study and method of filling the questionnaire. Neck Disability Index includes all the activities of daily living and, through this questionnaire the amount of disability was measured. A special test known as Cervical Flexion- Rotation Test was also used to determine the number of dentists having cervicogenic headache.

Through this study, Dentists would be beneficial and aware about cervicogenic headache.

## Conclusion

On the basis of the result it can be concluded that 26.73 % of Dentists have cervicogenic headache.

**Conflict of Interest:** The authors declare that there are no conflicts of interest concerning the content of the present study.

**Source of Funding:** Self- funded

**Ethical Clearance:**

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# Despondency and Oral Health Through Senescence: A Cross Sectional Follow-Up Study

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## Abstract

**Background:** The prevalence of depression is higher in elderly individuals residing in nursing homes (old age homes) than that of elderly living in their own residential localities.

**Aim:** The main objective of this study was to assess the relationship between the depression levels of the elderly people residing in an old age home and their oral hygiene status, with follow up for improvement of the oral hygiene status, following adequate self care and oral hygiene instructions.

**Materials and Method:** A single institutional cross sectional study was conducted at Valsaravakam, Chennai. 23 elderly citizens living in an old age home were examined in the study and administered with a questionnaire consisting of Geriatric depression scale–Short Form(GDS-SF). Adequate self care and oral hygiene motivation was performed.

**Statistical Analysis:** ANOVA, Post HOC tests (Tukey analysis) and T-Tests were used to analyze the data.

**Results:** The depression level is more prevalent in the elderly individuals suffering a continuous state of depression. Even after continuous motivation and implementation of instructions for proper oral hygiene maintenance, the outcome was unsatisfactory in this category of depressed individuals.

**Conclusion:** Special attention needs to be given to the elderly citizens residing in old age homes to wards regular health checkups, treatment modalities and self hygiene care, as their efficiency in leading their life is questioned.

**Keywords:** *Old age, depression, oral hygiene, old age homes, oral health.*

## Introduction

Old age, also called senescence, in human beings, is the final stage of the normal life. Old age is the last stage in human life and it is the age group in which the oldest members of a population are being comprised. In most of the current Western countries, the age limit for

the eligibility of retirement is 60 or 65 years, whereas, in many other countries, they consider the age limit to be anywhere between mid-40s and 70s.<sup>[1]</sup> The process of ageing is natural. It should be considered as a normal, biological phase of life. With the advancing medicines and public health measures in the last half of the 20<sup>th</sup> century, the life span of human beings is considerably increased. Due to this, elderly individuals (above 65years) face immense health issues as a result of ageing and this need to be dealt with serious attention.<sup>[2]</sup> Individuals having physical or psychological problems, stand in need of special consideration under a dental office setting.

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According to WHO, 1.7% constitutes the annual



rate of increase in global population, while 2.3% constitutes the population of people aged over 65 years. According to the United Nation estimates, adults older than 80 years will contribute to at least 20% of the world population and they are considered to be the fastest growing population segment in most of the countries. In India, with a population of over one billion, 7.6% constitutes the people aged above 60 years, which sums up to 76 million.<sup>[2]</sup> With the increase in age, the ability to maintain one's physical, mental and financial state would drastically decrease. Due to such reasons, it leads to a breakup of the system of a joint families and the introduction of a nuclear families that ultimately removed the elderly citizens from the family scene. An old age home is a social institution which intends to fulfill and cater the needs and meet their daily requirements of food and shelter – if not the bonds of love from the family.

If one visits an old age home, it would be clear that the inmates would be leading their life, not for the love of being away from home and independent but as an alternative to the negligence by their own family members. The inmates of old age homes, will also be suffering from chronic health issues and would be under medications. They may also undergo psychological and behavioral disturbances. This cohort is different from other elderly residing under their own shelters, as there is increased dependency to perform daily routine which leads to risk in oral problems. The psychological disturbances in the form of depression are prevailing in this cohort. Depression is related with personal negligence, which includes lack of interest in carrying out the preventive oral health and hygiene techniques. Since the residents are unable to visit the dentists by themselves, the best option is that the dentist should approach them. Fisketand Lewis defined domiciliary care as a service that reaches out to care for those who cannot reach a service themselves'.<sup>[3]</sup>

A comparative study, conducted by Dipeshkumar et al, involved the assessment of risk factors which were associated with depression in the elderly residents of an old age home, located in Rajkot. <sup>[4]</sup> The Study revealed that depressive symptoms were quite high among the elderly. These depressed elderly individuals residing in old age homes, require special attention towards regular dental health checkups and improvements should be made in family ties.<sup>[4]</sup>

Hence, this study attempts to assess the relationship between the Depression levels and the oral hygiene status of the elderly inmates in an old age home and further aiding in adequate oral hygiene care motivation and reassessing the oral hygiene status after one month, for improvement.

## Materials and Method

A single institutional cross-sectional study was conducted to assess the relationship between the depression levels and oral hygiene status among elderly citizens residing in an old age home located at Valsaravakkam, Chennai. The study cohort consisted of 23 elderly citizens and the study duration went up to a month. The study was conducted at the month of September. At the beginning of the month, the oral hygiene status of every individual was assessed using two indices that included simplified oral hygiene index (OHI-S)<sup>[5]</sup> and plaque index (PI)<sup>[6]</sup>, followed by continuous follow ups and reassessing the oral hygiene status using the same indices. ADA type III clinical examination is done using mouth mirror and explorer under good illumination, by a single examiner. Patients were examined by three examiners, individually. The examination took place in the old age home.

A questionnaire consisting of 15 items, were allotted for every individual. This questionnaire was based on the Geriatric depression scale–Short Form (GDS-SF).<sup>[7]</sup> In addition to this, the demographic details including name, age, sex, address, mobile number and duration of stay at the home, were noted. By conversing with the participants and by understanding their psychological state, the questionnaire was filled up.

A total of 23 participants agreed to participate in the study. Out of 23, two participants were completely edentulous and were excluded from the assessment of oral hygiene status using the indices. The remaining 21 participants were included in the assessment. Following the recording of indices and the GDS-SF, brushing techniques (modified bass technique)<sup>[8]</sup> were instructed to the participants. Maintaining the oral hygiene and its importance related to the overall physical health was educated to the participants. Participants were asked to follow the instructed techniques regularly for one month. ANOVA, Post HOC tests (Tukey analysis) and T-Tests were used to analyze the data collected.

## Results

**Table 1: One way anova to compare oral hygiene and depression**

		N	Mean	Std. Deviation	P Value
Post_OHIS	Normal	2	1.0000	±.00000	0.009*
	Initial Stage of Depression	10	2.0000	±.47140	
	Continuous State of Depression	9	2.2222	±.44096	
	<b>Total</b>	<b>21</b>	<b>2.0000</b>	<b>±.54772</b>	
Post_PI	Normal	2	2.0000	±.00000	0.169
	Initial Stage of Depression	10	2.6000	±.69921	
	Continuous State of Depression	9	3.0000	±.70711	
	<b>Total</b>	<b>21</b>	<b>2.7143</b>	<b>±.71714</b>	
Pre_OHIS	Normal	2	2.0000	±.00000	0.00*
	Initial Stage of Depression	10	2.9000	±.31623	
	Continuous State of Depression	9	3.0000	±.00000	
	<b>Total</b>	<b>21</b>	<b>2.8571</b>	<b>±.35857</b>	
Pre_PI	Normal	2	3.0000	±.00000	0.043*
	Initial Stage of Depression	10	3.6000	±.51640	
	Continuous State of Depression	9	3.8889	±.33333	
	<b>Total</b>	<b>21</b>	<b>3.6667</b>	<b>±.48305</b>	

\*P value is significant

Table 1 shows that 21 subjects participated in the study. Out of 21 subjects, there were 2(9.52%) subjects who were normal, 10(47.61%) subjects were in initial stage of depression and 9(42.85%) were in continuous state of depression among the post-OHIS category. Out of 21 subjects, there were 2(9.52%) subjects were normal, 10(47.61%) subjects were initial stage of depression and 9(42.85%) were in continuous state of depression among

the pre-OHIS category. Out of 21 subjects, 2(9.52%) subjects were normal, 10(47.61%) subjects were in initial stage of depression and 9(42.85%) were in continuous state of depression among the pre-PI category. Post OHI is significant, whereas, Post PI is not significant. The Pre OHI-S is highly significant with a value of 0.00 and the Pre-PI is statistically significant.

**Table 2: Comparison of OHIS and PI before and after the motivation**

		N	Correlation	P value
Pair 1	Pre-OHIS & Post-OHIS	21	.764	0.007*
Pair 2	Pre-PI & Post-PI	21	.722	0.006*

\* P value significant

Table: 2, shows the analysis using T-Tests. This reveals that both Pair 1(Pre-OHIS & Post-OHIS) and Pair 2(Pre-PI and Post-PI) are significant.

## Discussion

One of the most common psychiatric disorder, which is prevailing among people is depression. Even

though it prevails all over the globe, the impact of depression is more in developing and least developed countries. A study which was done in Briddashram, Nepal is an example of how depression prevails among elderly people in least developed country.<sup>[9]</sup> The rate of prevalence, worldwide ranges between 10% and 55%.

Depression causes sadness, isolation and lack of interest in performing day to day activities. The ability to do everyday tasks and performing oral hygiene and self care behaviors are drastically decreased. This consecutively, leads to deterioration in oral health and its maintenance. The burden of depression is higher among the elderly females than the elderly males (according to WHO).<sup>[10]</sup> The main reason for the institutional elderly to feel more depressed is because of the loneliness and lack of social support and they cannot feel the “level of kinship”, unlike the non- institutional elderly. Thus this study was intended to correlate the depression faced by the elderly individuals residing in an old age home, with their oral health care.

In this study, the depression in the independent variable and the oral hygiene status is the dependent variable. Depression is measured using the Geriatric Depression Scale – short form (GDS-SF).

As per the results, it is confirmed that there are 9.52% of people who are normal, 47.61% of people who are in the initial stage of depression and 42.85% of people who are suffering from a continuous state of depression. There are 61.9% of elders aged above 65 years of age and only 38.09% of individuals aged below 65 years. Among these individuals, there were both cooperative and least cooperative people. The mean depression score based on the Geriatric Depression Scale, is 10.14, ranging from 4 to 15.

Following the motivation towards oral hygiene and instruction of brushing techniques, scores after one month were recorded. This revealed that there was a significant improvement in the oral hygiene status among the individuals who were categorized under normal and in initial stages of depression. But, it was not comparatively significant among the individuals who were under continuous state of depression. Even though the majority of the population consisted of individuals, who were under initial stages of depression, it did not alter their performance in oral hygiene and self care behavior after the motivation. Thus a good outcome was observed in these set of population whereas, in subjects

with continuous state of depression, the oral hygiene status (post plaque index) was comparatively the same, after repeated instructions and motivation. Progress with ageing, reduced energy and motivation, inability to comprehend to the instructor, lack of ability to concentrate and follow the health care instructions, are some of the reasons for the unsatisfactory outcome of these individuals. A study by Kataszyna et al showed that neglecting oral hygiene procedures, avoiding cariogenic nutrition and necessary dental care, due to depression can possibly lead to an increased risk of periodontal diseases and dental caries.<sup>[11]</sup> Also, a study which was carried out by Yan XY et al, revealed that being unmarried individual was an important risk factor of depression in elderly people.<sup>[12]</sup> Since the majority of the subjects were unmarried, this factor also possibly contributes to the decreased performance in oral hygiene.

Thus, this study was intended to promote oral hygiene and cultivate proper self oral care practices, for the well being of the elderly people residing old age homes.

There were certain drawbacks related to this study. The subjects who participated in the study were comparatively minimal. Also, one of the major confounding factors is the socioeconomic status was not included and recorded in this study. This was because all the elderly individuals were under one roof, with adequate and plain food and other basic necessities. Moreover, the familial records of these elder individuals were uncertain.

## Conclusion

Depression shows a major impact on the elderly people and since it is directly proportional to the oral hygiene status, it is of major concern for the dental practitioners. Dependent elderly people are admitted in the nursing homes, considering that their oral health care needs would be met. But unfortunately, their oral health status is worse compared to that of community residents. In most of the developing countries, such as India, the knowledge and education towards the maintenance of oral health status is quite low. The necessity of care of oral hygiene is delivered only through the infrastructure of primary health care due to minimal resources and manpower. Moreover, the dental treatments are considered to be expensive and thus neglected for the old aged people due to lack of financial support. This negligence can be altered by approaching them in

modified ways, by the help of the Dentists. By getting to know the reasons for being homebound, the practitioners can approach the elderly with patience and empathy. Adequate knowledge based on the treatment modalities combined with improvised skills would contribute to a good overall oral hygiene and health, which further enhances the quality of their lives.

**Ethical Clearance:** Obtained from ethical clearance board of SRM Dental College

**Source of Funding:** Self

**Conflict of Interest:** The author declares no conflict of interest.

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# Prevalence of Postpartum Depression among the Mothers Visiting a Teaching Hospital Near Chennai

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## Abstract

**Background:** Major depressive disorders has affected a significant amount of people around the world. Among them, women have twice the risk of getting it. Postpartum depression is one of the major depressive disorders. The levels of steroid hormones in the body is one main reason for onset of postpartum depression. Studies have found that there are various cultural, social, economic and postpartum factors like educational status, age of marriage, age at pregnancy, postnatal complications etc. that have a relationship with the onset of postpartum depression.

**Objectives:** To study the prevalence of postpartum depression among mothers visiting a teaching hospital near Chennai and to determine the risk factors among these mothers.

**Method:** The study was carried out in Saveetha medical college, Thandalam among 111 mothers. Basic demographic and socio-economic details were obtained from them before they were made to take the standard EPDS (Edinburg postnatal depression scale) test.

**Results:** Out of the 111 women who took part in the study, 18 women pertaining to 13.51% of the population had high risk of postpartum depression. among various risk factors that were studied, postpartum complications in mother or child is a significant factor.

**Conclusion:** The percentage of women suffering from postpartum depression in this region is significant. This study could help doctors in identifying depressed mothers who need care and in turn reduce the number of mothers suffering from postpartum depression which in turn would increase the quality of mother-child bond.

**Keywords:** *Postpartum depression, Postnatal complications, EPDS.*

## Introduction

According to the World Health Organisation, major depressive disorder [MDD] is one of the leading disability in the world, affecting 12-20% of the world

population. In addition, it is found that women are twice likely to get it compared to men and suffer from comorbid anxiety<sup>[1]</sup>.

Postpartum depression is a major depressive disorder with onset within 1 month of delivering birth of a child. Also, there are cases where depressive symptoms start during antenatal period and continue for months postpartum<sup>[2]</sup>. Prevalence of postpartum depression on an average is about 10-15% but can increase to upto 30% depending on the criteria that is chosen. The risk of postpartum depression increases in mothers who had depressive symptoms prior to pregnancy<sup>[1]</sup>.

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Steroid hormones are considered to be one of the main cause for postpartum depression. Fluctuations in the levels of steroid hormones and peptide hormones during pregnancy and the postpartum period can lead to postpartum depression. Levels of hormones like estradiol, corticosterone, corticosteroid releasing hormone and oxytocin play a major role in this. Levels of progesterone and estrogen which are high during pregnancy face a sudden drop in levels once the placenta is released which could be one cause of postpartum depression. Abnormal HPA axis is also one cause of postpartum depression where there is excess secretion of corticosteroids and presence of a high flattened corticosteroid state [1].

On observing the brain of a woman suffering from postpartum depression, the resting state activity is less in the left frontal lobe compared to the right. Also, the connectivity along the amygdala, anterior cingulate cortex, hippocampus and dorsal lateral prefrontal cortex is less in mothers suffering from postpartum depression [3]. Genetics also has high impact in causing postpartum depression. Studies have been done on genes coding for substances like serotonin transporter, monoamine oxidase, tryptophan hydroxylase-2, brain derived neurotrophic factor etc. Polymorphism in such genes are said to be a cause for postpartum depression [4].

Major symptoms seen in postpartum depression are emotional liability, loss of appetite, feeling of guilt, despondency, tearfulness and loss of sleep. She would have extreme fatigue. The concentration and memory of the mother is affected and the mother might be unable to handle the baby. The mother might consider herself as inadequate and unloving in nature. [5]

Studies show that inability to treat the mother for postpartum depression would have an adverse effect on the child. The growth and development of the child is affected. There is increase in infant crying and colic which affects the sleep of the infant. Increased signs of stress is seen in the child. Women with postpartum depression have issues initiating breastfeeding due to which early cessation of breastfeeding is seen frequently in this population. [2]

Numerous patterns have been observed among mothers suffering from post-partum depression. "Phantom crying" was experienced in Hong Kong where mothers woke up thinking that they heard their child cry but only find that their child has been peacefully sleeping

[6]. In Nepali women it is seen that there is increased prevalence among women who have BMI<20 [7]. A study among Israeli women shows that women with postpartum depression kept repeatedly going to doctors for minor symptoms that they noticed [8].

A study in Japan shows that consuming food high in vitamin B2, carbohydrates and DHA reduces the onset of postpartum depression [9]. Gender preference is also a factor in countries like Turkey, India, China, Taiwan, Japan, Hong Kong, Vietnam and Thailand. A boy child is preferred in these areas [10].

In India, marital problems with husband is also found to be a major etiological factor affecting the onset of postpartum depression [11].

Due to the stigma surrounding these disorders, it is uncommon to see mothers come forward and discuss the symptoms they see in themselves. Hence it is the responsibility of the doctors to detect the postpartum depression and sufficiently treat them. By finding the prevalence in an area, undetected cases can be treated and more awareness can be raised regarding it and how important it is for the mother and child to treat the disorder as early as possible.

## Methodology

This cross-sectional study was carried out in Saveetha Medical College Hospital for a period of three months (Jan- Mar 2019). Prior to start of the study, approval for carrying out the study was obtained from the institute ethics committee. The sample size was calculated based on a study done in Ahmedabad to be 111 keeping the confidence level to be 95% and absolute error to be 7.5% [12]. The sampling method followed was convenient sampling. Postnatal mothers with child aged between 0 and 6 months were included in the study. Mothers who were previously diagnosed with depression or any other psychiatric conditions were excluded from the study. Prior to the start of questioning, proper written consent was obtained from the mothers. Basic socio-demographic details like education status of the mother and her husband, family income per month and workplace details were obtained. The socioeconomic status was calculated using the modified Kuppaswamy scale [13]. Other questions regarding the mother's current age, her age at the time of marriage, total number of children she has, sex of child, type of delivery, post delivery complications in herself and her child, whether the pregnancy was planned or not, breastfeeding habits

and sleep were also asked. The Edinburgh postnatal depression scale (EPDS) was used as the screening tool to check the mother for postpartum depression [14,15]. It is a questionnaire consisting of 10 multiple choice questions, each question having 4 options to choose from and scored between 0-3. Depending on the response given, the mother is scored out of a maximum score of 30. A mother with score above 12 was determined to be suffering from postpartum depression. The risk was estimated using odds ratio and chi-square test .

**Results**

In this study, 111 postpartum women were studied. Out of this, 15 women had the risk of postpartum depression pertaining to 13.51% of the population. Table 1 shows the prevalence of postpartum depression. The various demographic details taken into account are present in table 2.

Among the 111 mothers questioned, 66 (59.5%) mothers were below the age of 25. The number of mothers who got married after the age of 25 was 6 (5.4%).

When the parity of the mother was considered, 62 (55.9%) mothers were multi para. Between 0-28 days of postnatal period there were 72 (64.9%) mothers. Out of the children born, 52 (46.8%) were males and 59 (53.2%) were females.

When educational status of the mother was taken into account, 78 (70.3%) mothers were highly educated i.e above 10<sup>th</sup> standard. In the lower social class consisting of social class III and below, 60 (54%) mothers were present.

Caesarian delivery or episiotomy was performed on 71 (64%) mothers while the others had a normal delivery. 28 (25.2%) deliveries had postpartum complications either in the mother or in the child. 84 (75.67%) mothers had a planned pregnancy. 5 (4.5%) mothers had indirect modes of breastfeeding their child. When the mothers were asked about sleep, 41 (36.9%) mothers complained about reduced sleep.

Among women who married before the age of 20, 9.5% of them had postpartum depression. Among the women who married after the age of 20, 32.2% of the population which had postpartum depression.

Social class as a factor for comparison showed that 39.2% of women whose social class was above III had postpartum depression whereas the prevalence of postpartum depression was only 18.3% in women belonging to social class III or below.

In this study, complications in the mother or child is found to be a significant factor. Other factors taken into account are mentioned in Table 3.

**Table 1: Prevalence of postpartum depression**

	No of mothers (n = 111)	Percentage
No risk of postpartum depression	96	86.49%
Risk of postpartum depression	15	13.51%

**Table 2: Demographic details**

	Variable	Number (n= 111)	Percentage (%)
Score of EPDS	12 and below	96	86.49
	Above 12	15	13.51
Age	25 years and above	45	40.54
	Below 25 years	66	59.46
Education	Above class 10	33	29.73
	Class 10 and below	78	70.27
Social class	Above class III	51	45.94
	Class III and below	60	54.06

**Table 3: Risk factors related to postpartum depression**

Sl.No.	Risk Factor		More Likely	Less Likely	P-Value (Chi-Square test)	Odds Ratio	Confidence Interval
1.	Age of Mother	Above 25	7	38	0.603	1.33	0.44–3.98
		Below 25	8	58			
2.	Age at Marriage	Above 25	1	5	0.591*	1.30	0.14–11.96
		Below 25	14	91			
3.	No. of Children	Primi Para	9	40	0.184	2.10	0.69–6.37
		Multi Para	6	56			
4.	Postnatal Period	0-28 days	10	62	0.875	1.09	0.34–3.47
		1-6 months	5	34			
5.	Type of Delivery	Interventional	10	61	0.815	1.14	0.36–3.62
		Spontaneous	5	35			
6.	Social Class	Higher SES	10	41	0.083	2.68	0.85–8.44
		Lower SES	5	55			
7.	Mother's Education	Less Educated	6	27	0.349	1.70	0.55–5.24
		Highly Educated	9	69			
8.	Gender of Child	Male	10	42	0.098	2.57	0.81–8.09
		Female	5	54			
9.	Planned pregnancy	Unplanned	4	23	0.820	1.15	0.33–3.97
		Planned	11	73			
10.	Complications	Present	10	18	0.000	8.66	2.63–28.47
		No Complications	5	78			
11.	Sleep	Inadequate	8	33	0.157	2.18	0.72–6.5
		Adequate	7	63			
12.	Breastfeeding	Indirect	2	3	0.134*	4.76	0.72–31.28
		Direct	13	93			

\* indicates the P-Value based on Fisher's Exact test

## Discussion

The prevalence of postpartum depression obtained in this study is 13.51%. On comparison with a study done in Hong Kong, prevalence of postpartum depression amounts to 12.72%<sup>[16]</sup>.

In India the following studies have prevalence values close to this study. A study conducted in Jabalpur Prevalence of postpartum depression among rural population of Jabalpur was 18.4%<sup>[17]</sup>. A study was done in Udupi taluk of Karnataka involving 410 postpartum women within 6 months. Prevalence of postpartum depression was 21.5%<sup>[18]</sup>. Another study done earlier in Udupi in Karnataka shows the prevalence of postpartum

depression to be 15.8% within 6 weeks after delivery and 15.5% within 14 weeks after delivery<sup>[19]</sup>. A study was conducted in Ahmedabad in which the prevalence of postpartum depression was 20.4%<sup>[12]</sup>.

Education was considered a major factor for onset of postpartum depression. The risk of postpartum depression is 1.70 times more in mothers who have studied below class 10. Previous studies show that increased level of education increased the probability of occurrence of postpartum depression. When the level of education was high, higher secondary and degree level, the risk was 9-17 times more<sup>[18]</sup>.

When the age of the mother was taken into



consideration, among the women less than 25 years of age, 12.1% of mothers had postpartum depression whereas, 15.6% of mothers whose age was above 25 years had postpartum depression. Only 12.05% of women below the age of 25 and 17.91% above the age of 25 had postpartum depression in the study conducted at Udupi<sup>[19]</sup>.

When parity was taken as a factor for comparison, it was found that 18.4% of primi-para women had features of postpartum depression whereas 9.7% of multipara women had postpartum depression. When compared to the study done in Udupi, 11.11% of primi-para women had postpartum depression and 25% of multipara women had postpartum depression<sup>[19]</sup>.

When the sex of the child was taken into account, 19.2% of mothers had postpartum depression after having a boy child. Prevalence of postpartum depression was more among mothers who had a male child compared to those who had a female child. In contrast, in the study done at Jabalpur states that only 9.56% of mothers who had a boy child had postpartum depression compared to 20.39% of mothers who suffered from postpartum depression after having a girl child<sup>[17]</sup>. The increased literacy rate in Tamil nadu compared to Madhya Pradesh could be one reason for the following results.

Among the mothers who had less sleep, 19.5% of mothers had postpartum depression. 78.9% of mothers without adequate sleep had postpartum depression in the study conducted at Udupi<sup>[18]</sup>.

### Conclusion

It is important to know the prevalence of postpartum depression in an area and its risk factors so that suitable measures can be taken to reduce the risk factors. The prevalence of postpartum depression according to this study is 13.51%. The risk factors identified are age of mother (above 25), parity (primi-para), sex of child (male), education in mother (below class 10), socioeconomic status (above class III), complications in mother or child, unplanned pregnancy and breastfeeding (indirect). The presence of complications has been identified as significant risk factor.

By increasing the literacy rate among women and the level of education, the prevalence of postpartum depression can be reduced. Also, by suitable counselling preconceived notions regarding sex of the child can be removed from the minds of the parents which in turn

can reduce the prevalence of postpartum depression. Upliftment of mothers from poverty also plays an important role. Proper planning of pregnancy, normal delivery of baby and proper breastfeeding practices also helps in reducing the prevalence.

This is extremely important to increase the bond between the mother and child which is necessary for the physical, mental and social development of the child.

As the study was done in a short period of time, only a small sample size was taken. Religion and cultural sensitivity were not taken as risk criteria in the study.

**Conflict of Interest:** There is no conflict of interest.

**Source of Funding:** Self funded.

**Ethical Clearance:** Ethical clearance is obtained from the college scientific review board.

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# A Cross Sectional Study to Assess the Quality of Life among People with Type 2 Diabetes Mellitus in an Urban Area of Tamil Nadu

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## Abstract

**Introduction:** The need of adhering to treatment and restriction on the food choices adversely affect the satisfaction and happiness a diabetic can gain out of everyday life. Quality of life is an important component of diabetes management.

**Methodology:** A cross sectional study was conducted among the Diabetic patients residing in urban Chennai to assess their quality of life with the Quality of Life Instrument for Indian Diabetes Patients questionnaire. A total of 300 patients were selected using simple random sampling. Frequencies and percentages were analyzed using SPSS.

**Results:** Among the 300 study subjects, 65% were males and 35% were females. 56% of the study subjects were Graduates and around 50% come under the Income category of Rs.25, 000 to Rs.50, 000. Around 30% of the subjects said that their job is not affected due to Diabetes. 50% of the subjects complained of difficulty in performing vigorous activities such as cycling, running, etc. 75% of the subjects complained of frequent urination. Quality of life was found to depreciate with increasing age, years living with diabetes and lower income class.

**Conclusion:** Quality of life assessment and improvement is essential for appropriate diabetes management.

**Keywords:** *Quality of life, Diabetes, Complications, QOLID, Treatment.*

## Introduction

Diabetes mellitus is a chronic non-communicable disease which is associated with long term complications and significantly affects the quality of life of the affected patients. WHO reports suggest that the prevalence of Type 2 Diabetes in India to be 8.7%<sup>[1]</sup> while the prevalence of Type 2 Diabetes Mellitus in Tamil Nadu

was found to be 10.4% in a study done by Anjana RM et al.<sup>[2]</sup> Diabetic patients have to take hypoglycemic medications for prolonged periods and also exert strict dietary norms to maintain healthy blood sugar levels. They have to adhere to the advice on physical exercise and lose weight in order to keep the blood sugar levels under control and thereby avert the potential complications. The physical distress resulting from frequent episodes of hypoglycemia or hyperglycemia superimposed on the economic and social burden of the disease can be overwhelming to people to such high degrees that an entity called 'diabetes overwhelmus' has been described in literature<sup>[3]</sup>. Quality of life is an important factor which is positively related to treatment adherence. A good quality of life motivates the patient to manage his disease and achieve health and happiness in the long-

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term<sup>[4]</sup>. Measurement of quality of life is an important part of the monitoring procedure in the clinical field of management of diabetes and a part of clinical research to improve the treatment outcomes<sup>[4],[5]</sup>. According to the International Diabetic Foundation, India has the largest proportion of Diabetic population in this world.<sup>[6]</sup>With advances in health care technology, we have been successful in prolonging the lives of people chronic non-communicable diseases. However, considering the debilitating complications, nothing much is done to improve the quality of the prolonged life. The study was undertaken in an urban area of Chennai, Tamil Nadu among patients suffering with Type 2 Diabetes Mellitus with an objective of assessing their quality of life.

### Methodology

A cross sectional was conducted in an urban area of Chennai at Triplicane. The list of diabetic patients was taken from Triplicane PHC and by simple random sampling – lottery method subjects were selected. Subjects who suffer from Type 2 Diabetes mellitus, aged above 20 years and on treatment for at least 6 months were included in the study. The mentally unstable and pregnant women were excluded from the study. According to a study done by Anusuya G S et.al,<sup>[7]</sup> the percentage of known case of Diabetes in South Chennai was 22%. Using the formula  $4pq/L^2$  and with allowable error of 5%, the sample size derived was 275. Considering 10% non-respondent rate, 320 subjects

were interviewed for the study from January 2019 to March 2019. A written and informed consent was taken from all the study subjects before starting the interview. The subjects were probed for certain diabetes specific information such as the time since diagnosis, physical activity, smoking, alcoholism, family history. The quality of life assessment was done using the Quality of Life Instrument for Indian Diabetes Patients (QOLID), a reliable and valid questionnaire for Indian patients with Diabetes<sup>[8]</sup>. The QOLID has a total of 34 questions categorized under the domains of ‘role limitation due to physical health’, ‘Physical Endurance’, ‘General health’, ‘Treatment satisfaction’, ‘Symptom related issues’, ‘Financial worries’, ‘Emotional/Mental health’ and ‘Diet satisfaction’. This study has an ethical clearance certificate from the Institutional Ethics Committee. Data was managed using the Microsoft Excel and analyzed using SPSS software version.

### Results

Of the 300 patients of Type 2 Diabetes Mellitus interviewed, 195 were males and 105 were females. Amongst the study population, majority of the patients, 28.7% were in the age group of 41 to 50 years, a huge majority of almost 95% was married and nearly 21% were educated up to high school. About 27% of the study population belonged to skilled workers criteria and almost 50% had total monthly income of the family of Rs 25,000 to 50,000.

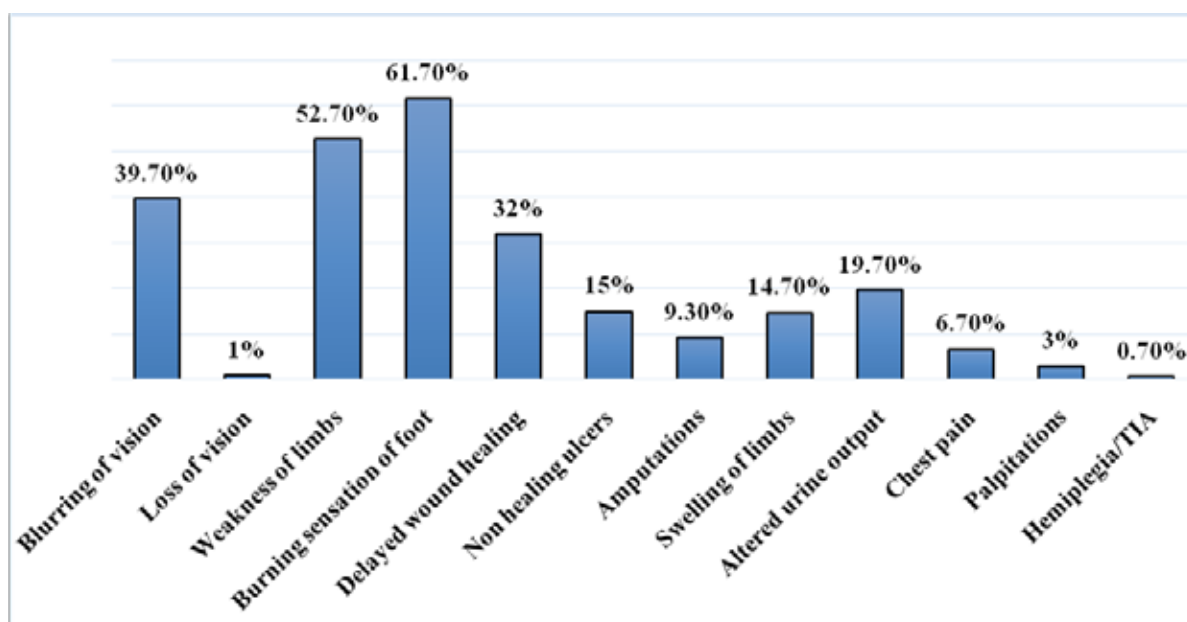


Fig: 1. Representation of the complications of Diabetes mellitus among study subjects

The **Fig 1**, represents the complications of having Diabetes Mellitus among the study participants and it was observed that almost 62% of the patients complained of burning sensation in the foot, followed by it 52% of the patients complained of weakness in the limbs while 39.7% of the patients reported blurring of vision. It was seen that the Diabetic neuropathy, a complication of Diabetes mellitus is more commonly seen when compared to other complications such as Diabetic nephropathy or retinopathy.

#### **Domains in Quality of Life Assessment:**

**Role limitations due to physical health:** While 5.7% of the study subjects complained that their job is frequently affected due to Diabetes, 29.7% of the study subjects said that their job was not affected due to Diabetes. 12.3% of the study subjects frequently complained of affected productivity at their jobs while 30% of the study subjects said that their productivity at job is in no way affected due to Diabetes. Approximately 5% of the study population frequently complained of affected leisure activities while 60% of the study subjects said that their leisure activities are sometimes to never affected due to Diabetes. 10% of the study subjects avoided travelling on business tours, holidays and general outings to a great extent due to Diabetes while about 90% of the study subjects sometimes to never have had Diabetes as a restraining factor for travelling. Almost 17% of the patients said that the requirement of sticking to a timetable for eating and taking medicines affects their work, while about 53% of them said that it sometimes affects their work and 30% never complained of any troubles sticking to the timetable which is affecting their work.

**Physical Endurance:** As many as 50% of the patients said that vigorous activities such as cycling, running, etc. were always limited due to Diabetes. About 35% of the patients complained of difficulties in performing moderate activities, 60% of the patients said that Diabetes never limited them from performing moderate activities like carrying weights, utensils, etc. However, with regards to limitation of walking uphill or climbing stairs, approximately 40% of the patients said that the limitation was more frequent. Approximately 90% of the patients, sometimes or never complained of difficulty in walking long distances, while only about 10% of the patients often complained about difficulty in walking long distances.

**General Health:** Almost 45% of the patients stated that, in their opinion their health is fair and only 6.3% opined that they are in poor health. Around 45% of the patients absolutely had no problem with concentrating on the work that they were performing while 9% complained of poor concentration on the work done. Almost 90% of the patients had no problems in their attention span while 10% of the patients complained of poor attention span.

**Treatment Satisfaction:** About 20% of the patients were “Very Satisfied” with the current treatment and about 10% were “Very satisfied” with the immediate relief the medicine produces while 75% of the patients were “Moderately satisfied” with, both, the current treatment for Diabetes as well as the immediate symptomatic relief the medicine produces. About 15% of the patients were “Very satisfied” with the time taken for the medicine to work while another 20% of the patients said they were “Very dissatisfied” with the time taken for the medicine to work. 5% of the patients were “Very satisfied” with the long term relief the medicine produces while about 80% of the patients said that they were “Moderately satisfied” with the long term relief the medicine produces.

**Symptom Related Issues:** 4% of the patients frequently complained of increased thirst or dry mouth while 53% of the patients often complaint of the same. Around 45 % of the patients said they felt excessive hunger “often” and nearly 75% of the patients said to have experienced urination very frequently during the past 1 month. About 5% of the patients complained of episodes of chest pain or palpitations, while 95% of the patients never complained of any experience of chest pain or palpitations during the past 1 month. 5% of the patients complained of weight loss of about 5 Kgs, 20% of the patients complained of weight loss of about 2 kgs while 75% of the patients never complained of any weight loss in the past 1 month.

**Financial Worries:** Almost 60% of the patients perceive the cost involved in the management of their diabetes to be “Reasonable” while 5% said it was “Very expensive”. 26% of the patients said they never prioritized their expenditure towards management of diabetes and 27% of the patients said that their family budget was “not at all” affected by Diabetes. Almost 30% of the patients said that the cost of Diabetes management did not limit their expenditure on other aspects of life such as movies, outing, parties, etc.

**Emotional/Mental Health:** 24% of the patients said that they were “Very satisfied” with their current life while 66% of the patients said they were “Moderately satisfied” with their current life. 28% of the patients were “Very satisfied” with their personal relationships while another 63% said that they were “Moderately satisfied” with their personal relationships. 73% of the patients said they were “Very satisfied” and 26% said they were “Moderately satisfied” with the emotional support that they get from their friends and family. Discouragement due to their health problems was frequent among 5% of the patients studied while about 38% of the patients denied any discouragement due to their health issue. 35% of the patients were able to lead life the same way as if the disease is absent while 4% of the patients complained that it was not at all possible to lead life the same way as if the disease is absent.

**Diet Satisfaction:** 8% of the patients said that they Always feel the restriction in choosing food while dining outside while 20% of the patients said they frequently felt a restriction in choosing the foods while dining out. Around 77% of the patients said they have very little choice while another 5% said they had no choice while eating meals or snacks away from home. About 20% of the patients often consume food items that they aren't supposed to eat, about 64% of the patients said that they “Sometimes”, while almost 20% “Never” eat food items that they aren't supposed to, just for the taste of the food.

## Discussion

The aspect of quality of life of persons living with Diabetes is an essential component for assessment, both for the patients as well as the healthcare providers. As the number of years ailing with Diabetes increases, deterioration of the quality of life begins and tends towards worsening unless and until appropriate measures are taken. The present study has evidence on how the quality of life of a subject with diabetes worsens over time. It is important for both the treating physician and the patient to undertake efforts to improve the quality of life during the period of treatment to ensure better treatment compliance.

It was observed that majority of the patients with Diabetes reported that they were not satisfied with their quality of life which was similar to the study done by Prajpathi et.al.<sup>[9]</sup>, Gautam et al.<sup>[10]</sup> and Anumol *et al.*<sup>[11]</sup> which concluded that the disease had adverse effect on the patients. It was also seen that the males reported to

have Diabetes more than the females which was similar to the study conducted by Eljedi et.al.<sup>[12]</sup> These factors also substantiate gender as a non-modifiable risk factors having more male preponderance to have Diabetes Mellitus.

It was reported that the complications of Diabetes Mellitus affects the quality of life than those without complications, which is similar to the study done by Prajpathi et.al.<sup>[9]</sup> who reported that the most common complication he observed was IHD and retinopathy followed by neuropathy whereas in our study the commonest complication was neuropathy followed by retinopathy. These differences might be due to the cultural and dietary variation between the two areas. In a study done by Benbow et.al.<sup>[13]</sup> it was observed that the common complication of Diabetes was Neuropathy which reduced the quality of life of th patients which was similar to our findings.

## Conclusion

The presence of complications has an adverse effect on the Quality of Life of the Diabetic population; Diabetic neuropathy which includes burning sensation in the foot and weakness of the limbs emerged as the most common complications from this study. Diabetes affects various domains of life such as Physical health, emotional wellbeing, social functioning and general health of the subjects, thereby affecting the Quality of Life. Hence, it is recommended for patients to have an adequate and strict Glycemic control which would enable them to maintain their Quality of Life thereby preventing the progression of the disease and the development of complications.

**Conflict of Interest:** None declared

**Source of Funding:** Nil

**Ethical Clearance:** Taken

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# Dexmedetomidine as an Adjuvant Agent to 0.5% Ropivacaine in Ultra Sound Guided Axillary Brachial Plexus Block in Orthopaedic Surgeries

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## Abstract

**Aim:** The aim of this study was to evaluate the effects of adding Dexmedetomidine to Ropivacaine regarding the onset of sensory and motor blockade in ultrasound guided axillary brachial plexus block.

**Materials and Method:** Fifty-four ASA physical status I-II patients undergoing elective forearm and hand surgery under ultrasound-guided axillary brachial plexus block were allocated into two groups. Group A (n=27) received 20ml 0.5% Ropivacaine + Normal saline(1ml) and Group B (n=27) received 20ml 0.5% Ropivacaine + 0.5µg/kg Dexmedetomidine. Onset time of sensory and motor block and haemodynamic changes were assessed.

**Results:** Onset time of sensory block for ulnar(6.48 minutes), radial(6.51minutes), median(6.59minutes), musculocutaneous (6.66minutes) was significantly faster in group B(p value<0.00001). Onset time of motor block as in Modified Bromage grade 2(8.51minutes), grade 1(11.22minutes) and grade 0(15.40minutes) in group B was significantly faster(pvalue<0.00001). Significant bradycardia was noted in group B.

**Conclusion:** Our study indicated that Dexmedetomidine as an adjuvant to Ropivacaine for ultrasound-guided axillary brachial plexus block fastened onset time of sensory and motor block.

**Keywords:** *Ultrasound guided axillary brachial plexus block, Ropivacaine, Dexmedetomidine.*

## Introduction

The brachial plexus block is extensively used for orthopaedic surgery of the upper limb as an alternative to general anaesthesia<sup>(1)</sup>. Various approaches are available but axillary approach to brachial plexus is popular due to its easy accessibility, safety, reliability<sup>(2)</sup>. With the advent of ultrasonography, success rate of anaesthesia has improved<sup>(1)</sup>. Ropivacaine is a pure enantiomer of pipercoloxylidide amide with longer duration and less cardiotoxicity compared to Bupivacaine<sup>(3,4)</sup>. Blocks with ropivacaine is useful in postoperative pain control, but it is associated with slower onset and duration of sensory block is not sufficient enough to avoid opioid usage<sup>(4,5)</sup>. Hence using adjuvants like adrenaline, clonidine, dexmedetomidine, opioid and steroids with local anaesthetics for the faster onset of block has been practiced for years<sup>(1)</sup>.

Dexmedetomidine, a highly selective alpha-2 adrenergic receptor agonist, has an alpha-2 to alpha-1 selectivity ratio of 1600:1 and is 7 times greater than that of clonidine<sup>(6)</sup>. Dexmedetomidine exhibits synergism with local anaesthetics<sup>(6)</sup>. To assess the role of dexmedetomidine as an adjuvant to Ropivacaine in terms of modifying the time of onset of sensory and motor blockade as well as to study its haemodynamic effects, we conducted this study comparing 0.5% plain Ropivacaine and 0.5% Ropivacaine with 0.5µg/kg<sup>(16)</sup> Dexmedetomidine in ultrasound guided axillary brachial plexus block.

## Materials and Method

This was an observational hospital based analytical study, which was conducted after Institutional ethical committee approval was obtained. Written informed



consent was obtained from fifty-four American Society of Anaesthesiologist (ASA) grade I and II patients belonging to eighteen to sixty years of age group, who were scheduled for forearm and hand surgery under ultrasound-guided axillary brachial plexus block. Patients with history of bleeding disorders, infection at the site of block, documented neuromuscular disorders, respiratory compromise, known allergy to local anesthetics and patients who refused to be a part of this study were excluded. Patients were advised 6 hours fasting prior to surgery.

Out of 54 patients, 27 patients received 0.5% Ropivacaine (20ml) + Normal saline (1ml) as block solution (Group A) and rest of the 27 patients received 0.5% Ropivacaine (20ml) + Dexmedetomidine (0.5 µg/kg)<sup>(16)</sup> as their block solution (Group B). It was performed using purposive sampling technique. Anaesthesiologist 1 loaded the drug and conducted the block. Anaesthesiologist 2 monitored and collected data.

On the day of the surgery, standard monitors with electrocardiogram, noninvasive blood pressure and pulse oximeter were connected and base line pulse rate, blood pressure, SpO<sub>2</sub> were recorded. An 18G intravenous peripheral line was inserted on the opposite hand to be operated and 500ml of Ringer Lactate infusion was started. In the event of heart rate recorded below 40 beats per minute, Injection Atropine 0.6mg was administered intravenously.

Ultrasound-guided axillary brachial plexus block was performed by Anaesthesiologist 1 with the patient in supine position and the arm abducted 90°. Ultrasound imaging was performed using PHILIPS HD11XE ultrasound machine with linear array transducer by Anaesthesiologist 1 and it was performed with a 50 mm, 20G hypodermic needle. After precisely scanning the nerves, an in-plane approach was performed with 5ml of local anaesthetic being injected around each nerve by Anaesthesiologist 1.

The following parameters were observed and assessed by anaesthesiologist 2: onset of sensory and motor block, haemodynamic changes and adverse events (nausea, vomiting). Sensory block of median, radial, ulnar and musculocutaneous nerves was assessed by loss of sensation to pinprick over the dermatomes. Radial nerve: dorsal 1st and 2nd intermetacarpal area. Median nerve: palmar side of tip of the 3rd finger. Ulnar nerve: palmar side of tip of the 5th finger. Musculocutaneous nerve:

lateral aspect of forearm<sup>(1)</sup> using a 3-point scale<sup>(1)</sup>, which was follows: 0=sharp pain, 1=dull pain (analgesia), 2=no pain (anaesthesia). The degree of sensory block was evaluated every 30 seconds after drug administration for 10 minutes. The motor block was assessed by a modified Bromage scale, as follows: grade 0=no movement, grade 1=finger movement, grade 2=flexion of the wrist against gravity, grade 3=extension of the elbow against gravity<sup>(6)</sup>.

The sensory block onset was defined as time from the injection to the disappearance of sharp pain by the prick test. The motor block onset was defined as time between completion of injection to grade 1 motor block. The block would be considered incomplete when any of the segments supplied by any of the nerves did not have analgesia at or after thirty minutes of injection.

Monitoring for hemodynamic variables such as heart rate, blood pressure, SpO<sub>2</sub> was done every minute for the first five minutes, every five minutes for the next fifteen minutes, every fifteen minutes until the completion of surgery. Bradycardia was defined as heart rate dropping below 60 beats per minute. Assessment of blood loss was done and fluid was administered as per the loss. Duration of surgery was noted. The intraoperative assessment was done by anaesthesiologist 2. All patients were observed for any adverse effects like nausea, vomiting, dryness of mouth and complications like hematoma, local anaesthetic toxicity and post-block neuropathy in the perioperative period.

Age, weight, duration of surgery was analysed using student's t test. Onset time of sensory and motor blockade was analysed using Mann-Whitney U test. heart rate, mean arterial blood pressure comparison among the two groups by a one-way ANOVA test by calculating mean, standard deviation and variance. The F-ratios were calculated and p values were obtained. The variation of mean heart rate, systolic blood pressure, diastolic blood pressure, mean arterial blood pressure were compared to the basal values using ANOVA test. The same was represented using a line diagram. p values less than 0.05 were considered statistically significant in all the analysis. All statistical analysis was performed using IBM SPSS 20.0 (SPSS Inc. Chicago, IL, USA).

## Results

The demographic data between the two groups (shown in table no 1) did not show any statistical significance. Mean value in terms of duration of surgery

in group A was 64.55 minutes and in group B it was 68.89 minutes with p value being 0.54, hence was not statistically significant.

**Table No 1: Patient Characteristics**

Parameters		Group A	Group B	P Value
Age (Mean)		36.92	36.81	0.974
Sex	Male	18	18	1
	Female	9	9	1
Weight (Mean)		64.55	68.89	0.54
Duration of Surgery (Mean)		80.44	79.81	0.13

Onset of sensory blockade for ulnar nerve was faster in group B (mean of 6.481minutes) when compared to group A (mean of 12.259minutes) and was statistically significant with U value of 21 and p value<0.00001. The mean onset of radial nerve blockade was 6.518 minutes in group B compared to 12.07 minutes in group A and was seen to be statistically significant with U value 24.5 and p value<0.00001. The mean onset of median nerve blockade was 6.592 minutes in group B compared to 12.259 minutes of mean onset in group A and was found to be statistically significant with U value 19.5 and p value<0.00001. Onset of musculocutaneous nerve blockade was faster in group B with mean of 6.666minutes when compared to group A with mean of 11.777 minutes and therefore found to be statistically

significant with U value 35.5 and p value< 0.00001 (shown in table no 2).

Onset of motor grade 2 was attained faster in group B (mean 8.518minutes) compared to group A (mean 15.407minutes) with U value 4.5 and p value <0.00001, proved to be statistically significant. Motor grade 1 was achieved in group B faster (mean 11.222minutes) compared to group A (mean 19.962 minutes) and was statistically significant (U value 2.5, p value<0.00001). The mean onset of motor grade 0 was achieved at 15.407 minutes in group B compared to mean onset of 24.185minutes in group A and found to be statistically significant (U value 53.5 and p value<0.00001)(as shown in table no 2).

**Table No 2: Onset of Blockade**

Parameters Mean Duration of Onset	Group A	Group B	P Value
<b>Sensory</b>			
Ulnar Nerve	12.25926	6.481481	The U-value is 21. p-value < 0.00001
Radial Nerve	12.07407	6.518519	The U-value is 24.5. p-value < 0.00001
Median Nerve	12.25926	6.592593	The U-value is 19.5. p-value < 0.00001
Musculocutaneous Nerve	11.77778	6.666667	The U-value is 35.5. p-value < 0.00001
<b>Motor</b>			
Grade 2	15.40741	8.518519	The U-value is 4.5. p-value < 0.00001
Grade 1	19.96296	11.22222	The U-value is 2.5. p-value < 0.00001
Grade 0	24.18519	15.40741	The U-value is 53.5 p-value < 0.00001

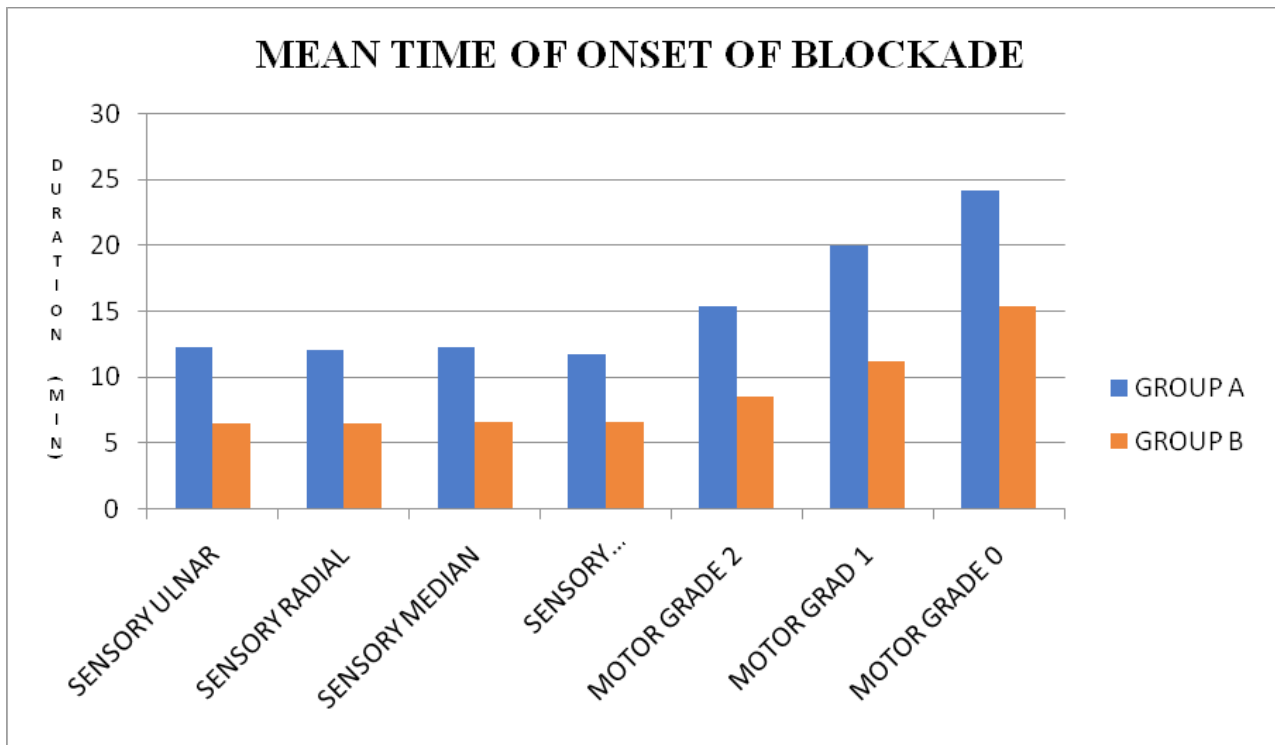


Chart No 1: Mean Time of Onset of Blockade

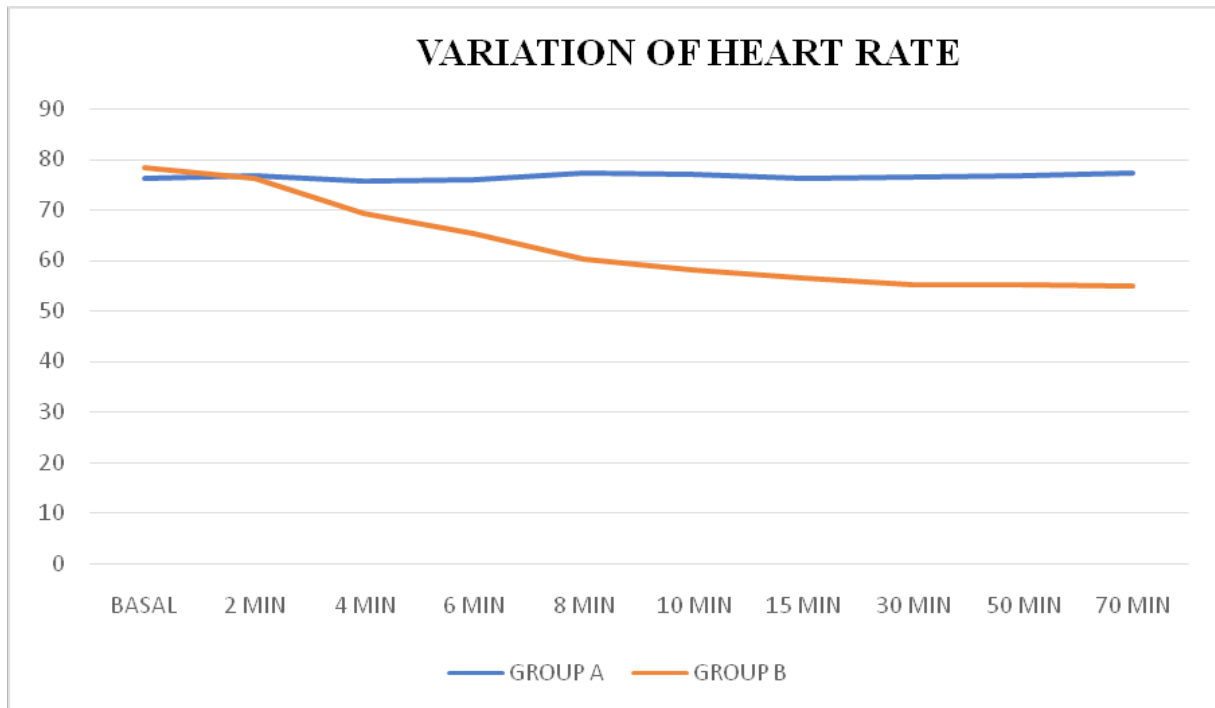
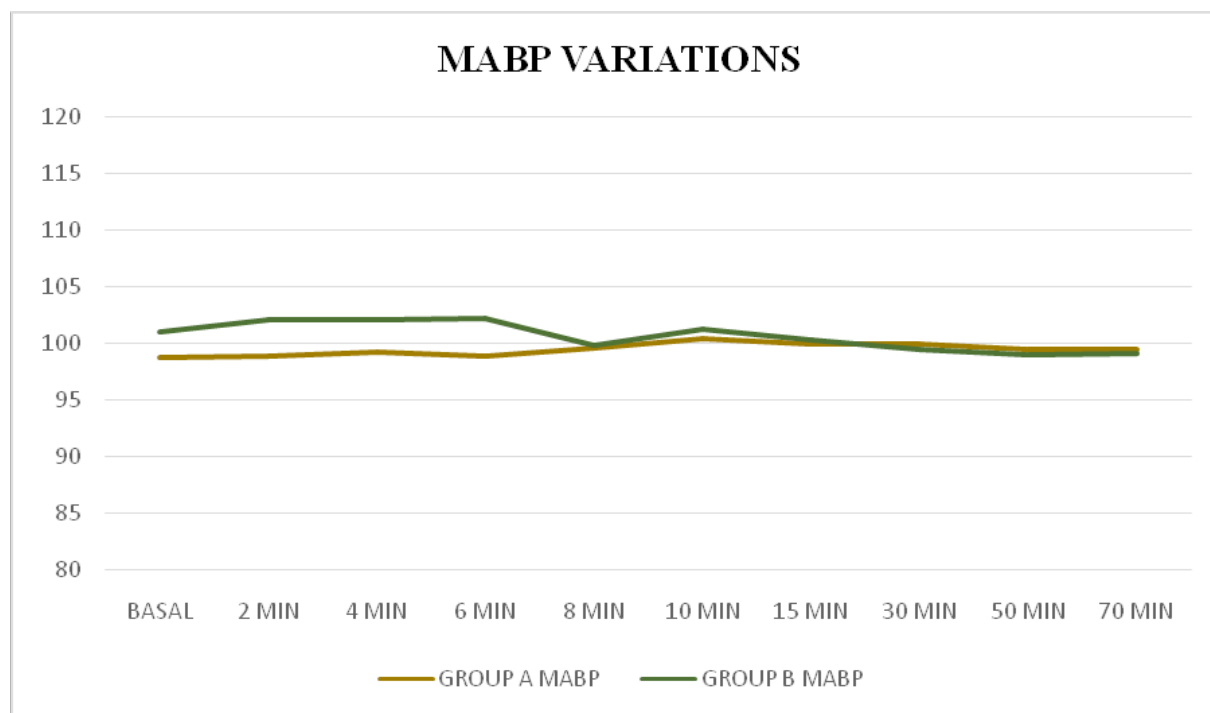


Chart No 2: Heart Rate Variation between the Groups

When we compared the variation of heart rate with respect to time and basal heart rate in each group, it was observed that in group A the heart rate varied from 75 to 77 throughout the procedure. In group B, which had

a basal heart rate of 78, there was a progressive drop in heart rate with time and the maximal drop was seen at 50 minutes. Therefore, group B had significant bradycardia (p value <0.001) compared to group A.



**Chart No 3: Mean Arterial Blood Pressure Variations**

The basal mean arterial blood pressure readings in group A was 98mmHg and in group B was 101mmHg respectively. There was no significant difference between the two groups and there was no significant variation seen in these values within their corresponding groups till the end of surgery (in chart no 3). Adverse reactions such as nausea, vomiting, hypotension was not observed throughout the procedure.

### Discussion

Literature review suggests that application of adjuvants with local anaesthetics fasten the onset and prolong the duration of block<sup>(7)</sup>. Dexmedetomidine is the most experimented adjuvant in anaesthesia with properties of analgesia, sedation, haemodynamic action, with evidence of several animal studies proving its ability to increase the duration of thermal nociception and analgesia<sup>(8-10)</sup>. Dexmedetomidine has the ability to cause bradycardia and hypotension, needing prolonged postoperative monitoring<sup>(11)</sup>. Hence, this drug should be carefully administered in patients with significant arrhythmias.

In our study, it was observed that adding 0.5µg/kg Dexmedetomidine to Ropivacaine, significantly fastened

the onset of sensory and motor blockade by an average of 6.56 minutes and 11.74minutes respectively and was associated with significant bradycardia, but hypotension was not recorded. Similar study conducted by Das et al<sup>(12)</sup> discovered onset of sensory blockade was shortened by 10.75 minutes ± 2.71 seconds and motor blockade was achieved within 14.35minutes ± 2.58 seconds when Dexmedetomidine 1µg/kg was added to 30ml of 0.5% Ropivacaine in a supraclavicular block, their study did not discover any significant haemodynamic alteration. In other study conducted by Nema<sup>(13)</sup> et al, the average time of onset of sensory blockade was 7.20±2.483 mins and average onset of motor blockade was 11.83±3.824 mins when Dexmedetomidine 50µg was added to 29ml of 0.75% Ropivacaine in a supraclavicular block, but they did not record haemodynamic changes. Farooq et al<sup>(14)</sup>, studied the effects dexmedetomidine 1µg/kg as adjuvants to 3mg/kg 0.75% Ropivacaine in supraclavicular block and discovered that, it shortened the onset of sensory block by 11.9 minutes and motor block by 23.1minutes with minimal haemodynamic changes. Abdullah et al<sup>(15)</sup> studied the effects of 0.5µg/kg dexmedetomidine with 15ml of 0.5% Ropivacaine in interscalene block in prolonging the action however they did not study the onset of action.

Metanalysis done by Vorobeichik et al<sup>(16)</sup>, Ping et al<sup>(17)</sup>, Dai et al<sup>(18)</sup>, Schnabel et al<sup>(19)</sup> and various other studies <sup>(20-22)</sup> stated that Dexmedetomidine as an adjuvant fastened the sensory and motor onset, improved the quality of brachial plexus block, increased the duration of analgesia, but at the cost of bradycardia and hypotension<sup>(23)</sup>.

There are certain limitations in this study. First, we did not study the degree of sedation caused by Dexmedetomidine. second, we did not record the duration of action of the drug. Third, the comparison between intravenous and perineural Dexmedetomidine was not done.

### Conclusion

Our study indicated that Dexmedetomidine as an adjuvant to Ropivacaine on ultrasound-guided axillary brachial plexus block significantly accelerated the time of onset of both sensory and motor block.

**Conflict of Interest:** None

**Source of Funding:** Self

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# Treatment of Intrabony Defect Using Platelet Rich Fibrin Combined with Bioactive Glass: A Case Report of a Maxillary Central Incisor

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## Abstract

The ultimate goal of periodontal therapy is to regenerate the lost periodontal tissues caused by periodontitis. Platelet rich fibrin (PRF), a rich source of autologous growth factors and cytokines, is an upcoming therapeutic approach in the management of periodontal osseous defects. Combination of autologous PRF and the alloplastic bone substitutes holds a promising potential of enhanced bone regeneration. This case report includes the management of an intrabony osseous defect in relation to #21 with a combination of Platelet Rich Fibrin & bioactive glass (calcium phosphosilicatealloplast) with the clinical and radiographic evaluations using cone beam computed tomography (CBCT) for a 9 months follow up period.

**Keywords:** *Intrabony defect, Platelet rich fibrin, bioactive glass, cone beam computed tomography*

## Introduction

The biologic goal of periodontal regeneration is restoration of the periodontium to its original form and function.<sup>1</sup> Periodontal regeneration is a multifactorial process which requires a multi-dependent sequence of biological events including cell-adhesion, migration, proliferation and differentiation.<sup>2</sup> These processes involve molecular signals which are primarily mediated by cytokines and growth factors. Platelets contain various growth factors and cytokines that play key roles in inflammation and wound repair.<sup>3</sup> This has led to the

idea of using platelets as therapeutic tools to improve tissue repair particularly in periodontal wound healing. The most positive outcome of periodontal regenerative procedures in intrabony defects and furcations has been achieved with a combination of bone grafting and guided tissue regeneration.<sup>4,5</sup>

Platelet-rich fibrin (PRF) described by Choukroun et al., (2000) is a second generation platelet concentrate which allows one to obtain fibrin membranes enriched with platelets and growth factors, after starting from an anticoagulant-free blood harvest without no artificial modification biochemically.<sup>6</sup> Numerous growth factors, such as Transforming growth factor- $\beta$  (TGF- $\beta$ ), Platelet-derived growth factor (PDGF), Vascular endothelial growth factor (VEGF), Insulin like growth factor(IGF) are released from PRF that modulate and upregulate growth factor function.<sup>7-9</sup> These growth factors have shown to possess potential for enhanced and accelerated hard and soft tissue regeneration.<sup>10</sup> PRF can stimulate cell proliferation of osteoblasts, gingival fibroblasts and periodontal ligament cells, but suppress the growth of epithelial cells. In addition, the PRF membrane could serve as a resorbable membrane for guided tissue regeneration.<sup>11</sup>

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Alloplastic graft materials may have their greatest usefulness as autograft extenders, being added to the available autogenous bone to provide a sufficient total volume of graft material. Bioactive glass exhibits osteoconductive, good manageability and hemostatic properties. It also acts as a barrier retarding epithelial down growth.<sup>12-13</sup>

When compared to periodontal probing and 2D intraoral radiography, 3D cone beam computed tomography (CBCT) scanning was found to be more effective in assessing periodontal structures.<sup>14</sup> Here, we present a 9-months follow-up report of an intrabony defect treated with an autologous PRF along with the use of bioactive synthetic graft by assessing clinical and radiological parameters, using CBCT measurements.

**Case Report:** A 46 year old female reported to the Department of Periodontics, with a chief complaint of mild pain in relation to the upper left front tooth for the past one week, with a recent episode of swelling & pus discharge that subsided after medication. She gave a history of a fish bone being stuck inside her gums 10 days back. She did not give any relevant medical history and was reported to be in a systemically healthy condition.

On Intraoral examination, the buccal aspect of left maxillary central incisor (#21) revealed a probing pocket depth (PPD) of 10mm, with a clinical attachment level (CAL) of 11 mm (Figure 1). No mobility was detected. Intraoral Periapical Radiograph and Computed cone beam tomography (CBCT) revealed loss of buccal cortical plate upto the apical third of #21 (Figure 2). Fremitus was found to be negative precluding the possibility of trauma from occlusion. Endodontic evaluation was done to test the vitality of #21. The tooth #21 was nonresponsive to vitality tests.

Hence, a diagnosis of Primary Periodontal lesion with secondary endodontic involvement in relation to #21 was made.

**The Treatment Plan Included:** Oral hygiene instructions and motivation of the patient in performing effective oral hygiene measures. Routine blood investigations were found to be in the normal range. Non-surgical periodontal therapy by means of conventional scaling and root planing using ultrasonic instrument and curettes. Antibiotics and analgesics were administered for 5 days. Root canal therapy was done in relation to #21, owing to the non – vital response explicated (Figure 3). The patient was recalled after every week for four

weeks. Re-examination after four weeks revealed no changes in PPD and CAL. Hence, periodontal surgical therapy was planned followed by Supportive Periodontal Maintenance therapy.

**Preparation of PRF:** Blood sample was taken on the day of the surgery according to the PRF protocol with a REMI 3000 centrifuge and collection kits. Briefly, 6 ml blood sample was taken from the patient without an anti-coagulant in 10 ml glass test tubes and immediately centrifuged at 3000 rpm for 12 minutes. The resultant product consisted of three layers:

1. Topmost layer of acellular platelet poor plasma (PPP)
2. PRF clot in the middle
3. Red blood cells (RBCs) at the bottom.

The fibrin clot was easily separated from the lower part of the centrifuged blood (Figure 4).

The PRF clot was gently pressed between the two sterile dry gauges to obtain a membrane (Figure 5).

**Surgical Procedure:** 0.2% chlorhexidine digluconate rinse was used to perform intra-oral antiseptics and iodine solution was used to carry out extra-oral antiseptics. After the administration of local anaesthesia, sulcular incisions were made and mucoperiosteal flaps were reflected in relation to #11, 21 and 22 (Figure 6). The inner surface of the flaps were curetted to remove the epithelium and granulation tissue. The root surfaces were thoroughly planed using curettes and ultrasonic scalers. The left maxillary central incisor revealed a combined intrabony defect (Figure 7). The root surfaces adjacent to the defect were conditioned for two minutes with 15% Ethylenediaminetetraacetic acid(EDTA) gel (pH 6.7) (Figure 8). The intrabony defect was filled with calcium phosphosilicatealloplast (NovaBone Dental Putty®) (Figure 9). PRF membrane of the required size was then placed on the graft (Figure 10). The flaps were repositioned to their pre-surgical levels and sutured with non – resorbable 3-0 black silk surgical suture (Figure 11). The surgical area was protected and covered with a periodontal dressing.

**Post – operative care:** After the surgery, post-surgical instructions were given and she was prescribed systemic antibiotics (amoxicillin 500mg, tid, 5 days), non – steroidal anti-inflammatory drugs (ibuprofen 200mg, bid, 5 days) and 0.2% chlorhexidine mouthrinse



(twice a day for 2 weeks). Sutures were removed after 7 days. Clinical healing was normal, with neither infectious episodes nor untoward clinical symptoms. The patient was seen at 1<sup>st</sup> week, 2<sup>nd</sup> week, 1<sup>st</sup> month, 3<sup>rd</sup> month and 6<sup>th</sup> month after surgery (Figure 12, 13). Re-examination at 9 months after the periodontal surgery revealed reduction in PPD (from 10mm to 2mm) and CAL (from 11mm to 3mm) with no signs of bleeding on probing (Figure 14) and significant radiographic bone fill in the periodontal intrabony defect.

**CBCT Measurements:** In the case of vertical defects, the defect depth is measured as the distance

between CEJ and the base of the defect [14]. The measurements were done with the help of Planmeca Romexis (Planmeca USA, Inc.,) viewer software to the accuracy of 0.2mm.

Pre – operatively the defect depth on the mesial and distal aspect of 21 was recorded as 8.6mm and 6.6mm (11.6 – 5mm) respectively (Figure 15). At the end of 9 months post – operatively, the CBCT measurements showed a significant gain in radiographic bone fill by 6.6 mm on both mesial (8.6 – 2 mm) and distal aspects of 21(Figure 16).



**Figure 1: Pre – operative view & CBCT revealed loss of buccal cortical plate upto the apical third of #21**



**Figure 2: Mucoperiosteal flap reflected & Clinical view of a combined intrabony defect wrt #21**



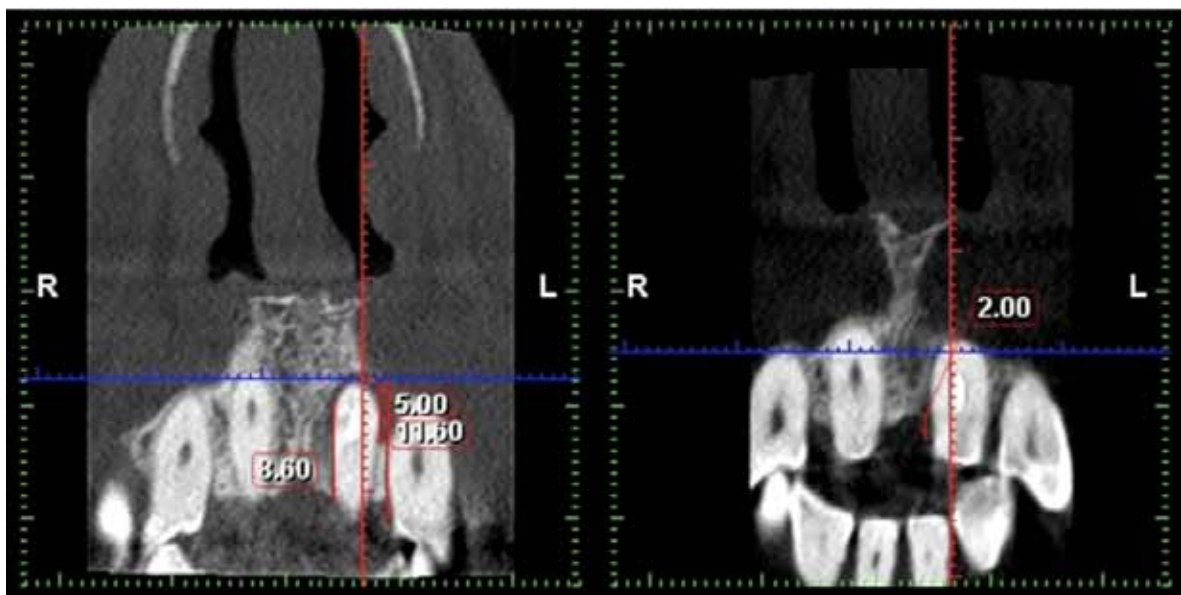
**Figure 3: Root biomodification done with 15% EDTA gel and Intrabony defect filled with Novabone putty bone graft**



**Figure 4: Platelet rich fibrin membrane placed over the defect and Interrupted sutures placed**



**Figure 5: Post – operative clinical view after 6 months and after 9 months showing reduction in PPD (10 to 2 mm) and CAL (11 to 3 mm)**



**Figure 6: Pre – operative measurement and Post – operative measurement [9 months] of the vertical bone defect on cone beam computed tomography**

### Discussion

The regeneration of the lost periodontal structures is the ultimate aim of the periodontal therapy in order to restore the health, function and esthetics of periodontium.

There was a significant reduction in PPD (from 10mm to 2mm) and CAL (from 11mm to 3mm) with no signs of bleeding on probing. Also, there was a significant radiographic bone fill of 6.6 mm on both the mesial and distal aspects of 21 in the periodontal intrabony defect.

NovaBone Dental putty is a new, next generation calcium-phosphosilicate bone graft material built from a bioactive glass platform with additives like polyethylene glycol and glycerine to improve handling and efficacy. It was the material of choice in our case to regenerate the buccal cortical bone wrt #21. The putty did not require any mixing and was used directly from the package into the defect. The osteostimulative property of Novabone results in new bone formation throughout the grafted site at rates faster than those seen with other synthetics.<sup>15</sup> The handling of this alloplast material is quite easy. Our results are in agreement to the previous studies of Froum, et al, Lovelace, et al, Mengel, et al. had reported 4.26 mm, 3.07 mm, 3.8 mm reduction in probing pocket depth respectively over a period of 6 months in sites treated with bioactive glass.<sup>16,17,18</sup>

PRF by Choukroun's technique does not require any anticlotting or gellifying agent. It is simpler and less expensive to prepare, as well as less risky to patients because it does not expose them to animal-derived anticlotting agents. PRF takes longer to be resorbed by the host, because of its dense fibrin matrix, which results in the slower and sustained release of platelet- and leukocyte derived growth factors into the wound area.<sup>19</sup>

Recently, studies have demonstrated that the PRF membrane has a very significant slow – sustained release of key growth factors for at least 7 days and upto 28 days which means that the PRF membrane stimulates its environment for a significant time during remodeling.<sup>20</sup> In a study, PRF was used as the sole grafting material and was found to be an effective modality of regenerative treatment for periodontal intrabony defects with regard to clinical and radiologic parameters.<sup>21</sup>

The results of this study demonstrate that Novabone Dental Putty (bioactive glass synthetic graft) and PRF membrane used in the treatment of intrabony periodontal osseous defects has led to clinically and statistically significant probing depth reduction, relative attachment level gain and radiographic osseous defect fill. The decision to utilize PRF membrane as defect filler in combination with calcium phosphosilicatealloplast was made because of its ease of manipulation and delivery to the surgical site. Once the defect was filled, it was covered by a PRF membrane, which was sutured in the desired position. The intended role of the PRF membrane was to contain the bone graft in the intrabony defect in the early phase of healing. In this case report, a significant reduction in PPD and gain in CAL was observed after

the application of alloplast with PRF membrane into the intrabony defect as early as in the first three months. The radiographs revealed a significant amount of bone fill in the intrabony defect at the end of nine months follow – up period.

The efficacy of CBCT for measuring the periodontal osseous defects have been detailed and validated by several researchers in the past.<sup>22</sup>To overcome the difficulties caused by the nature of conventional radiography, we have employed 3D image analysis using cone beam computed tomography (CBCT).

## Conclusion

In conclusion, the data from this case report suggests that the treatment of intrabony defects with calcium phosphosilicate putty and PRF results in significant improvements of pocket depth, clinical attachment level and radiographic osseous defect fill in human intrabony defects. Also, no adverse effects were seen with this mode of treatment. However, the long term results associated with this modality of therapy, as well as the histological nature of newly formed tissues after the treatment, remains to be elucidated.

**Conflict of Interest:** None declared.

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

**Source of Funding:** Self Funded

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# Hyperuricemia and its Impact on Incidence of Ischemic Stroke

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## Abstract

**Background:** High serum uric acid level poses an increased risk for various cardiovascular diseases including stroke. This study was conducted to determine the prevalence of high uric acid level and its relationship with acute ischemic stroke.

**Method:** It was a cross sectional studies involving 100 patients of acute ischemic stroke. Brain imaging, serum uric acid measurement was carried out beside evaluation for additional risk factors like HTN, DM, CAD, smoking and alcohol use.

**Results:** Patients' age ranged from 41 to 84 years (mean 59.8 years). Hypertension was found in 65%; DM was present in 51% patients; CAD was found in 32% patients; hyperlipidemia was seen in 34% patients. Patients with higher age had higher uric acid level (p-value 0.0001). Mean SUA for younger and elder age group was 4.36 mg/dl and 7.07 mg / dl respectively. SUA was higher in diabetic (5.98 mg / dl) than non-diabetic (4.88 mg / dl) with a p-value- 0.0006. Patients with associated CAD had higher SUA (p-value- 0.0004). There was no significant association between hypertension and uric acid. No significant association was found between SUA and hypertension or hyperlipidemia.

**Conclusion:** There is strong association between elevated serum uric acid level and acute ischemic stroke especially in elderly, diabetic and CAD patients. Strategies to lower the uric acid may decrease the development of various cardiovascular diseases like stroke.

**Keywords:** Uric acid, stroke, Ischemic, cardiovascular, Increased Incidence.

## Introduction

Stroke is one of the commonest causes of death. Stroke entails a high socio economic burden due to increased morbidity and mortality<sup>1</sup>. Early identification of individuals at risk could be of help in primary prevention strategies<sup>2</sup>.

It has been observed that disturbances in uric acid metabolism occur in various neurological and cardiovascular conditions. Uric acid has been implicated in the pathogenesis of a number of pathological conditions including stroke and atherosclerosis<sup>3</sup>.

Uric Acid (UA) is the most abundant antioxidant in plasma; it may serve its protective role by preventing lipid peroxidation<sup>4</sup>. Local UA concentrations increase during acute oxidative stress and ischaemia and the increased concentrations might be a compensatory mechanism that confers protection against increased free radical activity<sup>5</sup>. However, the role of serum uric acid (SUA) levels as an independent risk factor for vascular disease has been questioned for decades<sup>6</sup>. Evidence from epidemiological studies suggests that the elevated SUA levels may predict an increased risk for cerebrovascular

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(CV) events including stroke<sup>7, 8</sup>. Therapeutic modalities with a SUA lowering potential have been shown to reduce CV disease morbidity and mortality<sup>9</sup>. The increased incidence of stroke in diabetes mellitus (DM) is only partly explained by the adverse effects of DM<sup>10</sup>. SUA has been recently linked with insulin resistance<sup>9</sup>. One study indicated that hyperuricemia is a strong predictor of stroke events in middle aged patients with NIDDM independent of other CV risk factors<sup>10</sup>.

It is unclear whether high SUA levels promote or protect against the development of CV disease or simply acts as a passive or circumstantial marker of increased risk for cardiovascular events<sup>11</sup>. Data from larger studies have established an independent association between SUA level and cardiovascular diseases in subjects older than 45. In this respect SUA levels could be used as an easy to measure serum marker in selecting and appropriately treating subjects at risk<sup>12</sup>.

**Aims of the Study:** This study was conducted to find out correlation between the serum uric acid level and cerebrovascular accidents (CVA) and determine usefulness of uric acid level as a biochemical marker in the pathogenesis of CVA.

## Method

**Inclusion Criteria:** Patients with first episode of cerebrovascular accidents (stroke) who were admitted in our hospital within 24 hrs of onset of stroke

**Exclusion Criteria:** Recurrent stroke, patients younger than 18 years of age, patients with known or

possible cardiac source of emboli (atrial fibrillation, vascular heart disease), patients on anticoagulant therapy, patients receiving specific lipid lowering treatment, patients consuming medications that affect uric acid levels like corticosteroids, colchicine, allopurinol.

The study group comprised of 100 patients who were admitted in our Institute with stroke. Brain imaging was done to confirm diagnosis of stroke. The study period was from November 2015 to November 2017.

The blood samples were taken within 24 hrs of onset of stroke and sent for biochemical analysis and were analysed in our Biochemical Laboratory using standard analyser. The patients were further evaluated for the presence of additional risk factors such as Hypertension, DM, CAD, Dyslipidemia, smoking and alcohol use.

**Statistical Tools:** Data from all the selected patients were recorded in a Master Chart. Data analysis was done with the help of computer using Epidemiological Information Package (EPI 2002) software. Using this software, frequencies, percentage, mean, standard deviation,  $\chi^2$  and 'p' values were calculated. A p-value less than 0.05 was taken to denote significant relationship.

## Results

In this study patients had age ranging from 41 to 84 years. Majority of our stroke population was between 50 to 69 years old. The elderly population above 70 years old constituted 28 %. The mean age of the male population was 59.1 years and of the female population was 60.5 years. (Table 1).

**Table 1: Age Distribution according to sex**

Age in Years	Males		Females	
	No.	%	No.	%
Less than 40	-	-	-	-
40-49	8	16	6	12
50-59	7	14	9	18
60-69	20	40	22	44
70-79	13	26	11	22
80 and above	2	4	2	4
Mean	59.1		60.5	

Hypertension was found in 65% of our stroke population. Diabetes mellitus was present in 51% of the study population of stroke. Coronary Artery Disease was associated in 32% of the population. Thirty four % of

our stroke population had adverse lipid profile. Among the male population, 34 (68%) were smokers and 16 (32%) consumed alcoholics (Table 2).

**Table 2: Risk Factors according to sex**

Risk Factor	Males		Females	
	No.	%	No.	%
<b>Hypertension</b>				
Present	34	68	31	62
Absent	16	32	19	38
<b>DM</b>				
Present	23	46	28	56
Absent	27	54	22	44
<b>Smoking (Males)</b>				
Present	34	68	-	-
Absent	16	32	50	100
<b>CAD</b>				
Present	15	30	17	34
Absent	35	70	33	66
<b>Hyperlipidemia</b>				
Present	17	34	17	34
Absent	33	66	33	66
<b>Alcoholism (Males)</b>				
Present	16	32	-	-
Absent	31	62	50	100

The distribution of uric acid levels in the study population ranged from less than 5 mg to above 7mg/ dl.(Table 3)Mean uric acid level in males was 5.41 mg / dl and in females it was 5.47 mg / dl.With increasing age the uric acid level was found to be higher (p- value of 0.0001).

**Table 3: Age and uric acid according to sex**

Age Group	Uric Acid			
	Males		Females	
	Mean	S.D. +/-	Mean	S.D. +/-
40-49	4.19	1.72	4.48	0.7
50-59	5.0	1.54	4.92	1.3
60-69	5.42	1.53	5.54	1.51
70-79	7.1	2.1	7.04	1.45
80 & Above	8.4		4.8	0.85
'p'	0.0056		0.0077	

In our stroke population there was no significant association between hypertension and uric acid. The mean uric acid level was 5.49 mg/ dl and 5.24 mg / dl for male hypertensives and male non-hypertensive respectively; in female hypertensives and non-hypertensive mean uric acid was 5.82 mg /dl and 4.91 mg / dl respectively.(Table 4)



**Table 4: Hypertension and uric acid according to sex**

Hypertension	Uric Acid (mg/dl)			
	Males		Females	
	Mean	S.D. +/-	Mean	S.D. +/-
Present	5.49	1.76	5.82	1.64
Absent	5.24	2.18	4.91	1.15
p- value	0.3706		0.0763	

Among diabetics the mean uric acid value was 5.98 mg / dl with SD +/- 1.66 while among non-diabetics it was 4.88 mg / dl with SD +/-1.59 (p-value- 0. 0006). This association was more significant among male stroke patients with DM. But this association was not significant among female diabetic patients. (Table 5)

**Table 5: Diabetes Mellitus and Serum Uric Acid according to sex**

DM	Uric acid (mg/dl)			
	Males		Females	
	Mean	S.D. +/-	Mean	S.D. +/-
Present	6.16	1.86	5.8	1.49
Absent	4.76	1.68	5.0	1.8
P value	0.0095 Significant		0.0525 Not Significant	

Mean SUA level among our stroke population with CAD and without CAD was 6.46 mgs/dl and 4.96 mgs/dl respectively which was statistically significant (p-value- 0. 0004). When males and females patients were considered, males had a significant association between uric acid and CAD. Males with CAD and without CAD had mean SUA 6.98 mgs/dl and 4.73 mgs/dl respectively which was statistically significant (p- value of 0. 0003). Females with CAD and without CAD had mean SUA 5.99 mgs/dl and 5.21 mgs/dl respectively with no significant relationship (p-value 0.1659).

In our stroke population there was no statistically significant relationship between mean SUA level and serum lipid level. Mean SUA level in our stroke population with hyperlipidemia and without hyperlipidemia was 5.75 mgs/dl and to 5.28 mgs/dl respectively (p-value 0.2541). Among male patients mean SUA with and without hyperlipidemia was 5.67 mg/dl and 5.27 mg/dl respectively (p-value 0.7121). Among female patients mean SUA with and without hyperlipidemia was 5.84 mg/dl and 5.29 mg/dl respectively (p-value 0.3399).

Mean uric acid level in smokers and non-smokers was 5.14 mg/dl is 5.96 mgs/dl respectively which did not show statistically significant relationship between smoking and uric acid.

Further analysis was done to analyse the relationship between uric acid levels less and more than 7 mgs/dl and the risk for various cardiovascular events. This analysis showed that age more than 65 years and CAD had statistically significant relationship with uric acid level.

## Discussion

Stroke is defined as rapid onset of focal neurological deficit, resulting from diseases of cerebral vasculature and its content. India has a prevalence rate of stroke in range of 200 per 100,000 persons, nearly 1.5% of all urban hospital admissions, 4.5% of all medical and around 20% of Neurological cases<sup>13</sup>. The mortality rate of stroke in acute phase is as high as 20% and it remains higher for several years after acute event in stroke population<sup>14</sup>. Stroke is also an important cause of morbidity and long term disability<sup>14</sup>.

Uric Acid is one of the major aqueous antioxidants in human beings and constitutes as much as 2/3<sup>rd</sup> of plasma free radical scavenging ability. It is therefore prudent to expect that Uric Acid should have a protective role in stroke. But only one study<sup>15</sup> had found that higher levels of Uric Acid being neuroprotective in patients with stroke. However, Uric Acid can work as pro-oxidant under certain circumstances, particularly if the levels of other



antioxidants like ascorbic acid are low<sup>16</sup>. Various studies have shown that higher uric acid can result in endothelial dysfunction which can lead to vascular disease<sup>17</sup>. An association between Uric Acid and inflammatory markers has also been discovered<sup>18,19</sup>. According to Hayden et al<sup>20</sup> Uric Acid acts as an antioxidant in the early stages of atherosclerotic process, being one of the most powerful determinants of plasma antioxidant capacity. Later, in the evolution of atherosclerotic process when Uric Acid reaches 4-6mg/dl it becomes prooxidant. The Antioxidant-Prooxidant urate shuttle relies on its surrounding environment. Cerebral Ischemia initiates a complex cascade of metabolic events, generating nitric oxide and free oxygen radicals<sup>21</sup>.

Our study comprised of 100 Stroke patients with males and females being equal in number. Distribution of risk factors like Hypertension, DM and hyperlipidemia was of similar pattern. Mean age in males was 59.1 years and females 60.1 years. Elderly population in both sexes show high levels of Uric Acid. Milinois et al also found elevated Uric Acid in individuals older than 70 years<sup>12</sup> Regarding the association between cardiovascular (CV) risk factors and gender, CAD was significantly associated with high SUA levels in both sexes whereas DM was associated with high SUA only in males and not in females. Uric Acid has been found to be associated with an increased risk for acute ischaemic/nonembolic stroke in elderly patients independently of concurrent metabolic derangements<sup>12</sup>. This study also showed evidences for a significant association between Uric Acid level and elderly stroke population and the association was maintained even when both sexes are considered separately.

DM ranked second as a risk factor for stroke in our stroke population. Lehtosetal conducted study<sup>10</sup> involving 1017 persons with NIDDM, concluded that hyperuricemia was a strong predictor of stroke events in middle aged persons with NIDDM independently of other CV risk factors. In this study the mean Uric Acid level was 5.98 mgs/dl among diabetics and 4.88 mgs/dl among non-diabetics. There was a strong association between SUA and DM especially in male patients.

Serum Uric Acid (SUA) level has been shown to be significantly associated with cardiovascular mortality. Rotterdam study<sup>22</sup> showed that SUA was a strong risk factor for myocardial infarction and stroke. In our study CAD was found in 32 % of stroke patients. In this study

the mean SUA level in patients with CAD and without CAD was 6.46 mgs/dl 4.96 mgs/dl respectively which show a strong statistical significance.

Several prospective studies<sup>23</sup> have shown that higher levels of total cholesterol increase the risk of ischaemic stroke. In this study, the mean uric acid level in hyperlipidemic patients is 5.75 mgs/dl and in patients without hyperlipidemia is 5.28 mgs/dl and does not show any significant association between these variables.

## Conclusion

This study shows that elevated SUA is strongly associated with an increased risk for the development of acute ischaemic stroke. The association between elevated SUA and ischaemic stroke may need to be considered especially when treating elderly patients with associated DM and CAD. Lowering of SUA level can be considered as one of the preventive modalities for stroke. Further studies are required to assess whether lowering of SUA level with drugs can actually reduce the risk of ischaemic stroke.

**Funding:** Self-funding

**Conflict of Interest:** Nil

**Ethical Clearance:** Clearance taken from Ethics Committee of the institute

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# Anxiety and its Influencing Factors among Medical and Para Medical Students of Mangalore

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## Abstract

**Objective:** To assess the anxiety among medical and para medical students & the influencing factors of the same. Methodology: a cross sectional study done in medical college to assess anxiety among all the years of MBBS students and for para medicals we included physiotherapy, biomed science, speech and hearing department. it was self-administered questionnaire. We included only those who had presented at the time of data collection. Results:

This study observed that overall students showed mild anxiety (70%) followed by moderate (26%) and sever anxiety (4%). Majority of MBBS students were suffering from mild anxiety whereas Paramedical students showed moderate anxiety. Severe anxiety is more prevalent among MBBS students compared to paramedical students. Factors like getting poor marks, uncertainty of parental expectation, large content to read, not enough medical skills found have influence on anxiety among these students. Conclusion: MBBS students showed mild to moderate anxiety so as paramedicals. Which is risk factor for depression. Preventive measures should be taken to reduces any kind of anxiety.

**Keywords:** Anxiety, MBBS Student, getting poor grade in exam, inadequate medical skills.

## Introduction

According to American Psychology Association Anxiety is an emotion characterized by feelings of tension, worried thoughts and physical changes like increased blood pressure. People with anxiety disorders usually have recurring intrusive thoughts or concerns. They may avoid certain situations out of worry. They may also have physical symptoms such as sweating, trembling, dizziness or a rapid heartbeat<sup>(1)</sup>. Occasional anxiety is a part of life. Everyone experiences anxiety from time to time<sup>(2)</sup>. When it's last for weeks or months together it can interfere with daily activates exam

performance and relationship with friends and family. According to National Mental Health Survey 2015-16 the life time prevalence of anxiety disorders among young adults was 1.3% and current prevalence was 1.2%<sup>(3)</sup>. American College Health Association (ACHA) 2015 National College Health Assessment survey, reported that nearly one in six college students (15.8%) had been diagnosed with or treated for anxiety.<sup>(3)</sup> According to study done by Indoo Singh and Ajeya Jha at Sikkim reveal that 46% of medical and engineering students were having higher level of anxiety compare to other graduates. Medical students were having high level anxiety compare to engineering students<sup>(4)</sup>. Studies done at national and international level showed higher level of anxiety among students which can eventually lead to depression<sup>(5)</sup>. Hence it has become necessary to find out the prevalence of anxiety among these students so that early intervention can put front and students can be trained efficiently to cope up with academic stressors. The objectives of this study are to assess the prevalence of anxiety and the factors influencing the anxiety among medical and paramedical students of Mangalore,

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Karnataka. Its ubiquity in humans and its presence in a range of anxiety disorders make it an important clinical focus.

## Methodology

A descriptive cross sectional questionnaire based study was conducted among a student of medical and Para medical college of Mangalore. As per our convenient we have taken a college which has MBBS courses, physiotherapy, biomedical science, speech and hearing and pharmacy course as well. Study comprised students from all the above departments. We included students who were present at the time of data collection. It was self-administered questionnaires. The questionnaires were divided in to three section, first section contained socio-demographic characteristic, second section contained Beck's anxiety inventory, which had a list of common symptoms of anxiety along with indicator<sup>(6)</sup>. Each indicator had been scored "0", "1", "2" and "3" respectively. This list was made up of 21 common symptoms of anxiety. A grand sum of 0 – 21, 22-35, >36 has indicated as low anxiety, moderate and severe anxiety respectively. Third section of questionnaire was regarding influencing factors. Likert scale was used to assess these influencing factors. All the participants were informed and explain regarding motive of the study and consent was taken prior to the data collection. Students were allowed to give out questionnaire without answering. Data were analysed using the Statistical Package for Social Sciences (SPSS). Descriptive statistics was used for general characteristics of the participants and the results were presented in frequencies and percentages.

## Results

**Socio-demographic Characteristics:** Our study

comprises of 348 samples out of which, 133(38.21%) were male and 215(61.7%) were female, 210 were < 20years of age and 138 of them were >20 years of age, 208 were pursuing MBBS. Majority of them belong to nuclear family (89%). 63%, 14.9% and 21% of them belong to Hindu, Muslim and Christian family respectively.

Table 1: This study shows that majority of students suffer from mild anxiety (70%) followed by moderate (26%) and severe anxiety (4%). Studies conducted previously also suggest the same. According to this study, prevalence of anxiety is more among females than males, majority of whom were suffering from mild anxiety (67%) followed by moderate (31%) and severe anxiety (3.25%).

Table 2: Majority of MBBS students were suffering from mild anxiety whereas Paramedical students showed moderate anxiety. Severe anxiety is more prevalent among MBBS students compared to paramedical students. Factors like taking tests/examinations, conflicts with other students, uncertainty of parental expectation, poor academic performance, vast portions, peer pressure, feeling of insecurity, not enough practical skill during exams, performing in front of a huge crowd contribute to aggravating the anxiety in both the groups. Unjustified grading system, competition among peers, external appearance and fear of failing in exam or becoming repeater, craving for recognition found to be not influencing anxiety among both group. Factors like verbal or physical abuse, relationship issue with family and friends, separated from family found to be influencing anxiety among paramedical students whereas factors like unable to answer parental questions, parental wish for studying this course and quota system found to be influencing factors among MBBS students.

**Table 1: Proportion of level anxiety among the study participants (N=348)**

Anxiety categories	Females	Males	Frequency (Percentage)	P value*
Mild (0-21)	141(67.5%)	103(77.44%)	244(70%)	0.037
Moderate (22-35)	67 (31.1 %)	23 (17 %)	90(26%)	
Severe (>36)	7 (3.25%)	7 (5.2 %)	14(4%)	
<b>Total</b>	<b>215</b>	<b>133</b>	<b>348(100%)</b>	

\*chi-square test < 0.05

**Table 2: Proportion of anxiety among medical and paramedical (N=348)**

Anxiety Categories	Medicals (MBBS)	Paramedical	Total	P value*
Mild (0-21)	159(76.4%)	85(60.7%)	244	0.019
Moderate (22-35)	38 (18.3%)	52(37%)	90	
Severe (>36)	11 (5.3%)	3 (2.14%)	14	
<b>Total</b>	<b>208</b>	<b>140</b>	<b>348</b>	

\*chi-square test < 0.05

**Table 3: Factors Influencing the Anxiety among Medical and Paramedical Students**

Influencing Factors	Medical students (N=208)		Paramedical students (N=140)	
	Agree	Disagree	Agree	Disagree
Giving test or exam	136 (65%)	72(35%)	101(72%)	39(28%)
Conflicts with other students	114(55%)	94(45.1%)	85(62%)	55(39.2%)
Verbal or physical abuse	100(48%)	108 (52%)	80(57%)	60(43%)
Falling behind in studies	120(58%)	88(42.3%)	54(38.5%)	86(61.5%)
Uncertainty of parental expectation	116(56%)	92(44.2%)	58(41.4%)	55(39.2%)
Getting poor marks	132(63%)	76(36.5%)	77(55%)	63(45%)
Large amount of content to read	130(62.5%)	78(37.5%)	89(63.5%)	51(36.4%)
Something awful might happen	121(58%)	87(41%)	95(68%)	45(32%)
Not enough practical medical skill	130(62.5%)	78(37.5%)	72(51.4%)	68(49%)
Quota system	112(54%)	96(46.1%)	54(39%)	86(61%)
Unjustified grading system	99(48%)	109(52.4%)	61(43.5%)	79(56.4%)
Unable to answer parental question	106(51%)	102(49%)	66(47%)	74(53%)
Parental wish for studying medicine	71(34%)	37(17.7%)	27(19.2%)	113(81%)
Competition among peers	63(30.2%)	145(70%)	35(25%)	105(75%)
Performing in front of crowd	113(54.3%)	95(45.6%)	90(64.2%)	50(35.7%)
Separated from family	66(32%)	142(68%)	84(60%)	56(40%)
External appearance	85(41%)	123(59%)	62(44.2%)	78(55.8%)
Relationship issue	87(41%)	121(59%)	85 (61%)	55(39%)
Fear of failing in exam/becoming repeater	81(40%)	127(60%)	51(36.4%)	89(63.6%)
Craving for recognition	54(26%)	154(74%)	40(29%)	100(71.4%)

### Discussion

Anxiety is a growing problem not only in India but all over the globe is that students are more stressed than ever<sup>(7)</sup>. Medical students represent a highly educated population under significant pressures. A study done by Cardiff University in the UK reported that more than half of medical students admitted to feeling serious levels of anxiety<sup>(8)</sup>. Hence this study is done to assess the level of anxiety & which are the influencing factors to the anxiety. As we had used the Beck’s anxiety

inventory for assessing the anxiety, we found the 70% of our students were suffering from mild anxiety & only 4% of them show severe anxiety symptoms. Whereas students pursuing MBBS course showed 5.3% severe anxiety compare to 2.14% in paramedical. Curriculum, fees structure, competition, carrier perspectives, future job & opportunities working condition is different in both the groups hence the severe anxiety could be more in MBBS than paramedical.

Medical college is recognized as a stressful environmental though the reasons are myriad but failure in examination, separation from family, long duration of study hours, difference in the curriculum, duration of study years, competition and the environment of the college/hostel;<sup>(10)</sup> Getting poor marks, uncertainty of parental expectation, insufficient practical skills, large amount content to read found to influence the anxiety in MBBS students. Whereas giving exams, conflicts with other students, large amount of content to read, separated from family, performing in front of crowd & relationship issues found to influence the anxiety among paramedical students. So the influencing factors found to be similar in both the groups. As this both groups are having similar environment & long duration of course the influencing factors found to be similar in both the groups. This finding is similar with study done by indoo singh (56%) stating medical students are having higher level of anxiety compare to the students of other streams as medical students are having Hugh curriculum, large amount to study & competition makes more stressful environment for students which leads to anxiety some or other time<sup>(9)</sup>. Similarly, Malaysian study showed 44% of medical students were anxious. They found that stress is the main reason for anxiety and it reduces response capacity of students which eventually leads to anxiety and depression<sup>(10)</sup>. The study done in Pakistan found to have a high prevalence of anxiety & depression among medical college<sup>(11)</sup>. They found the females have high prevalence of anxiety compare to male students which is similar to our study. The medical student sample clearly evidenced a higher distress level than the general population controls (mean and SD was 1.43 & .45 LLOYD AND GARTRELL 1984)

This study has some limitation. It was self-administered questionnaire. The sample was restricted to private institute. Geographic constrain in the study as it was done in limited institute. Experimental research can be recommended to find relation between influencing factor and anxiety.

### Conclusion

This study indicates that there is high prevalence of anxiety among MBBS students & majority showed mild anxiety symptoms. Factors like giving exams test, large amount of content to read, uncertainty of parental expectation and not enough practical skills causing anxiety in students of this streams. Emotional intervention programme should be organized for the

Students as well as for the faculty members, so that they can work together in finding solutions for better stress management and handling anxiety among students.

**Conflict of Interest:** Nil

**Source of Funding:** Nil

Ethical clearance not taken for this study.

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# A Cross Sectional Study on Risk Factors, Smoking and Hypertension of Cardiovascular Diseases among Adult Population in Urban Slum Area, Bhubaneswar, Odisha

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## Abstract

**Introduction:** India is experiencing an epidemiological transition from communicable diseases to non communicable with cardiovascular diseases as a leading cause of mortality and morbidity. It has been estimated that by 2020, Cardiovascular disease(CVD) will be the largest cause of disability and death in India, with 2.6 million Indians predicted to die due to CVD.

**Objectives:** 1. To study the prevalence of smoking and hypertension among the adult population of field practice area of Hi-tech Medical College. 2.To find out association between these risk factors with the socio-demographic factors of the study populations.

**Methodology:** A cross sectional study was carried out for 4 months from August 2015 to November 2015. A pretested schedule was prepared containing the parameters required to identify the risk factors smoking, hypertension of CVD in the urban field practice area of Hi-tech Medical college, Bhubaneswar.

**Results:** Out of total study participants (681), there were 332 females and 349 males. Prevalence of smoking was found to be 17.5% and that of hypertension was 16.4% in my study population. Almost one third of the patients had positive family history for hypertension (35%). Statistically significant ( $P=0.001$ ) association was found between hypertension with different age groups (hypertension is more common in the age group of 40-50 years in males and 50-60 years in female).

**Conclusion:** Since high prevalence of cardiovascular risk factors was found in the adult population, continuous health awareness activities and health check-up must be required in the study area.

**Keywords:** *smoking, hypertension and cardiovascular disease*

## Introduction

With the turn of the century, cardiovascular diseases (CVDs) have become the leading cause of mortality in

India<sup>(1)</sup>. In comparison with the people of European ancestry, CVD affects Indians at least a decade earlier and in their most productive midlife years<sup>(2)(3)</sup>. For example, in Western populations only 23% of CVD deaths occur before the age of 70 years; in India, this number is 52%<sup>(4)</sup>. In contrast to developed countries, where mortality from CHD is rapidly declining, it is increasing in developing countries<sup>(5)</sup>. This increase is driven by industrialization, urbanization and related lifestyle changes and is called epidemiological transition<sup>(6)</sup>. Cardiovascular Disease (CVD) is a group of disorders of the heart and blood vessels that affects the cardiovascular system. CVD includes coronary heart disease (CHD), stroke, aortic

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aneurysm and dissection, peripheral arterial disease, rheumatic heart disease, congenital heart disease, deep venous thrombosis and pulmonary embolism and other CVDs (7). By next few years, 2.6 million Indians are predicted to die due to CHD, which constitute 54.1% of all CVD deaths (8). It has also been predicted that India will be the heart disease capital in the world by in near future(9).

**Methodology**

The study was conducted in the urban field practice area of Hi-Tech Medical college and hospital, Bhubaneswar . The total population of ward number - 53 is 15952, out of which the adult population from 30 to 60 years is 5391 . Adult population between 30-60 years were included in our study who were permanent resident of the study area. As per study of Gupta et al(11), the overall prevalence of hypertension is 37% and depending upon that our sample size was calculated as 681 (n = 4PQ/L<sup>2</sup>)

After approval of the institutional ethics committee and consent of the participants, the sample was collected by systematic random sampling method till sample size was reached. The study subjects were then interviewed through the pretested schedule and information regarding demographic profile, risk factors associated and health seeking behavior were collected . Data obtained were tabulated in Microsoft excel sheet. Statistical analysis was done using SPSS (version 20.0).

**Results**

A total of 681 study participants were included in the final analysis out of which 332 were females and 349 were males. Table 1 shows age wise distribution of study participants of which 31% were in the age group 30-40

years, 32% in 40 to 50 years and 37% in age group 50-60 years age group . It shows almost one third of the patients had positive family history for hypertension (35%) (Table 2). From the table number -3 it is found that there is statistically significant (P=0.001)association between hypertension with different age group(hypertension is more common in the age group of 40-50 years in males and 50-60 years in female).prevalence of hypertension was found to be 16.4% in the study population. Almost 82.5% of study population were found to be non-smoker and 17.5% were smokers (table-4). Table 5 shows history of smoking with different socio -demographic factors. Sex is significantly associated with smoking history (P value = 0.001). i.e. sex has direct impact to the Cardiovascular Diseases. And all others are found not statistically significant i.e. no association between the age and marital status with the current smoker of cardiovascular diseases.

**Table 1: Age wise distribution of the study participants**

Age Group (Years)	Number	Percentages (%)
30-40	212	31.13
40-50	216	31.71
50-60	253	37.15

**Table 2: Family History of Hypertension**

Family History	Number	Percentages (%)
No family history	442	65
Father	74	10.80
Mother	69	10.11
Both parent	96	14.09
<b>Total</b>	<b>681</b>	<b>100</b>

**Table 3: Association between Age group and hypertension in the study population**

Age (Years)	Hypertension Male Female		No Hypertension	Chi Square	d.f.	P value
30-40	12	6	194	21.34	2	0.001(S)
40-50	49	5	162			
50-60	18	22	213			

**Table 4: Smoking history among the study population.**

Smoking	Number	Percentages (%)
Present	119	17.5
Absent	562	82.5
Total	681	100

**Table 5: Association of smoking history with socio-demographic factors.**

Demographic factors	Smoking No Yes		Chi Square	d.f.	P value
<b>Sex</b>					
Male	230	119	133.280	1	0.001 (S)
Female	332	0			
<b>Age</b>					
30-40 years	188	24	17.01	2	0.001 (S)
40- 50 years	160	56			
50-60 years	214	39			
<b>Marital Status</b>					
Married	516	114	1.7065	2	0.426(NS)
Unmarried	37	5			
Widowed	9	0			

## Discussion

This study found high prevalence of CVD risk factors among the study population. They were disproportionately distributed by age, sex and marital status.. This was the first community-based study conducted to estimate the prevalence of CVD risk factors in the study area. CH. In our study, one third of the patients had positive family history for hypertension (37.1%).17.5% of the study population were smokers. Singh et al performed a population survey of CHD and risk factors in a rural and urban setting of Moradabad in 1997. A sample of 3575 subjects between ages 25 and 64 was enrolled in the survey. Overall prevalence of CHD was 9% and 3.3% in urban and rural populations respectively<sup>(10)</sup>.

Gupta et al conducted a cross-sectional survey of 1123 subjects in an urban population of Jaipur in 2002 to evaluate the prevalence of coronary artery disease and risk factors<sup>(11)</sup>. The overall prevalence of CAD was 6.2% in men and 10.8% in women. The highest prevalence of risk factors included hypertension (36.9%), tobacco use (23.9%), obesity (63%) and hypercholesterolemia (39.1%).In a recent large study from Kerala, Thankappan et al demonstrated a high prevalence of risk factors comparable to the Unites States<sup>(5)</sup>. A sample of 7449

men and women from rural, urban and slum background were included in the survey. The study underlined the alarmingly low level of awareness, treatment and control of hypertension and smoking in the adult population. Only a third of the individuals were aware of their hypertension and only a quarter were treated; of the treated, one-third had adequate control.

**Acknowledgement:** I acknowledge all my study participants for supporting me in carrying out my research work.

**Conflict of Interest:** Nil

**Source of Funding:** Nil

**Limitation:** Since the study conducted was limited to one slum area,more slum areas must be studied to generalize the result.

## Conclusion and Recommendation

We found a higher prevalence of different risk factors of cardiovascular diseases among the study population like family history of hypertension, hypertension and smoking in adult population. Strengthening of the current programme for non-communicable disease i.e. National program for Cancer, diabetes mellitus, cardiovascular

disease and Stroke (NPCDCS) should focus especially on the screening aspect of the non-communicable disease. This will help in controlling cardio-vascular disease through promoting on early screening, diagnosis and initiating of effective treatment which will result in preventing CVD associated complication and disabilities.

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# Assessment of Health Status and QOL of the Womens Working in Garment Factory in Tumkur: A Cross-sectional Study

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## Abstract

**Introduction:** Garment factories in India have been playing a vital role in creating employment opportunity for womens. It plays an important role in generating employment opportunities for the rural illiterate women otherwise they had to work as maid servant. Garment sector opened a new door for rural people to engage themselves into the economic activities.

Due to the physical demands and the repetitive nature of their work, factory workers are susceptible to musculoskeletal disorders, pain in the back and large joints such as the knee and shoulder joints are among the most common health complaints in industrialized societies. These problems are even more common among females and older workers.

The aim of this study was therefore to assess the nature and extent of health problems and the quality of life experienced by female garment workers in Tumkur.

**Methodology:** A cross-sectional survey was conducted among women working in garment factory . The survey included three questionnaires. A self-administered questionnaire will be used to collect data on quality of life using World Health Organization Quality of Life Brief questionnaire (WHO QOL) .GHQ 28 Questionnaire will be used to asses Physical health status of the study subjects.

Data were coded and entered into SPSS version22. After data cleaning and checking, tabulations were carried out using SPSS version22 in order to describe the population and the prevalence of the conditions of interest.

**Results:** Out of 162 38(23.4%) had Back pain, 20(12.3%) had gastric pain,8(4.9%) had dermatitis. 14(8.6%) had Joint Pain,8(4.9%) had Problems related to bones, 4(2.5%) had skin allergies, 68(41.9%) had tension headache, 68(41.9%) had Poor Quality of life, 94(58.0%) had good Quality of life.

**Conclusion:** Female garment workers reported overall good health; their most notable problem was musculoskeletal symptoms. The findings could represent adequate control of work-related risks.Around 58 % had good quality of life .

**Keywords:** *Garment workers, Female, Health Status, Quality of Life, Occupational Health*

## Introduction

The garment industry plays a vital role in providing employment to rural, less educated females and the economic liberalization that has occurred in India in the last three decades has significantly altered traditional

gender norms, allowing women to take on new roles as an independent wage-earner and sometimes as primary breadwinners for their families.<sup>1</sup>

It plays an important role in generating employment opportunities for the rural illiterate women otherwise

they had to work as maid servant. Therefore, garment factory sector opened a new door for rural people to engage themselves into the economic activities of india.

According to World Health Organization (1948), “Health is a state of complete physical, mental and social wellbeing and not merely the absence of diseases or infirmity”. So in these circumstances, it is obvious that the workers in the garment industry are suffering from various types of health problems. The occupational movement towards garment work will be affected negatively if this situation continues in the garment industry

These workers are under pressure to keep up with the production demands, working long shifts, at night and overtime<sup>2</sup>. To achieve production targets, the workers usually operate machinery continuously at one specified place in the production line.

Studies have identified numerous health problems among industrial workers in general and garment workers in particular<sup>3</sup>. Due to the physical demands and the repetitive nature of their work, factory workers are especially susceptible to musculoskeletal disorders, Pain in the back and large joints such as the knee and shoulder joints are among the most common health complaints in industrialized societies<sup>4</sup>. These problems are even more common among females and older workers<sup>5</sup>. They are a major reason for absence and workplace attrition and can be costly to both worker and the industry

The aim of this study was therefore to assess the nature and extent of health problems and the quality of life experienced by female garment workers in Tumkur.

**Objectives:**

1. To assesses the Health status of womens working in garment factory
2. To assess QOL of womens working in garment factory.

**Methodology**

A cross-sectional survey is designed on womens working in garment factory. After taking Informed consent study was done using semi structured questioner to collect data on Socio-demographic characteristics, occupational health problems, Data on quality of life will be collected using World Health Organization Quality of Life Brief questionnaire (WHO QOL) GHQ 28 Questionnaire will be used to asses Physical health

status of the study subjects.

Data were coded and entered into SPSS version22. After data cleaning and checking, tabulations were carried out using SPSS version22 in order to describe the population and the prevalence of the conditions of interest.

**Istitutional Ethical Clearance taken and Informed consent taken.**

**Results**

**Socio-demographic characteristics:** Out of 162 most 84(51.9%) of them were in the age group 28-38yrs, 86(53.1%) studied till 10<sup>th</sup> standard, 74(45.7%) had Normal weight.

**Health Profile:** Out of 162 38(23.4%) had Back pain, 20(12.3%) had gastric pain,8(4.9%) had dermatitis.

**Problems related to Bone, Unhealthy Environment and Respiratory system:** 14(8.6%) had Joint Pain,8(4.9%) had Problems related to bones, 4(2.5%) had skin allergies, 4(2.5%) had tightness of chest, 4(2.5%) had wheezing. 68(41.9%) had tension headache, 10(6.2%) had scaling of skin.

**Quality of Life:** 68(41.9%) had Poor Quality of life, 94(58.0%) had good Quality of life.

**Table 1: Distribution study subjects based on Socio-Demographic characteristics:**

Determinants	Frequency	Percent
<b>Age</b>		
18-28	56	34.6
28-38	84	51.9
38-48	22	13.6
<b>Education</b>		
Illiterate	12	7.4
Primary School	8	4.9
High School	32	19.8
Sslc	86	53.1
Puc	12	7.4
Degree	12	7.4
<b>Occupation</b>		
Semi Skilled Worker	152	93.8
Skilled Worker	10	6.2
<b>Total</b>	<b>162</b>	<b>100.0</b>

**Table 2: Distribution of study subjects based on BMI**

BMI Category	Frequency	Percentage
Underweight (<18.5)	36	22.2
Normal (18.5 - 24.9)	74	45.7
Overweight (25.0 - 29.9)	38	23.5
Obesity (30.0 - 34.9)	14	8.6
<b>Total</b>	<b>162</b>	<b>100.0</b>

**Table 3: Distribution of study subjects based on Overall Health Status**

Health Status	Frequency	Percent
No problem	64	39.5
Problem in bones	4	2.4
Gastric pain	20	12.3
Fatigue	4	2.4
Fever	4	2.4
Abdomen pain	2	1.2
Common cold	4	2.4
Dermatitis	8	4.9
Back pain	38	23.4
Eye stain	4	2.5
Malnutrition	4	2.5
Respiratory problems	4	2.5
Hepatitis	2	1.2
<b>Total</b>	<b>162</b>	<b>100.0</b>

**Table 4: Distribution of study subjects based on Overall Health Status**

Determinants	Frequency	Percent
<b>Problems Related to Skeleton and Bones</b>		
No problem	130	80.2
Problems related to bones	8	4.9
Problems related to Muscles	6	3.7
Trauma	2	1.2
pain in joint	14	8.6
Malnutrition	2	1.2
<b>Problems by Unhealthy Environment</b>		
No problem	150	92.5
Dermatitis	2	1.2
Fungal infection	2	1.2
Skin allergies	4	2.5

Determinants	Frequency	Percent
Asthma	2	1.2
Conjunctivitis	2	1.2
<b>Respiratory Problems</b>		
No problem	154	95.0
Wheezing	4	2.5
Tightness in chest	4	2.5
<b>Total</b>	<b>162</b>	<b>100.0</b>

**Table 5: Distribution of study subjects based on Overall Health Status**

<b>Headache</b>		
	Frequency	Percent
No problem	66	40.7
All headaches	18	11.1
Migraine	10	6.2
Tension	68	41.9
<b>Accidents</b>		
No problems	158	97.5
Take of work b/c of injury	4	2.5
<b>Dermatology</b>		
No problems	142	87.7
Rashes	2	1.2
Lesions	2	1.2
Infection	6	3.7
Scaling	10	6.2
<b>Total</b>	<b>162</b>	<b>100.0</b>

QOL Category	Frequency	Percent
Poor	68	41.9
Good	94	58.0
<b>Total</b>	<b>162</b>	<b>100.0</b>

Table 6: Distribution of study subjects based on quality of life .

## Discussion

Out of 162 most 84(51.9%) of them were in the age group 28-38yrs, 86(53.1%) studied till 10<sup>th</sup> standard, 74(45.7%) had Normal weight. Out of 162 38(23.4%) had Back pain, 20(12.3%) had gastric pain,8(4.9%) had dermatitis. 14(8.6%) had Joint Pain, 8(4.9%) had Problems related to bones, 4(2.5%) had skin allergies, 4(2.5%) had tightness of chest, 4(2.5%) had wheezing.

68(41.9%) had tension headache, 10(6.2%) had scaling of skin .

Previous studies of female garment workers in other countries such as Bangladesh, India, Fiji andLithuania have shown the same results<sup>9-12</sup>.

The study conducted by Nahar et al. (2010) showed that the particular nature of work in Readymade Garments created various types of health hazards among the selected respondents such as headache, malnutrition, musculoskeletal pain, eye strain, less appetite and some other problems like these<sup>13</sup>.

The income of the workers in the garment industry is too poor to meet their minimum needs. They lead their live very hard and could not spend money to get good and fresh food to meet healthcare needs . The workers often had to take rotten food and sometime they had to starve which causes health problems like diarrhea, peptic ulcer, abdominal pain, dysentery, stomach ache etc. The workers are not able to afford the required calories with their minimum earnings which cause malnutrition.

The confined workplace also caused breathing problem and respiratory problem of the workers in the garment factory because they had to inhale fabric dust and chemical contaminated to the fabric<sup>13</sup>.

Study done by Mehta (2012) found that breathing difficulty and respiratory problems of the workers is due to dust and loose fibres in the factory.

The factory buildings are confined and humid as well as proper air circulation is absent there. As a result, the workers suffer from pruritus and common cold (sneezing and coughing).

The workers in the ready made garment industry continue their job with heavy work pressure in the factory leads to fatigue, headache and frustration.

Most of them (94)58% in our study had good Quality of Life, Almost all the factories employ at least one visiting doctor for the workers, In addition, the financial independence achieved through the work may also contribute to the higher QOL observed

### Conclusion

Female garment workers reported overall good health; their most notable problem was musculoskeletal symptoms. The findings could represent adequate control

of work-related risks. Around 58% had good quality of life . The quality of work life of workers in the garment industry represents vulnerable situations in practice and need to erect the industry robustly through ensuring quality of work life for sustainable and safe and sound as well as well remunerated workers and their lives.

**Recommendation:** Studies can be conducted to assess relationship between the major health problems and productivity of the workers in the ready made garment industry.

**Acknowledgement:** Authors would like to acknowledge the Management of Sri Siddhartha Medical College, HOD of Department of Community Medicine and Study Participants.

**Funding:** Nil

**Conflict of Interest:** Nil

**Istitutional Ethical Clearance taken and Informed consent taken.**

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# Prevalence of Functional Foot Deformities in Obese School Going Children

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## Abstract

**Background and Objectives:** Obesity is a leading factor resulting in many health problem of which childhood obesity due to unhealthy diet and lifestyle is not uncommon. Obesity and foot deformities are closely linked to each other as the foot is the main support of body weight and the body weight need to be evenly distributed around the body. Increase in the body weight may increase the loading forces on the foot this in turn may alter the foot posture. This repetitive loading forces on the foot may give rise to the foot deformities. This study was conducted to find out functional foot deformities in obese school going children.

**Method:** A total of 75 subjects in between age group of 12-15 years were allocated in obese group according to their BMI to assess the presence of functional foot deformities respectively. Each subject was assessed using foot posture index and scored according to the components. The outcome measure included six components and each was assessed and scored according to appropriate values. The score was taken for both right and left foot.

**Result:** The results showed that all the components of foot posture index that is Talar head palpation, curves above and below the malleolus, inversion/eversion of calcaneus, prominence in the region of TNJ, congruence of medial longitudinal arch and abduction/adduction of forefoot on rearfoot are significant in obese children.

**Conclusion:** It was concluded that there is presence of functional foot deformities in obese school going children both in right and left foot.

**Keywords:** *Foot Posture Index, Functional foot deformities, Obesity.*

## Introduction

Obesity is a term which basically means excessive accumulation of fat which in turn increases the health risks.<sup>4</sup> Number of health problems are linked to obesity such as cardiovascular diseases, metabolic diseases,

musculoskeletal disorders, etc. India, a country which was traditionally known for high prevalence rates of under nutrition is now showing an increasing rate of obese population. Obesity in India is increasing now-a-days to a great extent due to number of factors such as unhealthy diet and sedentary lifestyle. India is following the trend of the developing countries and adapting a western lifestyle which includes an unhealthy diet. An increased intake of fast food, high calorie and high cholesterol diet and consumption of unhealthy processed food is the leading cause of obesity in India. It can also be said as a lifestyle disorder which affects all the age groups.

Childhood obesity is another major issue faced by Indian population which is either due lack of activity or

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due the unhealthy diet which is more common. As in adults the childhood obesity also has a major adverse effect on body which in turn may contribute to health risks in childhood as well as adulthood. Cardiovascular diseases, metabolic diseases, musculoskeletal diseases, etc. may be caused due to childhood obesity. Focusing on the musculoskeletal disorders linked with obesity, number of problems are faced by children which mainly affects the feet hence the interest is in examining the same.<sup>8</sup>

Obesity measurement is not just an observational study but is categorized according to the BMI. Body mass index is calculated in an attempt to quantify the amount of muscle, fat and bone in an individual. BMI is calculated by the Quetelet Index. The Quetelet index is defined as the body weight divided by the square of the body height and is universally expressed in units of  $\text{kg/m}^2$ , resulting from mass in kilograms and height in metres.<sup>2</sup> Using this the BMI will be calculated in children and they will be categorized according to the score.

Foot complex plays a major role in supporting the body weight and provides leverage in walking and running.<sup>10</sup> Foot development in children is rapid up to 5 years of age and many changes occurs in the foot during the developmental period. The arches of foot starts developing as the child begins to weight bear and walk.<sup>5</sup> The foot complex is important joint structure and any disturbances in the foot structure may lead to foot deformities in children which may not be symptomatic at the childhood but may produce adverse effects on the posture and gait. The functional deformities of childhood which may not be much troublesome at present may turn in to fixed deformities as the skeletal maturity is reached.<sup>9</sup>

Obesity and foot deformities are closely linked to each other as the foot is the main support of body weight and the body weight need to be evenly distributed around the body.<sup>6</sup> Increase in the body weight may increase the loading forces on the foot this in turn may alter the foot

posture. This repetitive loading forces on the foot may give rise to the foot deformities. This aspect of child's health has always remained neglected, unaware of the adverse effects.<sup>1</sup>

After discussing about the obesity as one of the most important factor which may affect the foot complex in children another aspect which may be thought of as a contributing factor is the footwear or the shoes worn by the school children. The school shoes are compulsory in every school in India now a days and are wore by children every day. The sole of the shoes may become uneven after prolonged and daily use and this again remains the neglected aspect which along with the obesity may also contribute in foot posture alterations and thus foot deformities in school going children.<sup>7</sup>

## Materials and Method

An approval for the study was obtained from the Protocol committee and institutional Ethical Committee of Krishna Institute of Medical Sciences Deemed to be University. The subjects from Krishna School Karad were screened and those fulfilling the inclusion and exclusion criteria were involved. Participants were informed about the study and consent was taken. BMI was taken and the subjects were selected according to criteria. The foot of the subjects were observed to rule out the absence or presence of functional foot deformities in subjects and was scored according to the Foot Posture Index which is the outcome measure used. The data was collected and analysed by using the software SPSS version 2.0.

### Data Analysis:

- Age and Gender Distribution:** 75 participants were involved in the study. The age group of all participants was 12 to 15 years of which 34 participants were male and 41 participants were female.
- FPI Result for Right and Left Foot of All Participants.**

Component	A	B	C	D	E	F
SD	0.61	0.56	0.79	0.66	0.62	0.610
SD Total score	3.10	3.10	3.10	3.10	3.10	3.10
Mean	-0.026	0.2	0.28	0.664	0.52	0.373
Mean Total score	1.666	1.666	1.666	1.666	1.666	1.666
p value	<0.0001	<0.0001	0.0003	0.0002	0.0021	0.0005
Result	Extremely significant	Extremely significant	Extremely significant	Extremely significant	Very significant	Extremely significant

A-talar head palpation, B-curves above and below malleolus, C-inversion/eversion of calcaneus, D-prominence in the region of TNJ, E- congruence of medial longitudinal arch and F-abduction/adduction of forefoot on rear foot.

**Interpretation:** Components A, B, C, D and F are extremely significant in right foot of all participants.

While component E is very significant in right foot of all the participants.

Component	A	B	C	D	E	F
SD	0.583	0.56	0.78	0.69	0.62	0.60
SD Total score	3.05	3.05	3.05	3.05	3.05	3.05
Mean	-0.097	0.073	0.121	0.146	0.390	0.292
Mean Total score	1.024	1.024	1.024	1.024	1.024	1.024
p value	0.0234	0.0533	0.0705	0.0763	0.1965	0.1362
Result	Significant	Not quite significant	Not quite significant	Not quite significant	Not significant	Not significant

**3. FPI Results of Right and Left Foot for Males:**

A-talar head palpation, B-curves above and below malleolus, C-inversion/eversion of calcaneus, D-prominence in the region of TNJ, E- congruence of medial longitudinal arch and F-abduction/adduction of forefoot on rear foot.

**Interpretation:** All the components A, B, C, D, E and F are extremely significant.

**4. FPI Result of Right and Left Foot for Females.**

Component	A	B	C	D	E	F
SD	0.65	0.54	0.78	0.60	0.58	0.614
SD Total score	3.02	3.02	3.02	3.02	3.02	3.02
Mean	0.058	0.352	0.470	0.411	0.676	0.470
Mean Total score	2.441	2.441	2.441	2.441	2.441	2.441
p value	<0.0001	0.0002	0.0005	0.0003	0.0014	0.0004
Result	Extremely significant	Extremely significant	Extremely significant	Extremely significant	Extremely significant	Extremely significant

A-talar head palpation, B-curves above and below malleolus, C-inversion/eversion of calcaneus, D-prominence in the region of TNJ, E- congruence of medial longitudinal arch and F-abduction/adduction of forefoot on rear foot.

**Interpretation:** Component A is significant in all the female participants. Component B, C and D is not quite significant. Component E and F is not significant in all the female participants.

**Outcome Measure:** Subjects were selected with age group of 12 to 15 years under the BMI category of overweight and obesity. The subjects were evaluated using the Foot Posture Index and the all the subjects were instructed about the details of the procedure. Six clinical components of the Foot Posture Index was assessed as follows:

Talar head palpation - the talar head was palpated on medial and lateral aspect of the anterior aspect of the ankle.

Supra and infra lateral malleolar curvature – the curves above and below the lateral ankle malleoli were observed.

Calcaneal frontal plane position – with the patient standing in the relaxed stance position, the posterior aspect of the calcaneus was visualised with the observer in line with the long axis of the foot.

Bulging in the region of the talonavicular joint – the area of the talonavicular joint was observed with the patient in standing position.

Height and congruence of the medial longitudinal arch – observation was made taking both the arch height and congruence in consideration.

Abduction/adduction of the forefoot on the rear foot– foot was observed directly from behind and in the line of the long axis of the heel.

Each of the component tests or observations was graded as grade 0 for neutral, with a minimum score -2 for clear signs of supination and +2 for positive signs of pronation. According to the grade final Foot Posture Index (FPI) score was derived and the observations was indicated on the FPI data sheet. Results were derived with the help of the statistical analysis from derived scores.

## Results

The results of above study states that there is significant prevalence of functional foot deformities in obese school going children with same result for both right and left foot.

## Discussion

Obesity is a rising issue in the world which is seen in adults as well as in children. Obesity has a number of adverse effects on the body. It may have adverse effects on cardiovascular system, metabolic or musculoskeletal system. Focusing on the musculoskeletal system the foot complex is mainly affected as the loading forces of the body are more on foot. Obesity and foot deformities are closely linked. The repetitive increased loading forces due obesity may affect the foot and lead to alterations in the foot posture thus leading to functional foot deformities.

The aim of the study is to study the prevalence of functional foot deformities in obese school children.

The objectives are to assess the presence of any functional foot deformities in school children due to obesity. The participants included were both males and females. The children included in the study are overweight or obese and have no lower limb injuries or surgeries or no symptomatic conditions of lower limb.

This project was done in six months duration with a sample size of 75 (females-41 and males-34) and with age group of 12-15 years. Children were selected of overweight or obese category according to the BMI classification. The subjects were taken from school in Karad. Consent was taken from the subject and assent was taken from the caretakers or parents.

The values which are measured from the participants are compared with the standard values of same gender for right and left foot also the values which are mentioned in the article for better results.

The procedure was carried out according to the easy quantification of standing posture by using FPI (foot posture index) and its six components were observed with the subject standing in relaxed stance position with double limb support.<sup>[3]</sup> The whole sample size that is 75 subjects shows extremely significant result with 45 percent of males having significant functional foot deformities and 55 percent of females having no significant functional foot deformities.

According to the FPI results of right and left foot for all the participants, components A, B, C, D and F are extremely significant in right foot of all participants. While component E is very significant in right foot of all the participants.

According to the FPI results of right and left foot for males all the components A, B, C, D, E and F are extremely significant.

According to the FPI results of right and left foot for females, component A is significant in all the female participants, component B, C and D is not quite significant, component E and F is not significant in all the female participants.

According to Jen-Huei Chang, Sheng-Hao Wang, Chun-Lin Kuo, Hsian Chun Shen, Ya-Wen Hong, Leou-Chyr Lin there was presence of flat foot in 75% of obese, 65% of overweight, 57% of normal weight and 48% of underweight children.<sup>7</sup> This study included only one component of foot that is the medial longitudinal arch of the foot from the above article.

According to M. ADORACION VILLARROYA<sup>1</sup>, J. MANUEL ESQUIVEL<sup>2</sup>, CONCEPCION TOMAS<sup>1</sup>, ANA BUENAFE<sup>2</sup> & LUIS MORENO the increased body mass is related to a lower medial longitudinal arch. This study also included only one component of foot that is medial longitudinal arch from the above article.<sup>6</sup>

### Conclusion

On the basis of the result of the study, it was concluded that there is presence of functional foot deformities in obese school going children. The result were same for right and left foot. The FPI score suggest presence of functional foot deformities. The components talar head palpation, curves above and below malleolus, inversion/eversion of calcaneus, prominence in the region of TNJ, congruence of medial longitudinal arch and abduction/adduction of forefoot on rearfoot are significant.

**Conflict of Interest:** There were no conflicts of interest.

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

**Funding:** Self funding.

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# To Study the Effect of Mulligan Mobilization Versus Conventional Therapy in Sacroiliac Joint Pain

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## Abstract

**Background:** Sacroiliac Joint Pain (SIJP) is a pain arising from SIJ structures such as anterior sacroiliac ligament, posterior sacroiliac ligament, interosseous ligaments or articular cartilage. The treatment of sacroiliac joint pain is quite challenging. The standard physical therapy (PT) interventions include repetitive exercises, manual joint mobilization, manipulation, bracing, massage, patient education, aerobic conditioning, general therapeutic exercise and electrotherapeutic modalities.

**Objectives:** To compare the effect of mulligan mobilization versus conventional therapy on pain on VAS, Lumbar Range of motion and functional disability in patients with sacroiliac joint pain.

**Material and Method:** A total 93 patients were screened as per the inclusion and exclusion criteria. Patients were randomly allocated in two groups. Group A received mulligan mobilization and Ultrasound therapy and group B received Conventional therapy i.e Ultrasound therapy. Outcome measures assessed were VAS for pain, Lumbar flexion by modified schober's test and MODQ for functional Disability.

**Result:** Mean difference of Pain on VAS  $4.41 \pm 1.04$  in group A and in group B  $3.63 \pm 1.27$ . Mean difference in Lumbar flexion ROM in group A it was  $1.30 \pm 0.67$  and in group B it was  $0.98 \pm 0.55$  Mean difference in MODI Score in group A was  $34.67 \pm 10.84$  and in group B it was  $13.50 \pm 6.45$ .

**Conclusion:** In the present study, we found that both the techniques Mulligan mobilization and Conventional therapy are effective in the subjects with Sacroiliac joint pain but Mulligan mobilization was found to be more effective than conventional therapy.

**Keywords:** Mulligan Mobilization, Ultrasound therapy, Sacroiliac joint Pain {SIJP}, Conservative treatment.

## Introduction

The conception of Sacroiliac joint (SIJ) as a generator is courteously recognized.<sup>(1)</sup> In India,

prevalence of Sacroiliac joint disorder is reported 13.8% to

47.9% in the widespread populace.<sup>(2)</sup> Sacroiliac Joint pain (SIJP) is a pain springing up from SIJ systems along with the Anterior sacro-iliac ligament as well as Posterior sacro-iliac ligament and the Interosseous ligaments or articular cartilage and the Sacroiliac joint dysfunction usually implies to the unusual position or movement of the structures surrounding to SIJ.<sup>(3)</sup> SIJ disorder remains a circumstance of the altered mechanism, either increase or fading from the standard ordinary movement or presence of an ordinary motion.<sup>(4)</sup>

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Low back pain is very common that influences about 70% of people in some unspecified time in the future in complete lifestyles.<sup>(1)</sup> SIJ dysfunction is a not unusual reason of Low back pain that happens in 16-30% patients.<sup>(5)</sup> The connection between the Sacroiliac Joint (SIJ) and the low back pain is a topic of debate by some researcher.<sup>(6)</sup> The sacroiliac joint is a crucial part of pelvic girdle and the lumbar spine. It is the load shifting mechanical connection between the spine and pelvis that may cause both SIJ and the other surrounding structures to supply stimuli.<sup>(4)</sup>

The Mulligan model that includes “MWM” is the new method is the Pain-free accessory glides with an active or passive physiological motion. The Physiotherapy mobilization of sacroiliac joint contributes in reestablishing the usual joint mechanics in order to have intacted Sacroiliac Joint for whole day.<sup>(4)</sup>

Ultrasound, when applied with suitable intensity and frequency, is thought to differ from superficial heating modalities by heating deeper tissues. Ultrasound is suggested for the treatment which includes promoting healing and regeneration of inflammatory tissue, the reduction of pain and to improvement in ROM and this is the rationale for the use of ultrasound for the management of soft tissue disorders in all joints, including the sacroiliac joint.<sup>(1)</sup>

## Methodology

The study was conducted after taking approval from Institutional Ethics Committee clearance [DMIMS (DU)/IEC/2018-19/7194] in Department of Musculoskeletal Physiotherapy, Ravi Nair Physiotherapy college, Sawangi (M), Wardha. Inclusion Criteria was patient with age 30-60 years, both genders, Patients with acute or chronic SIJ and sacroilitis. Exclusion Criteria was patient with PIVD, Lumbar canal stenosis, tuberculosis, tumors or any traumatic condition to pelvis and lower limb. The informed consent was obtained and patients were randomly allocated by chit method in two groups. Total 100 subjects were assessed out of which 7 subjects were excluded from study. 3 subjects were not willing to participate in study, 3 subjects refused to continue with the intervention and 1 subject met with RTA. Subjects were randomly allocated in both the groups by chit method. The pre and post pain on VAS, Lumbar flexion was assessed in terms of mST (Modified schober’s test) and Functional Disability in terms of MODI was taken.

**Group A: Mulligan mobilization and Ultrasound therapy:** 10 Repetitions of 3 sets with 5 mins rest period between each set was given for 10 days.

1. **Postero- Medial MWM [Sitting, prone and standing positions]:** Subjects was asked to execute offending motion after detailed assessment (sitting, standing, sitting to standing, bending down and raising from prone). The therapist stand opposite to the affected side. One hand of the therapist was placed over the sacrum for stability and another hand hooked the affected side’s ASIS. The therapist drew the ilium posterome dialy on the sacrum and maintained the glide until subjects completed the offending movement.<sup>(41)</sup>
2. **Antero-lateral MWM [Sitting, prone and standing positions]:** Subjects was asked to perform offending motion after detailed assessment (sitting, standing, sitting standing, bending down and rising from the prone). The therapist stands contrary to the lesion’s affected side. The therapist places one hand on the Posterior Superior iliac spine (PSIS) and another hand on the opposite side’s pubic ramus. The therapist drew the PSIS with one hand antero-laterally while stabilizing the inverse pubic ramus and allowing the subjects to execute offending motion by maintaining the glide.<sup>(41)</sup>

## Group B: Conventional therapy

- A. **Ultrasound therapy:** Ultrasound of electroson 709 was used to treat subjects. Subjects was comfortably placed (sitting or lying) and evaluated carefully with extra pillow assistance. Before switching on power, time and intensity was checked and was kept at ‘ 0.’ Any excess heat or pain was reported by subjects. Subjects was instructed if he/she experience any discomfort during treatment. Gel was applied to the skin and transducer’s surface. Ultrasound (US) head was moved in overlapping circles, transducer motion speed was slow maximum 3/4cms<sup>2</sup>. Ultrasound dose was 1W/cm<sup>2</sup> with 1MHz frequency in continuous mode, 1 MHz was selected owing to its enhanced penetration depth and was given for eight minutes.<sup>(1)</sup>

**Data Analysis:** Statistical analysis was done by using descriptive and inferential statistics using student’s paired ‘t’ test, unpaired ‘t’ test and SPSS 22.0 version software was used. The p<0.05 is considered as level of significance.

**Table 1: Comparison of mean difference in pain on VAS Score in both groups Student's unpaired t test**

Group	N	Mean	Std. Deviation	Std. Error Mean	t-value
Group A	46	4.41	1.04	0.15	3.22 P=0.002, S
Group B	46	3.63	1.27	0.18	

According to table 1, based on student's unpaired 't' test, the mean difference of pain on VAS scale in group A and group B was compared. The P value was 0.002, which is found to be significant and represented graphically.

**Table 2: Comparison of mean difference in Lumbar flexion ROM in both groups Student's unpaired t test**

Group	N	Mean	Std. Deviation	Std. Error Mean	t-value
Group A	46	1.30	0.67	0.09	2.42 P=0.017, S
Group B	46	0.98	0.55	0.08	

According to table 2, based on student's unpaired 't' test, the mean difference of Lumbar flexion ROM in group A and group B was compared. The P value was 0.017, which is found to be significant and represented graphically.

**Table 3: Comparison of mean difference in MODI Score in both groups Student's unpaired t test**

Group	N	Mean	Std. Deviation	Std. Error Mean	t-value
Group A	46	34.67	10.84	1.59	11.37 P=0.0001, S
Group B	46	13.50	6.45	0.95	

According to table 3, based on student's unpaired 't' test, the mean difference of MODI score in group A and group B was compared. The P value was 0.0001, which is found to be significant and represented graphically.

## Discussion

The present study on the effect of Mulligan mobilization and conventional therapy in Sacroiliac joint pain subjects. Analysis of Pain relief was done by subjective VAS by statistical mean. Mean and standard deviation of pain in terms of VAS was done and found that the average of VAS score for group A on 0<sup>th</sup> day was 7.02±1.43 and 10<sup>th</sup> day was 2.60±1.06 and for group B on 0<sup>th</sup> day was 7.02±1.49 and 10<sup>th</sup> day was 3.39±1.49. When intragroup comparison was done there is a significant difference in both the groups i.e Group- A and group- B. When intergroup comparison was done within both groups there was difference were group A showed significant improvement in terms of VAS. The result of the present study agreed with **George Lewith, et.al.** in this series reported that VAS can be used as parameter to quantify the pain intensity and there was decreased pain threshold in subjects with the SIJD.<sup>(18)</sup> **Lennard Voogt et al** concluded that Modest evidence showed that manual therapy reduces local pressure pain thresholds in musculoskeletal pain, instantly following intervention.<sup>(39)</sup>

Analysis of Lumbar flexion was done by Modified Schober's test by statistical mean. Mean and standard deviation of lumbar flexion in terms of modified schober's test was done and found for group A on 0<sup>th</sup> day was 3.05±0.92 and on 10<sup>th</sup> day was 4.35±0.50. In group B on 0<sup>th</sup> day was 3.07±0.87 and 10<sup>th</sup> day was 4.06±0.67. When intragroup comparison was done there is a significant difference in both the groups i.e Group-A and Group-B. When intergroup comparison was done within both groups there was difference were group A showed significant improvement in lumbar flexion in terms of modified schober's test. The result of present study supported with the results of **Teys et al.** studied on the initial effect of mulligan mobilization on PPT and ROM of the shoulder. The findings stated that Mulligan mobilization has an instant affirmative impact on ROM and pain ranges.<sup>(4)</sup>

Disability analysis was done by subjective MODQ by statistical mean. Mean and standard deviation of disability in terms of MODQ was done and found that average of MODQ score for group A on 0<sup>th</sup> day was 55.21±15.05 and on 10<sup>th</sup> day was 20.54±9.47. In



group B on 0 day was  $56.61 \pm 14.80$  and on 10<sup>th</sup> day was  $43.11 \pm 12.44$ . When intragroup comparison was done there is a significant difference in both groups i.e Group -A and group- B. When intergroup comparison was done within both groups there was difference were group A showed significant improvement in functional disability in terms of MODQ. **Prof. V.MANIVANNAN et al** reported in this study that MET has effect in reduction of Pain and improves functional ability in subjects with SIJD.<sup>(18)</sup>

Sacroiliac joint pain offers a serious healthcare problem and produce a huge liability over the general public. Simple, safe physiotherapy interventions procedure like Mulligan mobilization technique combined with conventional therapy could be of prodigious value. This provide low price easy means of treatment in subjects with Sacroiliac joint pain. Hence, the present study was conducted for 10 days of intervention shown that subjects receiving Ultrasound therapy and Mulligan Mobilization in experimental group showed more significant improvement than the control group subjects receiving Ultrasound therapy.

### Conclusion

In the present study, we found that both the techniques Mulligan mobilization and Conventional therapy are effective in the subjects with Sacroiliac joint pain but Mulligan mobilization was found to be more effective than conventional therapy. Result of this study suggest that a gradual improvement was seen throughout the session. The pre and post treatment score of Modified Oswestry Disability Questionnaire (MODQ), Visual Analog Scale (VAS) and Lumbar flexions showed improvement observed in both groups i.e. Group-A & Group- B but more significant improvement was observed in Group A receiving Mulligan mobilization. The present study rejects the null hypothesis and accept the alternative hypothesis i.e. Mulligan mobilization combined with Conventional treatment is more effective than conventional treatment alone in management of Sacroiliac joint pain.

**Ethical Clearance:** Ethical clearance obtained by Ethical Committee of Datta Meghe Institute of Medical Sciences.

**Conflict of Interest:** Nil.

**Source of Funding:** Self

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# Increased Risk of Recurrent Ischemic Stroke in Anemic Patients

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## Abstract

**Background:** Anaemia is a risk factor for various cardiovascular events including stroke. There is limited data on the association between anaemia and recurrence of ischemic stroke. This study was intended to explore an association between anaemia and recurrent ischemic stroke.

**Method:** A cross sectional study was conducted over 3 years involving patients of ischemic stroke. Data on ischemic stroke acute or chronic, history of comorbid or confounding factors like of hypertension, diabetes, smoking, alcohol, age, gender and haemogram was collected and analysed.

**Results:** Out of 165 patients having acute ischemic stroke, 65 had first episode of stroke and 100 were found to have recurrence of ischemic stroke. Among the patients with first stroke 23 (35.38%) had anemia and 42 had normal hemoglobin. Among the patients with recurrent ischemic stroke 62 (62%) had anemia (P value <0.001) and 38 had normal hemoglobin. Even after adjusting for confounding factors the odds of anaemia being associated with recurrent ischemic stroke was three times higher (p= 0.001).

**Conclusion:** There is a significant association between anaemia and recurrent ischemic stroke. Longitudinal studies can delineate the temporal association between anaemia and recurrent ischemic stroke.

**Keywords:** Anaemia, Recurrent, Ischemic Stroke, Increased, Risk, Cerebrovascular Accident.

## Introduction

Stroke or Cerebrovascular Accident (CVA) is characterized by rapidly developed clinical signs of cerebral dysfunction, lasting more than 24 hours or leading to death with no apparent cause other than vascular origin<sup>1</sup>. Ischemic Stroke is an important cause of morbidity and mortality worldwide<sup>2</sup>. In India the

prevalence rate of Stroke is 84-262/100000 population in rural and 334-424/100000 population in urban areas and the incidence rate for stroke is 119-145/100000 population<sup>3</sup>.

Patients with stroke have an increased risk for recurrent stroke or myocardial infarction or death<sup>2</sup>. A recurrent Ischemic stroke is defined as an acute ischemic stroke in a patient with previous Ischemic stroke<sup>4</sup>. The incidence of recurrent stroke is more after silent infarcts which can only be detected on radiological imaging and can be useful as a surrogate endpoint for clinical recurrence in secondary prevention trials<sup>5</sup>.

The incidence of recurrent stroke reduces with control of risk factors for stroke<sup>6</sup>. Presence of risk factors like leukoariorosis, atrial fibrillation<sup>7</sup>, left atrial enlargement<sup>8</sup>, intracranial haemorrhage, intermittent claudication, age, headache<sup>9</sup>, metabolic syndrome

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and DM<sup>10</sup> are associated with increased recurrence of Ischemic stroke.

India faces the challenge of increasing incidence of recurrent ischemic stroke due to inadequate control of risk factors<sup>4</sup> and inadequate secondary prevention strategies<sup>6</sup>. Recurrent ischemic Stroke has high death and disability rate<sup>11</sup>. Patients with previous stroke or transient ischemic attack<sup>11</sup> have high mortality due to recurrence of stroke.

Anaemia is a risk factor for various cardiovascular events like stroke and is associated with higher mortality<sup>12, 13</sup>. Anaemia is an independent predictor of short and long term mortality in stroke patients<sup>12, 13</sup>.

Anaemia is defined as a haemoglobin of less than 12 gm/dL in women and less than 13 gm/dL in men<sup>14</sup>. Anaemia is common in elderly patients, with a prevalence of about 8.5% for those 65 years and older and is associated with increased mortality and hospitalization<sup>14, 15</sup>. Anaemia is associated with decreased oxygen carrying capacity, increased inflammatory response and alteration in blood viscosity<sup>12,13</sup>. Reduced oxygen carrying capacity of blood in anaemic individuals is important in pathophysiology of ischemic stroke<sup>13</sup> and also hinders neurological improvement ischemic stroke<sup>16</sup>.

Recent studies demonstrated that acute ischemic stroke presenting with anaemia had poorer outcome<sup>13, 15</sup> even in less severe stroke patients<sup>17</sup> compared to patients with normal hemoglobin level and anaemia is an independent predictor of death<sup>16</sup>.

**Objectives:** This study was conducted to determine the prevalence of anaemia among patients of recurrent ischemic stroke and first episode of ischemic stroke and to explore any association between anaemia and recurrent ischemic stroke.

**Material and Method**

We conducted a retrospective study at Mediciti Institute of Medical Sciences, Ghanpur, Medchal. The case records of patients admitted with diagnosis of Acute Ischemic stroke from January 2015 to December 2017 were analysed. Data was collected regarding age, gender, haemoglobin, past history of stroke, hypertension, diabetes, smoking and alcohol use. CT/MRI brain imagings were studied to identify old and new infarcts to segregate the stroke patients into first ever stroke group and recurrent stroke group. Patients’ records with anaemia and those with normal hemoglobin were segregated with anaemia defined as Haemoglobin of less than 12 g/dl for women and less than 13 g/dl for males. All records of patients above the age of 18 years with first episode of stroke or recurrent stroke based on clinical history or case records or radiological findings on CT/MRI brain were included.

Data was analysed for anaemia as an independent risk factor for recurrent ischemic stroke and to evaluate the persistence of the association of anaemia with ischemic stroke after assessing for various confounding factors for stroke like age, sex, history of hypertension or diabetes and history of addiction like smoking and alcohol.

**Results**

Out of a total 165 patients studied (mean age = 59.9+/-12.1years) with a diagnosis of acute ischemic stroke 101 were males (mean age =59.3+/-11.6years) and 64 were females (mean age =60.9+/-12.8years). The group having first episode stroke had a mean age of 58.65 years and that of recurrent stroke had a mean age of 60.68 years. Out of the total population of 165 individuals, 65 patients were admitted with a diagnosis of first ever stroke episode and 100 patients had an evidence of previous stroke either based on history or brain imaging. (Table 1).

**Table 1: Distribution of Age in the Study Population**

	Total	Male	Females
Number of patients	165	101	64
Mean Age in years +/-SD	59.9 +/-12.1	59.3+/-11.6	60.9+/-12.8
Mean age (years) of First episode Stroke patients +/-SD	58.65+/-12.19	59.29+/-11.45	58+/-13.74
Mean age (years) of Recurrent Stroke patients+/-SD	60.68+/-12.28	59.24+/-11.79	63.47+/-11.03

Out of the 65 patients with first episode of stroke, 35 were males and 30 females. Out of the 100 patients with recurrent stroke 66 were males and 34 were females.

The Prevalence of anaemia was 35.38% in patients with first episode Ischemic stroke and 62% in patients with recurrent ischemic stroke. Out of the total

population, 80(56 males and 24 females) patients had normal haemoglobin and 85(45 males and 40 females) had anaemia. The mean Haemoglobin for the total population was found to be 12.4+/-2.4gm/dl, for males it was 13.12+/-2.5 gm/dl and for females it was found to be 11.3+/-1.6 gm/dl. (Table 2).

**Table 2: Anaemia in Study Population**

Variable	All Patients (165)	Male	Females
Mean Haemoglobin +/- SD	12.4+/-2.4	13.12+/-2.5	11.3+/-1.6
Normal Haemoglobin, n(%)	80(48.48%)	56(55.44%)	24(36.92%)
Anaemia, n(%)	85(51.51%)	45(44.55%)	40(62.5%)

Out of the 65 patients with first ever episode of stroke, 42(30 males and 12 females) patients had normal haemoglobin and 23(5 males and 18 females) patients had anaemia. And out of the 100 patients with recurrent stroke, 38(26males and 12 females) had normal haemoglobin and 62(40 males and 22 female) patients had anaemia.

Percentages of males in first and recurrent stroke with anaemia are 16.6% and 60.6% respectively and the percentages of females with anaemia in the first and recurrent stroke are 60% and 64.7% respectively. The results indicate a significant difference in males but a marginal difference in females in relationship between anaemia and recurrent ischemic stroke. Results also signify that males with anaemia have significantly higher incidence of recurrent ischemic stroke.

In this study population of 165 patients, we found that 108 patients had hypertension (60 males and 48 females), 52 patients had DM (28 males and 24 females), 42 patients were smokers (male 40 and female 2) and 62 patients consumed alcohol (males 52 and females 10).

**Statistical Analysis:** When this data was statistically analysed using STATA version 13.0, Chi Square test separately for males and females and also combining them, the results showed a strong association of anaemia with recurrent stroke as an independent factor with a p value= 0.0015 for the total population. Also when anaemia was evaluated as an independent risk factor for recurrent stroke we found that p-value was 0.0015 and the Odd's of developing recurrent ischemic stroke in a patient having anaemia is 2.97 times when compared to a patient having normal haemoglobin.

When we separately evaluated the association between anaemia and recurrent stroke for males and females, we found that the association was more significant in the male population.

In the male population of 101 patients, 35 patients presented with first episode of stroke, out of which 30 patients had normal haemoglobin and 5 patients had anaemia. Sixty four male patients had recurrent Ischemic stroke out of which 26 patients had normal haemoglobin and 40 patients had anaemia. When analysed for association between anaemia and Recurrent stroke in the male population using chi square test, we found that it was statistically significant with a p value of <0.001. Also we found that the odd's of an anaemic male to develop recurrent ischemic stroke was 9.23 times when compared to males having normal haemoglobin (Table 3).

Among the 64 females in our study population, 30 patients presented with first episode of stroke, out of which 12 patients had normal haemoglobin and 18 patients had anaemia. And 34 female patients presented with recurrent Ischemic stroke out of which 12 patients had normal haemoglobin and 22 patients had anaemia. When analysed for correlation between anaemia and Recurrent stroke in the female population using chi square test we found that it was not statistically significant with p-value = 0.79. Also we found that odd's ratio of an anaemic female to develop recurrent ischemic stroke was 1.22 times when compared to females having normal haemoglobin (Confidence interval being 0.12 to 0.74). (Table 3).

**Table 3: Correlation of Anaemia and recurrent Ischemic Stroke**

Haemoglobin (Hb)	First episode of stroke		Recurrent Stroke		Total
	Males	Females	Males	Females	
Normal Hb	30	12	26	12	80
Anaemia	5	18	40	22	85
Total	35	30	66	34	165

A multivariate logistic regression model with anaemia, sex, age, Hypertension, DM, smoking and alcohol consumption and as predictor variables and Recurrent Ischemic stroke as Outcome variable was analysed. Based on this analysis it was found that the odds of Recurrent Ischemic stroke were approximately three times higher in individuals with anaemia even after adjusting for age, sex, hypertension, diabetes, smoking

and alcohol consumption which are known to increase the risk of recurrence in Ischemic stroke patients and the association based on p Value of <0.001 still persisted. Also from the regression model we found that males with anaemia had a higher risk of development of recurrent ischemic stroke when compared to the females having anaemia. (Table 4).

**Table 4: Regression Analysis Table**

Variable	Odds Ratio	95% CI for Odds ratio	P value
Anaemia	2.351341	1.49 to 3.69	<0.001
Sex (males = 1)	0.3054602	0.12 to 0.74	0.01
Age	1.0150601	0.98 to 1.04	0.465
Hypertension	0.7003731	0.33 to 1.45	0.335
Diabetes	1.346158	0.64 to 2.75	0.442
Alcohol	1.119032	0.47 to 2.50	0.830
Smoking	0.6357079	0.25 to 1.81	0.442
Constant	1.472659	0.08 to 24.8	0.788

CI- Confidence Interval

Analysis was carried out to find out any association between type of anaemia (microcytic, normocytic or macrocytic) and severity of anaemia (mild, moderate or severe) with recurrence of ischemic stroke. We found no significant association between any of them and recurrent ischemic stroke.

**Discussion**

In our study population 2/3<sup>rd</sup> of the patients had recurrent ischemic stroke and 1/3<sup>rd</sup> of the patients presented had first ever episode of stroke which shows a high incidence and prevalence of recurrent ischemic stroke. Various studies done previously showed that

factors like Hypertension, DM, dislipidemia<sup>6,9</sup> atrial fibrillation, leukoaraiosis<sup>7</sup>, premature atrial complexes<sup>8</sup>, age, Intracranial haemorrhage, intermittent claudication<sup>9</sup> and metabolic syndrome<sup>10</sup> have been identified as risk factors for development of recurrent ischemic stroke. But, there is limited data on anaemia as a risk factor in the development of recurrent ischemic stroke. Several studies conducted previously showed that anaemia is an independent poor prognostic factor<sup>2</sup> in various conditions like Acute MI, Congestive cardiac failure, chronic kidney disease<sup>12</sup> etc with evidence for both short term and long term increased mortality<sup>12,16</sup>. Also the role of anaemia in worsening of brain ischemia<sup>13</sup> after an

acute ischemic event and increase in the damage caused to the penumbral tissue in acute ischemic stroke<sup>16</sup> have been identified by David Tanne et al. and Hao Z, et al respectively. Anaemia has also been evaluated to be a risk factor for ischemic stroke by David Tanne, et al and its association with higher rates of disability and mortality have been described by Milionis H, et al<sup>12,13</sup> in Ischemic stroke patients.

Overall in our study we found that the ratio of patients with recurrent ischemic stroke having normal haemoglobin compared to those having anaemia was found to be approximately 2:3. Our study shows that anaemia is commonly seen in recurrent ischemic stroke. This study also showed that the presence of anaemia in the male population is strongly associated with recurrent ischemic stroke when compared to the female population.

In our study we also analysed association between stroke and severity and type of anaemia and found that the severity and type of anaemia was not associated with recurrent ischemic stroke; but the presence of anaemia irrespective of type or severity has significant association with recurrent ischemic stroke more so in the male population.

In our study every alternate patient had anaemia which correlates with the values of the national health survey done in 2014-2015(19)<sup>18</sup> which showed that approximately 50% of the Indian population has anaemia with a female preponderance. This highlights the need for larger study to evaluate the role of anaemia as a preventable risk factor for the development of Recurrent Ischemic stroke.

The present study has limitations like being a retrospective case record based analysis, with a small sample size in a local population.

### Conclusion

This study showed that prevalence of Anaemia in Recurrent Ischemic stroke patients (62%) was much higher when compared to the prevalence of anaemia in first episode stroke patients (35.38%). We also found that the odds of anaemic patients to develop recurrent ischemic stroke was three times compared to patients having normal haemoglobin. Even after adjusting for other confounding factors anaemia was an independent risk factor for recurrent ischemic stroke. This study highlights that screening for and correction of anaemia

may reduce the incidence of recurrent ischemic stroke

**Conflict of Interest:** Nil

**Source of Funding:** Self

Ethical clearance was taken from the Institute's ethics committee.

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# Prevalence of Balance Disturbances in Women with Android and Gynoid Obesity

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## Abstract

**Objectives:** In recent years increased incidence of obesity has been reported among general population due to vast changes in lifestyle of people attributing to industrialization and urbanization. However, the magnitude of the problem is more in women than in men. Hence, an attempt was made to review the impact of android and gynoid types of obesity on the balance in females

**Method:** A cross-sectional, observational study was conducted on 100 premenopausal women aged 40-50 years. The participants were divided into android and gynoid obesity using waist hip ratio. Postural stability was assessed using functional reach test.

**Result:** Balance disturbance was found in both android and gynoid type of obesities. Balance disturbance was found more in females with gynoid type of obesity. In android obesity 24 % of women have severe risk of falls and 76 % have moderate risk of falls. In gynoid obesity 33% have severe risk of fall and 67 % have moderate risk of fall according to functional reach test.

**Conclusion:** On the basis of the results of the study, it was concluded that balance disturbance was found more within the females with gynoid as compared to the females with android type of obesity.

**Keywords:** Balance, Android, Gynoid, Obesity, Waist Hip Ratio, Body Mass Index, Falls.

## Introduction

WHO defines obesity as abnormal or excessive fat accumulation that presents a risk to health.<sup>1</sup> With the recent development incidence of obesity is increasing dramatically among general population.<sup>2</sup> The prevalence of obesity is 38% for males and 40% for females respectively.<sup>2,3</sup> Causes of obesity may include poor diet, genetic predisposition, lack of physical activity,

advancing in technology, sedentary lifestyle, endocrine disorders, medications or mental disorders. Measure of obesity is Body mass index (BMI), a person's weight (in kilograms) divided by the square of his/her height (in metres). A person with BMI of 30 or more is considered obesity. Obesity is classified as:

30-34.9 – class I obesity

35.0-39.9 – class II obesity

> 40 – class III obesity<sup>1</sup>

Globally, there were more than 300 million adult obese individuals and more than 115 million individuals suffering from problems related to obesity. Obesity is a major risk factor for number of chronic diseases including hypertension, diabetes, heart diseases, respiratory diseases, cancer and also musculoskeletal disorders.<sup>1</sup>

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Obesity is associated with various morbid conditions that include hypertension, diabetes mellitus and hypercholesterolaemia. Compared with normal weight adults, adults with BMI greater than 40kg/m<sup>2</sup> have increased chances of suffering from these morbid conditions. They are also likely to have asthma and arthritis. Increased body mass leads to a variety of hemodynamic and cardiovascular changes such as increased cardiac output, larger stroke volume, decreased vascular resistance and increased cardiac work. They are also at an additional risk for altered respiratory physiologic condition. Oxygen consumption and carbon dioxide production is more pronounced in obese people.<sup>13</sup>

Android obesity is distribution of adipose tissue mainly around the trunk and upper body, in areas such as abdomen, chest, shoulder and nape of the neck. This may lead to apple shaped body or central obesity. Central obesity is measured as increase in waist circumference or waist-hip ratio.<sup>4</sup> it is increase in waist circumference > 88 cm (35 in).

Gynoid obesity refers to body fat that forms around the hips, buttocks and thighs. It is typically seen in females. This may lead to pear shaped body.<sup>5</sup>

Waist hip ratio is measured using an inch tape by taking a horizontal measurement where tape passes around the waist at the height of umbilicus. Another measurement is taken at the widest point of the hips. Finally divide waist measurement with hip one.<sup>6</sup>

Waist Hip Ratio has been associated with risks of coronary heart diseases, type 2 diabetes and hypertension<sup>7</sup>. Balance control is defined as an ability to maintain and stabilize a position.<sup>6</sup>

The effects of obesity on balance control have been widely described<sup>6</sup>. Obese and overweight individuals have reduced functional abilities compared with normal weight older adults<sup>8</sup>. There is a linear trend between

postural stability and body weight<sup>9</sup>. It has been reported that young individuals who are obese and overweight sway at a faster velocity than normal weight individuals<sup>10</sup>. Obese older women had a greater sway velocity than the other groups under vision and no vision conditions<sup>9</sup>.

The functional reach test is a quick screen for determining risk for falls in older adults. The individual is asked to stand erect with their feet at shoulder length apart and with one arm elevated to 90° of shoulder flexion. The arm is parallel to the yard stick that has been secured to the wall. The individual places their closed fist against the yard stick and slides the fist as far forward as they can without losing their balance. Functional reach is a difference in inches between the two positions of the fist. This test is usually performed three times and results are averaged<sup>11,12</sup>.

Obesity is associated with increased risk of falls and subsequent injury. In one research it is found that obese subjects have a higher prevalence of falls and ambulatory stumbling or a loss of balance than their non-obese counterparts. Obesity increases the stress within the bones, joints and soft tissues, resulting in altered musculoskeletal function. Impaired balance is a strong risk factors for falls.<sup>6</sup>The purpose of this prevalence study is to investigate the effects of types of obesity on the balance of a women.

**Materials and Methodology**

An observational cross sectional study was conducted for the duration of 6 months. Total 100 women of age 40-50 years voluntarily took part in this study. All the participants gave their written informed consent to participate in this study. Obese women (BMI >30) were included. Exclusion Criteria were as follows pregnancy, use of assistive devices, surgical history of lower limb, females with psychological ailments, use of drugs that affect balance, present neurological, musculoskeletal, neuromuscular or physical disabilities, functional blindness (acuity level worse than 20/200).

**Tables:**

**• Agewise Distribution:**

Age Group	Presence of Balance Disturbance	Percentage	Total
40-44	29	50%	39
45-50	29	50%	61
<b>Total</b>	<b>58</b>	<b>100%</b>	<b>100</b>

**Interpretation:** From the above table it is clear that in the age group of 40 - 44 years balance disturbance was seen in 50% of women and in age group of 45-50 years balance disturbance was seen in 50% of women.

• **Distribution of Balance Disturbance:**

Functional reach test	Presence of balance disturbance	Percentage
Positive	58	58%
Negative	42	42%
<b>Total</b>	<b>100</b>	<b>100%</b>

**Interpretation:** From the above table it is clear that out of 100 obese women, maximum 58 (58%) women presented with a positive functional reach test

**3. Distribution of Balance Disturbance in Accordance with Type of Obesity:**

Type of Obesity	Presence of Balance Disturbance	Mean Score $\pm$ SD	Percentage	Total
Android	25	9.97 $\pm$ 3.24	43.1 %	50
Gynoid	33	10.02 $\pm$ 3.24	56.9%	50
<b>Total</b>	<b>58</b>	<b>7.57 <math>\pm</math> 1.74</b>	<b>100%</b>	<b>100</b>

**Interpretation:** From the above table it is clear that out of 50 women with android type of obesity, maximum 25 (50%) women presented with a positive functional reach test. Out of 50 women with gynoid type of obesity, maximum 33 (66%) women presented with a positive functional reach test.

**4. Distribution of Severity of Balance Impairment According to Functional Reach Test**

	Android	Mean $\pm$ SD	GYNOID	Mean $\pm$ SD	Total
Severe Risk of Falls	5	9.98 $\pm$ 3.312	13	10.2 $\pm$ 3.23	18
Moderate Risk of Falls	20	9.92 $\pm$ 3.237	20	10.04 $\pm$ 3.21	40
<b>Total</b>	<b>25</b>	<b>9.97 <math>\pm</math> 3.24</b>	<b>33</b>	<b>10.02 <math>\pm</math> 3.24</b>	<b>58</b>

**Interpretation:** From the above table we can interpret that in android obesity 24 % of women have severe risk of falls and 76 % have moderate risk of falls. In gynoid obesity 33% have severe risk of fall and 67 % have moderate risk of fall according to functional reach test.

**Association of Balance Disturbance between Android and Gynoid Type of Obesity:**

	t-Value	df	p- Value
Unpaired 't' Test	2.138	98	0.0350(S)

S\* Significant

**Interpretation:** This table shows that, association between balance and android and gynoid type of obesity by unpaired 't' test, it was found to be 2.38 with 98 degrees of freedom and p-value of (0.0350) which was significant.

**Association between Balance and Android and Gynoid Type of Obesity**

	U Statistics	Mean	p Value
Mann Whitney Test	945.50	14.267	0.0360(S)

**Interpretation:** This table shows that the p-value found with Mann Whitney Test was (0.0360) as this p value was  $<0.05$  it was found to be significant.

## Result

Balance disturbance was found in both android and gynoid type of obesity. Balance disturbance was found more in females with gynoid type of obesity. In android obesity 24 % of women have severe risk of falls and 76 % have moderate risk of falls. In gynoid obesity 33% have severe risk of fall and 67 % have moderate risk of fall according to functional reach test.

## Discussion

The aim of this study is to find out the prevalence of balance disturbances in between the women with android and gynoid obesity. The objectives of this study were to find out the number of obese females, to differentiate them into android or gynoid obesity. To check balance in both the android and gynoid categories. WHO defines obesity as abnormal or excessive fat accumulation that presents a risk to health. With the recent development incidence of obesity is increasing dramatically among general population. The prevalence of obesity is 38% for males and 40% for females respectively.

Causes of obesity are Poor diet, genetic predisposition, lack of physical activity, advancing in technology, sedentary lifestyle, Endocrine disorders, Medications or mental disorders. Globally, there were more than 300 million adult obese individuals and more than 115 million individuals suffering from problems related to obesity. Obesity is a major risk factor for number of chronic diseases including hypertension, diabetes, heart diseases, respiratory diseases, cancer and also musculoskeletal disorders. Obesity is associated with increased risk of falls and subsequent injury. In one research it is found that obese subjects have a higher prevalence of falls and ambulatory stumbling or a loss of balance than their non-obese counterparts. Obesity increases the stress within the bones, joints and soft tissues, resulting in altered musculoskeletal function. Impaired balance is a strong risk factor for falls. The purpose of this prevalence study was to investigate the effects of types of obesity on the balance of a women.

In postmenopausal women there are multiple factors which can result into balance disturbance such as osteoporosis, osteoarthritis, decreased muscle strength, one of the main leading cause may be hormonal changes, but in premenopausal age such factors which can interfere in the study are comparatively less.

The study was done in 6 month duration and was

conducted in Karad. Obese females of 40-50 age group were selected for the study. Total 100 females based on the inclusion and exclusion criteria were selected and written consent was taken. The subjects were explained about the procedure and functional reach test was performed to rule out the balance disturbance. According to the result obtained after performing the test conclusion was made with the help of statistical analysis. Unpaired T Test and Mann Whitney Test were performed and significant balance disturbance in gynoid type of obesity was noted ( $p = 0.036$ ).

In the previous study made in Spanish postmenopausal women the participants were divided into obese, overweight and normal weight groups according to BMI and into android, uniform and gynoid body fat. Distribution according to WHR. The results showed that a BMI of 25 kg/m<sup>2</sup> or higher ( $p = 0.038$ ) and android body fat distribution ( $p = 0.003$ ) were correlated with the risk of falling. The probable reasons for the difference could be the difference in the outcome measures, their sample size included the women with various groups of BMI whereas in our study only obese women were included, the age group, geographical variability, they have an active lifestyle compared to the samples in our study.

On the basis of the results of the study, it was concluded that there is prevalence of balance disturbances in females with android and gynoid type of obesity. Balance disturbance was found more within the females with gynoid as compared to the females with android type of obesity.

## Conclusion

On the basis of the results of the study, it was concluded that there is prevalence of balance disturbances in females with android and gynoid type of obesity. Balance disturbance was found more within the females with gynoid as compared to the females with android type of obesity.

**Conflict of Interest:** There was no conflict of interest.

**Source of Funding:** This study was self funded.

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

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# Quality of Life, Stressful Life Events and Pathways to Care among Patients with Common Mental Disorders in Primary Health Care

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## Abstract

**Context:** Stressful life events have an impact on common mental disorders. It is also essential to assess the quality of life and pathway of care to mental health to provide a comprehensive picture of these disorders and plan community mental health services.

**Aims:** This study was done to assess the quality of life and stressful life events among patients diagnosed with common mental disorders. We also assessed the pathways to mental health care.

**Settings and Design:** A 2 stage cross-sectional study was conducted- first stage of screening followed by 2<sup>nd</sup> stage of detailed assessment among diagnosed patients in a rural community in Karnataka, South India

**Method and Material:** Patients diagnosed with CMDs were assessed using WHO QOL BREF scale, Presumptive Stressful Life events scale and Pathway to care study pack.

**Statistical Analysis Used:** Descriptive data was analyzed as proportion and pathway to care is presented as diagrammatic representation. Anova and correlation coefficients were used to assess determinants of quality of life and the role of life events respectively.

**Results:** Financial loss or problems were the most common life events. Mean social relationship domain score was significantly lower and stressful life events in the past 1 year was significantly higher in females. Overall QOL, work capacity, social relationship and environmental domain scores were significantly higher among those who had sought some form of care. Stressful life events experienced ever in lifetime was positively correlated with HAM D score and significant somatic symptoms. Delay after seeking care from general practitioner was much lower compared to other systems of care.

**Conclusions:** QOL and stressful life events were significantly associated with gender. Care seeking in the past had led to improvement of quality of life among the patients.

**Keywords:** *Quality of life, Stressful Life events, Pathways to care, Common Mental Disorders.*

## Introduction

Quality of Life (QOL) has been described by the World Health Organization as “an individual’s perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns. It is a broad ranging concept affected in a complex way

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by the person's physical health, psychological state, level of independence, social relationships, personal beliefs and their relationship to salient features of their environment." Further, if we were to infer the definition of health, it follows that in order to measure health and the impact of health care, we also need to measure well-being in addition to the normal measurements of disease frequency and severity.<sup>1</sup>

The structure of mental health care in primary care is generally understood in terms of the "pathways to care" model.<sup>2</sup> It is essential to understand this in low- and middle-income countries like ours where there is paucity of well-established community-based mental health services. Although primary care can be used in management of more severe disorders, it is the common mental disorders that are generally viewed as the main remit of primary care.

Mental disorders have complex causation patterns in which environmental factors play an important role. Sometimes normal or excess stimuli faced by a person during his/her life course in the form of "life events" may play a role. According to Settersten and Mayer, "*A life event is a significant occurrence involving a relatively abrupt change that may produce serious and long-lasting effects.*"<sup>3</sup> It is important to assess the impact of life events and how they affect mental health, illness and severity.

In order to plan community mental health services in the rural field practice area, this study was done to evaluate the healthcare seeking behaviours in the community by mapping the existing pathways to mental health care, to determine the role of life events in common mental disorders as well as to assess the impact of common mental disorders on quality of life.

## Material and Method

This was a community based two stage cross sectional study conducted in a rural field practice area for a period of 2 years (2011-13). In the first stage, a community survey was conducted among adult members aged 18-65 years and excluding those with pre-existing severe medical or psychiatric disorders. After obtained institutional ethical clearance and informed consent from individual participants, they were screened for psychological distress using the WHO Self Reporting Questionnaire-20 (SRQ 20).<sup>4</sup> The sample size was calculated to be 940 using the formula  $n = 4pq/L^2$  with an earlier prevalence of 2% and absolute allowable error

of 1% and a non-response rate of 20%. The sampling unit was a household and considering the average adult household size of 3, it was decided to cover 310 households. Systematic random sampling was done and every 8th household was selected (Sampling interval was calculated based on the total number of households in the village and the number of households to be screened as 310).

In the second stage, those who screened positive for SRQ (threshold value was taken as 8)<sup>5</sup> were assessed by a psychiatrist in the Community Health Centre using the MINI International Neuropsychiatric Interview (MINI PLUS)<sup>6</sup> diagnostic scale to arrive at the diagnosis of Common Mental Disorders (CMDs), Quality of Life using the WHO QOL BREF<sup>1</sup>, Gurmeet Singh's Presumptive stressful Life event scale<sup>7</sup> and the Pathway to Care study pack of R Gater et al.<sup>8</sup>

Statistical analysis has been presented in the form of descriptive analysis to assess the percentage prevalences and Anova for determinants of individual domain and mean overall QOL scores. Correlations and Mann Whitney test have been used for SRQ scores and life event analysis. Pathways to care has been presented using diagrammatic representation.

## Results

Of the 943 subjects surveyed, psychological distress was present in 40 out of which 25 patients were ultimately diagnosed with Common Mental Disorder.

The most common life event experienced was financial loss or problem (72%). Some of the events that were not experienced at all included detention in jail of self or close family member; robbery or theft or outstanding personal achievement (Figure 1).

There was no significant correlation between SRQ score and number of life events in past 6 months (Spearman's  $\rho = -0.234$ ,  $p = 0.260$ ), past 1 year (Spearman's  $\rho = 0.142$ ,  $p = 0.498$ ) or ever in lifetime (Spearman's  $\rho = 0.024$ ,  $p = 0.911$ )

Differences of mean domain and QOL values between different socioeconomic classes, religion, age groups, marital status, education, individual monthly income, tobacco use or alcohol consumption were not significant. Median life events and mean rank values of life events in past 6 months, past 1 year and ever in lifetime did not differ significantly according to socioeconomic



status, religion, age, marital status, individual monthly income, tobacco use or alcohol consumption.

Mean social relationship domain score was significantly higher ( $p=0.043$ ) in males ( $63.67\pm16.18$ ) than females ( $46\pm17.99$ ). Mean physical and work domain values and mean QOL score were higher in males ( $50.33\pm11.8$ ,  $46.83\pm9.43$  and  $53.79\pm6.41$  respectively) but this was not statistically significant. Mean environment domain score was higher in females ( $55.47\pm10.49$ ) than males ( $54.33\pm7.71$ ) but this difference was not statistically significant. Mean rank values of number of life events in the past 1 year was significantly higher in females compared to males ( $p=0.04$ ).

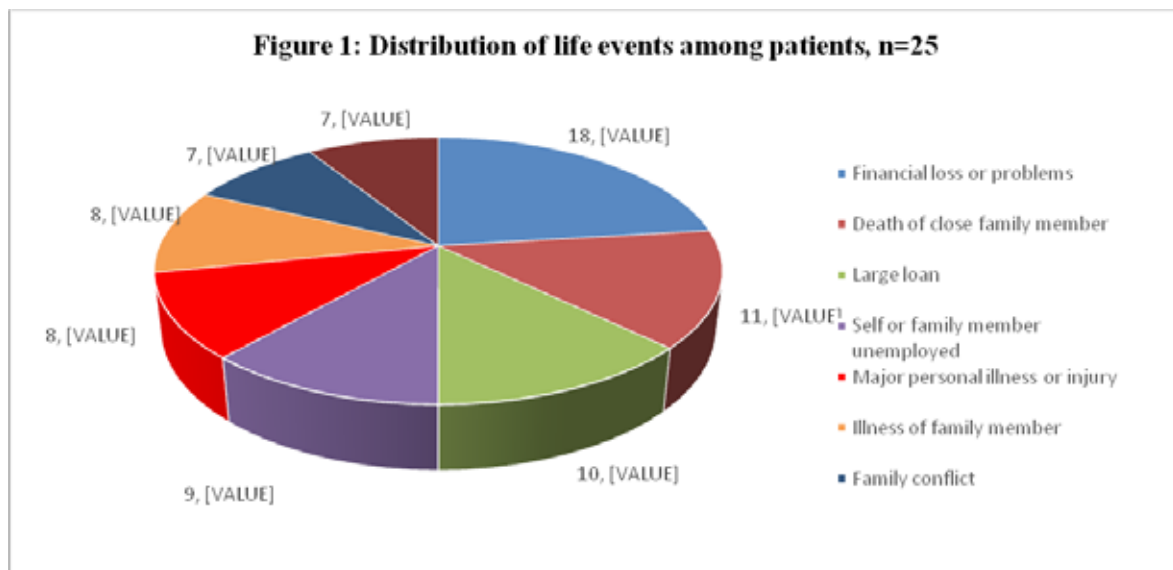
There was no association between severity of anxiety or depression or main psychiatric diagnosis with overall QOL or individual domain scores. SRQ mean rank values, mean rank values of life events in past 6 months, past 1 year and ever in lifetime did not differ significantly according to duration of disease, severity category of anxiety or depression, HAM A score, main psychiatric diagnosis or past history of mental health care. There was no significant correlation between SRQ score, number of life events in past 6 months and past 1 year with HAM-D score.

There was a significant positive correlation between number of life events ever in lifetime and HAM D score, implying that persons with more life events ever in life time score higher in HAM D (Spearman’s  $\rho=0.516$ ,  $p=0.008$ ).

There was a significant positive correlation between number of life events ever in lifetime and number of significant somatic symptoms, implying that as the number of life events ever in lifetime increased, number of significant somatic symptoms also increased (Spearman’s  $\rho=0.409$ ,  $p=0.042$ ). Further, mean rank values of number of life events in past 1 year were significantly higher in somatization disorder and social phobia ( $p=0.034$ ).

Mean physical, work capacity, social relationship domain score environment and mean QOL score was higher in those who had received care ( $47.7\pm10.7$ ,  $51.8\pm4.05$ ,  $60\pm15.15$ ,  $60.2\pm6.9$  and  $54.92\pm4.98$  respectively) compared to those who did not ( $46.8\pm9.8$ ,  $45.07\pm8.77$ ,  $43.73\pm18.72$ ,  $51.87\pm10.14$  and  $46.86\pm7.49$  respectively). This difference was significant in overall QOL score as well as in all individual domains except physical domain.

10 out of 25 (40%) patients had sought some form of healthcare for their symptoms. of the persons diagnosed with common mental disorders, gender was not associated with help seeking in the past ( $X^2=0.146$ ,  $p=1.000$ ). Out of those who sought care, 5 (50%) consulted the general practitioners with most common symptoms being somatic or anxiety related, 3 out of 10 (30%) of patients had consulted with mental health professional (MHP) directly usually with symptoms of anxiety, mood changes or insomnia and 2 (20%) had sought help from ayurvedic practitioners/traditional healers) for somatic symptoms and excessive worrying or fear. (Figure 2).



Out of the 2 patients whose first contact was with other systems of care, 1 was referred by Ayurveda doctor to MHP with referral rate of 50%. 1 was referred by a religious priest to Ayurveda professional. The referral rate to MHP was lower in case of general practitioner, with only 1 of 5 (20%) being referred to mental health professional, 1 (20%) to another GP and 3 (60%) stopping in the pathway. However, delay after seeking care from general practitioner (2 weeks) was much lower compared to other systems of care (48 weeks).

## Discussion

In the present study, social relationship domain scores were significantly lower in females compared to males and though the mean QOL scores difference did not reach significant levels it was higher in males too. This finding is similar to earlier studies<sup>9,10</sup>

Educationwise, mean QOL scores were least in lower education groups, in those who were illiterate and educated up to primary school. Positive correlation of education with QOL has been corroborated in other studies<sup>11,12</sup> In our study, mean QOL score was higher in those belonging to higher socioeconomic classes though association was not significant; similar to other studies.<sup>12</sup> Though quality of life did not vary significantly with respect to type of diagnosis, it was least in patients suffering from dysthymia as also seen in other studies.<sup>13,14</sup>

We found that mean rank values of life events experienced in the past 1 year is associated with gender with females scoring higher. In previous literature, gender differences in life events reveal that women have a broadly higher risk for life events in general<sup>15,16</sup> There was a significant positive correlation between number of life events ever in lifetime and number of significant somatic symptoms as also seen in other studies.<sup>17</sup>

In the present study, there were 3 main pathways seen, first contact with the general practitioner or primary care who were then referred to mental health professional; patients with first contact with other systems of care (Ayurveda/religious practitioner) who were then referred to mental health professional and the third pathway was direct consultation with mental health professional. The present study showed that general practitioners were the most common first contact; which was similar to an earlier study<sup>18</sup> but was in contrast to earlier study<sup>8</sup> which found that native healers were

more important than general practitioners. The median delay after being seen by primary care physicians/general practitioners to mental health professional in the current study was 2 weeks which was similar in earlier studies.<sup>8,18</sup> In the present study somatic complaints were the most common presenting symptoms in 2 of the pathways; similar to the earlier study<sup>8</sup>.

In the current study 40% of patients had contacted some form of care which was comparable to earlier studies<sup>18</sup> Our study did not find gender to be significantly associated with help seeking which was similar to some studies<sup>19</sup> but in contrast to earlier studies where females were more likely to seek help than males.<sup>20</sup>

## Conclusions

Female gender had significantly lower social relationship domain of QOL among patients with CMDs. Any form of care seeking in the past had significantly improved the overall QOL as well as work capacity, social and environmental domains. Financial loss or problems were the most common life events experienced by the subjects. Number of life events ever in lifetime was positively correlated with the HAM-D score and number of significant somatic symptoms. Although referral rate to a mental health professional was low among general practitioners who had been approached by the patients for help (20%), the delay was much lower (2 weeks) when compared to other systems of care (48 weeks).

**Limitations:** This was a community-based study, where in the final subset of patients who were diagnosed with common mental disorder and further assessed for QOL, life events and pathway of care was small. Hence, it may be difficult to generalize inferences based on the present study alone. Also, it is important to consider the effect of vulnerability/susceptibility and other mediating factors since the stress perception varies with respect to gender, individual's personality, neurotic score and social support system.<sup>7</sup>

We recommend further studies among a larger sample of patients with diagnosed common mental disorders to assess the QOL and make interpretations on the association of life events with CMDs.

**Conflict of Interest:** None

**Source of Funding:** Self

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# Effect of Stretching and Strengthening Exercises (Janda's Approach) in School Going Children with Lower Crossed Syndrome

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## Abstract

**Objective:** The main objective of the study was to find out the effect of stretching and strengthening exercises (Janda's Approach) in School going children with lower crossed syndrome.

**Method:** Students between the ages 11 to 15 years were screened for lower crossed syndrome and 41 students were having lower crossed syndrome and are selected for the study. The treatment program was conducted for 2 weeks, scheduled 5 sessions per week. The outcome measures were manual muscle testing of the abdominal muscles and gluteal muscles and Thomas test which were recorded before and after treatment sessions.

**Results:** There was increase in strengths of abdominal muscles and gluteal muscles after 4 weeks treatment (p value < 0.0001) which was statistically significant and there was reduction in tightness of hip flexor muscles (p value < 0.0001) which was statistically significant.

**Conclusion:** On the basis of results of our study we concluded that stretching and strengthening exercises (Janda's Approach) are effective in treating lower crossed syndrome in school going children.

**Keywords:** Lower crossed syndrome, low back pain, school going children, Janda's approach, Low back pain management.

## Introduction

Lower Crossed Syndrome is characterised by tight hip flexors and lower back muscles crossed with weak abdominals and gluteus muscle.<sup>1</sup> The tightness of the thoraco-lumbar extensors on the dorsal side crosses with tightness of the iliopsoas and rectus femoris. Weakness of the deep abdominals ventrally crosses with weakness of the gluteus maximus and medius.<sup>1</sup>

Before the age of 20 low back pain is uncommon among children and adolescents.<sup>2</sup> The annual incidence of low back pain in children of age between 11 to 15 gets increasing from 11.8% to 21.5% over a period of 5 years.<sup>3</sup> Birger et al concluded that 85% of low back pain has an origin due to muscle imbalance due to long term postural faults called lower crossed syndrome.<sup>4</sup> Prevalence of lower crossed syndrome in school going children at age 11 to 15 is 21% and 29% of school going children are at risk of having lower crossed syndrome in future.<sup>5</sup>

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### Two types of muscles are present in our body:

- (i) Postural muscles: iliopsoas, quadrates lumborum etc,
- (ii) Phasic muscles: abdominals, hip extensors etc.

Postural or static muscles have tendency to tighten and phasic or dynamic muscles develops weakness.<sup>1,6</sup>

Lower crossed syndrome is one in every of the threatening mixtures of biomechanical muscle imbalance because of excessive stress it places on the structures of lower back. This postural imbalances develops a chronic pain condition of lower back that becomes more difficult to correct in later stages.<sup>7</sup>

At school during class and at home in front of television children spend more time in seated position.<sup>8</sup> Sedentary time of children increases with age.<sup>9</sup> Children aged 4-15 years are seated for an average 7-8 hours a day.<sup>8</sup> Senior school children aged 13 to 16 years were seated 78.7% of their time in the classroom.<sup>10</sup>

Due to prolonged sitting postures like sitting at a desk in school all day, the hip flexors become shortened or tight. This results in inhibition of gluteals. The lumbar lordosis increases due to the tight hip flexors.<sup>11</sup>

The ergonomically designed furniture decreases the activity of lower and middle back muscles which lessens muscular fatigue if the posture is maintained for prolonged time such as during school hours.<sup>12</sup> Muscular function is replaced by the seat while sitting. Muscular inactivation for prolonged time leads to weakening of the corresponding muscles.<sup>8</sup> Sitting in the same posture for a long time puts physiological strain on the muscles, the ligaments & the discs.<sup>13</sup> During classes children adopt different postures regardless of postural variations created by ergonomically designed furniture.<sup>14</sup> Even if children preferred ergonomically designed furniture prevalence of low back pain is not altered.<sup>13</sup>

If lower crossed syndrome remains untreated, it can result in obesity and low back pain in future. Sedentary behaviour may contribute to anxiety and depression and also has been shown to be a risk factor for certain cardiovascular diseases. It is also linked to high blood pressure and elevated cholesterol levels. Sitting too much can cause a decrease in skeletal muscle mass.<sup>15</sup>

The physiotherapeutic treatment currently being used to treat lower crossed syndrome includes<sup>16,17</sup>

- Postural training/functional training in which patient is told to avoid all postures and activities that exacerbate lumbar lordosis.
- Myofascial release or manual therapy for tight structures

- Modalities like ultrasound, laser therapy and thermotherapy are also used.

**According to the Janda's Approach, the treatment should be organised into three stages:**

- 1. Normalization of the peripheral structures:** This includes restoration of proper postural alignment thorough postural and ergonomic education and correcting the biomechanics of a peripheral joint.
- 2. Restoration of muscle balance:** Restoring normal muscle length must first be addressed before attempting to strengthen a weakened muscle.
- 3. Facilitation of afferent system and sensory motor training:** This training improves movement coordination and promotes ideal mechanical loading of biological structures.<sup>18</sup>

The Janda's approach is effective in normalising the lordosis curvature, increasing strength of weak abdominals and weak gluteals and increasing the length of tightened hip flexors and back extensors.<sup>19</sup>

Physiotherapy treatment with Janda's approach might help to prevent secondary changes and prevent future consequences and enhances optimal muscle function and to improve postural alignment of the lower back. And also can help children, teachers and their parents by making them aware about lower crossed syndrome and its future consequences.

Thus, present study is designed to find effectiveness of Janda's approach in school going children with lower crossed syndrome to make them aware about this muscular imbalance and need to get proper and timely management through professional Physiotherapists.

## Materials and Methodology

**Study Design:** Comparative Study, sample size: 41, Place of study: schools in Karad, sampling method: simple random sampling, study duration: 3 months

### Participants:

**Inclusion Criteria:** Both boys and girls willing to participate in the study between the age group of 11 to 15 years and diagnosed with Lower Crossed Syndrome by a Certified Physiotherapist/Orthopedician.

**Exclusion Criteria:** History of spinal trauma, Joint dysfunction in past 3 months or congenital deformities at hip or lumbar region, Recent fracture to related joints

in past 6 months, History of abdominal, hip or lumbar surgeries in past 3 months and Not willing to participate in the study.

**Outcome Measures:**

1. Manual muscle testing of abdominal muscles and gluteal muscles<sup>20</sup>
2. Thomas test<sup>20</sup>

Procedure: After getting ethical clearance by Institutional ethics committee, students on the basis of inclusion and exclusion criteria were selected for the study. Boys and girls were assessed in an assessment room in presence of a female attender. Manual Muscle Testing of abdominals and gluteal muscles was assessed. After that Thomas test was performed to rule out the hip flexor tightness causing the anterior pelvic tilt. The data from both the outcome measures was collected. After examining all the students those having lower crossed syndrome were taken into a group.

Warm up exercises were done followed by stretching protocol for the iliopsoas, rectus femoris and erector spinae along with strengthening of the abdominals and the gluteal group of muscles for 10 repetitions of 3 sets.<sup>18</sup> After that cool down exercises were given.

**Exercise Protocol<sup>21</sup>:**

1. Passive Hip Flexor Stretch 30 seconds hold 3 repetitions on each side
2. Thoracolumbar extensors stretch 30 second holds 3 repetitions
3. Abdominal Curl ups with hands at side 10 repetitions 2 sets

**Progression:**

- Abdominal curl up with arms crossed
  - Abdominal curl ups with hands behind head
4. Pelvic bridging 10 seconds hold 10 repetitions 2 sets

**Home Exercises:**

- Lunges: 10 seconds hold 10 repetitions 2 sets for each side

- Abdominal curl ups 10 repetitions 2 sets
- Pelvic bridging 10 second hold 10 repetitions 2 sets<sup>21</sup>

The treatment protocol was set for 5 sessions in a week for 2 weeks. After the 10 sessions outcome measures were recorded and data analysis was done by comparing pre and post values.

**Results**

1. **Age & Gender Distribution:** As shown in table no.1, out of the total 41 students 19 students were girls and 22 students were boys. It is observed that the number of students affected is seen increasing as the age increases.
2. **Abdominal Muscle strength:** As shown in table no. 2, the mean abdominal muscle strength pre intervention was 3.244 which increased to 4.951 post intervention. The p value by paired t- test was found to be <0.0001 which was extremely significant.
3. **Gluteal Muscle Strength:** As shown in table no. 3, the mean gluteal muscle strength pre intervention was 2.854 which is increased to 4.976 post intervention. The p value by paired t test was found to be <0.0001 which was extremely significant.
4. **Thomas Test:** As shown in table no. 4, the mean tightness of hip flexor pre intervention was 15.610 which was reduced to 5.244 post intervention. The p value by paired t test was found to be <0.0001 which was extremely significant.

**Table No. 1: Age and gender distribution**

Age	Boys	Girls
11	2	0
12	3	0
13	6	0
14	6	8
15	5	11
Total	22	19

**Table No. 2: Parameters of abdominal muscle strength**

Parameters	Pre Mean ±SD	Post Mean ±SD	Mean Difference	t value	P value
Abdominal Strength	3.244 ±0.5823	4.951 ±0.2181	1.707	21.350	<0.0001

**Table No. 3: Parameters of gluteal muscle strength**

Parameters	Pre Mean ±SD	Post Mean± SD	Mean Difference	t value	P value
Gluteal Strength	2.854 ±0.3578	4.976 ±0.1562	2.122	41.012	<0.0001

**Table No. 4: Parameters of Thomas test**

Parameters	Pre Mean ±SD	Post Mean± SD	Mean Difference	t value	P value
Thomas Test	15.610 ±1.656	5.244 ±1.090	10.366	50.350	<0.0001

**Discussion**

This study was focused on effectiveness of stretching and strengthening exercises (Janda’s Approach) in school going children with lower crossed syndrome. In these total 41 students of age 11 to 15 years were taken. The age group most affected was 13-14 years. In a recent study it’s been found that prevalence of lower crossed syndrome in school going children of age 11 to 15 years is 21% and 29% of school children of same age are at risk of developing lower crossed syndrome in future.<sup>5</sup> In a study it’s been found that the time spent by children in a seated position is average 7-8 hours a day, which consists of 6-7 hours in school, 1-2 hours in tuitions, 1 hour in front of television. This time reaches its peak in between 11 to 15 years.<sup>8</sup>

Prolonged sitting can cause hip flexor tightness which causes anterior pelvic tilt which increases lumbar lordosis. This causes weakness of gluteal muscles and abdominal muscles. This pattern of muscular imbalance gives rise to low back pain<sup>11</sup> which is termed as Lower Crossed Syndrome by Janda.

Prevalence of lower crossed syndrome is more in boys which is 22% as compared to girls which is 18% in school going children of age 11 to 15 years.<sup>5</sup> A previous study was done in young adults of age 21 to 31 years in which they found out that prevalence was more in females as compared to males.<sup>7</sup> In our study, out of the 41 students 19 were females and 22 were male students. Male prevalence is found to be more as compared to females. The consequences of lower crossed syndrome can be obesity and Low back pain in the future. Insufficient levels of physical activity in growing years are major factors to overweight and obesity.<sup>15</sup> Sedentary behavior is likely to facilitate sedentary lifestyle in later years.<sup>22</sup>

Mean abdominal muscle strength pre intervention

was 3.244 ±0.5823 which is fair on the manual muscle testing score. In a study Mc ceary proposed that in the erect position, anterior pelvic tilt and a lordotic posture is permitted by abdominal muscle weakness.<sup>23</sup> After strengthening abdominal muscles for 10 sessions with abdominal curls ups with progression the mean strength of abdominal muscles was increased with mean 4.951 ±0.2181 which is normal on the manual muscle testing score. The mean gluteal muscle strength pre intervention was 2.854 ±0.3578 which is poor to fair on manual muscle testing score. After strengthening the gluteal muscles with pelvic bridging the mean strength was increased to 4.976 ±0.1562 which is normal on manual muscle testing score. The exercises stimulated the muscles fibres to recruit all the motor units which increase its strength.<sup>24</sup> Therefore it can said the reason for increasing the strength may be a result of strengthening of specific group of muscles.

Mean hip flexor tightness pre intervention was 15.610 ±1.656 which reduced to 5.244 ±1.090 after stretching for 10 sessions. In stretching the tension in the muscles is reduced and muscle spindle fibres are stretched which increases its length.<sup>25</sup> Therefore it can be the reason for normalising the length of tightened muscles. A previous study was done, in which the authors concluded that stretching of tight muscles and strengthening of weak muscles are beneficial in normalizing the strength of abdominals and gluteals and increasing flexibility of hip flexors and Thoracolumbar extensors.<sup>19</sup> Janda’s approach hypothesized that restoring muscle length of a tight muscle spontaneously facilitate a weak antagonist. The normalization of muscle length should be followed by specific strengthening, movement re-education and endurance training. Once peripheral structures are normalized, muscle balance is restored.<sup>1,26</sup> Therefore, in the presence of tight antagonistic muscles; restoring normal muscle length must first be addressed before attempting to strengthen a weakened muscle.<sup>19</sup>

Another observation of this was, teachers, parents and students were not aware about their conditions or symptoms of lower crossed syndrome. They were not aware about the consequences of lower crossed syndrome in future and role of physiotherapy in treating this condition. This study can help to create awareness about the condition and the role of physiotherapy in treating it.

### Conclusion

On the basis of the results of our study, it was concluded that stretching and strengthening exercises (Janda's Approach) was significantly effective on children with lower crossed syndrome.

**Source of Funding:** This study was funded by Krishna Institute of Medical Sciences Deemed to be University, Karad.

**Conflict of Interest:** The authors declare that there is no conflict of interest concerning the content of the present study.

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# Awareness of Breathing Exercises in Pre-Operative Patients Undergoing Abdominal Surgery

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## Abstract

**Background:** Breathing exercises plays an important role in day to day life as its responsible for the functional stability. To prevent secondary complications like post-operative pulmonary complication, effects of immobility, morbidity, mortality. Hence this study being conducted to find out the awareness of breathing exercises in pre-operative patients before undergoing abdominal surgery.

**Objectives:** Objective of the study was to find out awareness of breathing exercises in pre-operative patients undergoing abdominal surgery and to find out awareness regarding importance of breathing exercise according to their gender wise.

**Methodology:** The study was conducted in Krishna institute of medical sciences with a sample size of 100 pre-operative undergoing abdominal surgery with simple random sampling method. The population under study are pre-operative patients. The questionnaire used was framed by the author. The questionnaire was filled by pre-operative abdominal patients.

**Result:** On the basis of this study, 30 females and 38 males was not aware of breathing exercises. No differences are found in male and female patient's knowledge about breathing exercises. Amongst 100 pre-operative patients, 68 patients are unaware about importance of breathing exercises in patients undergoing abdominal surgery.

**Conclusion:** The study concluded that maximum number of pre-operative patients lack awareness regarding the importance of breathing exercises in their respective conditions.

**Keywords:** Awareness, Breathing exercise, pre-operative abdominal patients, gender.

## Introduction

Muscles of respiration

Inspiration

**Primary Muscles:** Diaphragm, scalenes, parasternals.

**Accessory muscles:** Sternocleidomastoids, upper trapezius, pectoralis major and minor, subclavius, external intercostals

**Expiration:** Primary muscles: none active during resting.

**Accessory Muscles:** Rectus abdominis, transversus abdominis, internal oblique muscle and external oblique muscle, pectoralis major, internal intercostals.<sup>[1]</sup>

The respiration divide into three parts; upper respiratory tract, lower respiratory tract and trachea. In upper respiratory tract structures are the nasal, cavity, pharynx and larynx the lower respiratory tractcompose

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of conducting airways of the tracheobronchial tree terminal respiratory units.<sup>[2]</sup>

**Mechanics of Ventilation:** Movement of thorax while ventilation; each ribs having its own pattern of movement. The ribs are attach anteriorly to sternum and posteriorly to transverse processes bodies, disks and making a closed kinematic chain.(except ribs 11 and 12). The thoracic cage enlarges in all three planes of movement during inspiration and expiration .<sup>[3,4]</sup>

Increasing in the anterior posterior dimension by forward and upward movement of the sternum and upper ribs this is said to be pump handle movement. In case of increasing in the transverse dimension there is an elevation and outward turning of the lateral portion of the ribs is said to be bucket handle movement. While when increase in vertical dimensions is describe as piston action because the diaphragm descends as the muscle contracts.<sup>[3,4,5]</sup>

**Mechanism of Respiration:** Respiration is a term used to describe gas exchange within the body .It categorized as external respiration and internal respiration .<sup>[2]</sup> External respiration, the exchange of gas at the alveolar-capillary membrane and pulmonary capillaries. when a person inhale oxygen supply to the alveoli via tracheobronchial tree,oxygen diffuses through the alveolar wall and interstitial space and into the bloodstream through the pulmonary capillary walls. The vice versa with carbon dioxide transport.<sup>[3]</sup>

Internal respiration, exchange of gas between the pulmonary capillaries and the cells of the surrounding tissues. It occurs when oxygen in arterial blood diffuses from red blood cells into tissues requiring oxygen for function. The reverse occurs with carbon dioxide transport.<sup>[3]</sup>

Since inspiration is an active,oxygen requiring process, oxygen is consumed by the respiratory muscles. Expiration occurs when the respiratory muscles relax. while inspiration is an active process (muscle contraction) while expiration is passive (elastic recoil).<sup>[4]</sup>

### **Breathing Pattern**

In male – Abdominothoraco breathing pattern.

In female – Thoracoabdominal breathing pattern.<sup>[4]</sup>

### **Goals of breathing exercises:**

- To avoid postoperative pulmonary complication.

- Reduce the length of hospital stay.
- Promote relaxation and relieve stress.
- Improve or redistribution ventilation.
- Improve patients overall functional capacity for daily living activities.<sup>[2]</sup>

### **Types of breathing exercises:**

1. Diaphragmatic breathing
2. Segmental breathing:
  - a. Lateral costal expansion
  - b. Posterior basal expansion
3. Pursed lip breathing
4. Incentive spirometry
5. Respiratory resistance training
6. Glossopharyngeal breathing.<sup>[1,2,3]</sup>

Pre-operative education about health related to the patients, prepare them for surgeries and help to decrease the post-operative complications<sup>[5]</sup>.As surgery leads to stress, anxiety and major physiological changes and decreased quality of life in upper and lower abdominal surgeries patients<sup>[6]</sup>. It is difficult situation for every individual patients who undergoing surgery. The main aim of entire health care team is to care about safe and complete course of treatment and to avoid post-operative complications<sup>[7]</sup>. In India, post upper abdominal surgery complication for 20 to 25 % and in lower abdominal surgery complication for 5 to 10 % were present<sup>[7]</sup>.

Upper abdominal surgery has higher incidence post-operative pulmonary complications which are frequently a treat to this objective<sup>[8]</sup>. This complication associated with increase in death, morbidity and hospital stay.<sup>[6]</sup> The upper abdominal surgeries leads to reduce in lung volume and having shallow breathing pattern<sup>[9]</sup>.In case of anesthesia, lasts for longer causes has high risk of death and injury rate which leads to incidence of post pulmonary complications.<sup>[10]</sup>

The breathing exercises play an important role in preventing and lowering severity of post pulmonary complications in patients undergoing surgeries such as pneumonia, hypoxemia, atelectasis<sup>[7-1]</sup>. Recovery in physical capacity in major abdominal surgeries by the help of preoperative exercise therapy may enhance better improvement after surgery. Pre-operative exercise

programs which known as pre-rehabilitation which lead to early improvement after abdominal surgery.<sup>[6]</sup>

### Methodology

An approval for the study was obtained from the protocol committee and the institutional Ethical committee of Krishna institute of medical sciences deemed to be university . The study was done in Krishna hospital, Karad for 6 months duration. The 44 females and 56 males were participated. Individuals were approached and those fulfilling the inclusion criteria were selected. The procedure was explained and written informed consent was taken from the patients.

Demographic information of the subject was taken . The individual were explained about the purpose of the study. Also, they were informed about the procedure. Each of them was given questionnaire sheet to fill. Data was recorded. Later statistical analysis was done in accordance to distribution of gender,overall patients.

### Result

The above result in study show that 88% of patients was not taught by the physiotherapist and 86% of patients were not prescribe to perform breathing exercise. 82% patients don't know about pre-operative breathing exercise can lower the risk of secondary complication (table-1). In female 69% pre-operative patients were not having knowledge of breathing exercise. As  $t=12.550$  and  $p$  value was  $<0.0001$ , which was considered extremely significant. In 56 male 70% pre-operative patients were not having knowledge of breathing exercise .As  $t=16.109$  and  $p$  value  $=<0.0001$ , which was considered extremely significant. As there was not difference between male and female knowledge so stastically it was not significant  $2(p=0.4130)$  (table-2).

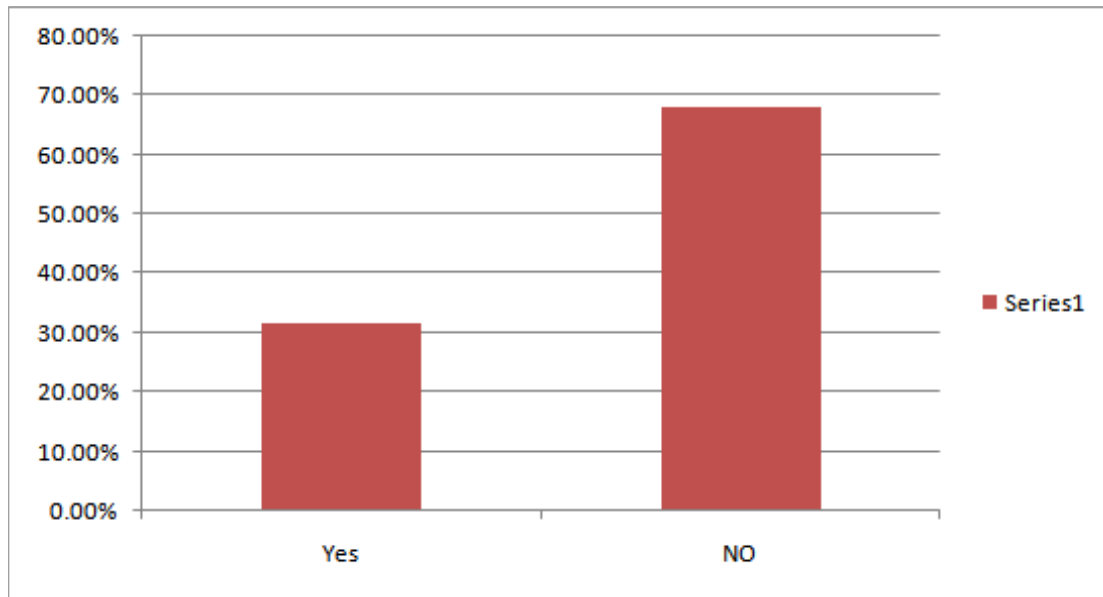
Therefore, Amongst overall pre –operative patients 68.2% was not having awareness about breathing exercise. Hence it was extremely significant with  $p$  value  $>0.0001$ (fig no.1).

**Table No. 1: Genderwise distribution in the study**

No of pre-operative patients	Yes	No	Percentage of awareness		Mean + SD
			Yes %	No%	
56 males	18	38	69%	31%	2.910+1.352
44 females	14	30	30%	70%	3.159+1.670

**Table No. 2: Percentage of awareness of breathing exercises in pre-operative patients**

Questions	Yes (F%)	No (F%)
Q1	73%	27%
Q2	47%	53%
Q3	12%	88%
Q4	14%	86%
Q5	32%	68%
Q6	30%	70%
Q7	18%	82%
Q8	19%	81%
Q9	40%	60%
Q10	33%	67%



**Figure No. 1: Awareness in overall pre-operative patients.**

### Conclusion

On the basis of this study, 69 % of females were unaware of breathing exercises and in 70% of males were unaware of breathing exercises. Amongst 100 pre-operative patients 68.2% are not aware of importance of breathing exercises in patients undergoing abdominal surgery. Therefore patients should be aware of importance of breathing exercises and physiotherapist should take their breathing exercises before undergoing abdominal surgery. Hence to avoid morbidity and mortality.

### Discussion

The purpose for the study was to aware the pre-operative patients about breathing exercises and their importance before undergoing abdominal surgery.

The pre-operative patients should have the knowledge of breathing exercises and perform before undergoing surgery.

According to Seher Unver, Gamze Kivanc, Hatice Merve Alptekin (2018) et al; Deep breathing exercise education receiving and performing status of patients undergoing abdominal surgery. As study was done in 2015 was conducted in surgical ward of university hospital with 130 patients among them 52.8% were not having information about deep breathing exercises and 56.2% received information and even they had perform breathing exercises (51.5%). A total of 60.3%

of the patients received knowledge from nursing students instead of physiotherapist therefore they found correlation between the status of receiving education and performing of patients ( $p < 0.0001$ ).

The findings of overall awareness in pre-operative patients in the study showed that in Krishna hospital the 68.2% were not having knowledge or aware about importance of breathing exercises in abdominal condition prior to the surgery.

**Conflict of Interest:** None.

**Ethical Clearance:** Ethical clearance was taken from institutional committee of Krishna institute of medical sciences, deemed to be university, Karad.

**Source of Funding:** Self funded.

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# Effect of Aerobic Exercise on Exercise Tolerance and Quality of Life in Post Myocardial

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## Abstract

**Background:** Acute myocardial infarction is the most cause of morbidity and mortality nowadays. Incidence of Acute myocardial infarction is more in Indian population.

**Objective:** To find the effect of aerobic exercise on exercise tolerance and quality of life in post myocardial infarction subjects

**Method:** In this experimental study, 40 subjects who undergone post PTCA were selected, 29 males and 11 females they were assessed by 6 min walk test for exercise tolerance and quality of life by using mac new QLMI questionnaire.

**Result:**

**Conclusion:** The exercise tolerance and quality if life is improved by doing aerobic exercise.

**Keywords:** PTCA, Myocardial Infarction, Quality of life, exercise tolerance, 6 min walk test, aerobic exercise, walking program.

## Introduction

Myocardial infarction is a clinical syndrome that results in sudden occlusion of coronary artery with resultant infarction and death of cardiac myocytes in the region supplied by that artery. It is known that cardiovascular disease are the main cause of morbidity and mortality in the world today acute myocardial infarction is the main cause. The patient with AMI reduces activities of daily living and work and may even impact their quality of life<sup>1</sup>.

After AMI, bed rest is advised and one of the

complications related to bed rest is restriction is immobility, which results in decrease in functional capacity and quality of life of the individual. The cardiac rehabilitation should be started within two months after the discharge from the hospital. But, necessary to start gradually and first to perform test such as 6 min walk test for testing exercise tolerance<sup>1</sup>. Functional capacity is the ability to perform daily activities in most cardiac patients, FC is reduced with the occurrence of cardiac symptoms such as early fatigue, dyspnea and angina pectoris during activities<sup>2</sup>. Eccentric exercise is an economical type of exercise with low energy requirements and does not cause early fatigue . Therefore, it is used for cardiac patients, who have low physical; activity and exercise intolerance<sup>2</sup>. Aerobic exercise of moderate intensity improved physical capacity and other cardiovascular variables. The world health organization defines quality of life as the individuals perception of their position in life in the context of the culture and value system in which they live in relation of their goals, expectations, standards and concerns<sup>3</sup>.

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Aerobic exercises decreases hyperventilation in heart failure patients and influences the acid base imbalance 13 . Aerobic exercise training is effective and workable measure improving respiratory efficiency, left ventricular systolic function, stopping further progression in patients with coronary heart disease and chronic heart failure after successful angioplasty. Aerobic exercise with moderate intensity improved physical capacity and other cardiovascular variables.

Graded exercise therapy is planned for the subjects. A GET programme will help you gradually improve your ability to undertake some of the physical activities that you have been unable to do since becoming unwell.

### Method

This study is experimental type of study. This study was conducted in cardiopulmonary section of physiotherapy department in Krishna hospital Karad. The sample size selected for this study was 40 which was calculated by statistics formula The sampling method used was simple random sampling method.

This study was done within 6 months of duration. The patients were selected from the cardio department, who undergone post PTCA after 1 month. The assessment of patients were taken that is 6 min walk test for exercise tolerance and MAC New QLMI questionnaire for quality of life. Among 40 subjects, 29 were male and 11 were female. The subjects with reduced functional capacity and quality of life were instructed first about all the session after assessment the treatment was started that is graded walking program was set for subjects. They were asked to walk upto 65%, the vital parameters were checked before and after the walk. The subject was asked to stop and take rest if feels like breathlessness and chest pain. The session was set for 3 weeks. The percent was increased by 5% as per subjects tolerance. The increased tolerance upto 75%maximum improved the exercise tolerance and quality of life of the subjects. The home program was told to subjects and asked to perform it regularly and asked for regular follow up.

### Discussion

Based on the results, it is noted that acute myocardial infarction affects a decrease in the quality of life and functionality. In the present study, the predominance of gender was the Male, with only 27% female gender. In the present study,40 subjects were selected,29 Male and 11 females which undergone PTCA after one

month, evaluated quality of life one month after ptca. The quality of life was lower than the people with same age group and no infarction. Functional capacity is also reduced after

PTCA in MI patients, which can be assessed through a sub maximal test, that is 6 min walk test.

This study was carried out to see the effect of aerobic exercise on exercise tolerance and quality of life of post ptca patients, in previous studies, the exercise were prescribed only in CABG patients not in PTCA patients so aim of this study was to improve functional capacity and quality of life of Post PTCA patients.

Graded walking program was set for the subjects. The subjects were asked to walk with minimum intensity for first few days,before and after the walking program the vitals have been checked. The intensity of walking program is increased day by day by 5% as per the patients tolerance. If the patient walks at intensity 75%maximum, the tolerance is improved. By this graded walking program the exercise tolerance and quality of life is improved in post PTCA myocardial infarction patients.

### Conclusion

The results suggest that myocardial infarction patients undergone PTCA after two months, had a improvement in exercise tolerance and quality of life by doing aerobic exercise that is a graded walking program.

**Conflicts of Interest:** Their is no conflict of interest concerning content of the study.

**Ethical Clearance:** This study was approved by institutional ethics committee in KIMSUDU.

**Source of Funding:** This study is self funded study.

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# Impact of Dyspnea on Functional Capacity in Breast Cancer Patients

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## Abstract

**Background and Objective:** Breast cancer in females stands most common cancer in India with rate of incidence as 25.8 per 1,00,000 females. In breast and lung cancer dyspnea is more commonly seen. Dyspnea is a multidimensional experience of breathing discomfort.<sup>[1]</sup> Dyspnea is fourth most common symptom seen in cancer patients.<sup>[6]</sup> On functional activity breast cancer with dyspnea patients had general respiratory weakness, lower peak exercise capacity and peak ventilation and more shallow and rapid breathing pattern in response to activity. The purpose of this study was to find the impact of dyspnea on functional capacity in breast cancer patients.

**Material and Methodology:** In this cross sectional study, 100 subjects were taken between the age of 30-65 years, subjects were taken according to MRC score. Thus tests such as 6MWT and 1MSTS were performed and cancer dyspnea scale was used to determine the impact.

**Result:** A total of 100 patients with dyspnea data were included. The study duration was of 6 months One minute sit to stand test results (n=100, p=0.005), 6 minute walk test results (n=100, p=0.005), the main result was showed (n=100, p=0.0001) that was 43% subjects score positive and 57% subjects score negative impact on functional capacity.

**Conclusion:** By this study, it is concluded that there is very low negative impact of dyspnea on functional capacity in breast cancer patients.

**Keywords:** Functional capacity, Dyspnea, Breast cancer.

## Introduction

Breast cancer in females stands most common cancer in India with rate of incidence as 25.8 per 1,00,000 females. In 2018, 1,62,468 new cases were reported and 87,090 deaths were seen. The incidence of breast cancer in India is observed more in metropolitan cities. In India, breast cancer cases generally showed up or were diagnosed in advanced stages.

In breast and lung cancer dyspnea is more commonly seen.

Dyspnea is a multidimensional experience of breathing discomfort.<sup>[1]</sup> Dyspnea is fourth most common symptom seen in cancer patients.<sup>[6]</sup>

**Mechanism of Dyspnea in Cancer Patients:** Cancer treatment causes an increase in brain serotonin level and upregulation of a population of 5-HT receptors leading to reduce somatomotor drive modified hypothalamic – pituitary adrenal axis function and sensation of reduced capacity to perform physical work<sup>[10]</sup>.

Due to the normal level of hormone and protein which are connected to inflammatory process causes muscle fatigue that can decrease the ability to expand

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the lungs, so the level of oxygen decreases and carbon dioxide increases and results in breathlessness.<sup>[5]</sup>The frequency of breathlessness increases rapidly with disease progression in patients with cancer.

The intensity of dyspnea and the occurrence of activity related dyspnea correlated with presence of anxiety, depression, fatigue and cough. A lower coping capacity was associated with a greater likelihood of dyspnea.

Dyspnea may vary person to person due to following factors:- Medical (site of cancer, pain and cough). Psychological (anxiety and depression). Social (education, marital status).<sup>[7]</sup>

**Causes of dyspnea:** Direct and indirect causes

Direct causes:-pleural effusion, pleural tumor, ascites, hepatomegaly, superior vena cava syndrome, lymphangitic carcinomatosis.

Indirect Causes: Cachexia, anemia, pneumonia, pulmonary aspiration, pulmonary emboli.<sup>[8]</sup>

Quality of life in cancer patients suffering from dyspnea have negative impact. Patients with dyspnea have difficulties in their daily living activities. Patients have bad impact on their functional, social and on mental health.<sup>[2]</sup>

On functional activity breast cancer with dyspnea patients had general respiratory weakness, lower peak exercise capacity and peak ventilation and more shallow and rapid breathing pattern in response to activity.

In cancer patients the 6MWT seems to be as valid and reliable as in healthy elderly, cardiac and pulmonary patients. Limitation was Small sample size. Short duration of study. Limited geographical area for study.

**Methodology**

A total number of 100 subjects who were willing to participate and fulfilled the inclusion and exclusion criteria were chosen. A written consent was obtained from the individuals. Subjects were taken according to MRC score and underwent to the test of 6MWT and 1 MSTs then after cancer dyspnea scale was used to determine the impact. Study duration was for 6 months.

**Statistical Analysis and Results**

Statistical analysis of the recorded data was done. Study design is cross sectional. Arithmetic mean and standard deviation was calculated for each outcome measure. T test was done. The study has p value <0.000 and was extremely significant.

**MRC Score:**

**Table 1: This table shows grade wise MRC score in breast cancer patients.**

MRC Score	
Grade 1	32%
Grade 2	30%
Grade 3	37%
Grade 4	1%

**Table 2: This table shows how many time patient was able to performed sit to stand test in 1 minute.**

Frequency of 1 minute sit to stand test	Patients
5-10	16
11-15	27
16-20	38
21-25	18

Group	P value
Group A-B	>0.05
Group A-C	>0.05
Group B-C	>0.05

**6 Minute walk test:**

**Table 3: This table shows how many time patients were able to walk in 6 minutes.**

6 Minute walk in meter	Patients
100-200	40
201-300	25
301-400	24
401-500	10

Group	P Value
Group A-B	>0.05
Group B-C	>0.05
Group C-D	>0.05

Group	Standard deviation	P Value
Group A	4.45	>0.05
Group B	4.45	>0.05
Group C	3.501	>0.05
Group D	1.021	<0.05

**Table 4: This shows the impact of dyspnea on functional capacity in breast cancer patients.**

Cancer Dyspnea Score	
Positive	43%
Negative	57%

Standard Deviation	P Value	T Value
4.475	<0.0001	40.969

**Interpretation:** The above graph shows that in 43% people score is positive & in 57% people the score is negative.

## Discussion

Dyspnea is a multidimensional experience of breathing discomfort.<sup>[1]</sup> Dyspnea is fourth most common symptom seen in cancer patients.<sup>[6]</sup>

In the breast cancer patients peripheral fatigue which is muscle weakness occurs due to the chemotherapy, which can decrease the ability to expand the lungs, so the level of oxygen consumption decreases and carbon dioxide increases and thus results in breathlessness.<sup>[5]</sup>

The frequency of breathlessness increases rapidly with disease progression in patients with cancer. The Six minute walk test and one minute sit to stand test is reliable and valid as in healthy elderly and pulmonary patients.<sup>[9]</sup>

In cancer patients the cancer dyspnea scale is reliable in Marathi and Hindi. Multidimensional scales, which can be used to assess dyspnea in cancer patients. Aim of the study was to find the impact of dyspnea on functional capacity in breast cancer patients. To find the impact of dyspnea on functional capacity in breast cancer patients. To assess the severity of dyspnea in breast cancer patients.

The functional capacity was limited by other factors such as pain, anxiety. In other study which was conducted in all type of cancer in that the total number of patients were 923 and out of that 32.6% with breast cancer had

breathlessness. This study has shown that dyspnea on functional capacity in breast cancer patients had negative (43%) impact on their daily living activities.

One patient was unable to perform the 6 minute walk test and 1 minute sit to stand test because of grade 4 dyspnea.

The study was done in six months of duration and was conducted in Karad. The total of breast cancer subjects with dyspnea were approached and then 100 subjects were selected on the basis of inclusion and exclusion criteria and consent was taken. Subjects were taken from Krishna hospital. Then subjects were explained about the procedure of study.

The impact on functional capacity was assessed using six minute walk test, one minute sit to stand test and cancer dyspnea scale.

According to Modified Medical research council dyspnea scale subjects are taken, then the subjects under went for six minute walk test and one minute sit to stand test then asked to marked the cancer dyspnea score.

### The following interpretations were made:

- P value for group A 0.093, group B 0.079, group C 0.0122 was not significant.
- Pvalue for group A was 0.0335, group B 0.0389, group C 0.0979 was not significant
- The above graph shows that in 43% people score was positive & in 57% people the score was negative.

## Conclusion

By this study, it is concluded that there is very low negative impact of dyspnea on functional capacity in breast cancer patients.

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

**Ethical Clearance:** An ethical clearance certificate was obtained from the Institutional Committee Krishna Institute of Medical Sciences Deemed to be University, Karad.

**Acknowledgement:** The authors would like to express their special gratitude towards all the patients that participated in the study. We would also like to thank our families and institution for their everlasting support which enabled us to continue our research activities.

**Source of Funding:** Self.

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# Assessment of Serum Cations in Normal and Preeclampsia Pregnancies: A Cross Sectional Comparative Study

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## Abstract

**Background:** Preeclampsia is a syndrome characterized by pregnancy induced hypertension and proteinuria with high prevalence rate in India. Aim of the study is to estimate serum cations in normal and preeclampsia pregnancy women.

**Materials and Method:** Serum calcium, magnesium, zinc and copper were measured by spectrophotometric method and sodium and potassium using ion selective electrodes in 40 preeclamptic women matched for gestational age with 40 normal pregnant women. The statistical analysis was done using unpaired “t” test, chi square test and odds ratio.

**Results:** The preeclamptic women demonstrated a significantly lower serum calcium, zinc, magnesium and sodium levels compared to normal pregnant women. Copper levels was higher than the normal range in both the groups and the difference between the groups remained insignificant. Decreased serum zinc and calcium were found to be the most significant risk factors for elevation of blood pressure in preeclampsia patients.

**Conclusion:** Current study demonstrates that decreased cations in the plasma may be one of the primary causes for elevation of blood pressure in preeclampsia patients.

**Keywords:** Preeclampsia, calcium, magnesium, zinc, sodium, potassium, pregnancy.

## Introduction

Preeclampsia or pregnancy-induced hypertension (PIH) is a leading cause of maternal and perinatal mortality and morbidity<sup>1</sup>. Preeclampsia is a syndrome characterized by hypertension (both systolic  $\geq 140$  mm Hg and diastolic  $\geq 90$  mmHg), proteinuria and oedema, noticed after 20-24 weeks of gestation<sup>2</sup>. The other associated abnormalities include vision problems, hemolysis, elevated liver enzymes, low platelet count, abnormal fetal growth and preterm delivery<sup>3</sup>. Prevalence

of preeclampsia pregnancy has been found to be 5-14% around the world and about 4-18% in India<sup>4,5</sup>.

In developing countries, preeclampsia has been noticed in the patients consuming low quality diet<sup>2</sup>. The development of the disease may involve several pathophysiological processes like reduced placental perfusion, endothelial dysfunction, oxidative stress, alterations in renin angiotensin mechanism and abnormal cation metabolism<sup>6</sup>. Hypokalemia and increased dietary sodium may increase the blood pressure in preeclampsia patients<sup>1</sup>. Magnesium insufficiency might be a potential cause for development of preeclampsia and premature delivery of low birth weight babies. Magnesium deficiency in pregnancy increases the chances of neonatal death<sup>7</sup>. The deficiency of zinc has been attributed to fetal growth retardation, congenital abnormalities, complications of pregnancy and delivery

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8. Conflicting information are available on ECF cations in preeclampsia, hence a study on Indian population was important as they were at a greater risk as indicated by increased prevalence when compared globally.

### Materials and Method

It is a cross-sectional hospital based study that involves 80 primigravid women in their third trimester, of which 40 were preeclamptic and 40 normal pregnant women within the age range of 20-40 years. All the subjects were normotensive in their first trimester. Informed consent was taken from the study participants.

Patients with clinical history of hypertension (systolic BP>140mmHg or diastolic BP>90mmHg) and proteinuria (>300mg/day) during the second or third trimester of pregnancy were included for the study. Pregnant women with normal blood pressure and with no history of proteinuria during pregnancy were the controls. Pregnant women with added comorbidity factors like gestational diabetes mellitus, hypothyroidism, epilepsy, endocrine disorders and kidney diseases were excluded from the study. All the subjects were not on any mineral supplementation at the time of sample collection.

Fasting blood samples were collected in aseptic conditions in plain vacutainers, allowed to clot centrifuged at 4000rpm for 5 minutes. Serum was separated and stored at -20°C until further analysis. Serum was analysed for total calcium (NM BAPTA method), magnesium (Xylidyl blue method), zinc (nitro PAPS method), copper (Dibromo PAESA method) using

semi auto analyser by spectrophotometric method using commercially available kits, sodium and potassium using autoanalyzer Cobas 6000 by ion selective electrodes.

**Statistical analysis** The results were analysed using a statistical package SPSS version 17.0. Student's unpaired "t" test, chi square test, odds ratio and multivariate analysis logistic regression were used for the analysis. P < 0.05 was considered as significant.

### Results

Table 1 represents the demographic comparison between normal pregnancy and preeclampsia group. There was a significant decrease in gestational weeks and body mass index between the groups. Preeclamptic women were considerably older in age compared to normal pregnant women. Sodium and potassium levels were found to be within reference range, in both the groups. However, in preeclampsia group sodium levels were significantly lower compared to healthy pregnant women. Further, the preeclamptic women demonstrated a significantly lower serum calcium, zinc, magnesium and sodium levels compared to normal pregnant women. Copper levels was higher than the normal range in both the groups. Moreover the increase in copper in preeclamptic group was not statistically significant (Table 2). After adjustment with the dependent variable (normal pregnancy), of all the parameters. Zinc (183.17) and calcium (29.39) were found to be significantly associated risk factors for developing elevated blood pressure observed in preeclampsia patients (Table 3).

**Table 1: Baseline characteristics of the study groups n=number of subjects**

Variables	Group 1 (Cases) n=40	Group 2 (Controls) n=40	p-value
Age (years)	29.1 ± 5.0	26.2 ± 3.9	<0.01
Gestational period (weeks)	33.6 ± 2.0	35.9 ± 2.5	<0.001
Systolic blood pressure (mm Hg)	145.5 ± 12.8	112.7 ± 6.26	<0.001
Diastolic blood pressure (mm Hg)	95.4 ± 8.4	76.5 ± 8.5	<0.001
BMI (kg/m <sup>2</sup> )	21.44 ± 2.85	22.0 ± 2.0	0.31
Haemoglobin (gm/dL)	12.0 ± 1.3	12.1 ± 1.0	0.68

**Table 2: Comparison of electrolytes and minerals between the study groups n=number of subjects**

Variables	Group 1 (Cases) n=40	Group 2 (Controls) n=40	p-value
Sodium (mmol/L)	136.0±2.9	138.1±2.6	<0.001
Potassium (mmol/L)	4.1±0.5	4.0±0.3	0.62
Calcium (mg/dL)	8.7±0.7	9.4±0.5	<0.001
Magnesium (mg/dL)	2.0±1.4	2.6±0.3	<0.01
Zinc (µg/dL)	51.8±22.7	92.3±22.4	<0.001
Copper (µg/dL)	231.1±54.1	216.0±33.2	0.13

**Table 3: Logistic Regression of study parameters**

	B	S.E	Wald	P	Adjusted OR	95% CI for EXP(B)	
						Lower	Upper
Sodium group	-0.409	1.024	0.159	0.690	0.665	0.089	4.940
Potassium group	0.431	1.196	0.130	0.718	1.539	0.148	16.044
Zinc group	5.210	1.301	16.044	<0.01*	183.178	14.308	2345.055
Calcium group	3.381	1.333	6.433	0.01*	29.393	2.156	400.734
Magnesium group	-0.243	2.081	0.014	0.907	0.785	0.013	46.380
Copper group	-1.770	2.165	0.669	0.413	0.170	0.002	11.854
Hb level	1.271	0.630	4.077	0.043	3.565	1.038	12.246
BMI group	1.146	0.903	1.610	0.204	3.146	0.536	18.470
Constant	-14.644	9.781	2.241	0.134	0.000		

## Discussion

It is evident from the results of the study that preclamptic women were considerably older in age compared to normal pregnant women which is in acceptance with previous reports and maternal age may be a major risk factor for development of preeclampsia<sup>9</sup>. Preeclampsia women had a significantly lower gestational period compared to the normal pregnant women that may lead to delivery of baby with lower birth weight<sup>4</sup>, which is in line with our observation. Sodium and potassium act as the extracellular and intracellular cations respectively whose presence is tightly regulated by sodium potassium ATPase. In preeclampsia there appears to be an alteration in the transport system of these electrolytes across the vascular muscle cells which increases the blood pressure and may serve as an etiological factor<sup>10</sup>.

Deficiency of nutrients is more common throughout the period of pregnancy in developing countries. The studies have shown that women who were on low

dietary calcium could be predisposed to preeclampsia which is alleviated by calcium supplementation<sup>11</sup>. Decreased serum calcium level in preeclampsia may be due to the rise in cellular calcium of the vascular smooth muscle which causes vasoconstriction resulting in increased peripheral resistance and enhancement of blood pressure<sup>1</sup>.

Magnesium sulphate is the drug of choice for the treatment of severe preeclampsia as it causes vascular smooth muscle relaxation and peripheral vasodilation<sup>12</sup>. Magnesium supplementation during pregnancy decreases foetal abnormalities, increase the birth weight of new-born and prevent preeclampsia<sup>11</sup>. Punthumapol et al<sup>13</sup> found that the magnesium levels were not altered in preeclampsia patients however, Sukonpan et al<sup>14</sup> reported hypocalcemia and low magnesium in preeclampsia which corroborates our finding of low magnesium. Magnesium acts as calcium antagonist by its action on calcium channels, but, when magnesium sulfate was infused as treatment there was no change in plasma calcium<sup>15</sup>. Further results of present study



confirms the fact that pregnant women with decreased plasma calcium and zinc were at higher risk of developing preeclampsia. Low zinc levels in the plasma of preeclamptic women may be due to increased passive movement of zinc through the placenta to foetus. Further, the affinity of albumin to zinc was also decreased in pregnancy. Hypoalbuminemia seen in preeclamptic women may predispose to decreased serum zinc levels<sup>16</sup>.

Absorption of copper is highly increased during pregnancy, reason behind this is a high requirement of copper containing enzymes for aerobic respiration. Elevated copper levels in pregnancy is said to inhibit the zinc absorption and this in turn explains the reason for low levels of zinc<sup>17</sup>. Decreased levels of zinc and increased levels of copper were observed in preeclamptic patients in our study. Zinc and copper are said to exist in combined form and any alteration in their ratio may result in the inactivation of anti-oxidant enzymes<sup>18</sup>. Oxidative stress has been proposed to be one of the etiological factors of preeclampsia. Copper and zinc are essential components of SOD and ceruloplasmin, the antioxidant enzymes of plasma. It has been shown that the deleterious effects of free radicals increase with the gestational age and hence in preeclamptic women<sup>15</sup>.

### Conclusion

Current study demonstrates that decreased cations in the plasma may be one of the primary causes for elevation of blood pressure in preeclampsia patients.

The present study encourages women to consume food rich in micro minerals during pregnancy to reduce complications like preeclampsia. The results of the study calls for an exhaustive research on mineral supplementation as a tool in prevention and management of preeclampsia.

**Source of Funding:** Nil

**Conflict of Interest:** None

**Ethical Clearance:** Taken from Institutional Ethics Committee.

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# Is Wrist Manipulation and Low-Level Lasertherapy Collectively Beneficial for Patients with Lateral Epicondylitis?

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## Abstract

**Aim:** The goal of the study is to find the effectiveness of Wrist Manipulation and Low- Level Laser Therapy, Flexibility and Endurance training to reduce pain and improve grip strength in patients with lateral epicondylitis of elbow.

**Method:** A total of 30 subjects with Lateral Epicondylitis (LE), both male and female, between 25 to 50 years were selected and randomly further separated among 2 groups. The 2 separate groups comprised of 15 subjects each (male=7; female=8). Group A received Low-Level Laser Therapy(LLTT), Flexibility and Endurance training and Group B received Low-Level Laser Therapy along with wrist manipulation, flexibility and endurance training for 3 days per week. For both groups, total period of treatment was 4 weeks. Numeric Pain Rating Scale(NPRS) and Grip Strength (GS) were used as pre and post outcome measures.

**Results:** Result of the study suggests improvement in mean value of NPRS and Grip Strength for groups A and B following treatment. The treatment was statically more significant in group B than group A.

**Conclusion:** The study concludes that patients affected with Lateral Epicondylitis receiving wrist manipulation along with Low-Level Laser Therapy, Flexibility and Endurance training demonstrates significant improvement.

**Keywords:** Lateral Epicondylitis, Wrist Manipulation, Low-level Laser therapy, Flexibility, Endurance training.

## Introduction

Lateral Epicondylitis (LE), more commonly called as "Tennis Elbow"(TE) is an injury caused due to the overuse of wrist extensor tendon that attach along the outer side of the elbow. It may lead to inflammation

and cause degenerative changes such as Tendinosis and micro tear of fibrous tissue at these points. It is one of the commonest lesion of forearm. Occurrence of LE is 7-20 times more frequent than medial epicondylitis<sup>1</sup>. It is mainly a recurrent type of injury which is difficult to cope up and can last for several months or weeks. The characteristic episode of tennis elbow average duration lies between 6 months to 2 years. LE is generally related to sport with microscopic and macroscopic tears in Extensor Carpi Radialis Brevis (ECRB), mainly caused due to excessive use, repetitive eccentric contraction and gripping exercises of wrist<sup>1</sup>.

The commonly affected is dominant arm with the occurrence of 1-3% in normal population, but this

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increases to 19% at 30-60 years of age. This disorder does not differ between men and women<sup>2</sup>.

There has been a definite clinical presentation; the major complaints are decreased grip strength and pain. With the help of various special tests we can confirm the diagnosis of this condition<sup>3</sup>. The test includes palpation, resisted wrist extension, overuse, passive wrist flexion and resisted middle finger tension<sup>4</sup>. Frequent wrist rotation and extension may produce "repeated minor trauma" and strain in the common extensor area of wrist. The tissue attempts to repair, but continuous contraction of muscle pulls the surfaces separately which leads to repetitive tear. The pathological condition of tendon like "Fibroarigiomatous Hyperplasia" has poor quality, slow to heal and painful<sup>4</sup>.

In LE, a dull greyish edematous tissue replaces the normal glistening tendon. This tissue often encompasses the origin of ECRB tendon to the level of the radial head. It was seen the occurrence of pathological changes on the inner side of the extensor aponeurosis in approximately 35% of cases. In 20% calcific exostosis of the lateral epicondyle was present<sup>5</sup>.

Viola L, described histopathologic examination of samples obtained from patients with chronic refractory lateral epicondylitis that showed vascular abundance and focal hyaline degeneration that is consistent with a generative relatively than an inflammatory process. Histological examination of bone-tendon junction in patient with tennis elbow has shown evidence of a repair response of variable degree, the most frequent feature being mucopolysaccharide infiltration and bone formation<sup>6</sup>.

Traditional treatment program for people with LE have focused primarily on the pain control by Ultrasound, Anti-inflammatory Medication, Iontophoresis and Phonophoresis followed by Rehabilitation program which ranges from flexibility to strengthening and endurance training. Many medical treatments already used for treating LE include Corticosteroid injection, Drug therapies, Electrical stimulation, Laser, Acupuncture, Counterforce bracing and Ergonomics. Surgical treatment is needed only in 5-10% of patients who do not react after many months of conventional treatment<sup>7</sup>. A group of Researcher's conducted a study on manipulation of wrist management for lateral epicondylitis. They concluded that manipulation of wrist is capable of relieving symptoms in LE patients<sup>8</sup>.

Similarly, investigators conducted a study of effects from Low-Level Laser Therapy (LLLT) to treat tendinopathy. It was randomized placebo-controlled trials with LLLT. They concluded that sub-acute and chronic tendinopathy LLLT is greatly effective<sup>9</sup>.

The aim of the present study was to find the efficacy of wrist manipulation procedure along with LLTT and graduated exercise therapy regimen in patients of LE.

## Method

Sample consisted of 30 subjects with LE, with both male and female individual as participants between 25 to 50 years. All participant's obtained a written rationalization of the trial earlier to entry in the study and were given knowledge regarding their consent for participation. Following this subjects were randomly allocated equally into Group A and Group B respectively.

All subjects met the subsequent inclusion criteria of person's between age of 25-50 years, Tennis Elbow patients with Cozens test positive signs and symptoms of Tennis Elbow lasting for greater than 6 weeks, ache over lateral side of elbow and problems in holding objects. Individuals undergone a steroid injection in the past 30 days in elbow, patient's with patho-neurodynamics round elbow, any history of Rheumatoid Arthritis, Systemic or Neurological disorders were excluded from the study.

Variables: Independent variables were wrist manipulation technique, LLTT, Flexibility and Endurance Training while dependent variables were pain and grip strength.

Two outcome measures, Numeric pain rating Scale (NPRS), Grip Strength (GS) were used in the study. GS was assessed with a handheld Dynamometer

Group A: Subjects of group A obtained LLTT at the Tenoperiosteal junction of the ECRB. LASER machine used configured Mid 1500 IRRADIA, wavelength: 904 nm, mean energy output: 12 MW, peak value: 8.3 W and frequency of 70 Hz (pulse mode). The tender point was dealt with it for 30 sec resulting in a dose of remedy of zero.36 J/point. The subjects were treated for three sitting/week for four weeks.

Group B: Subjects of group B acquired Wrist manipulation method following LLTT. During manipulation of wrist, subject was asked to place his or her affected forearm on the examination table with hand facing downward. Therapist sat perpendicularly

to the patient’s affected side and held the subject’s scaphoid bone between his thumb and index finger to reinforce the aid of placing the thumb and index finger of the opposite hand. Therapist placed the participant’s wrist dorsally by the time he ventrally manipulated the wrist. Entire procedure was repeated for 15 notions. The technique was done twice, by means of either forceful passive extension of the wrist or extension in opposition to resistance. Period of intervention consultation was 15 to 20 minutes. No regulations in use of the arm had been imposed. Each the groups additionally obtained

flexibility and endurance training. The protocol was followed 3 times a week for 4 days.

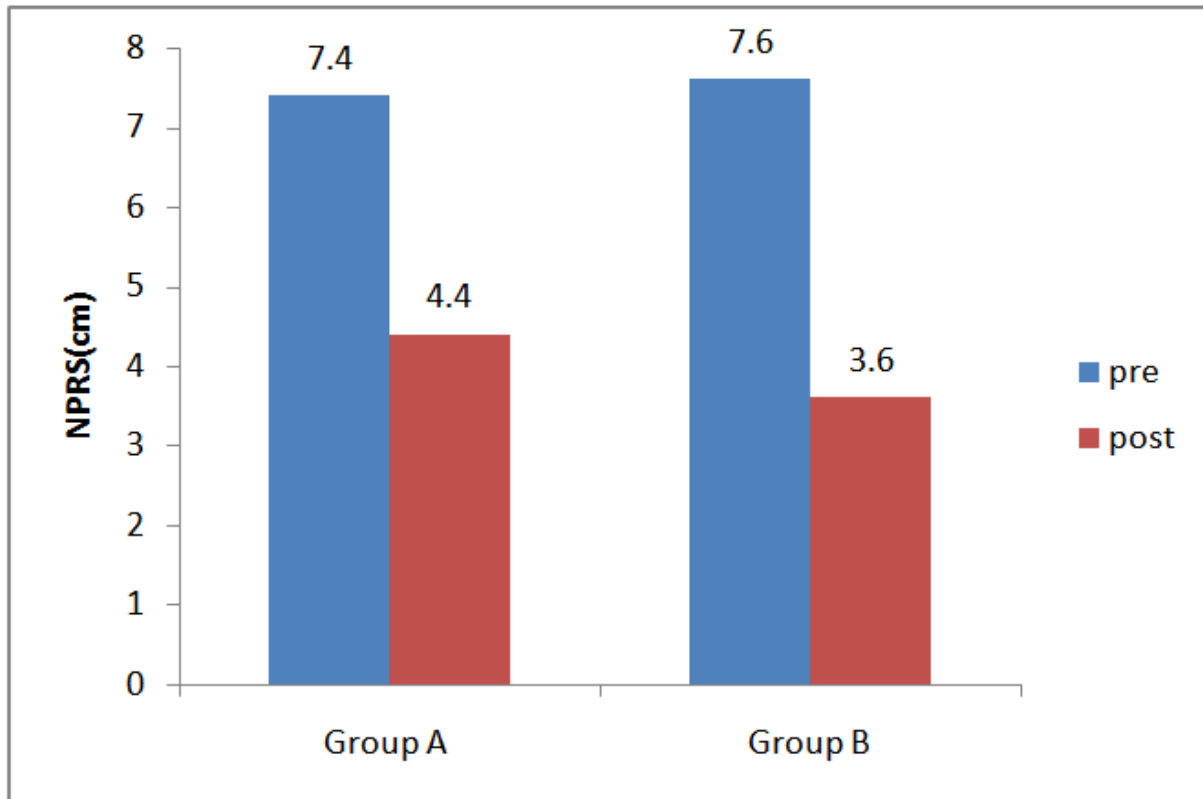
**Results**

Results from both groups put to statistical analysis to find the Mean, Standard Deviation, P value, T value and the Statistical significance between NPRS, GS in both groups having Lateral Epicondylitis. There was no significant difference between the groups in terms of age, BM and baseline measurements (NPRS, GS).

**Table 1.1 Comparison of pre and post NPRS score within group A and B.**

Group		Mean	S.D.	t value	p<0.05
Group A	Pre NPRS	7.4	1.12	-5.17	Significant
	Post NPRS	4.4	0.91		
Group B	Pre NPRS	7.6	0.83	-11.52	Significant
	Post NPRS	3.6	1.055		

Paired sample t-test was used to compare pre and post NPRS value within group A and group B. The table value is less than the calculated t- value. Therefore, the results revealed significant difference between pre NPRS and post NPRS measurements at p<0.05



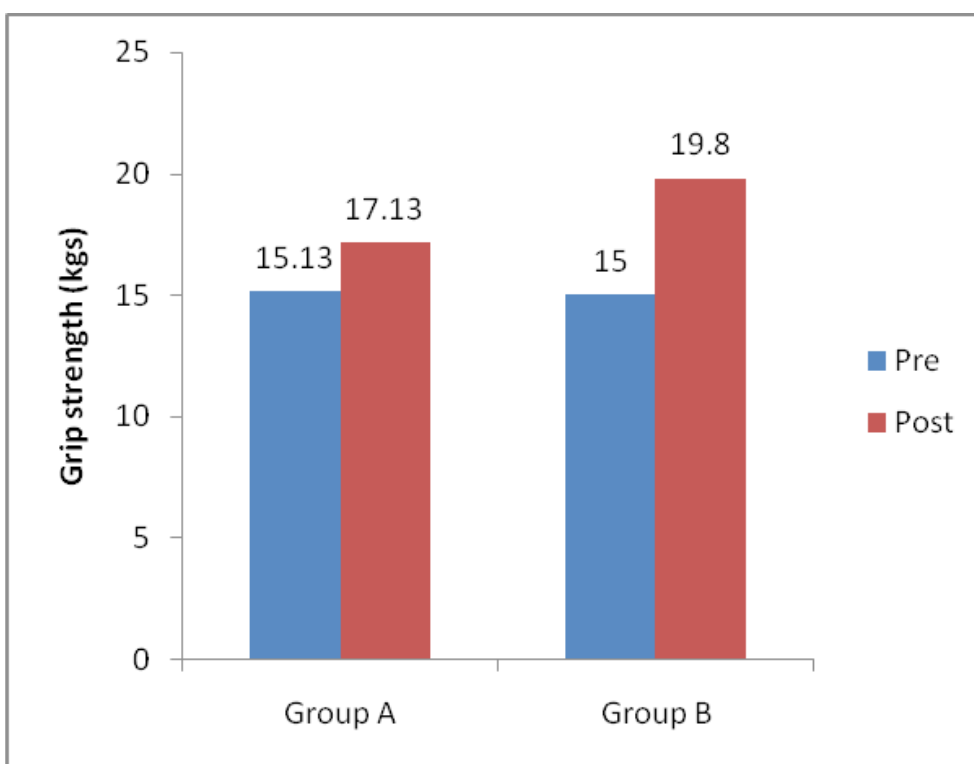
**Figure 1.1 Comparison of Pre and Post NPRS score within group A and B.**

**Table 1.2: Comparison of pre and post grip strength score within group A and B**

Groups		Mean	S.D.	t value	p<0.05
Group A	Pre Grip Strength	15.13	0.9904	-5.1667	Significant
	Post Grip Strength	17.13	1.1254		
Group B	Pre Grip Strength	15.00	1.1952	-11.529	Significant
	Post Grip Strength	19.80	1.08232		

Paired sample t-test was used to compare the mean for strength in Group A and B. The table value (2.14) is less than the calculated t- value. Therefore, the results

revealed significant difference between pre and post strength measurements at p<0.05.



**Figure 1.2 Comparison of Pre and Post Grip Strength score within Group A and B.**

**Table 1.3 Comparison of Post NPRS score between Group A and B.**

Post NPRS	Mean	S.D.	t value	p<0.05
Group A	4.4	0.9102	2.22287	Significant
Group B	3.6	1.0555		

Unpaired sample t-test has been used to compare the mean of post NPRS between group A and B. Mean and Standard Deviation for NPRS scores for Group A after 3 weeks was 4.4 ± 0.9102 and for Group B was 3.6

± 1.0555. Table value (2.14) is less than the calculated t- value (2.22287). Therefore, the results revealed significant difference between post NPRS measurements in both groups at p<0.05.

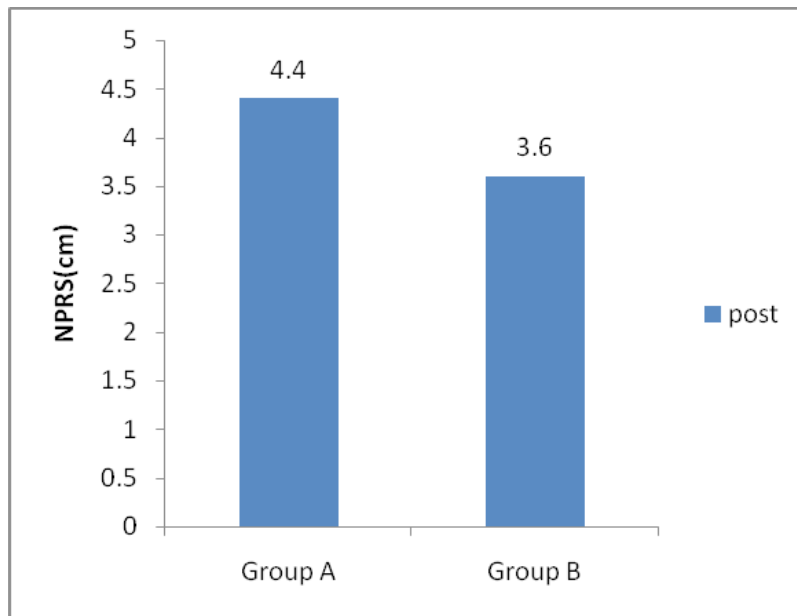


Figure 1.3 Comparison of Post NPRS score between Group A and B.

Table 1.4 Comparison of Post Grip Strength score between Group A and Group B.

Post Grip strength	Mean	S.D.	t value	p<0.05
Group A	17.13	1.1254	-6.614378	Significant
Group B	19.8	1.08235		

Unpaired sample t-test was used to compare the mean of post grip strength between group A and group B. The mean and standard deviation for grip strength scores for Group A after 3 weeks was  $17.13 \pm 1.1254$  and for Group B was  $19.8 \pm 1.08235$ . The table value (2.14) is less than the calculated t value (-6.614378). Therefore, the results revealed significant difference between post NPRS measurements in both groups at  $p < 0.05$ .

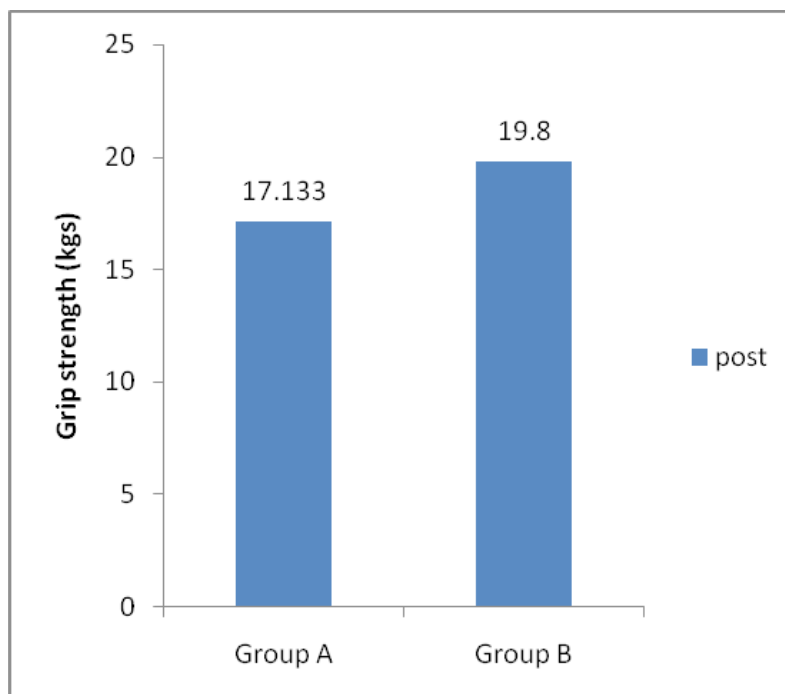


Figure 1.4 Comparison of Post Grip Strength score between Group A and B

## Discussion

Findings from this study indicate that subjects in both the groups had significant decrease in pain & increase in grip strength. However, out of the two groups, group receiving manipulation of wrist demonstrated more improvement in both, pain reduction as well as grip strength augmentation.

Result from manipulation of wrist in this study is bolstered with results from previously published trials, where in Strujs PA et al compared effectiveness of Wrist Manipulation with conventional Physiotherapy in managing tennis elbow. They concluded manipulation of the wrist produce more significant results in improving outcomes<sup>1</sup>. Manchanda G et al compared the effectiveness of movement with mobilization and manipulation of wrist in tennis elbow management and validated both to be equally effective in management of LE<sup>7</sup>.

Clinical viability of control treatment shown in randomized clinical trials which report benefits in term of relief from discomfort and quick rebuilding of capacity<sup>10 11 12</sup>.

This might be because of direct impacts on articular joint structures and transmission of afferent impulses through nociceptive fibers within the CNS and psychological impacts<sup>13</sup>.

Ongoing evidence has shown that central nervous system may assume a part in inhibition of pain following joint manipulation<sup>14 15</sup>. Vicenzino et al investigated impact of a Non-Thrust Cervical Lateral Glide in patients with interminable TE<sup>16</sup>. This method helped them gain functional gripping, decrease pain pressure threshold and improve the overall circulation induced by sympathetic nervous system. More recently, Paungmali discovered comparative outcomes which revealed sympatho-excitation following mobilization with movement of elbow<sup>17</sup>.

Jan M Bjordal conducted a systematic review to find procedure related evaluations and meta-analysis of Low Laser in TE and the conclusion was LLLT managed with ideal measurement of 904 nm and perhaps 632 nm wavelengths specifically to tennis elbow, helps to relieve pain and less disability in LE, both alone and in conjunction with an exercise regimen<sup>2</sup>.

Stergioulas A planned & executed a study on effect of Low-Level Laser and plyometric exercises

as treatment for TE, their results suggested plyometric exercises with LASER therapy to be more significant than other group<sup>18</sup>.

Vasseljen O studied TE by applying LLTT versus placebo therapy. They concluded that LLTT to show better effect over placebo group<sup>19</sup>.

Haker E et al performed a study on lateral humeral epicondylgia by applying LASER intervention to the acupuncture points. Follow-ups were done after 3 months and 1 year. They found no differences between LASER and the placebo group<sup>20</sup>.

**Clinical Implication:** The result of this study will help physiotherapists to use more effective interventions, in the form of wrist manipulation along with LLTT and conventional physiotherapy to facilitate reduction in pain and improve hand power with maximum holding ability in LE patients.

## Conclusion

This study concludes, wrist manipulation technique along with LLTT, Flexibility and Endurance Training bring sufficient improvement in reducing pain and improving grip strength in patients with LE of elbow.

**Conflict of Interest:** Nil

**Source of Funding:** Nil

Ethical clearance was taken from Institutional Committee Of Maharishi Markandeshwar Deemed to be University.

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# Effect of Motor Relearning Programme and Conventional Training on Functional Mobility in Post Stroke Patients

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## Abstract

**Introduction:** Regaining functional mobility after stroke is a challenging task for any healthcare professional. Patients lack flexibility in using both upper and lower limbs. The present study was undertaken to find out effective treatment for it.

**Purpose:** The objective of this study is to compare the effects of motor relearning programme with conventional training on functional mobility in post stroke patients.

**Method:** A experimental study was done among stroke subjects with sample size of 30 by simple random sampling method. The outcome was assessed with the help of motor assesment scale for stroke and modified Barthel index. Data was analysed by statistical tests using students t test.

**Results:** When compared within the groups, motor relearning programme and conventional training was effective in improving functional mobility. But when compared between the groups, motor relearning programme was found to be extremely significant for improving functional mobility (P Value is <0.001).

**Conclusion:** Motor relearning programme is extremely significant in improving functional mobility than conventional training in post stroke patients.

**Keywords:** Functional mobility, motor relearning programme, conventional training.

## Introduction

Stroke is defined by the World Health Organization as 'a clinical syndrome consisting of rapidly developing clinical signs of focal (or global in case of coma) disturbance of cerebral function lasting more than 24 hours or leading to death with no apparent cause other than a vascular origin<sup>1</sup>.

According to the Global Burden of Diseases (GBD) study in 1990, stroke was the second leading cause of death worldwide<sup>2</sup>. A global systematic review of population-based stroke studies has documented that the incidence rate of stroke in LMICs has increased from 56/100,000 person-years during 1970-1979 to 117/100,000 person-years during the period 2000-2008<sup>3</sup>. Stroke is one of the leading causes of death and disability in India. The estimated adjusted prevalence rate of stroke range, 84-262/100,000 in rural and 334-424/100,000 in urban areas. The incidence rate is 119-145/100,000 based on the recent population based studies.

Paralysis is one of the most common disabilities resulting from stroke. The paralysis is usually on the side of the body opposite the side of the brain damaged by stroke. It may affect the face, an arm, a leg, or the entire side of the body. This one-sided paralysis is

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called hemiplegia. Hemiplegia follows many structural and functional impairments. Functional mobility is commonly affected in these individuals due to paralysis of movement.

A structured programme can significantly increase recorded patient activity levels during inpatient stroke rehabilitation without additional resource<sup>4</sup>. Various Neurophysiological approaches are evident in treatment of stroke. Every approach works on its principles for regaining voluntary control and mobility following stroke.

Physical rehabilitation, comprising a selection of components from different approaches, is effective for recovery of function and mobility after stroke<sup>5</sup>.

Circuit-based exercise presents better effects on gait when compared with conventional intervention and that its effects on balance and functional mobility were not better than conventional interventions<sup>6</sup>.

A Study on Bobath based and movement science based treatment for stroke was conducted by P M Vanliet, N B Lincoln, A Foxall. There were no significant differences in movement abilities or functional independence between patients receiving a BB or an MSB intervention. Therefore the study did not show that one approach was more effective than the other in the treatment<sup>7</sup>.

Proprioceptive neuromuscular facilitation techniques works on principle of diagonal movement patterns but demands some voluntary control in the patient to perform those exercises. It is exclusively used in reducing spasticity and improving voluntary control.

Task related training in stroke has shown its effects on walking performances when compared with conventional training<sup>8</sup>.

Major studies have shown muscle weakness is the primary factor limiting recovery of physical function. Conventional exercises are traditionally practiced exercises throughout the world. Exercises like passive movements, functional re-education, electrical stimulation, gymnasium exercises, gait training are included in it.

Motor learning mechanisms are operative during spontaneous stroke recovery and interact with rehabilitative training. For optimal results, rehabilitation techniques should be geared towards patients' specific

motor deficits and possibly combined<sup>9</sup>.

Motor relearning programme (MRP) for stroke framed by them is a good example of Task Oriented Approach<sup>10</sup>.

Functional mobility is largely affected and needs to take care of as it is a challenging part for any physiotherapist. Present study focuses of comparing the concepts of motor relearning with conventional approach.

## Material and Method

This experimental study was done from 1/7/2015 to 30/7/2016 in Krishna Hospital Karad Taluka in Maharashtra. After getting clearance from the institutional ethical committee, the study population of 30 was taken. Subjects who were Stroke cases, impaired functional mobility and dependent, Deficits in upper limb and lower limb functions, with both the Sexes and any side was included in this study. The exclusion criteria was Subjects having any medical condition that affects his/her performance, Completely recovered case of Stroke in terms of walking abilities & upper limb activities, Subjects with Transient Ischemic Attack. The sampling method used was simple random sampling. The sample size was calculated using the formula

$$n = (SD^2_1 + SD^2_2) (Z_{1-\alpha/2} + Z_{1-\beta})^2 \\ (X_1 - X_2)^2$$

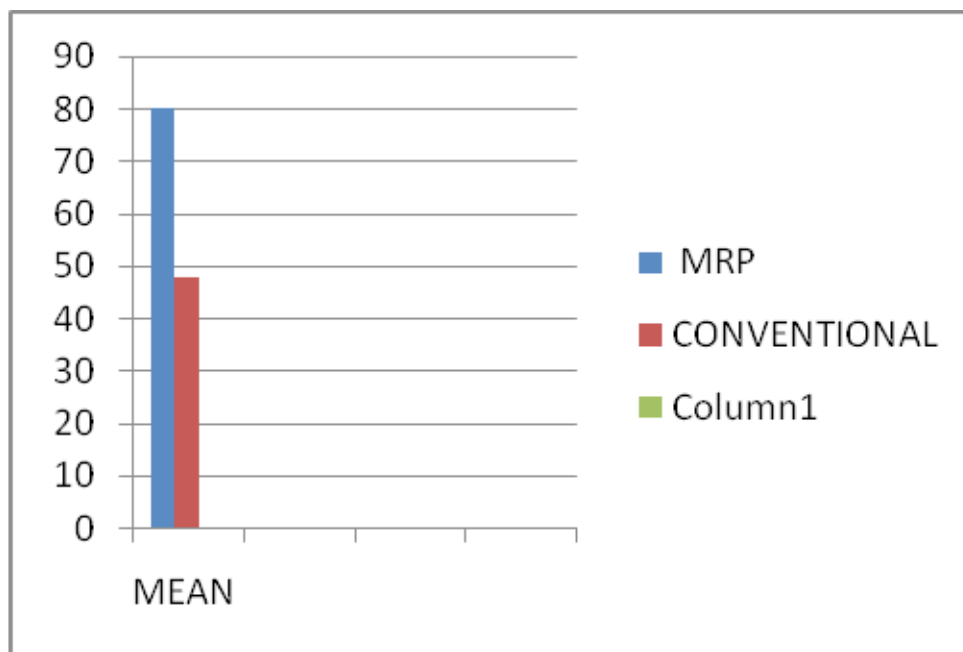
With 95% confidence and 80% power sample size was 30 in each group. Computer generated random numbers were used to allocate the interventions. Subjects were divided into two groups. Group A was experimental group and Group B was control group. Treatment was given for 6 weeks (4 times/week). Data collection was done on pre and post treatment findings. The changes were measured based on Motor Assessment Scale (MAS) for stroke and modified Barthel index. In MAS activities like supine to side lying, supine to sitting over side of the bed, balanced sitting, walking, upper arm function, hand movements and advanced hand activities were assessed. Data analysis was done by students T test for within the group and between the group changes.

**Findings:** Of the total 30 subjects, in Group A(MRP) 10 males and 5 females and in Group B (conventional) 9 males and 6 females were present. 63% of males and 37 % of females were present. In group A out of 15 subjects 7 had right side involvement and 8 had left side

involvement and in group B 9 subjects had right side involvement and 6 had left side involvement. Total of 53% subjects were with right hemiplegia and 46.6 were with left side hemiplegia. Based on the findings analysis was done for within the group (paired t test) and between the groups (unpaired t test).

**Between the groups:** For analysis between the groups, Unpaired t- test was used.

In modified Barthel index, standard deviation for group A was 12.502 and group B was 5.589. P value < 0.001 was considered extremely significant.  $t = 9.908$  with 27 degrees of freedom.

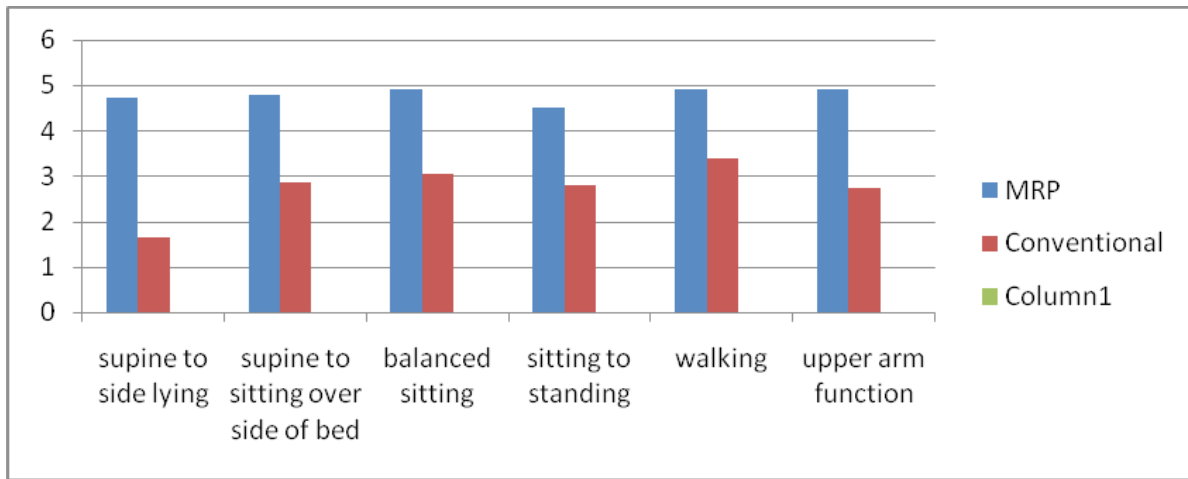


**Figure 1. Between the groups comparison of Modified Barthel Index.**

In motor assessment scale, analysis was done on 8 different activities related to functional mobility.

**Table 1. Association of Between the group analysis of Motor Assessment Scale.**

Sr.No.	Activity	Group A (MRP)		Group B (Conventional)	
		Mean	SD	Mean	SD
1	Supine to side lying	4.714	0.611	1.66	0.899
2	Supine to sitting over side of bed	4.785	0.699	2.86	0.639
3	Balanced sitting	4.92	0.615	3.06	0.703
4	Sitting to standing	4.5	0.518	2.8	0.414
5	Walking	4.92	0.47	3.4	0.82
6	Upper arm function	4.92	0.82	2.73	0.79
7	Hand movements	4.5	0.51	2.73	0.70
8	Advanced hand activities	4.21	0.578	0.266	0.45



**Figure 2: Between the group analysis of Motor Assessment Scale.**

**Within the groups:** For analysis of within the group changes, Paired t-test was used.

**Table 2: Association of within the group analysis of Modified Barthel Index and motor assessment scale**

Sr.No.	Outcome Measure	Group A MRP				Group B Conventional			
		Pre		Post		Pre		Post	
		Mean	SD	Mean	SD	Mean	SD	Mean	SD
1.	<b>Modified Barthel index</b>	16.214	7.54	80	12.5	9.6	3.66	47.66	5.5
2	<b>Motor Assessment scale</b>								
a.	Supine to side lying	0.57	0.51	4.71	0.61	0.6	0.50	1.66	0.89
b.	Supine to sitting over side of bed	1	0.67	4.8	0.69	1.13	0.83	2.86	0.63
c.	Balanced sitting	1.214	0.42	4.92	0.61	1.26	0.45	3.06	0.70
d.	Sitting to standing	0.785	0.42	4.5	0.51	0.8	0.41	2.8	0.41
e.	Walking	1.35	0.74	4.92	0.47	1.33	0.72	3.4	0.82
f.	Upper arm function	1	0.968	4.92	0.82	0.933	0.96	2.73	0.79
g.	Hand movements	0.928	0.61	4.5	0.51	0.933	0.59	2.73	0.70
h.	Advanced hand activities.	0	0	4.21	0.57	0	0	0.266	0.45

P Value is <0.001, considered extremely significant

**Discussion**

Present study was conducted to find out the effect of motor relearning programme and conventional training on functional mobility in post stroke patients.

Total of 30 subjects were included in this study. Patients were divided into two groups as per random allocation.

Control Group (Conventional), Experimental Group (MRP).

**Control Group (Conventional):**

- Conventional exercises are traditionally practiced for improving functional mobility post stroke
- Conventional therapies uses exercises like MAT exercises, assisted exercises, weight bearing exercises, gymnasium exercises, electrical stimulation etc.
- Conventional voluntary exercises may have increased levels of brain-derived neurotrophic factor and other growth factors. The effects achieved

by these exercises may be due to the process of neurogenesis.

- The effects achieved may be due to the plasticity by stimulating new connections between cells of the brain.
- Conventional exercises includes variety of strengthening exercises .leg strengthening has no effect on walking speed.<sup>11</sup>
- Most of them are open chain activities which might be less effective in learning process when compared to motor relearning programme.

### **Experimental Group (MRP):**

- Post training improvement in Motor relearning programme and conventional training can be supported by plasticity following brain lesion. Reorganization after brain lesion takes place as a result of structural and functional changes. Repetitive exercises and training in real life task following stroke may be a critical stimulus to the making of new more effective functional connections within remaining brain tissue.
- Neural system is inherently flexible adaptive and responding according to many factors like patterns of use. (NUDO AND COLLEAGUES, 2001)<sup>12</sup> suggested that the complex organization provides the foundation for functional plasticity in motor cortex.
- Study by Pascual Leone et al on cortical representation reflects changes associated with skill development that and provoked by active, repetitive, training and practice <sup>13</sup>. So it can be because of specificity of training with respect to different environmental conditions as practiced in Task Related Training might had helped in post training improvement in spatial variables.
- Motor relearning programme involved training of real life activities while conventional training involved simple repeated movements which were not having meaning to the patient.
- Motor relearning programme added specificity and variability to practice. Patients were given opportunity to practice in variety of contexts. Although skill performance may be initially delayed, it might have helped in improved retention of skill. Then acquired skill can be applied more easily to other novel environmental situations in real

life activities. However constant practice carried out in conventional training m In Task related training the whole task was broken down into discrete parts. Individual components were practiced separately and immediately followed by performance of at least part of the activity for which patient was preparing. This might had helped to improve the complex task of walking. Whereas in conventional training exercises for all muscle groups were carried out and at the end practice of mobility was carried out which might had not useful to do transfer of training in complex task and learner had only limited number of solutions.

- MRP has a greater involvement of attention control, inhibitory control, flexibility training, memory updating. This all has a direct relation with improvement in functional mobility.
- These all considerations can be supported by a statement by Kottke that if the practiced activity has been precise, the engram will be precise i.e. “Practice doesn’t make perfect” rather, when it comes to motor engrams “Perfect Practice make Perfect”<sup>14</sup>.

### **Conclusion**

The study concludes that Motor Relearning Programme is more effective in improving functional mobility in post stroke patients when compared with conventional training.

**Conflicts of Interest:** There are no conflicts of interest.

**Source of Funding:** The study was supported by Krishna Institute of Medical Sciences Deemed to be University, Karad, Maharashtra . India

**Ethical Clearance:** The study has clearance of ethical committee from Krishna institute of medical sciences deemed to be university, Karad.

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# The Effectiveness of Counselling on Knowledge, Acceptance and Choice for Postpartum Intrauterine Contraceptive Device (PPIUCD) among Primi mothers

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## Abstract

**Background:** Post-partum contraception is the best evidence based intervention in prevention of pregnancy and abortion related maternal morbidity and mortality in the developing countries. The spacing for contraception among women in the postpartum period can be effectively fulfilled by post partum insertion of PPIUCD, in a single visit under the Government scheme of providing free maternity services during institutional delivery.

Despite optimal efforts by family planning program, very few primi mothers are opting for spacing method and lack of awareness has resulted in discontinuation of family planning method particularly PPIUCD. This study is designed to PPIUCD and causes for discontinuation at follow up in our hospital. The objectives of the study were study PPIUCD practices at Talera hospital and Akurdi hospital, Pune; causes for discontinuation of PPIUCD.

**Research Methodology: Research Approach:** Quantitative approach, **Research design-Quasi** experimental design one group Pre-test Post-test design, **Population**—primi mothers, **Sample**—The sample of the study comprised of Primi mothers, **Sample size:** 60 primi mothers, **Sampling technique:** Simple Random Sampling Technique was used. **Setting:** the selection of the study setting is on the basis of the feasibility of conducting study and availability of sample. Study will be conducted in Talera Hospital and Bhosri Hospital, PCMC, Pune.

**Result:** In pre-test, majority of 91.7% of the primi mothers had poor knowledge and 8.3% of them had average knowledge regarding PPIUCD. In post-test, majority of 86.7.7% of the primi mothers had average knowledge and 13.3% of them had poor knowledge regarding PPIUCD. This indicates that the knowledge among primi mothers regarding PPIUCD improved remarkably after individual counselling.

Researcher applied paired t-test for effectiveness of individual counselling on knowledge among primi mothers regarding PPIUCD. Average knowledge score in pre-test was 8.4 which increased to 11.9 in post-test. t-value for this test was 12.2 with 59 degrees of freedom. Corresponding p-value was small (less than 0.05), the null hypothesis is rejected. This is evident that the knowledge among primi mothers regarding PPIUCD improved significantly after individual counselling.

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Since all the p-values are large (greater than 0.05), none of the demographic variables were found to have significant association with the acceptance and choice for PPIUCD as a contraceptive method among Primi Mothers.



**Conclusion:** Hence it is concluded that the Counselling on Knowledge, Acceptance and Choice for Postpartum Intrauterine Contraceptive Device (PPIUCD) is Effective in Primi Mothers.

**Keywords:** *Counselling, Knowledge, Acceptance, Choice, Postpartum Intrauterine Contraceptive Device (PPIUCD), Primi Mothers.*

## Introduction

**Population of India:** India is the second most populated country in the world with nearly a fifth of the world's population. According to the 2017 revision of the World Population Prospects, the population stood at 1,324,171,354.<sup>1</sup> India has more than 50% of its population below the age of 25 and more than 65% below the age of 35. It is expected that, in 2020, the average age of an Indian will be 29 years, compared to 37 for China and 48 for Japan; and, by 2030, India's dependency ratio should be just over 0.4.<sup>2</sup>

Health of Women lives have changed over the centuries. Aside from the numerous dangers and diseases, women became wives and mothers often when they were just emerging from their own childhood. Many women had a large number of pregnancies which may or may not have been wanted. In the past, childbirth itself was risky and frequently, led to the death of the mother. Most women in the past did not live long enough to be concerned about menopause or old age.<sup>3</sup>

Family Planning/Family Welfare Programme (FWP) by the Government in India

- FWP is integrated with other health services.
- 2-child family norm to be practiced
- Door-to-door campaigns to encourage families to accept the small family norm
- Encouraging education for both boys and girls
- Encouragement of breast feeding

Myth of Indians have Another important barrier to contraceptive family planning Interval IUCD which can be inserted in the uterus at any time of menstrual cycle (after ruling out pregnancy) or it can be also be inserted after 6 weeks of giving birth.(PPIUCD) insertion can be done post placental that is within 10 min of placental expulsion, intra caesarean at the time of caesarean section or within 48 hours of delivery<sup>4</sup>

**Research Approach:** Research approach refers to the way in which the researcher plan the research process. It is the systematic, objective method of discovery of empirical evidence. It is the back bone or structure of the study to provide framework that support the study and holds it together.<sup>5</sup> It helps the investigator in the selection of subjects, manipulation of independent variables, control observation to be made and the type of statistical analysis to be used to interpret the data.

Experience on Awareness, Acceptability, Safety, Efficacy, Complications and Expulsion of Postpartum Intrauterine Contraceptive Device Insertion. INTERNATIONAL JOURNAL OF SCIENTIFIC STUDY, 5(1), 207-212. The PPIUCD (Inserting Cu T 380 A by 10 minutes after placental delivery) was demonstrably safe, effective, has high retention rate. The expulsion rate was not very high and it can be reduced with practice. With the high level of acceptance despite low levels of awareness, the government needs to develop strategies to increase public awareness of the PPIUCD through different media sources. It is also important to arrange training on PPIUCD in order to increase knowledge and skills among healthcare providers. This will also further promote PPIUCD use and aid in reduction of the expulsion rates. Cash incentives to the acceptor, motivator and of course provider would bring about a substantial progress in the PPIUCD use in developing countries like India. By 1970s the hormonal IUCDs were developed to reduce the incidence of increased bleeding associated with copper. World health organization propose family planning using contraceptive devices as a highly effective method of family planning. They have now enumerated family welfare as a important component of postpartum care. It can also be easily advocated as the women are highly motivated and convenient.<sup>6</sup>

**Research Design:** A research design selected for present study was **quasi experimental: pre-test post-test research design.**

**Table 1. Schematic Presentation of the Study Design**

Primi Antenatal Mothers	Pre-Test	Intervention	Post-Test
Randomization of primi mothers	Assessment of the knowledge on PPIUCD	Counselling on PPIUCD: • Acceptance • Choice	<ul style="list-style-type: none"> <li>• Knowledge</li> <li>• Acceptance</li> <li>• Choice</li> <li>• Follow-up</li> </ul>

**Table 1. Analysis of data related to the knowledge of women regarding PPIUCD.****Knowledge of Primi mothers regarding PPIUCD before intervention. N=60**

Knowledge	Pre-test	
	Frequency	Percentage
Poor (Score 0-10)	55	91.7%
Average (Score 11-21)	5	8.3%
Good (Score 22-32)	0	0.0%

In pre-test, majority of 91.7% of the primi mothers had poor knowledge and 8.3% of them had average knowledge regarding PPIUCD.

**Analysis of data related to the level of acceptability and choice for PPIUCD as a contraceptive method among Primi mothers.**

**Table 2: Level of acceptability and choice for PPIUCD as a contraceptive method among Primi mothers. N=60**

Acceptability and choice for PPIUCD Item	Frequency	Percentage
<b>Would you like to go for PPIUCD</b>		
Yes	18	30.0%
No	42	70.0%
<b>If yes, then what are the timing of insertion you would prefer</b>		
Post placental period within 10 minutes after expulsion of the placenta	9	15.0%
Within 48 hours of delivery	2	3.3%
Extended postpartum period after 6 weeks	7	11.7%
<b>How many years you would want to continue the PPIUCD</b>		
0-1 year	9	15.0%
2-3 years	7	11.7%
4-5 years	2	3.3%

30% of the primi mothers had responded they would like to go for PPIUCD.

**Analysis of data related to the effectiveness of counselling before and after intervention:**

**Table 3: Effectiveness of counselling on knowledge among primi mothers regarding PPIUCD. N=60**

Knowledge	Pre-test		Post-test	
	Frequency	Percentage	Frequency	Percentage
Poor (Score 0-10)	55	91.7%	8	13.3%
Average (Score 11-21)	5	8.3%	52	86.7%
Good (Score 22-32)	0	0.0%	0	0.0%

In pre-test, majority of 91.7% of the primi mothers had poor knowledge and 8.3% of them had average knowledge regarding PPIUCD. In post-test, majority of 86.7.7 percentage of the primi mothers had average knowledge and 13.3% of them had poor knowledge regarding PPIUCD. This indicates that the knowledge among primi mothers regarding PPIUCD improved remarkably after individual counselling.<sup>7</sup>

Researcher applied paired t-test for effectiveness of counselling on knowledge among primi mothers regarding PPIUCD. Average knowledge score in pre-test was 8.4 which increased to 11.9 in post-test. t-value for this test was 12.2 with 59 degrees of freedom. Corresponding p-value was small (less than 0.05), the null hypothesis is rejected. This is evident that the knowledge among primi mothers regarding PPIUCD improved significantly after individual counselling.<sup>8</sup>

**Table 4: Paired t-test for Effectiveness of counselling on knowledge among primi mothers regarding PPIUCD. N=60**

	Mean	SD	t	Df	p-value
Pre-test	8.4	1.6	12.2	59	0.000
Post-test	11.9	1.7			

Analysis of data related to association between level acceptances with selected demographic variables.

**Table 5: Fisher’s exact test for association between level acceptances with selected demographic variables. N=60**

Demographic variable		Acceptability		p-value
		Yes	No	
Age	18-23 years	6	13	1.000
	24-29 years	11	26	
	30-35 years	1	3	
Educational status	Profession or Honors	2	2	0.870
	Graduate	5	11	
	Intermediate or diploma	2	7	
	High school certificate	9	20	
	Middle school certificate	0	2	
Occupation	Professional	1	1	0.771
	Semi professional	0	1	
	Skilled worker	0	1	
	Unemployed	17	39	
Income	Rs. 126,360 and above	0	1	0.114
	Rs. 63,182-126,356	0	1	
	Rs. 47,286-63178	1	0	
	Rs. 31589-63178	7	7	
	Rs. 6327-18949	10	33	
Religion	Hindu	15	33	0.514
	Muslim	2	8	
	Christian	1	0	
	Others	0	1	

Demographic variable		Acceptability		p-value
		Yes	No	
Gestational age	Less than 12 weeks	3	4	0.414
	20 weeks	13	36	
	26 weeks	2	2	
Within how many years do you want the second child	1– 2 years	13	22	0.315
	3 – 4 years	5	18	
	4 – 5 years	0	2	
Have you ever used temporary family method	Yes	13	24	0.387
	No	5	18	

Since all the p-values are large (greater than 0.05), none of the demographic variables were found to have significant association with the acceptance and choice for PPIUCD as a contraceptive method among Primi mothers.

### Major Findings of the Study:

#### 1. Findings related to demographic data of subjects:

- In this study, 31.7% of the primi mothers had age 18-23 years, 61.7% of them had age 24-29 years and 6.7% of them had age 30-35 years.
- In this study 6.7% of them had profession or honors, 26.7% of them were graduates, 15% of them were intermediate or diploma, 48.3% of them had high school certificate and 3.3% of them had middle school certificate.
- In this study 3.3% of them were professional, 1.7% of them were semi-professional, 1.7% of them were skilled worker and 93.3% of them were unemployed.
- In this study 1.7% of them had income above Rs.126360, 1.7% of them had income Rs.63182-126356, 1.7% of them had income Rs. 47286-63178, 23.3% of them had income Rs31589-63178 and 71.7% of them had income Rs6327-18949.
- In this study 80% of them were Hindu, 16.7% of them were Muslim, 1.7% of them were Christian and 1.7% of them had some other religion.
- In this study 11.7% of them had gestational age less than 12 weeks, 81.7% of them had

gestational age 20 weeks and 6.7% of them had gestational age 26 weeks.

- In this study 58.3% of them wanted the second child in 1-2 years, 38.3% of them wanted second child in 3-4 years and 3.3% of them wanted second child in 4-5 years.
  - In this study 61.7% of them had used temporary family method.
  - 86.7% of them had used oral pills, 1.7% of them had used copper-T and 11.7% of them had used emergency contraceptive pills.
- #### 2. Findings related to the knowledge of women regarding ppiucd
- In pre-test, majority of 91.7% of the primi mothers had poor knowledge and 8.3% of them had average knowledge regarding PPIUCD.
- #### 3. Findings related to the level of acceptability and choice for ppiucd as a contraceptive method among primi mothers
- In this study 30% of the primi mothers had responded they would like to go for PPIUCD.
- #### 4. Findings related to the effectiveness of counselling before and after intervention
- In pre-test, majority of 91.7% of the primi mothers had poor knowledge and 8.3% of them had average knowledge regarding PPIUCD. In post-test, majority of 86.7% of the primi mothers had average knowledge and 13.3% of them had poor knowledge regarding PPIUCD. This indicates that the knowledge among primi mothers regarding PPIUCD improved remarkably after counseling.<sup>9</sup>

- Researcher applied paired t-test for effectiveness of counseling on knowledge among primi mothers regarding PPIUCD. Average knowledge score in pre-test was 8.4 which increased to 11.9 in post-test. T-value for this test was 12.2 with 59 degrees of freedom. 10 Corresponding p-value was small (less than 0.05), the null hypothesis is rejected. This is evident that the knowledge among primi mothers regarding PPIUCD improved significantly after counseling.

#### 5. Findings related to association between level acceptance and choice with selected demographic variables

- Since all the p-values are large (greater than 0.05), none of the demographic variables were found to have significant association with the acceptance and choice for PPIUCD as a contraceptive method among primi mothers.

#### Discussion

This study was carried out to assess the effectiveness of counselling on knowledge, acceptance and choice for Postpartum Intrauterine Contraceptive Device (PPIUCD) among primi mothers. Since the p – values was large (greater than 0.05), the findings lead to the rejection of the hypothesis that shows that there was a significant effect of Postpartum Intrauterine Contraceptive Device (PPIUCD).<sup>11</sup>

COMPARISON OF THE LEVEL OF KNOWLEDGE, ACCEPTABILITY FOR PPIUCD AS CONTRACEPTIVE METHOD AMONG PRIMI MOTHERS, 30% responded out of 60 primi mothers, the results of the present study showed that the counselling on knowledge, acceptance and choice for Postpartum Intrauterine Contraceptive Device (PPIUCD) among primi mothers are effective.<sup>12</sup>

Anandhi, A., & Mothilal, R. et al, (2016). Acceptance of post placental intrauterine contraceptive device: recent increase in trend. IUCD is a temporary method of contraception in use for many years. Our main objective is to find the acceptance of (post placental intrauterine contraceptive device) PPIUCD in recent years <sup>2</sup> Results: Total women delivered in our hospital were 17,577 over a period of 3 years. Three years comparative study revealed significant increase in acceptance of PPIUCD insertion among primi para from 31.7% TO 64.04%. Acceptance of PPIUCD in delivered mothers was 28.9

% in first year (April 2015 to March 2016) to 54.6% in third year (April 2017 to March 2018). This clearly shows the role of service provider in the success of a national program though acceptor is always ready in most of the times.<sup>13</sup>

#### Conclusion

In this brief snapshot of research proposal are designed to describe for readers the “big pictures” and help them more easily understand the details of the research. Conducting the research study in itself is not important until unless its findings are known to all concerned and implication of its findings have been discussed. The present chapter deals with discussion, conclusion, implication, limitation and recommendation as per the findings of the present study.<sup>14</sup>With this aim the investigator selected the problem statement as –

- To assess the knowledge of women regarding PPIUCD.
- To assess the level of acceptability and choice for PPIUCD as a contraceptive method among Primi mothers.
- To assess the effectiveness of counseling before and after intervention.
- To assess the association between level acceptance and choice with selected demographic variables.

**Conflict of Interest:** Nil

**Source of Finding:** Self

**Ethical Clearance:** Obtained from institute and hospital.

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# Towards Digital Diagnosis of Oral Cancer: A Study on Optimum Preferences of Histopathological Techniques and Features

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## Abstract

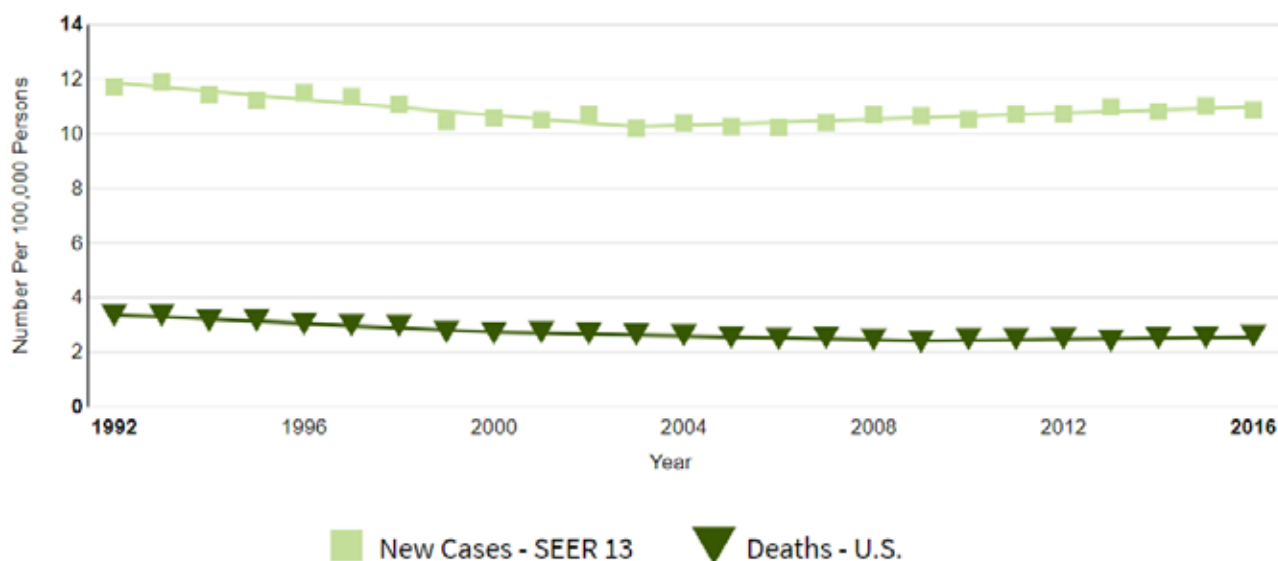
Accurate diagnosis is dependent on various factors in the pathological domain, like types of slides used and features scrutinized. Sometimes a diagnosis is evident due to clear symptoms. But under adverse constraints, like improper acquisition etc., it is very difficult to give a quick and clear diagnosis. The study aims to conduct a survey from the well-known histopathologists of the country to gather an understanding of the techniques preferably used by them for diagnosis of the disease and summarize it, for arriving at optimum options which may be adopted for automation. This was a cross-sectional study conducted from March 2018 to May 2018 using a pre-tested structured questionnaire of multiple answer choices. The study subjects comprised of resident histopathologists of the hospitals covering states/locations all over the country, by selective sampling. The hospitals were selected based on the availability of on-site pathology centres and wide coverage. The analysis of the data was done using Ms-Excel and SPSS. The Non-Parametric Friedman Test was conducted to test for significance of the responses. Oral Squamous Cell Carcinoma (OSCC) of buccal mucosa with both moderately and well-differentiated grades were reported. For diagnosis, H & E stain for the slides of 4 $\mu$  thickness is mostly used. Further, invasion of basement membrane was the most important architectural feature and increased nucleo-cytoplasmic ratio the most important cytological feature. This type of survey will help in carrying out a directed diagnosis or further research for automated diagnosis using the results.

**Keywords:** Oral cancer, Diagnosis techniques, Feature study, Preference, Survey.

## Introduction

Healthcare costs will need to reduce if we are to treat more people. The area of diagnosis offers possible significant cost reduction while improving accuracy by using technology. Recent times have witnessed an increase in the incidence of cancer.<sup>1</sup> According to the World Health Organization, 6,57,000 new cases of cancers of the oral cavity and pharynx are estimated each year and more than 3,30,000 demises.<sup>2</sup> This is mainly because of urbanization and industrialization which leads to a major change in lifestyle and exposure to environmental pollution. It is well known that cancer incidence in urban population is nearly double that of

the rural population. Further other important factors like demographics, increased life expectancy and access to healthcare contribute to the cause. Morbidity due to cancer is almost double in the rural population than the urban population.<sup>3</sup> Clear causes are poverty, illiteracy, ignorance, myths of the disease and access to cancer facilities. Oral and oropharyngeal carcinomas still continue to hold the sixth most common cancers in the world.<sup>4</sup> Surveillance, Epidemiology and End Results (SEER) 9 registries of the National Cancer Institute of the United States Public Health Service, 2018 report shows the following statistics (Figure 1).<sup>5</sup>



**Figure 1: Trends in incidence rates of cancer of the oral cavity and pharynx from 1975-2015**

Head and neck cancers are a major concern worldwide and especially in North-East India. National Cancer Registry Programme declares that, in India, oral cancer is the most common cancer amongst men (16.1 % of all cancers) and the second most common cancer amongst women (10.4 % of all cancers). According to Globocan 2018 (it is an online database providing estimates of incidence and mortality in 185 countries for 36 types of cancer and for all cancer sites combined) data, new cases registered for oral cancer is 1,19,992. The total number of demises in men and women together is 72,616.<sup>6</sup>

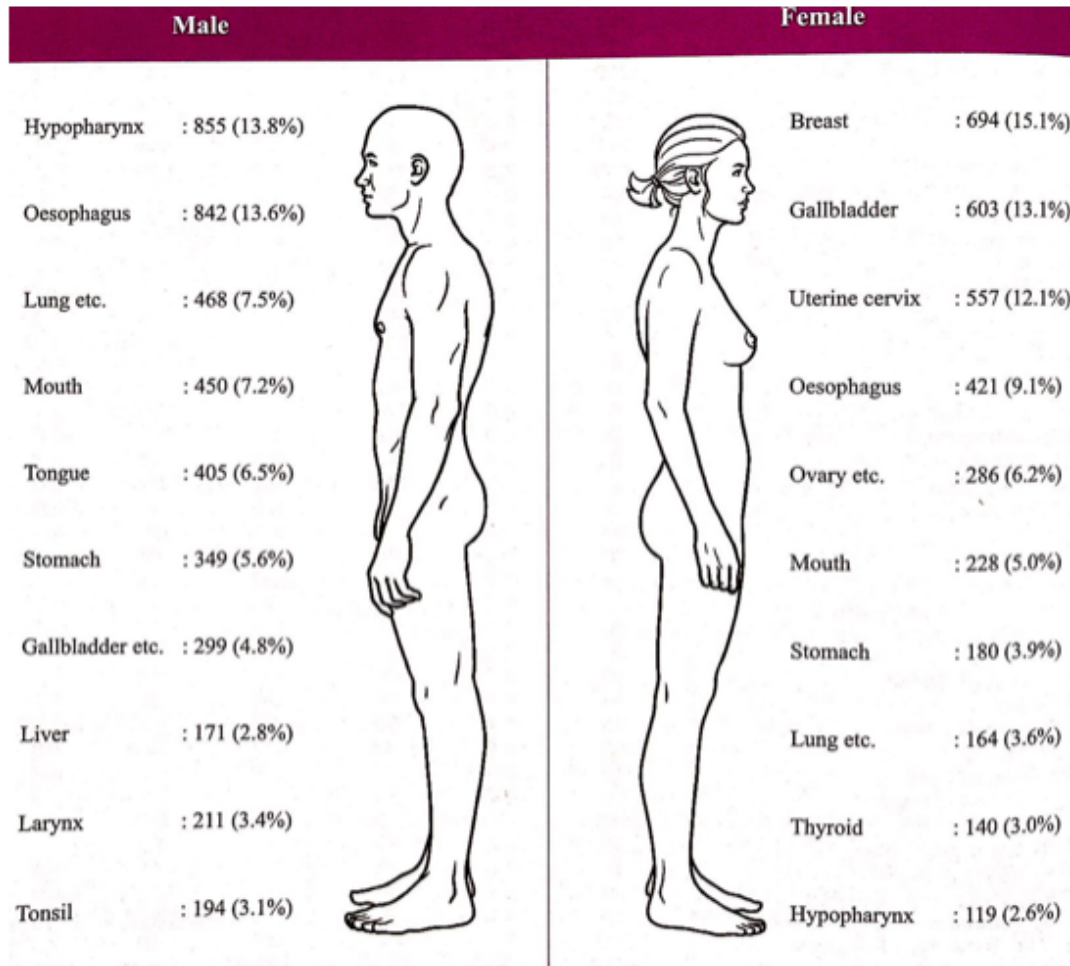
**Figure 2** shows the proportion of mouth, tongue and other oral cancers incident in patients of North-East India, as per latest report of Dr. B. Borooah Cancer Institute (BBCI), a grants-in-aid institute of Department of Atomic Energy, Government of India and a unit of Tata Memorial Centre, Mumbai and the premier institute of cancer treatment in the region.

Two points are noteworthy regarding oral cancer control and treatment management. First, as per WHO recommended priorities and strategies for prevention and control of Oral (Mouth and Pharynx) cancer,

Primary prevention is very effective and early detection is partly effective.<sup>7</sup> Hence, coupling the two together gives a direction for activating control programmes. Secondly, more than 80% of the diagnosis of oral cancers is done on the basis of microscopy. Accurate and timely diagnosis is the major strategy, as well as a challenge for lowering the incidence of the disease and follow-up clinical treatment. It itself is a by-product of various inputs, starting from the type of slide to type of stains used and types of features inspected and analysed. This stimulates us to conduct a survey in this direction to gather some information from the well-known histopathologist of the region, so as to make a bucket list of the most important parameters required for generating a fast yet accurate diagnosis. For the survey, we have designed a questionnaire consulting with highly experienced pathologists. The queries placed through the questionnaire carries significance as it gives us ample insight into understanding the techniques used by the pathologist for the diagnosis of the disease. Our aim is to utilize the information hence collected, for development of algorithms for automated oral cancer diagnosis, so that the software may be as realistic as possible and may relate well with the process followed in the region.



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**Figure 2: Distribution of various types of cancers by site in male and female**

**Materials and Method**

**Study Population and study design:** This survey was conducted from March 2018 to May 2018. The study subjects comprised of resident histopathologists of the hospitals who were sent the questionnaires by post and contacted either by phone or e-mail for intimation. The study does not involve any ethical clearance as no experiments were done on the participants. This is a cross-sectional study covering states/locations (Assam, Meghalaya, Manipur, Kolkata and Kerala) all over the country, by selective sampling. In total, 110 questionnaires were sent to the histopathologists of different hospitals and well-known diagnostic centres of India. The hospitals were selected based on the availability of on-site pathology centres and wide coverage.

**The Questionnaire:** All information was obtained by using a pre-tested structured questionnaire with multiple answer choices (Annexure 1). Then data were compiled in an excel sheet and calculations and data analysis was done with the help of SPSS-14 version. The questionnaire consisted of two parts. The first part contained the questions regarding preferred broad techniques related to the detection of oral cancer from biopsy sections. In the second part, some additional questions were put forward to understand in detail the common features observed by the pathologists for detection of malignancy.

It was also queried “What is the maximum time taken to investigate one slide?” Finally, pathologists were asked whether any automated imaging system was used for diagnosis. Response category for this question

was “Yes” and “No”. For each query, the respondents were offered to give all their options, with priority if so entailed.

**Analysis:** The analysis of the data was done using Ms-Excel (Ver 2016) and SPSS (14). The data were coded and entered in SPSS where the Non-Parametric Friedman Test was conducted to test for significance of the responses.<sup>7</sup> The Friedman test is most suitable for the study as the responses are all ‘ordinal’, that is being scaled according to preferences stated by the respondents. It is further appropriate because the data may not be normally distributed. To calculate the percentage of preference for the questions with priority choice, weights were assigned. Highest weight was given to the first choice and so on in reverse order. The study tested for the perception of pathologists about the response to different questions. Thus null hypotheses formed for each response were “there is a difference in perception or preference between the pathologists regarding the responses”.

**Findings:** 75 responses were received (68.18 %) out of 110 questionnaires mailed. All the pathologists (100%) viewed squamous cell carcinoma as the most common histological type of oral cancer diagnosed in their laboratories. The number of choices per question is shown in the following table [Table 1].

From the study, it was observed that 43.5% opted for buccal mucosa as the most common site of occurrence followed by 17.4% for gingivobuccal sulcus, 13% for tongue, 7.2% for alveolus, 5.8% each for lip and base of the tongue, 4.2% for gingiva and 2.9% for retromolar trigone. The percentage of choices were calculated and are depicted in Figure 3a.

Further, as per the survey, both well-differentiated grades and moderately differentiated grades have been found to be in the leading position with 48 cases. Poorly differentiated grade was in the second position with 11 cases. Regarding preference of thickness of biopsy section/sample used for preparing a slide, most of the laboratories 43.9% preferred 4 $\mu$  thickness, followed by 17.1%, 12.2% and 7.3% preferred for 3 $\mu$ , 5 $\mu$  and 6 $\mu$  respectively.

All 75 laboratories (100%) uses Hematoxyline and Eosin stain for a routine examination. 31 pathologist (22.7%) considers the invasion of basement membrane as the most important architectural feature to diagnose malignancy. 22 pathologists agreed on the invasion of sub-epithelial tissue/other tissue as the second most important architectural feature to diagnose malignancy and 20 put loss of polarity of basal cells in third place. A maximum number of pathologists (22.7%) considers increased nucleo-cytoplasmic ratio as the most important cytological feature to diagnose cancer followed by hyperchromasia (19.2%) and atypical mitotic figures (17.4%).

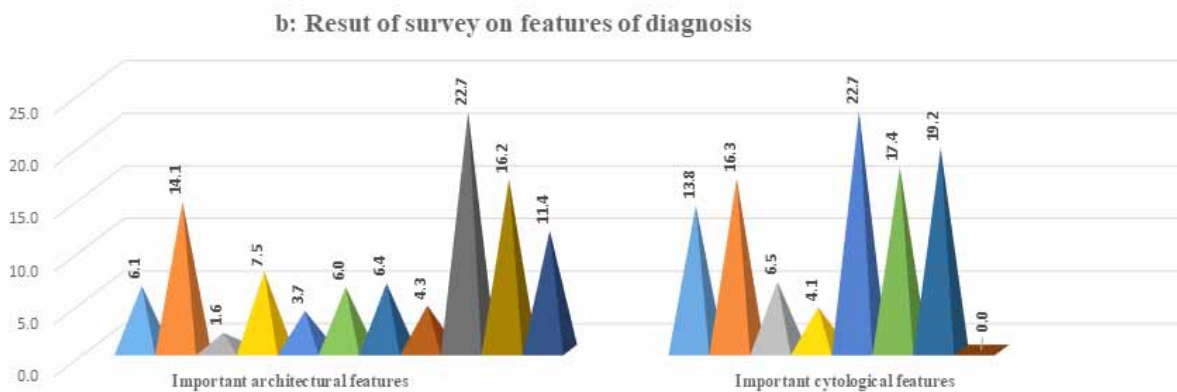
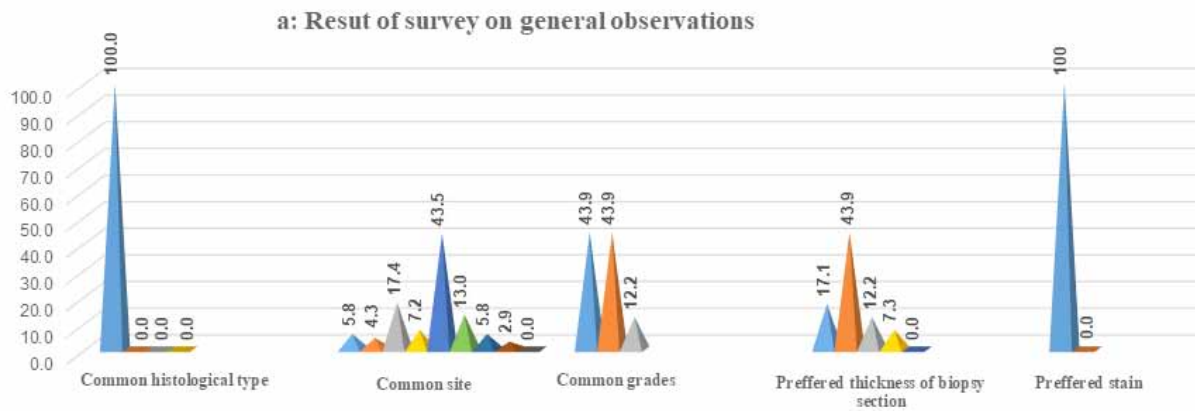
Response to the question “Maximum time taken to investigate one slide” varies from 1 minute to 1 hour. Further, no histopathologist reported uses of any automated imaging system for diagnosis in their laboratories.

The test-statistic of Friedman test, viz. Chi-Square is like a variance over the mean ranks: it's 0 when the mean ranks are exactly equal and becomes larger as they lie further apart. Also,  $p$  is the probability of finding our sample differences, i.e. if the population distributions are equal. The mean ranks of the responses, chi and respective  $p$ -values of the test are shown in the last two columns of Table 1.

**Table 1: Response of respondents on general observations**

Question	Response Choices	No. of Responses	Mean ranks	Chi (p)
Most common histological type of oral cancer diagnosed	Squamous cell carcinoma	75	5.00	132.000 (.000)
	Verrucous carcinoma	Nil	2.50	
	Minor salivary gland carcinomas	Nil	2.50	
	Lymphomas	Nil	2.50	
	Other	Nil	2.50	

Question	Response Choices	No. of Responses	Mean ranks	Chi (p)
Most common site of occurrence	Lip	7	4.64	66.860 (.000)
	Gingiva	7	4.50	
	Gingivobuccal sulcus	32	5.73	
	Alveolus	11	4.77	
	Buccal mucosa	52	6.83	
	Tongue	30	5.29	
	Base of tongue	11	4.62	
	Retromolar trigone	5	4.36	
	Other	Nil	4.26	
Maximum reported grades of OSCC	Well-differentiated	48	2.20	12.071 (.002)
	Moderately differentiated	48	2.20	
	Poorly differentiated	11	1.61	
Thickness of biopsy section/ sample used for preparing slide (in $\mu$ )	3	16	3.03	29.108 (.000)
	4	36	3.86	
	5	16	2.88	
	6	7	2.73	
	Other	Nil	2.50	
Stain used for routine examination	Hematoxyline and Eosin	75	2.00	33.000 (.000)
	Other	Nil	1.00	



**Figure 3: The percentage of choices of different responses**

## Discussion

According to the SEER (Surveillance, Epidemiology and End Results program of the National Cancer Institute of the United States Public Health Service) registries in the USA between 1973 and 1987, of all the oropharyngeal malignancies reported, more than 95% were squamous cell carcinomas.<sup>9</sup> Other studies have corroborated that OSCC is the most common oral malignancy, representing up to 80–90% of all malignant neoplasms of the oral cavity.<sup>10,11</sup> The incidence of OSCC remains high.<sup>12,13</sup> 90% of all oral malignancies

involve with OSCC.<sup>13-16</sup> As per the latest report of Dr B. Borooah Cancer Institute, 95% of head and neck cancers are squamous cell carcinoma. Likewise, in our study, we got 100% responses for OSCC. Other epidemiological studies found that tongue, lip and floor of the mouth were the most frequent sites of lesions of OSCC.<sup>17-19</sup> Studies reported buccal mucosa and mandibular alveolus as most common sites too<sup>20,21</sup> and that the lip and tongue were the most and second most common site of OSCC.<sup>21,22</sup> The report of the findings is presented in **Table 2** and depicted in **Figure 3b**.

**Table 2: Response of respondents on features for the diagnosis**

Question	Response Choices	No. of Responses	Mean Ranks	Chi (p)
Most important architectural feature to diagnose malignancy	Irregular epithelial stratification	11	5.55	54.336 (.000)
	Loss of polarity of basal cells	20	7.42	
	Drop-shaped rete ridges	2	4.18	
	Increased number of mitoses	13	6.05	
	Abnormally superficial mitoses	7	5.00	
	Premature keratinization in single cell	9	5.14	
	Intraepithelial keratin pearls	10	5.56	
	Loss of intercellular attachment	8	5.36	
	Invasion of basement membrane	31	7.67	
	Invasion of sub-epithelial tissue/other tissue	22	6.82	
	Lymphatic and vascular invasion	18	7.26	
Cytological features observed	Abnormal variation in nuclear size	18	3.97	78.049 (.000)
	Abnormal variation in nuclear shape	23	4.85	
	Abnormal variation of cell size	12	3.92	
	Abnormal variation of cell shape	8	3.56	
	Increased nucleo-cytoplasmic ratio	32	6.67	
	Atypical mitotic figures	28	4.56	
	Hyperchromasia	30	5.92	
	Other	Nil	2.55	

As evident from the Friedman analysis, all the  $p$  values are highly significant and hence all the null hypotheses are rejected. It is henceforth summarized that there is a marked difference in perception of the pathologists about the histological method and features used for evaluation of slides. Further, if choice is to be made for best 5 features for digitization, then that would be, in descending order of priority.

- (i) Invasion of basement membrane, Invasion of sub-epithelial tissue/other tissue, Loss of polarity of basal cells, Lymphatic and vascular invasion and Increased number of mitoses for architectural analysis, and
- (ii) Increased nucleo-cytoplasmic ratio, Hyperchromasia, Atypical mitotic figures, Abnormal

variation in nuclear shape, Abnormal variation in nuclear size for cytological analysis respectively

### Conclusion

North-East India is considered to have the highest occurrence of oral cancer across the country. We have conducted this nation-wide survey to gather some useful information about the diagnosing techniques used by the pathologists and to summarize them, so as to identify the optimum ones. This information may be adequately used to incorporate into algorithms for automated detection and diagnosis of oral dysplasia, for researchers who want to carry out research in the area of digital pathology.

**Acknowledgement** The authors thank all the pathologists who had contributed in deriving a significant inference out of this survey with their valuable inputs. The first author would like to acknowledge the Department of Science and Technology (DST), Government of India for proving fund under Women Scientist-A scheme (SR/WOS-A/MS-11/2013 date 20.08.2014) for this study.

**Ethical Clearance:** Not applicable

**Source of Funding:** Department of Science and Technology (DST), Government of India.

**Conflict of Interest:** None

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# A Survey on Patient Satisfaction Levels Regarding Physiotherapy Treatment in Satara District

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## Abstract

**Background:** Patient satisfaction is a complex construct and is regarded as an important component in the assessment of quality of care. The measurement through satisfaction surveys, allows clinicians to examine the extent to which their services are meeting the patients needs. Questionnaires were used to obtain patients views of the physiotherapy treatment in abroad countries and developed cities of India. But no studies were carried out in Satara district regarding patient satisfaction in physiotherapy treatment. So the study is to be carried out by self marking questionnaire scale.

**Objectives:** To assess the satisfactory levels of the patients undergoing physiotherapy services in Satara district with the self marking questionnaire and to evaluate the feedbacks of the patients undergoing physiotherapy in Satara district with individual feedback.

**Method:** The study group consisted of 500 patients, both males and females randomly taken, aged between 20-60 years who were undergoing physiotherapy services in Satara district. Self marking questionnaires with 5 point Likert scale was used as the outcome tool and was given to the patients undergoing physiotherapy treatment and was asked to fill it. Each subject was given the questionnaire and according to the score they were further evaluated.

**Result:** The statistical analysis showed that 88.8% of patients were satisfied with the physiotherapy treatment in Satara district.

**Conclusion:** The survey showed that out of 500 patients 444 patients were satisfied with the physiotherapy treatment in Satara district.

**Keywords:** Patient Satisfaction, Self marking questionnaires, Physiotherapy.

## Introduction

Patient satisfaction is a complex construct and is regarded as an important component in the assessment of quality of care. The measurement through satisfaction

surveys, allows clinicians to examine the extent to which their services are meeting the patients needs. The dimensions predicting patient satisfaction with medical care have been widely studied to compare patient satisfaction across wide range of clinical specialities.<sup>(1)</sup>

The attitude of the patients towards the therapist and the therapist attitude towards the patients is very important aspect throughout the treatment. In the qualitative studies researchers have used unstructured or semi-structured interviews to elicit patient's views of their physiotherapy experience. In general, patients were satisfied when they felt that the therapist had understood their problem and that their care needs had been met.

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Dissatisfaction was expressed when patients were not involved in the decision-making process and there were delays in initiating treatment.<sup>(1)</sup>

Surveys conducted to examine patient satisfaction with physiotherapy since then have either modified/used extant instruments that had been previously subjected to rigorous reliability and validity testing or developed new tools like the Patient Satisfaction questionnaires, etc.<sup>(1)</sup>

There were use of questionnaires to obtain patients views of the physiotherapy treatment in abroad countries and developed cities of India. But no studies were carried out in Satara district regarding patient satisfaction in physiotherapy treatment. So the study is to be carried out by self marking questionnaire scale.

### Methodology

An approval for the study was obtained from the Protocol committee and the Institutional Ethical Committee of KIMSDU. Individuals were approached and those fulfilling the inclusion criteria were selected. Demographic information of the subjects was taken. The individuals were explained about the purpose of the study. Also, they were informed about the procedure. Each of them was given questionnaire to fill. Data was recorded. Later statistical analysis was done in accordance to distribution of the age, both genders with satisfied and unsatisfied result and general result also.

**Study Design:** The study was a Survey study.

**Setting:** Study sessions were held in physiotherapy clinics and hospitals of Satara.

**Participants:** All participants were selected by Convenient sampling method.

**Variables:** Primary outcome measure used was 5 Point Likert Scale.

**BIAS:** The study was not bias because the study included all the patients undergoing Physiotherapy treatment.

**Study Size:** The study size was 500

**Statistical Analysis:** Statistical analysis was done using un-paired t test. The analysis were performed using the software SPSS (version 25.0, Chicago, USA). Arithmetic means & standard deviation was calculated for each outcome measure and Arithmetic mean was derived from adding all the values together and dividing the total number of values. MS Excel was used for drawing various graphs with given frequencies and the various percentages that were calculated with the software.

Standard deviation (SD) was calculated according to the following formula.

$$SD = \sqrt{\frac{\sum (X - \bar{X})^2}{N}}$$

N

Where,  $\sqrt{\quad}$  = Square root of all the calculations under this symbol.

X = the individual score.

$\bar{X}$  = the mean score.

$\sum$  = sum of all the calculations to the right.

N = the total number of frequency.

### Results

- Gender wise distribution in the study:

Table No. – I

Gender	Satisfied		Unsatisfied		Total
	Number	%	Number	%	
Male	213	86.24	34	13.76	247
Female	231	91.30	22	8.70	253
Total	444		56		500
P value	0.0979				



**Interpretation:** The above table revealed that out of 500 patients undergoing physiotherapy treatment, maximum of getting satisfied result were Females 231 (91.30%) out of 253 females and Males 213 (86.24%) out of 247 males. There was no statistical association between satisfaction result and gender (p=0.0979).

• **Age wise distribution in the study:**

**Table No. – II**

Age	Satisfied		Unsatisfied		Total
	Number	%	Number	%	
20-39	256	91.76	23	8.24	279
>=40	188	85.07	33	14.93	221
Total	444		56		500
P value	0.0269				

**Interpretation:** The above table revealed that out of 500 patients undergoing physiotherapy treatment, maximum 256(91.76%) with satisfied result were in the age group of 20-39 years and rest 188(85.07%) with satisfied result were in the age group of >=40 years. There is statistical association between satisfaction result and age (p=0.0269).

• **General satisfaction result:**

**Table No. III**

Result	Satisfied		Unsatisfied		Total
	Number	%	Number	%	
	444	88.8	56	11.2	500

**Interpretation:** The above table shows that out of 500 patients undergoing physiotherapy treatment, maximum 444(88.8%) out of 500 patients were satisfied with the physiotherapy treatment and minimum 56(11.2%) out of 500 patients were unsatisfied with the physiotherapy treatment.

**Discussion**

This study “A survey on patient satisfaction levels regarding physiotherapy treatment in Satara district” was conducted to find out the Satisfaction levels of patients undergoing physiotherapy treatment.

Patient satisfaction is a complex construct and is regarded as an important component in the assessment of quality of care. The measurement through satisfaction surveys, allows clinicians to examine the extent to which their services are meeting the patients needs. The dimensions predicting patient satisfaction with medical care have been widely studied to compare patient satisfaction across wide range of clinical specialties.<sup>(1)</sup>

The attitude of the patients towards the therapist and the therapist attitude towards the patients is very

important aspect throughout the treatment. In the qualitative studies researchers have used unstructured or semi-structured interviews to elicit patient’s views of their physiotherapy experience. In general, patients were satisfied when they felt that the therapist had understood their problem and that their care needs had been met. Dissatisfaction was expressed when patients were not involved in the decision-making process and there were delays in initiating treatment.<sup>(1)</sup>

Surveys conducted to examine patient satisfaction with physiotherapy since then have either modified/used extant instruments that had been previously subjected to rigorous reliability and validity testing or developed new tools like the Patient Satisfaction questionnaires, etc.<sup>(1)</sup>

There were use of questionnaires to obtain patients

views of the physiotherapy treatment in abroad countries and developed cities of India. The majority of studies were carried out in American and European countries but no studies were carried out in Satara district of Maharashtra, India regarding patient satisfaction with physiotherapy treatment. So the study is to be carried out by self marking questionnaire scale.

Aim of the study was to find the patients satisfactory levels undergoing physiotherapy in Satara District.

The objects of the study were to assess the satisfactory levels of the patients undergoing physiotherapy services in Satara district with the self marking questionnaire and to evaluate the feedbacks of the patients undergoing physiotherapy in Satara district with individual feedback.

In this study, 500 samples were included on the basis of inclusive and exclusive criteria. In that both males and females were taken randomly aged between 20-60 years. Prior consent was taken and were explained about the study. Self marking questionnaires with 5 point Likert scale were given to the patients undergoing physiotherapy treatment and were asked to fill it.

According to the statistical analysis the samples were distributed according to gender where females 231(91.30%) out of 253 females were more satisfied while males 213(86.24%) out of 247 males were satisfied ( $p=0.0979$ ) with no statistical association between satisfaction result and gender ( $p=0.0979$ ). Also samples according to Age were also distributed where maximum patients 256(91.76%) with satisfied result were in the age group of 20-39 years and rest patients 188(85.07%) with satisfied result were in the age group of  $\geq 40$  years ( $p=0.0269$ ) with statistical association between satisfaction result and age ( $p=0.0269$ ).

The General Satisfaction Result from the overall 500 samples according to the study where 444(88.8%) patients were satisfied with the treatment session and there was a negative result from 56(11.2%) patients who showed unsatisfied result with different reasons of duration of treatment, environment of the treatment hall, behavior of therapist and punctuality of therapist towards the treatment.

It has been reported in previous studies of Sarah N Casserley-Feeney and colleagues<sup>(3)</sup> on Patient satisfaction with private physiotherapy for musculoskeletal pain that satisfied patients will return for treatment when the need arises and will speak in favorable terms about the

treatment and facility. Thus it is very much important that physiotherapists make efforts to ensure that their patients are satisfied with the treatment.

According to Julia M. Hush and colleagues<sup>(2)</sup> in their study Patient Satisfaction with Musculoskeletal Physical Therapy Care: A Systematic Review, The key process variables that result in high satisfaction are adequate duration and frequency of the treatment, appropriate follow-up, continuity of care and mode of treatment and involvement of the patient in decision-making process. Clearly patients need to feel they have had adequate time with the treatment and they have been carefully re-evaluated and followed up. Reducing patient-therapist time, a current pressure in health care, can be interpreted by patients as lack of interest in them and lead to lower satisfaction and quality of care. Thus satisfaction of patient plays important role in quality of care.

## Conclusion

On the basis of the analysis done the study concluded that 88.8% of the patients were satisfied with the physiotherapy treatment in Satara district. This study provides information that may be valuable to physiotherapists and students in guiding their professional practice towards optimizing patient satisfaction and quality of physiotherapy care.

**Conflict of Interest:** There were no conflict of interest in this study

**Ethical Clearance:** Ethical clearance was taken from institutional ethical committee of Krishna institute of medical sciences, Deemed to be university, Karad.

**Funding:** No funding.

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# A Study on Correlation between Normal Delivery and Cesarean Section Delivery on Lumbar Lordosis in Women

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## Abstract

**Objectives:** Low back pain in postnatal women is a major issue. So, lumbar curvature is a key feature to maintain core strength for which it has to be assessed. The individual variations in spinal curvature and lordotic pattern signifies the bio mechanics of the spine and it responds according to the load/activities. So this search is taken up among postnatal women. Women should also have awareness about the posture maintenance after the delivery. Postnatal women should work for the correction of the spinal curvatures. So, early assessment is necessary. Also secondary factors like the type of shoes women wear, Occupation and Lifestyle can influence the spinal curvatures which can be dealt with easier with the outcome of the research.

**Methodology:** In this correlational study, 100 women with age group of 25 to 35 years who have undergone cesarean section delivery and normal delivery, 50 each, were enrolled. Their lumbar lordosis was measured by the flexicurve. Results were obtained and compared.

**Result:** The average mean value of lumbar lordosis in the women with cesarean section delivery was 45.12 degrees and in women with normal delivery was 39.80 degrees.

**Conclusion:** On comparing summary score of lumbar lordosis in women with normal delivery and cesarean section delivery, there is difference of about 5.32 degrees in the score. The t test shows value of 37.296 in normal delivery and 42.969 in cesarean section.

Thus concluding that incidence of lumbar lordosis in women with cesarean section is more than in the women with normal delivery.

**Keywords:** Lumbar lordosis, Cesarean section delivery, LSCS delivery, Normal delivery, Flexicurve, Correlation.

## Introduction

The lumbar spine supports the upper body and transmits the weight of the trunk with upper body to the pelvis and lower limbs. Lumbar spine consists of 5 vertebrae. The normal resting position of the lumbar spine is in S shaped and is midway between flexion

and extension. Lumbar spine plays an important role for posture and stability providing the strength needed for stability especially utilized in static and dynamic postures<sup>1</sup>.

Lumbar lordosis: The anterior concavity in the curvature of the lumbar spine as viewed from the side<sup>2</sup>.

Or

An abnormal increase in lumbar curvature<sup>2</sup>.

Differences do exist in lumbar lordosis of males and females. Depending upon the nature of variations in

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their origin, the spinal curve, reasoning and implications from a morphological, functional and evolutionary perspective<sup>3</sup>. The female spine manifested a statistically significant greater curvature, greater cranial peak height and a caudally located lordotic peak. As caudal peak height is similar for males and females, the illusion of deeper lordosis among females is due partially to the fact that the upper part of the female lumbar curve is positioned more dorsally (more backwardly inclined). So concluding on this, Males and females manifest different lumbar curve shape, yet similar amount of inward curving (lordosis). The morphological characteristics of the female spine were probably developed to reduce stress on the vertebral elements during pregnancy and nursing<sup>3,7</sup>.

#### Types of lumbar lordosis<sup>4</sup>:

- Hyperlordosis (lordotic posture): It is characterized by an increase in the lumbosacral angle. Increase in lumbar lordosis and an increase anterior pelvic tilt and hip flexion. Often seen with increased thoracic kyphosis and forward head and is called kypholordotic posture.
- Hypolordosis (flat low back posture): It is characterized by a decrease in the lumbosacral angle. Decrease in lumbar lordosis and an increase posterior pelvic tilt and hip extension<sup>4</sup>.
- Muscles of the lumbar spine and their prime actions:<sup>4</sup>
  - Rectus abdominis: Trunk flexion
  - Internal obliques and external obliques: bilateral contraction causes trunk flexion.
  - Transversus abdominis: trunk rotation.
  - Quadratus lumborum: pelvic hiking and side bending of the spine.
  - Multifidus: spinal extension and contralateral rotation.
  - Intersegmental rotators and intertransversarii: sense vertebral position and motion.
  - Superficial erector spinae muscles (iliocostalis, longissimus, spinalis): primary trunk extensors.
  - Iliopsoas (iliacus and psoas major): primary hip flexors.
- Causes of alteration in lumbar lordosis:<sup>4,9</sup>

- Sustained faulty posture
- Pregnancy
- Obesity
- Weak abdominal muscles
- Continued slouching or flexion in sitting or standing postures.
- Overemphasis on flexion exercises in general exercise programs.

#### There are two types of delivery of the baby<sup>5</sup>:

1. FTND (full term normal delivery): The delivery of a baby through the pelvis and vagina.
2. LSCS (lower segment caesarean section): A cesarean section is the delivery of a baby through an incision the abdominal wall and uterus rather than through the pelvis and vagina.

#### Pregnancy-induced pathology<sup>6,8,10</sup>:

1. Posture related back pain
2. Increased ligamentous laxity
3. Joint laxity
4. Sacroiliac/pelvic girdle pain
5. Diastasis recti

#### Methodology

An approval for the study was obtained from the Protocol committee and the Institutional Ethical Committee of KIMSDU. Individuals were approached and those fulfilling the inclusion criteria were selected. Total 100 individuals were selected. The procedure was explained and written informed consent was taken from those willing to participate.

Demographic information of the subjects was taken. The individuals were explained about the purpose of the study. Also, they were informed about the procedure. Each of them was assessed for the lumbar lordosis using flexicurve.<sup>12,13</sup>

In this correlational study, 100 women with age group of 25 to 35 years who have undergone cesarean section delivery and normal delivery, 50 each, were enrolled. Their lumbar lordosis was measured by the flexicurve. Results were obtained and compared.

Data was documented and statistical analysis was done

**Data Presentation, Analysis and Interpretation:**

**1. Comparison of lumbar lordosis in women with normal delivery and cesarean section delivery:**

**Table No. 1: Comparison of lumbar lordosis in women with normal delivery and cesarean section delivery.**

Lumbar Lordosis (Mean) Normal Delivery	Lumbar Lordosis (Mean) Cesarean Section Delivery
39.80	45.12

**Interpretation:** From the above graph it is clear that incidence of greater degrees of lumbar lordosis in women with cesarean section delivery is higher than in the women with normal delivery.

**Table No. 2**

	Normal delivery	Cesarean section delivery
Mean±SD	39.8±7.546	45.12±7.569
t value	37.296	42.969
p value	>0.10	0.0259
Interference	Significant	Significant

Unpaired t test value: 3.520

p value: 0.0007

Significant difference

**Association according to age group:**

**Table No. 3**

AGE (IN YEARS)	NORMAL DELIVERY		CESAREAN SECTION DELIVERY	
	AVERAGE	COUNT	AVERAGE	COUNT
25 TO 30	39.45	31	45.1	30
31 TO 35	40.36	19	45.15	20

**Result**

The incidence of greater degrees of lumbar lordosis in women with cesarean section delivery is higher than in the women with normal delivery.

**Conclusion**

After analyzing the data, it was found that the average mean value lumbar lordosis in the women with cesarean section delivery is 45.12 degrees.

And the average mean value of lumbar lordosis in the women with normal delivery is 39.80 degrees.

On comparing summary score of lumbar lordosis in women with normal delivery and cesarean section delivery, there is difference of about 5.32 degrees in the score.

The t test shows value of 37.296 in normal delivery and 42.969 in cesarean section.

Thus concluding that incidence of lumbar lordosis in women with cesarean section is more than in the women with normal delivery.

**Conflicts of Interest:** There were no conflicts of interest in this study

**Ethical Clearance:** Ethical clearance was taken from institutional committee of Krishna institute of medical sciences.

**Funding:** Self

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# Systematic Review on Effectiveness of Zinc Chloride in the Treatment of Halitosis

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## Abstract

**Background:** Halitosis refers to a chronic offensive mal odour produced from body cavities, especially oral cavity. It can cause detrimental psychological effects on the patient as well as aggravate infections in the oral cavity due to increase in bacterial load. Zinc chloride provides a solution for both by providing an antibacterial property and neutralises the VSCs that cause halitosis.

**Aim:** To study the effectiveness of Zinc chloride in the treatment of Halitosis

**Study Design:** A systematic review of research articles was performed. Electronic and hand search retrieved 515 records, 436 were screened. The intervention and outcomes were assessed in the study included for systematic review.

**Results:** Four studies were included in this systematic review. These studies showed the antimicrobial efficacy and ability of zinc chloride to inhibit the Volatile sulphur compound (VSC) production by oral bacteria. It also showed the synergistic property of Zinc chloride when combined with other compounds.

**Conclusion:** Despite the effective antimicrobial property and neutralisation of Volatile sulphur compound by zinc chloride, it still is unable to directly act on the gaseous VSCs. Therefore further studies must be done to improve the efficacy of zinc chloride and to develop new formulations that will help in managing the condition in a more effective way.

**Keywords:** Zinc Chloride, Halitosis, Volatile sulphur compounds, antimicrobial, Systematic review.

## Introduction

Halitosis is a chronic offensive bad odour, which originates from cavities such as mouth, nose or sinuses<sup>1</sup>. It often causes anxiety and embarrassment during

social interactions to the person. It is caused due to the production volatile sulphur compounds which produces the malodour<sup>2</sup>.

Halitosis is of two types: genuine and delusional. Genuine halitosis can be further classified into physiological and pathological, while delusional can be classified into pseudo halitosis and halitophobia<sup>2</sup>.

Causes of halitosis can be broadly classified into intra oral and extra oral causes. Intra oral causes include poor oral hygiene, infections of periodontal structures and diseases of the oral mucosa. Extra oral causes include respiratory infections, malignancies of lung and nasal cavity, gastrointestinal diseases such as GERD- gastro

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oesophageal reflux disorder (most common), peptic ulcer and oesophageal diverticulum. Other systemic conditions such as diabetes mellitus, kidney failure and liver cirrhosis also predispose halitosis. Drugs such as Amphetamines, Disulfuram, Nitrates and nitrites are also known to cause halitosis<sup>3</sup>.

Management of halitosis is necessary both from a medical as well as a psychological stand-point. Thus, management can be primarily achieved by treating the cause of the condition. In case of extra oral causes, appropriate treatment is to be given for the underlying condition, wherein intra oral cause can be treated by either direct action on the bacteria or by action on the volatile sulphur compounds which lead to halitosis<sup>4</sup>. Treatment for halitosis can be achieved mechanically and chemically. Mechanical interventions include tongue scraping, tooth brushing, interproximal brushing and flossing. Chemical interventions include usage of mouth rinses, toothpastes and chewing gums containing Chlorhexidine, Zinc chloride and cetylpyridinium chloride<sup>2</sup>.

Zinc salts have a wide range of dental uses. They are useful in controlling halitosis, preventing calculus formation and also have been proved to be anticariogenicity. They are also biocompatible in nature<sup>4</sup>. Studies suggest zinc chloride neutralize the VSCs and thus prevent halitosis along with its bacteriostatic nature<sup>5</sup>. It also shows synergistic effects when it is used along with chlorhexidine and cetylpyridinium chloride and does not stain teeth unlike chlorhexidine<sup>6</sup>. Thus the main objective of this systematic review is to assess the effectiveness of zinc chloride in the treatment of halitosis.

**Objectives:** To assess the effectiveness of Zinc chloride in the treatment of halitosis.

## Material and Method

### Eligibility Criteria:

### Inclusion Criteria:

1. Articles based on zinc chloride as an intervention for treatment of halitosis were included.
2. Full text articles were included.
3. Studies published in English were included.
4. Publications from all years.

### Exclusion Criteria:

1. Articles published in other languages.
2. Only abstracts available.
3. Unrelated articles.

**Search Strategy:** Literature on effectiveness of Zinc chloride in the treatment of Halitosis in databases such as PubMed, Elsevier science Direct, Cochrane, Wiley online library and Ovid Medline were taken into study for review. Literature search was conducted using the keywords Zinc chloride AND Halitosis.

### Search Engines:

1. Pubmed
2. Elsevier Science Direct
3. Ovid Medline
4. Wiley Online Library
5. Cochrane

## Results

The search yielded 515 articles and 436 were screened and were assessed independently. Among these articles four articles were included and studied for this systematic analysis. Figure 1 shows the flow diagram of the records that were identified, screened, assessed for eligibility, excluded and included in the review

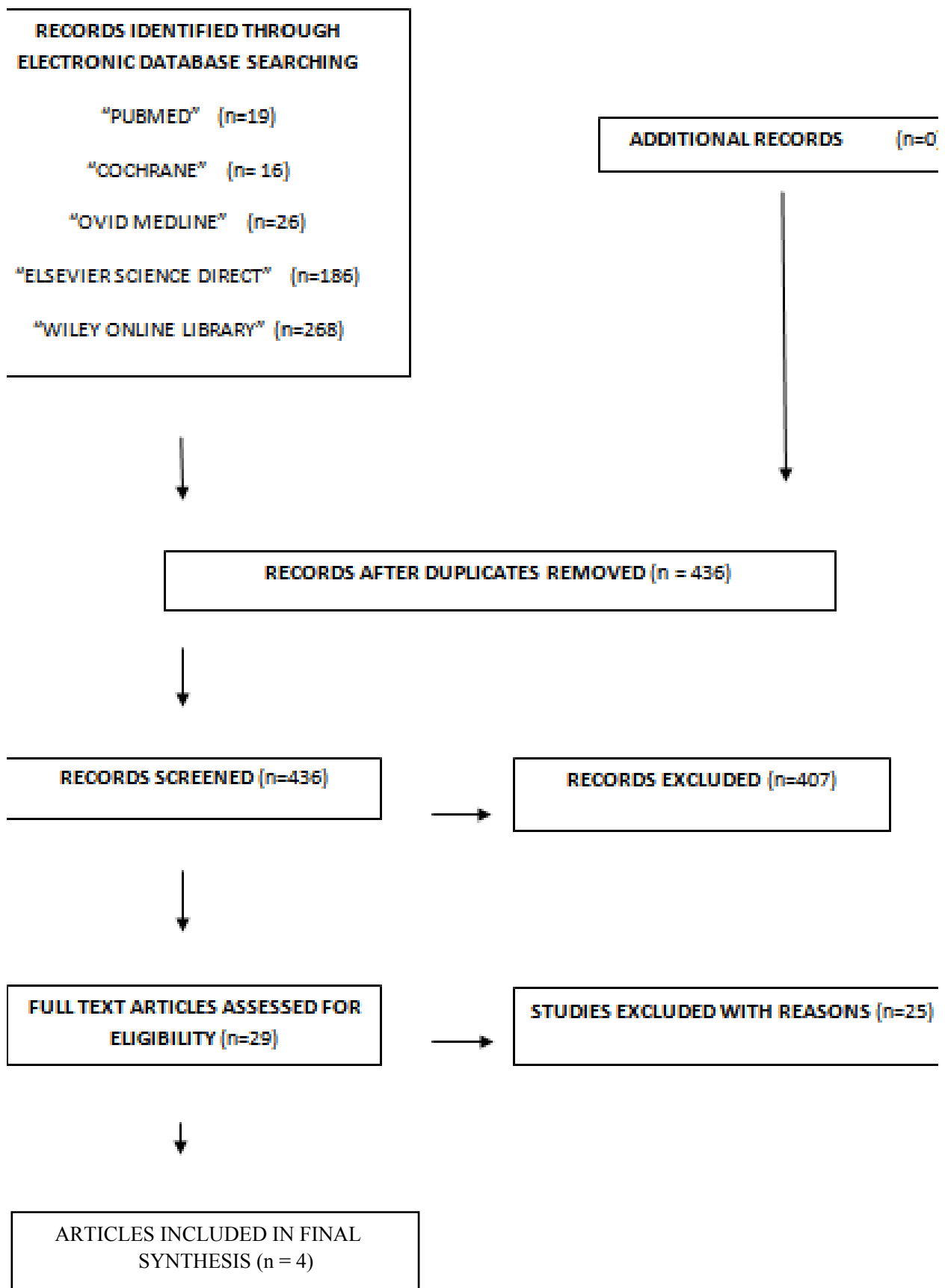


Figure 1: Flow diagram showing the number of studies identified, screened, assessed for eligibility, excluded and included in the systematic review

**Table 1: Characteristics of the interventions in the included studies**

S. No	Author Year	Aim of Review	Chemical Intervention Used	Substrate Used	Growth Medium and Temperature (If Bacterial Strains Used)
1.	JU-SIK KIM 2014	Ability of anti- <i>vs</i> c solutions to eliminate gaseous <i>vs</i> c by direct contact	20ml of 0.16% sodium chlorite, 0.25% zinc chloride, 0.1% chlorhexidine and distilled water	Mixed <i>vs</i> c, hydrogen sulphide, methyl mercaptan and Dimethyl sulphide	-
2.	ROBERT L. PIZZEY 2011	Evaluate antimicrobial effectiveness of an o-cymen-5-ol/zinc system	Zinc chloride, o-cymen-5-ol, zinc gluconate	<ul style="list-style-type: none"> <li>• S.mutansctc 10499</li> <li>• S.mutans ua159</li> <li>• A.viscosusctc 10951</li> <li>• F.nucleatumctc 10562</li> <li>• P.gingivali-s atcc 53978</li> <li>• C.albicanscpf 3179</li> </ul>	Blood agar;37°C; aerobically Blood agar;37°C; anaerobically Sabouraud's dextrose agar; 25°C; aerobically
3.	JEONG HYUN KANG 2015	Antimicrobial efficacy of zinc chloride and cetylpyridinium chloride on growth of bacteria which is involved in pathophysiology of halitosis and peri implant disease	0.25% cpc, 2.5% zncl□ and 0.25% cpc and 2.5% zncl□ in combination	<ul style="list-style-type: none"> <li>• F.nucleatumatcc 25586</li> <li>• P.gingivalisatcc 33277</li> <li>• P.intermedia atcc25611</li> <li>• T.denticolaatcc 33521</li> <li>• T.forsythiaatcc 43037</li> <li>• S.aureusatcc 29213</li> <li>• S.mutansatcc 25175</li> </ul>	Brain heart infusion broth 37°C Modified new oral spirochete medium Tryptic soy broth
4.	JEONG HYUN KANG 2017	Investigate the antimicrobial efficacy of zncl□ and cetylpyridiniumchlorideand their inhibitory capacity on <i>vs</i> c production by oral bacteria	Cpc, zncl□,cpc and zncl□ in combination	<ul style="list-style-type: none"> <li>• A. actinomycetemcomitansatcc 437718</li> <li>• F.nucleatumatcc 25586</li> <li>• P.gingivalisatcc 33277</li> <li>• P.intermediaatcc25611</li> <li>• S.aureusatcc 29213</li> <li>• S.mutansatcc 25175</li> <li>• T.denticolaatcc 33521</li> <li>• T.forsythiaatcc 43037</li> </ul>	Brain heart infusion broth; 37°C; anaerobically Tryptic soy broth Modified new oral spirochete medium

**Table 2: Outcome Data as Reported in Included Studies**

S.No.	Author	Year	Outcome	Result
1.	Ju-Sik Kim	2014	Sodium Chlorite Solution Reduced The <i>Vsc</i> Concentration Remarkably, While Zinc Chloride And Chlorhexidine Decreased The Concentration By Approx.30%.	Results Suggest That Sodium Chlorite Solution Has Direct Action On The <i>Vsc</i> s While The Anti- <i>Vsc</i> Zinc Chloride And Chlorhexidine Are More Likely Due To Their Antimicrobial Activity And Inhibition Of <i>Vsc</i> Production.
2.	Robert L. Pizzezy	2011	Zinc Inhibited Glycolysis And Protease To A Greater Extent Than O-Cymen-5-Ol. Glycolysis Inhibition By The 2 Agents Was Additive. O-Cymen-5-Ol/Zinc Chloride Showed Greater Effects Than Placebo	The Combination System Has Direct Antimicrobial Effects And Shows Synergistic Effect Against Anaerobes, Thus Is Desirable For Toothpaste Preparations.
3.	Jeong Hyun Kang	2015	Both Zncl□ And Cpc Effectively Inhibited Bacterial Growth. Zncl□ Was Generally More Effective Than Cpc. Both Agents In Combination Showed Synergistic Effects.	Zinc And Cpc Inhibited Bacterial Growth That Causes Halitosis Effectively. The Effect Is Even More Powerful When Used In Combination.
4.	Jeong Hyun Kang	2017	Zncl□ And Cpc Effectively Inhibited Growth Of All 8 Strains. Zncl□ Was Generally More Effective.	Both Zncl□ And Cpc Provide Antibacterial Action And Directly Decreases The Bacterial <i>Vsc</i> sproduction.

## Discussion

Halitosis is a chronic offensive bad odour, which originates from cavities such as mouth, nose or sinuses<sup>1</sup>. Management of halitosis is crucial from both psychological and medical stand point. Management of halitosis can be achieved by 2 means: Chemical and Mechanical interventions include tongue scraping, tooth brushing, interproximal brushing and flossing. Chemical interventions include usage of mouth rinses, toothpastes and chewing gums containing Chlorhexidine, Zinc chloride and cetylpyridinium chloride<sup>2</sup>.

In the 4 articles mentioned above, the action of zinc against oral microflora was studied so as to prove its effectiveness in the treatment of halitosis. Kang et al<sup>6</sup> has discussed antimicrobial efficacy of Zinc chloride and cetylpyridinium chloride on the growth of 7 different bacteria which include S.aureus, S.mutans, P.gingivalis, F.nucleatum, T.denticola and T.forsythia. This study showed that the combination of the 2 compounds were more effective than the individual compounds themselves. i.e.  $ZnCl_2 + CPC > ZnCl_2 > CPC$ , on all the bacteria except for P gingivalis and T denticola. Thus these two compounds together can reduce and suppress the VSCs production by the bacteria when used together than we used individually.

J.-S. Kim et al<sup>[8]</sup> has studied the ability of Chlorine dioxide, Zinc chloride and Chlorhexidine solution to eliminate the gaseous VSCs by direct contact. This study showed that in spite of zinc chloride having two different mechanisms to control halitosis; by antimicrobial property and second by oxidising thiol group of amino acids on the VSCs, it still is only effective if the VSCs are dissolved into the solution or is present in a liquid medium. It has no direct on the gaseous form unlike Chlorine dioxide which has proved to be the most effective.

Pizzey et al<sup>9</sup> has studied the antimicrobial activity of zinc chloride, zinc gluconate and o-cymen-5-ol against S mutans, A.viscosus, P gingivalis, F.nucleatum and C albicans. This study showed that a combination system of these compounds showed a synergistic direct antimicrobial effect. Also zinc chloride inhibited glycolysis and protease to a greater degree than o-cymen-5-ol, thus indicating a potential for anticariogenicity.

J.H.Kang et al<sup>10</sup> has studied the antimicrobial efficacy and inhibition capacity of Zinc chloride and CPC on 8 different bacteria. This study showed that

except for S.aureus and S mutans all the other bacteria produced VSCs. Also the VSCs produced by each of these bacteria were unique in nature. Zinc chloride and CPC both showed good antimicrobial activity and also showed synergistic properties when combined. But repeated ingestion of minimal quantities of zinc may lead to distress conditions such as nausea, abdominal pain and diarrhoea. This study concluded by saying that the treatment of halitosis in each patient must be individualised according to the concerned bacteria and an effective intervention must be chosen according to the bacteria which causes it.

## Conclusion

Zinc chloride neutralises the VSCs in the oral cavity by both its antimicrobial action as well as by oxidising the thiol group in the VSCs. Thus it helps in both in prevention in formation of the VSCs and neutralisation of the VSCs. Even though it shows synergism when combined with compounds like Chlorhexidine, Cetylpyridinium chloride and o-cymen-5-ol, it is proved to have no direct action on gaseous VSCs unlike Chlorine dioxide. Therefore further studies must be done to improve the efficacy of zinc chloride and to develop new formulations that will help in managing the condition in a more effective way.

**Conflict of Interest:** No conflict of interest of any nature or kind of product, service or company presented in this article.

**Source of Funding:** Self

**Ethical Approval:** The study was approved by the institutional committee

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# A Study of Acute Kidney Injury in Severe Acute Pancreatitis in a Tertiary Care Hospital in North India

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## Abstract

Acute kidney injury is one of the most dreaded complications of severe acute pancreatitis and is associated with a high burden of mortality. Objectives (i) To identify the incidence of acute kidney injury in patients admitted with severe acute pancreatitis (on the basis of Atlanta classification -2012) (ii) To determine the severity of AKI in these patients based on the KDIGO-AKI-2012 criteria, based on urine output and serum creatinine elevation, (iii) To assess the requirement of renal replacement therapy and outcome of the renal dysfunction in these patients.

**Method:** It is an observational study of 50 patients in ICU under department of medicine, MM hospital, Mullana in whom severe acute pancreatitis was diagnosed on the basis of Revised Atlanta classification (2012). The patients are followed up throughout the hospital stay. The mode of management and the outcome of acute kidney injury were assessed.

**Results:** Acute kidney injury occurred in 28 patients (56%). Majority of the patients who developed AKI were alcoholic. Mortality rate in our study was 44%. Median age of patients who had acute pancreatitis was 56 years. Stage 3 AKI was in 19 patients (38%), followed by stage 2 16% (n=8) and stage 1 in 1 patient only%. Majority of the Acute Kidney Injury group patients were treated conservatively with fluids and antibiotics (n=27, 54%) and 23 patients required hemodialysis (46%). 22 patients expired (44%) in AKI group, while only no patient expired in non-AKI group. In SAP with AKI patients the risk of death significantly increases with alcohol intake. Conclusions: In our study, the incidence of AKI in severe acute pancreatitis patients was 56%. Based on the KDIGO staging of acute kidney injury, majority of the patients were in stage-3 and ethanol use was significantly related with the development of AKI. Many of them required haemodialysis. An early recognition of AKI in acute pancreatitis and timely management can improve the outcome and reduce mortality.

**Keywords:** Acute pancreatitis, acute kidney injury, serum amylase.

## Introduction

Acute pancreatitis is defined as an acute inflammation of the pancreas. The most common causes are gall stones and alcohol, others which are less common could

be congenital anomalies, trauma, surgery, metabolic derangements, toxins etc. All these aetiologies ultimately lead to inappropriate zymogen secretion and disturbance of cellular metabolism causing auto-digestion of the gland. Diagnosis can be made by the presence of any two out of three criteria i.e. – typical abdominal symptoms like pain and vomiting, biochemical markers including amylase and lipase and radiological evidence of pancreatitis (on USG abdomen, CT scan, MRCP, etc). Severity of the disease can be mild (no organ dysfunction), moderate (organ dysfunction lasting for less than 48 hours) and severe in which organ (gastrointestinal, renal, hepatic,

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central nervous system, respiratory and cardiovascular) dysfunction lasts for more than 48 hours or is associated with extensive pancreatic necrosis.<sup>1</sup>

(TABLE 1).<sup>2</sup> Patients were evaluated for the duration of symptoms, severity of disease, clinical course during hospital stay and outcomes

**Method**

It is an observational study in which patients coming to mmimsr (department of medicine) diagnosed as acute severe pancreatitis were studied . Acute pancreatitis was diagnosed when patients presenting with abdominal pain, rise in serum amylase and/or lipase > 3 times of normal range and radiological findings suggestive of acute pancreatitis. Severity was calculated on the basis of APACHE II scoring or CTSI index .organ dysfunction lasting for more than 48 hours were labelled as severe acute pancreatitis. 50 such patients in medicine ICU were studied.

Circulatory failure was labelled when patients required inotropic support to achieve systolic blood pressure >100 mm of Hg. Respiratory failure when patient could not sustain oxygenation and required mechanical ventilation. AKI was labelled when people with previous normal renal function developed deterioration of renal functions with rise in creatinine >2 mg/dl with decline in urinary output to less than 0.5mg/kg/hr for 6 hours or more (according to KDIGO AKI 2012 classification)

**Results**

In our study out of 50 patients of severe acute pancreatitis 42% (21/50) were females, rest 58% were male .76% i.e. 16/21 of the women had history of gall stones. 52% of the total patients gave h/o of alcohol and all of them were men .median age was 56 years and range was 27 to 82 years .

pain abdomen was invariable present in 100% of case followed by vomiting in 92%, icterus was present in 24% cases and fever in 14%.(As Shown in Table 2)

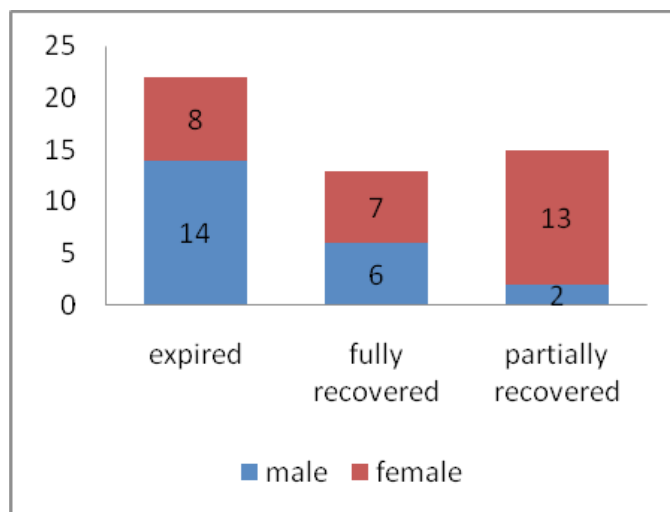
AKI occurred in 56% of total cases (28/50) and 23 patients i.e. 46% of the total patients required renal replacement therapy (haemodialysis) and most of them were alcoholics.

24% patients required intubation or mechanical ventilation owing to poor oxygen saturation or altered sensorium, all of theses patients were in the AKI group .44% (22/50) cases of severe acute pancreatitis expired, rest of them recovered fully or partially.

**Table 1: Kdigo Classification-2012**

Stage	Serum Creatinine	Urine output
1	1.5–1.9 times baseline or ≥ 0.3 mg dl <sup>-1</sup> (≥26.5 μmol litre <sup>-1</sup> ) increase within 48 h	≤0.5 ml kg <sup>-1</sup> h <sup>-1</sup> for 6–12 h
2	2.0–2.9 times baseline	≤0.5 ml kg <sup>-1</sup> h <sup>-1</sup> for 12 h
3	3.0 times baseline or Increase in serum creatinine to ≥4.0 mg dl <sup>-1</sup> (≥353.6 μmol litre <sup>-1</sup> ) or Initiation of renal replacement therapy or In patients <18 yr, decrease in eGFR to <35 ml min <sup>-1</sup> per 1.73 m <sup>2</sup>	≤0.3 ml kg <sup>-1</sup> h <sup>-1</sup> for 24 h or Anuria for × 12 h

**Comparison of clinical outcomes on basis of gender:**



**Figure 2**

**Table 2: Patient Demographics of Severe Acute Pancreatitis**

	Female	Male	Total
Number of patients	21	29	50
History of gall stones	16	6	22
History of alcohol	0	26	26
Pain abdomen/epigastrium	21	29	50
Vomiting	18	28	46
Icterus	11	1	12
Fever	4	3	7
Expired	8	14	22
Recovered fully	7	6	13
Recovered partially	2	13	15

**Table 3: Comparative characteristics among two groups of severe acute pancreatitis**

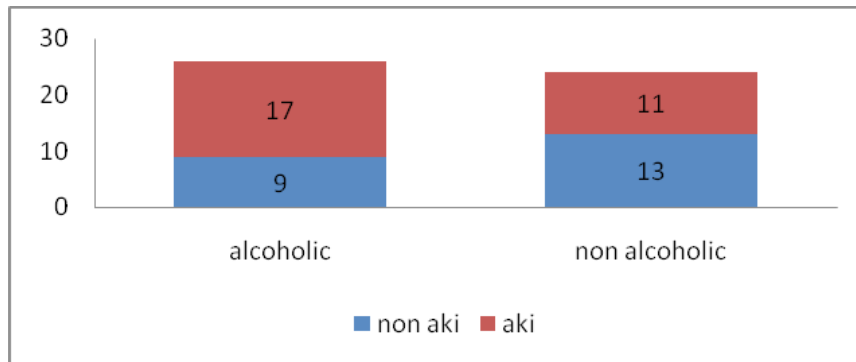
Characteristics of patients with AKI	Recovered from AKI (n=6)	Died (n=22)
Gender (M/F)	19/9	14/8
Age	42±9.57	46±9.34
Days of Insult	8±6.17	8±4.32
Hb (g/dl)	10.18±2.30	11.32±2.60
WBC (x103 cells per cumm)	20.60±9.88	21.56±11.58
Urea	240±138.68	236±119.68
Creatinine	11.78±7.82	9.98±4.83
Oligo-Anuria (%)	66.6% (4/6)	63.6%(14/22)
Potassium	5.32±1.34	4.56±2.2
Bicarbonate	12±5.34	16±6.54
Deranged INR (%)	33.3%	54%
Circulatory Failure (%)	16.6%	68.18%
Required Mechanical Ventilator (%)	0	
Haemodialysis Sessions	4.23±3.62	2.8±2.31



**Comparison of severity of aki between alcoholics and non alcoholics:**

**Table 4**

Kdigo Classification	Alcoholic	Non Alcoholic
Stage 1	0	1
Stage 2	5	3
Stage 3	12	7
Total	17	11



**Figure 3**

**Discussion**

Acute pancreatitis is a result of inappropriate secretion of zymogens, disturbed cellular mechanism of the pancreas causing auto digestion of the gland . it is a fatal disease and requires prompt diagnosis and treatment .AKI in association with acute pancreatitis was first described in 1951, as “renal anoxia syndrome”<sup>3</sup>

Further literature search reveals case reports and series highlighting high mortality in patients who develop acute kidney injury in association with acute pancreatitis.<sup>4-6</sup>

The pathophysiological mechanisms can be attributed to inappropriate activation of trypsinogen to trypsin progressing to sirs due to pancreatic injury, later causing MOF and death in some cases.<sup>7</sup> Also reported are release of vasoactive substances,<sup>8</sup> liberation of proteolytic ezymes from the damaged pancreas<sup>9</sup>

and due to disseminated intravascular coagulation.<sup>10</sup> recent literature also tells about the role of hypoxia, liberation of amylase from the injured pancreas with resulting impairment of renal microcirculation, abdominal compartment syndrome decreasing renal perfusion, intra-abdominal hypertension and hypovolemia.<sup>11</sup>

The activation of the complement system with severe forms of pancreatitis has also been reported, further promoting intra- peritoneal inflammation and cytokine activation.<sup>12</sup> The role of oxygen free radicals in leading to apoptosis in pancreas.<sup>13</sup>

Severe tissues damage and endothelial dysfunction is described to be strongly linked to overproduction of NO.<sup>14</sup>various literature suggests that incidence of AKI in acute pancreatitis is 14-42%<sup>(15-19)</sup>. Tran DD et al. report 16% prevalence of AKI with AP<sup>20</sup>

A study by kumar et al in central India done on severe acute pancreatitis reported 19.4% incidence of AKI and 57.1 % mortality in severe acute pancreatitis prognosis is poor in diabetics and alcoholics. Hung yuan lin et al reported 23.6% mortality associated with SAP. Manokaran S et al conducted a study on 100 patients in south india, AKI occurred in 32% cases, renal replacement therapy was required in 6.25%of total . 4 patients expired in the AKI group and 1 in non AKI group. Rubina naqvi’s study in Pakistan showed that 79% patients of AKI in severe acute pancreatitis required haemodialysis .

As shown in table 3 .In our study AKI occurred in 52% (28/50) cases of severe acute pancreatitis, 18 (36%)

had documented oligouria total of 46%(23/50) required haemodialysis inspite of giving adequate hydration and antimicrobial therapy in all cases, majority of them were alcoholics .prognosis was determined by the severity grading of AKI, severity of acute pancreatitis and alcohol use, this was in corcordance with findings by ravinderkumar et al and manokaran s et al .

Delayed organ specific management can affect patient prognosis and in our part of world, especially in our country India lack of health care facilities and disparity in resources availability often guides the fortune. In present study patients reached to this facility ranging from two to 28 days of developing the symptoms but this duration was not significantly different among survived and deceased patients.

Limitation of study: To know exact prevalence of AKI associated with AP in country, multi center studies at national level should be planned, so that exact intensity of problem, associated factors, management availabilities and outcome can be addressed in a better way.

**Ethical Clearance:** Taken from institutional ethics committee (IEC, MMDU, Mullana).

**Source of Funding:** Self

**Conflict of Interest:** Nil

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# Prevalence of Metabolic Syndrome and its Components among the Urban Population of Saraswathi Nagar, Nellore

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## Abstract

The term Metabolic Syndrome (MS), a modifiable determinant in the outcome of Cardio Vascular Diseases and Diabetes is defined as a constellation of risk factors like glucose intolerance, obesity, raised blood pressure and dyslipidemia. The screening of metabolic syndrome among high risk individuals can ensure early and prompt intensive management of the risk factors.

**Methodology:** The present study was a Community based, descriptive cross-sectional study conducted in urban population using multistage sampling technique over a period of one year using a semi-structured pre-designed and pretested questionnaire as the study tool. The study included a sample of 300 adults above the age of 19 years who gave consent were selected from four randomly selected urban localities in Nellore district.

**Results:** In this study 209 (69.7%) of the subjects were found to have at least one of the components of metabolic syndrome. It was seen that 127 individuals (42.3%) had been identified with two or more of the metabolic risk factors. The prevalence of the metabolic syndrome by NCEP-ATP III criteria was observed to be 27.7% (CI 95%: 22.64% to 32.76%).

**Conclusion:** With increasing trends of non-communicable diseases screening of Metabolic Syndrome ensures early diagnosis and better treatment outcomes which is promising for the upcoming future.

**Keywords:** *Metabolic syndrome, BMI, screening, hyperlipidemia, blood pressure, obesity.*

## Introduction

For the past 15 years, rapidly rising burden of Non Communicable Diseases has been the concern of epidemiologists from both in national and international agencies such as World Health Organization (WHO)<sup>1</sup>. In the developing countries, the burden of chronic diseases has been increasing, which is leading to significant social, economic and health consequences.

The term is defined as a constellation of risk factors like glucose intolerance, obesity, raised blood pressure and dyslipidemia, which predisposes the subject to increased risk of CVD and Diabetes<sup>2</sup>. The prevalence of the MS varies by the definitions used for the components and by the weight status of the subjects. World-wide, the prevalence of MS ranges from 10% to 50%<sup>3</sup>. The

prevalence of MS among Asian Indians were found to be 23.2%, 18.3% and 25.8% using the WHO, NCEP-ATPIII and the IDF definitions, respectively<sup>4</sup>.

The efforts were made to recognize individuals with MS from different sets of population so that they may be identified for intensive management of the risk factors<sup>2</sup>. In the recent years, a lot of research work has been done on MS, but most of them are hospital based and a very few are conducted at the community level. All the classical risk factors comprising the MS are seen to be prevalent in Asians residing in India; 31.4% abdominal obesity, 45.6% hypertriglyceridemia, 65.5% low HDLc, 55.4% hypertension and 26.7% raised Fasting Plasma Glucose have been reported from South India<sup>5</sup>.

None of the studies were done on MS among the

urban population of Nellore city. The aim of the study was to estimate the prevalence of Metabolic Syndrome and its components among the adult population of Saraswathi Nagar in the Nellore District of Andhra Pradesh and to study the association of risk factors with the Metabolic Syndrome.

### Materials and Method

The present study was a Community based, descriptive cross-sectional study conducted in Saraswathi Nagar, Nellore, which comprises of 10 localities with 6362 houses. A sample of 300 adults above the age of 19 years who gave consent were selected from four randomly selected localities of the field practice area of UHTC.

Sample size was calculated as follows.

#### Where:

$p$  = prevalence of MS in urban India = 23 % (average of the studies <sup>1,4,6</sup>)

And formula for calculating was  $Z^2pq/d^2$

$$1.962 \times 23 \times 77/5 \times 5 = 279.$$

Adding 10% non-responsive rate to the above derived sample, the total sample size (n) comes to  $279 + 20 = 299$  congruent -300.

The sample fraction was calculated by dividing the total number of houses in the four selected localities with sample size. Systematic sampling technique was used to select the houses required for the sample. Ethical clearance was sought from the Institutional Ethical Committee of Narayana Medical College, Nellore.

Study tool consisted of a semi-structured pre-designed and pretested questionnaire. The anthropometric measurements were taken along with the face to face interview followed by collection of blood sample of participant in their fasting state after obtaining their consent. The blood sample was collected with the help of a lab technician on the subsequent day for fasting plasma glucose, serum triglyceride and serum HDLc.

IPAQ short form of questionnaire was used to assess the physical activity of the study subject with details about the type of activity- moderate or vigorous and how much time was spent on that activity and for how many days in a week<sup>6</sup>. The blood samples collected were transported to the SR Diagnostics pathological

laboratory at the Lotus Hospital, Pogathota, Nellore for analysis within an hour. The lipid profile of the subject was analyzed using Hitachi 704 analyser.

#### Statistical analysis :

The collected data was checked for quality and coding was done prior to entering into the computer statistical program. Analysis was done using Statistical Package for the Social Sciences (SPSS) Version 22.0, released in the year 2013. Descriptive statistics like frequencies, means etc., were calculated and inferential statistics like chi-square test was done. Multiple logistic regression analysis was done to calculate Adjusted Odds Ratio (AOR) and p-value adjusted for confounding factors.

### Results

In the present study, out of 300 study subjects, majority (26%) belonged to the age group of 51-60 years. The mean age of the study population is 44.5 years. There were 176 (58.7%) females and 124 (41.3%) males. 90.3% (271) of the study subjects were found to be married during the study period, while only 5.7% (17) were single. 242 (80.7%) were literates, while only 58 (19%) of the subjects were illiterates. In the study population of 300, 76 (25.3%) belonged to Upper middle class and 32 (10.7%) belonged to Lower class.

Tobacco consumption was seen only in the males. Among the 124 males, 33% (41) of them were smokers. Of the 124 males, 46 (37%) subjects were alcoholic. 11.2% were heavy drinkers and 25.8% were moderate drinkers. Among the 264 consumers of mixed diet, 41 (13.7%) subjects had non-vegetarian for more than 2 days a week, and 74.3% had non-vegetarian for less than or equal to 2 days per week. Of the 300 individuals, 85 (28.3%) of them had salt intake of more than 5 grams per day, while 71.7% had recommended salt intake (Table 1).

In the current study of 300 subjects, 32 (10.7%) individuals were engaged in vigorous activity and 95 (31.7%) persons were moderately active, while the rest (57.7%) were doing low activity. As seen from the table 2, stress was present in 84 individuals (28%), while the rest 216 of the study subjects (72%) didn't show any stress. Central obesity was seen in 109 of 300 individuals, showing an overall proportion of 36.3% (CI 95%: 30.96%, 41.84%). However, the association of the variables was not statistically significant ( $p=0.358$ ).

The prevalence of hypertension in male population was found to be  $23.8\% \pm 7.5\%$  (95% CI). In females, the observed prevalence of hypertension was  $23.6 \pm 6.7\%$  (95% CI). As observed from the study, the prevalence of Diabetes was 20.7% (CI95: 16.12%, 25.28%) and that of pre-diabetes was 12.3%. of the 300 study subjects, 81 individuals had high levels of triglycerides with an estimated prevalence of 27% (CI 95%: 21.98%, 32.02%).

In the present study, it was noted that low levels of HDL-cholesterol were seen in 103 study subjects, with a prevalence of 34.3% (CI 95%: 28.93%, 39.67%). In this study 209 (69.7%) of the subjects were found to have at least one of the components of metabolic syndrome. It was seen that 127 individuals (42.3%) had been identified with two or more of the metabolic risk factors. The most prevalent metabolic risk observed was the presence of abdominal obesity in 109 subjects (36.3%) and also the low levels of HDLc, which was present in 103 (34.3%) participants.

Family history of diabetes (19.7%) and the prevalence of diabetes (20.7%) was observed to be the least occurring risk factor in the present study. The prevalence of the metabolic syndrome by NCEP-ATP III criteria was observed to be 27.7% (CI 95%: 22.64% to 32.76%). It was found that the females had more prevalence of MS (28.2%) when compared with males (27%). However the association of MS with gender was not statistically significant (p value=0.822) Variables like higher age groups, higher education, low physical activity, high salt intake, alcohol consumption, high BMI values, a positive family history of hypertension and fast food intake of more than 2 days per week had statistical significant association (p-value < 0.05) with metabolic syndrome. These variables were observed to be independent risk factors in the development of MS.

**Table 1: Association of Metabolic syndrome with various Risk factors (Logistic Regression Analysis)**

Variable	MS (n=300) Yes No		AOR	CI (95%)	p-value
<b>Smoking</b>					
Non-smoker	65	194	Ref		
Heavy smoker	3	6	0.811	0.12-5.19	0.825
Moderate smoker	7	8	1.613	0.37-7.02	0.524
Light smoker	8	9	1.236	0.29-5.15	0.771
<b>Alcohol</b>					
Non-alcoholic	61	193	Ref		
Heavy drinker	8	6	4.764	1.03-22.0	0.046*
Moderate drinker	14	18	2.362	0.78-7.07	0.125
<b>Diet</b>					
Vegetarian	8	28	Ref		
Non-veg $\leq 2$ d/week	64	159	2.471	0.85-7.14	0.147
Non-veg $> 2$ d/week	11	30	2.620	0.71-9.62	0.095
<b>Fastfood</b>					
$\leq 2$ days/week	64	205	Ref		
$> 2$ days/week	19	12	4.308	1.59-11.65	0.04*
<b>Oil</b>					
$\leq 210$ ml/week	53	161	Ref		
$> 210$ ml/week	30	56	1.546	0.78-3.03	0.205
<b>Salt</b>					
$\leq 5$ g/day	46	169	Ref		
$> 5$ g/day	37	48	2.115	1.08-4.14	0.029*
<b>Physical Activity</b>					
Low activity	65	108	Ref		
Moderate activity	15	80	0.293	0.13-0.61	0.010*
Vigorous activity	3	29	0.243	0.06-0.90	0.036*

Variable	MS (n=300) Yes No		AOR	CI (95%)	p-value
<b>Stress</b>					
Absent	58	158	Ref		
Present	25	59	1.306	0.63-2.65	0.465
<b>Family History Hypertension</b>					
Absent	49	179	Ref		
Present	34	38	3.713	1.50-9.19	0.005*
<b>Family History Diabetes</b>					
Absent	61	180	Ref		
Present	22	37	1.228	0.27-4.98	0.231
<b>BMI</b>					
Underweight	3	38	Ref		
Normal	20	95	2.806	0.63-12.48	0.176
Overweight	32	47	8.908	1.97-40.12	0.004*
Obese	28	37	10.69	2.30-49.7	0.003*

AOR= Adjusted Odds Ratio, CI= Confidence Intervals

\* indicates significant variable (p<0.05)

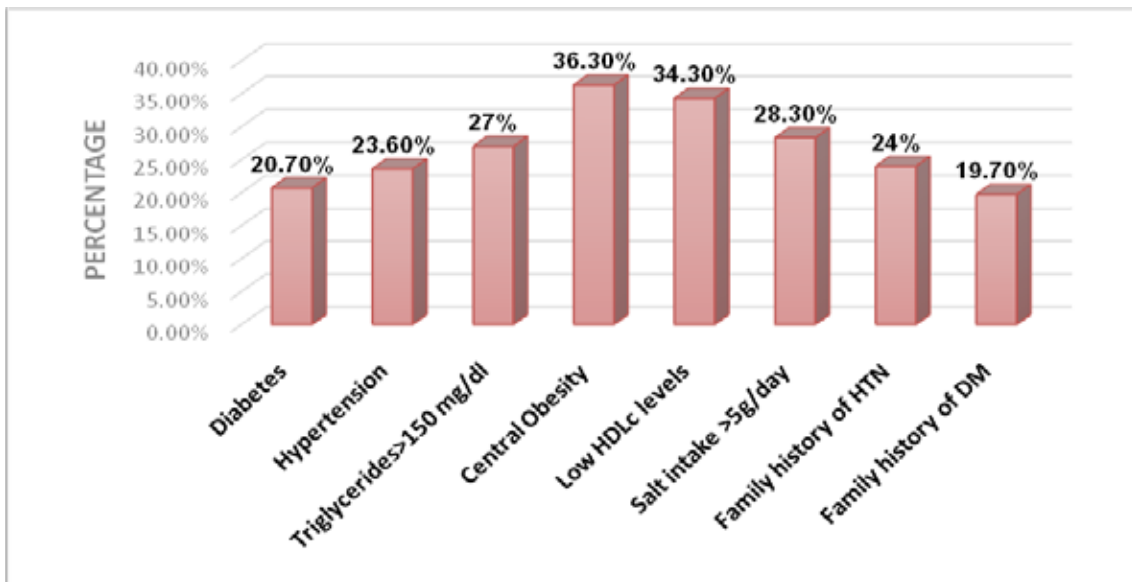


Figure 1: Prevalence of individual risk factors for Metabolic Syndrome (n=300)

### Discussion

Asian Indians are a high risk population with respect to diabetes and CVD and the numbers are consistently on the rise. The prevalence of MS in Asian Indians varies according to the region, the extent of urbanization, lifestyle patterns and socioeconomic/cultural factors<sup>7</sup>. Even though there were several other criteria to diagnose metabolic syndrome, the present study took NCEP-ATP III criteria, as it was more flexible and can diagnose MS even in the absence of glucose intolerance, which in itself is a predisposition to dysmetabolic dyslipidemia, an obesity phenotype and pro-inflammatory status<sup>1</sup>.

The overall prevalence of metabolic syndrome in this study was found to be 27.7% and it was more prevalent in females rather than in males. The higher prevalence rate of MS in females was supported by several studies<sup>5,8</sup> conducted in different parts of India. Contrarily, a study by Sawant et al. showed a prevalence of 25.16% in males and 12.6% in females, showing a higher prevalence in males<sup>1</sup>. Women transition from pre-menopausal to post-menopausal state with substantial metabolic changes and oestrogen deficiency might lead them to an increased predisposition to metabolic syndrome<sup>9</sup>.

An overall increasing trend of metabolic syndrome

was observed in prevalence rates with increase in age. This finding was in concordance with the study conducted in Bangalore<sup>10</sup>. MS had no significant association with education, although it slightly decreased with higher education, similar to a study done by Kaur J which showed an inverse association between level of education and metabolic syndrome<sup>5</sup>. Chandola et al., in his study had found a positive dose-response association between exposure to work related stress and MS, but in the current study, no such association was seen<sup>11</sup>. This study found similar observations to the study by Mangat et al. where the prevalence was higher among upper socio-economic classes compared to lower classes<sup>12</sup>. Furthermore, Rodríguez et al. in his study noticed an independent association of age, gender, moderately-intense physical activity, elevated fasting plasma glucose level, dyslipidemia, hypertension, treatment with oral hypoglycemic agents and the presence of endocrine disorders with MS which was found to be consistent with the present study<sup>13</sup>.

The study also showed that participants with diabetes had a high prevalence of major cardiovascular risk factors—hypertension, hypercholesterolemia, low HDL cholesterol and high triglycerides. However prevalence of hypertension was not as high as dyslipidemia and diabetes mellitus (Figure 1). This finding suggests that associations of dyslipidemia and diabetes mellitus were closely related to MS. This finding was similar to the findings from the study done on old people<sup>14</sup>. In the present study, the high prevalence of low levels of HDLc was found to be 34.3%. Low HDLc levels were very common among Asian Indians and were corroborated from the findings made by various studies across South Asia<sup>15</sup>.

#### **Limitations of the Study:**

1. The prevalence of MS in the present study was estimated using NCEP-ATP III criteria and the other criteria were not used because of limited resources.
2. Physical activity assessment was done by 24 hour recall method in this study and the application of a better method to assess physical activity was beyond the scope of the study.

**Recommendations:** The initial management of metabolic syndrome involves lifestyle modifications, including changes in diet and exercise habits. Since the current study found that obesity was more prevalent, weight loss and lifestyle change are considered to

be the most important initial steps in treating MS. Pharmacological interventions to correct dyslipidemia, hypertension and hyper-glycemia were recommended in the current study population. The staff of UHTC needs to be encouraged to identify the individuals with MS, thereby understanding the disease load and planning effective intervention strategies to decrease the prevalence of MS.

### **Conclusion**

This study revealed a high prevalence of metabolic syndrome in the urban adults of Nellore and 69.7% of the study subjects were found to have at least one risk factor of MS. A high prevalence of metabolic syndrome in this urban population explores the need for a comprehensive non-communicable disease prevention and control program. Lifestyle modification remains the initial intervention of choice for this population.

#### **Funding of the Study: Self**

#### **Conflicts of Interest: None**

#### **List of Abbreviations used:**

AOR	- Adjusted Odds Ratio
ATPIII	- Adult Treatment Panel III
BMI	- Body Mass Index
CI	- Confidence Intervals
CVD	- Cardiovascular Diseases
FPG	- Fasting Plasma Glucose
HDLc	- High Density Lipoprotein cholesterol
HTN	- Hypertension
IDF	- International Diabetes Federation
IPAQ	- International Physical Activity Questionnaire
LDL	- Low Density Lipoprotein
MS	- Metabolic Syndrome
NCDs	- NonCommunicable Diseases
NCEP	- National Cholesterol Education Program
SPSS	- Statistical Package for the Social Sciences
UHTC	- Urban Health Training Centre
WHO	- World Health Organization



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# A Descriptive Study to Assess the Knowledge of Staff Nurses Regarding Ethico-Legal Aspects in Patient Care at Selected Hospital, Mangaluru

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## Abstract

**Background of the Study:** Ethics is a branch of modern philosophy related to concept of right and wrong. Ethics is especially essential for the nurse to deal with the most fundamental actions like birth, death and at the time of pain etc. Nurses must know their legal obligation as they have to update with the fast changing and advancing knowledge to provide appropriate nursing care. The best way for the nurse to avoid lawsuit is too aware about the nursing standard in practice.<sup>1</sup>

**Objectives of the Study:** The objectives of the study were:

- To assess the knowledge of staff nurses regarding ethico – legal aspects in patient care.
- To find the association of knowledge score with their selected socio demographic variables.

**Materials and Method:** A descriptive study was conducted among 174 staff nurses who were working in a tertiary care hospital were selected by non probability convenient sampling technique. The data was collected using demographic proforma and structured knowledge questionnaire.

**Result:** The study result showed that majority (42%) belonged to the age group of 26-30 years. Maximum number of samples were female (85.6%), most of the samples had B.Sc nursing (degree) qualification (60.3%), while 27.6% had 1 year of experience, majority of samples (31.6%) were working in medicine ward and 41.4% had previous information regarding ethical and legal aspects. The 55.74 % had average knowledge, and 40.8% had poor knowledge and 3.4% had good knowledge. There was a significant association was found between level of knowledge and selected demographic variables such as gender and source of information.

**Conclusion:** The study concluded that there is a need to improve the level of knowledge of staff nurse regarding ethico - legal responsibilities for better patient care. Nurses need to improve knowledge by conducting educational programmes.

**Keywords:** Knowledge, staffnurses, ethico- legal aspects, patient.

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## Introduction

Nurses face many legal and ethical issues while providing patient care and it is essential to understand the law and way to affect the nursing practice is surrounded by many legal aspects because nurses are accountable for their professional judgement and legal boundaries which she must function to protect them from liability<sup>2</sup>.

To determine the aspects of health care provision are most likely to influence satisfaction with care and willingness to recommend hospital services to others and secondly to explore the extent to which satisfaction in a meaningful indicators of patient experience of health care services<sup>3</sup>. Ethics are the rules or principles that govern right conduct and are designed to protect the rights of human beings<sup>4</sup>. Nurses practice amicably includes practical efficacy and ethics now a day's legal and ethical problems associated with client care are arising day by day therefore, nurses should have adequate understanding of basic legal concepts and issues relevant to nursing profession in order to protect the rights of the clients and the nurses.<sup>5</sup>

### Materials and Method

It was a descriptive study, structured knowledge questionnaire based study conducted at selected tertiary care hospital Mangaluru. Ethical clearance was obtained from institutional ethics committee and formal permission was obtained from institutional authority. A Questionnaire was prepared by reviewing the literature and got it validated by the subject experts. The pretesting was done and found reliable using non-probability convenient sampling technique. The

calculated reliability (r) of the tool was 0.9 found to be reliable for data collection. The 174 samples were selected by convenient sampling. All the participants in this study was explained clearly about the purpose and nature of the study, in the language they can understand. They were enrolled in the study only after obtaining written informed consent. After taking the consent the data was collected by providing structured knowledge questionnaire. The questionnaire consists of two section; socio-demographic performance and structured knowledge questionnaire.

### Result

The study result showed that majority (42%) belonged to the age group of 26-30 years. Maximum number of samples were female (85.6%), most of the samples had B.Sc (degree) qualification (60.3%), while 27.6% had 1 year of experience, majority of samples (31.6%) were working in medicine ward and 41.4% had previous information regarding ethical and legal aspects. The 55.74 % had average knowledge, and 40.8% had poor knowledge and 3.4% had good knowledge. There was a significant association was found between level of knowledge and selected demographic variables such as gender and source of information

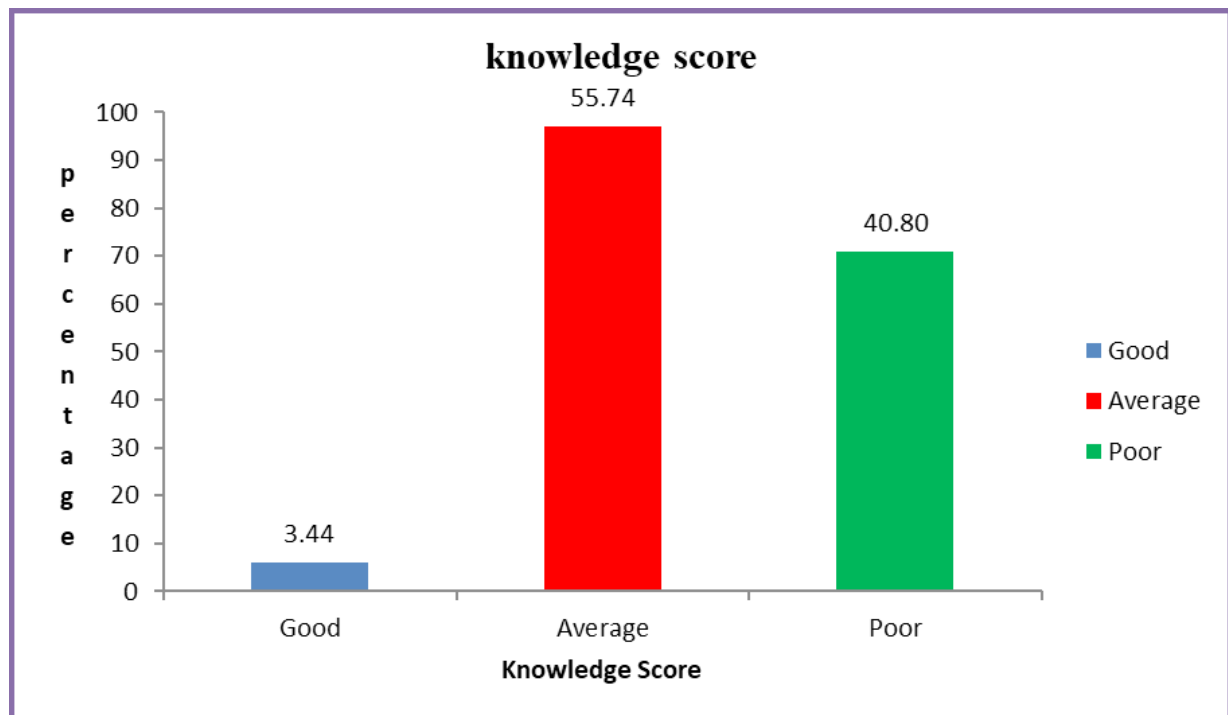


Figure 1: Bar diagram showing distribution of sample based on knowledge Score

The bar diagram showed that 3.44 % of sample had good, 55.74% had average and 40.80% had poor knowledge score.

**Table 1: Association of knowledge score with their selected socio-demographic variables**

Sl. No.	Demographic variable	Median <10 >10	$\chi^2$	df	P value
1.	<b>Age in years</b>		25.765	36	0.897*
	a) 20-25	31 40			
	b) 26-30	30 43			
	c) 31-35	7 17			
	d) >36	4 2			
2.	<b>Gender</b>		8.308	12	0.761*
	a) Male	10 15			
	b) Female	62 87			
3.	<b>Educational qualification</b>		34.705	36	0.530*
	a) GNM(N)	16 30			
	b) BSc (N)	46 59			
	c) PBBSc (N)	8 8			
	d) MSc (N)	2 5			
4.	<b>Total year of experience</b>		38.078	36	0.375*
	a) 6 month	14 27			
	b) 1 year	18 30			
	c) 1 and half year	19 24			
	d) 2 and half year	21 21			
5.	<b>Area of work</b>		59.252	60	0.503*
	a) Medicine	22 33			
	b) Surgery	15 27			
	c) OBG	16 12			
	d) Paediatric	14 13			
	e) Neurology	3 6			
	f) Others	2 11			
6.	<b>Previous any experience</b>		18.87	12	0.091*
	a) Yes	24 48			
	b) No	48 54			

**Note:** \* - Indicates non-significant

## Discussion

The present study was undertaken to assess the knowledge of staff nurses regarding ethico- legal aspects in patient care at Yenepoya Medical College Hospital, Mangaluru. The findings of the study demonstrated that among 174 staff nurses surveyed, majority (42%) belonged to the age group of 26-30 years. Maximum number of samples were female (85.6%), most of the samples had BSc (degree) qualification (60.3%), while 27.6% had 1 year of experience, maximum number of samples for working is 31.6% in medicine ward, and

41.4% had previous information regarding ethical and legal aspects.

The result showed that the staff nurses had inadequate knowledge and there was significant relationship between knowledge score and selected socio – demographic variables such as age, gender, educational qualification, year of experience, area of work and previous knowledge. Present study finding showed that majority 45 (20%) were using book for source of awareness on legal and ethical aspects in patient care. 160 (70%) graduation in nursing are comes

order educational qualification. 46 (20%) are 2 month – 1 year and 132 (57.39%) are 1-5 years of clinical experience.

The study result are supported by a study conducted to assess the nurses knowledge regarding ethico legal aspects should that majority 72 (41.4) using book for source of awareness on legal and ethical aspects in patient care. 7 (4.0%) graduation in nursing are comes order educational qualification. 41 (23.6%) are 6 month, 48 (27.6%) are 1 year, 43 (24.7%) are one and half year and 42 (24.1%) are 2 and half years of clinical experience.

### Conclusion

Ethics is a branch of modern philosophy related to concept of right and wrong. Ethics is especially essential for the nurse to deal with the most fundamental actions like birth, death and at the time of pain etc. Nurses must know their legal obligation as they have to update with the fast changing and advancing knowledge to provide appropriate nursing care.

**Source of Funding:** Nil

**Conflict of Interest:** Nil

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# Prevalence of Diaphragm Dysfunction in Relation to Breathing Pattern in Non Specific Low Back Pain

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## Abstract

**Background:** Low Back pain is commonly seen clinical condition which is encountered in day to day practice of Physiotherapy. There is lack of studies correlating the relationship between the diaphragm and low back pain.

**Purpose:** The aim of the study was to observe the diaphragm dysfunction with relation to the breathing pattern in individuals with low back pain.

**Material and Method:** The materials used in this study is Pen, pencil and the data collection sheet. An observational study was carried out using a cross sectional study design. The study was carried in Karad city, Maharashtra, India. 80 Participants with low back pain [37:M;43:F] has been participated in the study. The diaphragm weakness and breathing pattern were evaluated at rest as well as after motor task with the help of Manual Assessment of Respiratory Motion and pulmonary Function Test.

**Result:** Observational findings of this study demonstrates partial weakness and altered breathing pattern in patients with low back pain.

**Conclusion:** Partial diaphragm weakness and an altered breathing pattern was found in individuals with low back pain.

**Keywords:** *Diaphragm weakness, Breathing pattern, Low back pain, Motor task.*

## Introduction

Low back pain is one of the very commonest problem in the general population affecting almost 70-80% of the people<sup>[1]</sup>. Both the genders are affected but Women being the most affected than men<sup>[2,4]</sup>. Low back pain is the pain which lies between the 12<sup>th</sup> rib and the

inferior gluteal folds which may or may not radiate to the legs<sup>[3]</sup>. Back pain may occur due to degeneration of the spine, jobs that require repetitive lifting of heavy weights, jobs that require prolonged sitting as well as standing and mechanical stress over the intervertebral disc<sup>[3]</sup>. Other than mechanical causes Back pain may be a feature of the extra spinal disease like the Genito-Urinary or Gynaecological conditions<sup>[1]</sup>.

Age: Usually back pain is uncommon in children, but if it is present it may be because of some Organic Disease. In adolescents age group the traumatic back pain and the postural back pain may be the common cause<sup>[1,4]</sup>. In adult age group there may be various cause such as ankylosing spondylitis, disc prolapse<sup>[4]</sup>. In elderly there may be various causes such as degenerative arthritis and osteoporosis<sup>[4]</sup>.

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Sex: Women who had several pregnancies are mostly affected<sup>[4]</sup>. Poor Muscle Tone due to lack of Exercises are the contributory factors in these women<sup>[1,4]</sup>. Due to Obesity during the Pregnancy women may develop Mechanical Back Pain<sup>[4]</sup>.

Occupation :- The occupation may give us the clues of the risk factors which are responsible for back pain. People with sedentary jobs are most likely to be prone for back pain that the people whose work includes various activities <sup>[4]</sup>.

Usually Low back pain can be classified into three; Acute, Subacute, Chronic. Patients with Low back pain may present with decrease in the Muscle Strength and decrease in the Postural Control <sup>[1,2]</sup>.

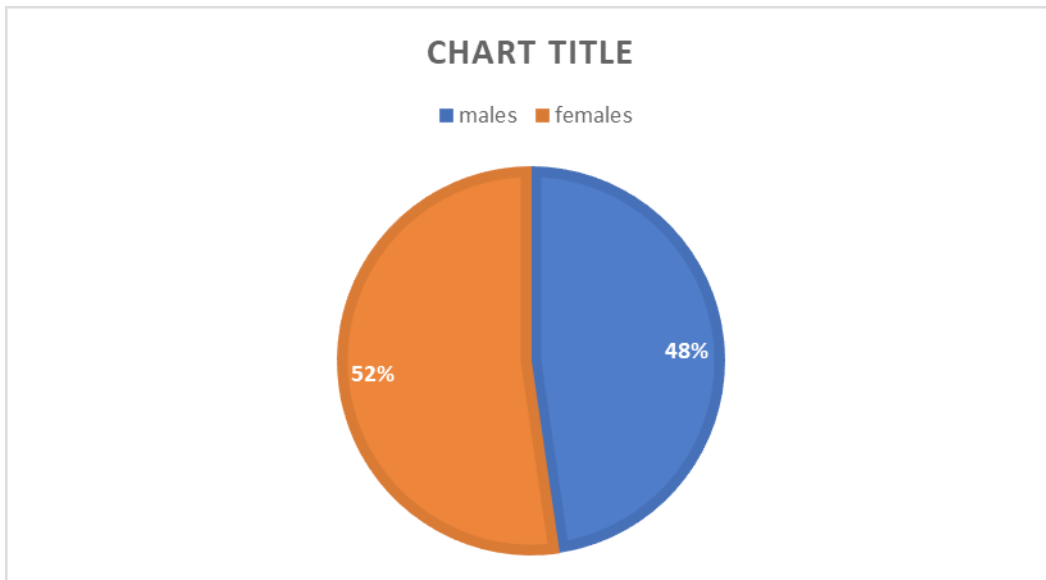
The recent evidences suggested that the diaphragm is not only the main muscle of respiration but also contribute biomechanically in the maintenance of the trunk stability as well as in regulating the intra-abdominal pressure <sup>[1,2]</sup>. Diaphragm plays a role as a trunk stabilizer as well as helps in respiration<sup>[1,2]</sup>. It was found that when the diaphragm gets activated by the Phrenic Nerve there was an increase in the intra-abdominal pressure which subsequently enhanced the Spinal Stiffness<sup>[1,2]</sup>. The Transverse Abdominis, the Pelvic Floor Muscle and the Multifidus along with Diaphragm help in the Stabilization of the Trunk<sup>[5]</sup>.

It was found due to delay in the contraction of Transverse Abdominis there was an inefficient muscular stabilization, kinematics of diaphragm was impaired as well as the kinematics of pelvic floor muscle was impaired and there was change in the respiratory pattern when the patient was asked to perform any motor control tasks<sup>[5]</sup>. And thus the alteration in the Kinematics of the Trunk Stabilizer may be the responsible factor for Low Back Pain<sup>[5]</sup>.

**Method**

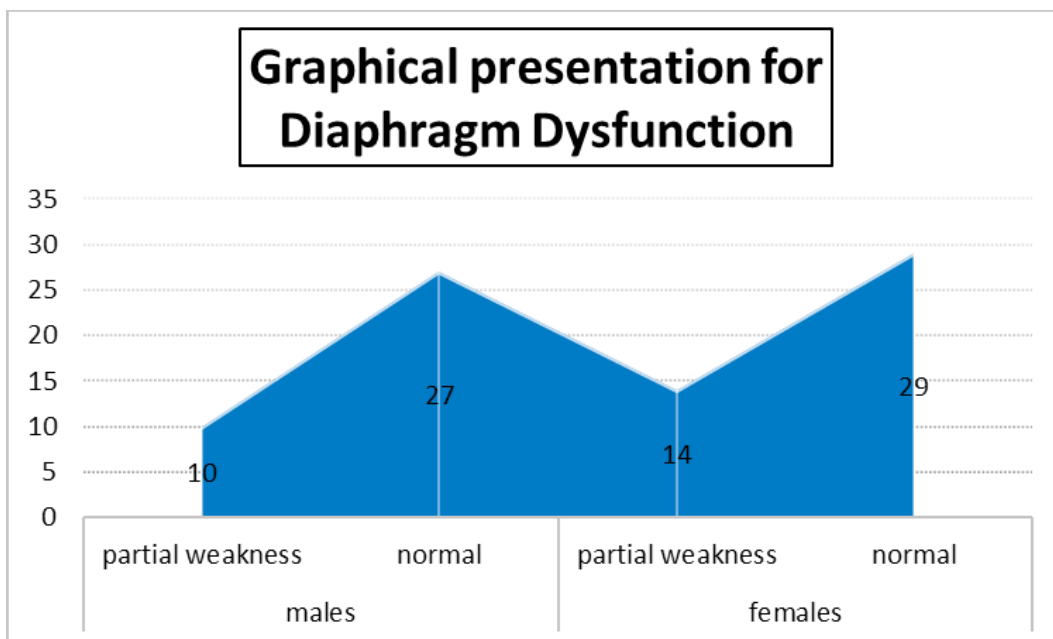
An observational study was carried out using a cross sectional study design. The study was conducted in the city of Karad, Maharashtra. The samples were chosen using the simple random sampling method. The participants in this study are both males and females suffering with nonspecific low back pain. Subjects are selected as per inclusion and exclusion criteria. Study were conducted using a sample size of 80 patients with nonspecific low back pain (n= 4pq/L<sup>2</sup>) for a period of 6 months. The materials used in this study includes data collection sheet and consent form.

**Statistical Analysis Used:** Statistical analysis of the recorded data was done by using the software SPSS version20



**Figure 1: Participants**

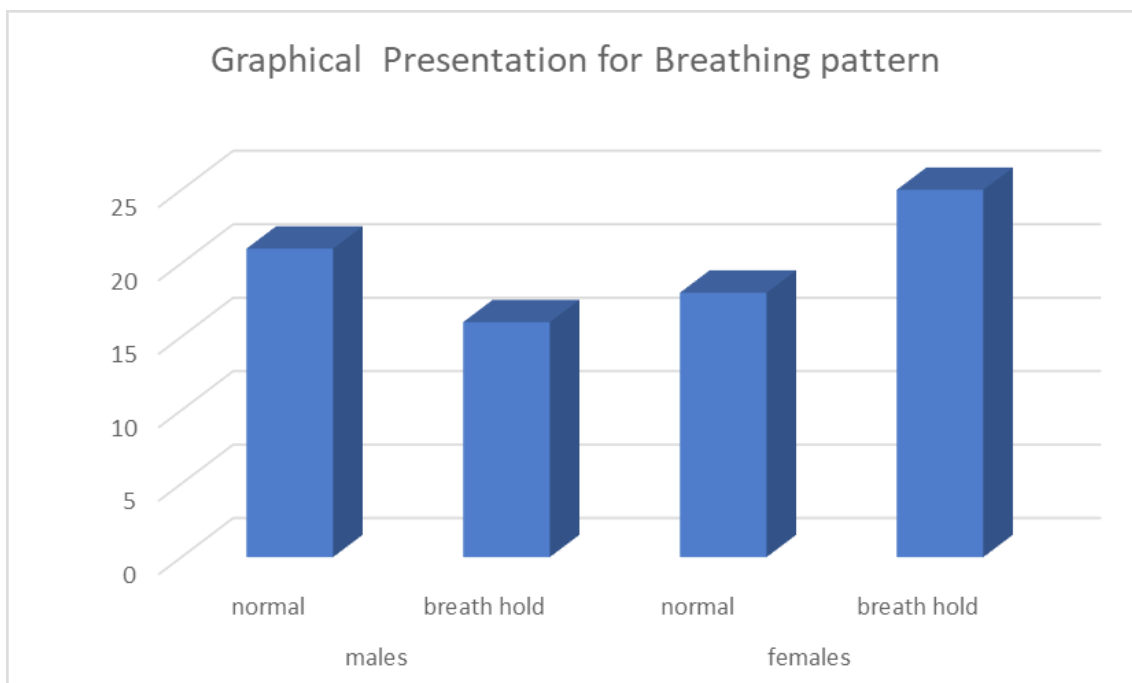
**Interpretation:** Individuals with low back pain, 52% seen in females and 28% seen in males.



**Figure 2: Diaphragm Dysfunction**

**Interpretation:** 10 male individuals with partial weakness were found while 27 individuals were found to be normal.

14 female individuals with partial weakness were found while 29 individuals were found to be normal.



**Figure 3: Breathing Pattern**

**Interpretation:** 20% of male individuals were found to be normal while 14% males were found to have breath hold.

18% females individuals were found to be normal while 24% females were found to have breath hold



## Results

The result showed that there was partial weakness in the diaphragm along with a significant breath hold while performing a motor task in individuals with non specific low back pain.

## Discussion

This research aimed to study the diaphragm dysfunction with relation to the breathing pattern in individuals with non specific low back pain. Biomechanically diaphragm is a main muscle for respiration as well as a trunk stabilizer. Evidence suggests that a lack in the spinal control can sometimes contribute to low back pain as the spine becomes vulnerable to loading during any motor task such as lifting, picking up the weights.

The objective of this study is to find out dysfunction of diaphragm along with the breathing pattern in individuals with chronic low back pain.

This study was done in six months of duration with sample size of 80 (43-females; 37-males) and age group between 20 and 40 years. The individuals participated in the study were diagnosed with low back pain lasting for past 6months or more. The individuals with any underlying respiratory problems were not allowed for the participation. The subjects were taken from Karad city. Consent form was taken from the subjects. The procedure was carried out by assessing the strength of the diaphragm by measuring the Vital Capacity. The breathing pattern of the subjects were assessed at rest as well as while performing the motor task.

Diaphragm weakness in subjects with Low Back Pain can contribute in a reduced Spinal Control.

One main reason is an Increase in the Intra-abdominal pressure which results in a relative stiffness. Increased Intra-abdominal pressure suggests to unload the spine by the trunk muscle activation. When the postural control and the respiration demand gets increased the co-ordination of both gets complicated.

Due to the alteration in the activity of Transversus Abdominis and the diaphragm the subjects with Low back pain often reported altered postural control.

There is continuous Fluctuation effect falling on the Intradiskal pressure.

The respiration induced Intradiskal pressure changes can play a big role in the nutrition and thus in the mechanical behavior of the Intervertebral disk.

The greater diaphragm weakness in the low back pain individuals can contribute in a decrease in the spinal control in such a population and this is via a response evoked by the inspiratory muscles metaboreflex activation- this may impair the function of the muscles that is the muscles involved in spinal control.

Figure:1 shows that out of 80 individuals 52% of Women has a non-specific low back pain, and 48% of Men has non-specific low back pain.

Figure: 2 shows that out of 37 male individuals 10 individuals had a partial weakness of diaphragm while the other 27 were found to be normal.

Out of 43 female individuals 14 individuals had a partial weakness of diaphragm while the other 29 were found to be normal.

Figure:3 shows that 20% male individuals were found to be normal at rest as well as while performing the motor task

But around 14% of the male individuals had breath hold while performing the motor task.

On the other hand 18% female individuals were found to be normal at rest as well as while performing the motor task.

But around 24% of the females had breath hold while performing the motor task.

## Conclusion

On the basis of the result of the study, it was concluded that there is a partial weakness in the diaphragm and a significant breath hold while performing a motor task in individuals with non specific low back pain.

**Conflict of Interest:** There was no conflict of interest..

**Source of Funding:** This study was self funded

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

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# Prevalence of Hypertension among Economically Productive Tribal Population in Tamilnadu

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## Abstract

**Background:** According to world health organization, cardio vascular diseases are considered as major public health problem among all non-communicable disease. Current study aimed to study the prevalence of hypertension among economically productive tribal population in Tamil Nadu. **Rationale:** although several studies have been carried among different population on non-communicable disease, very few studies conducted among tribal population in India.

**Materials and Method:** A community based descriptive cross-sectional study conducted among economically productive tribal population in Tamil Nadu. Complete enumeration survey method were used to obtain the study subjects. 89 study subjects aged 30 years and above were selected as a sample. Anthropometry, and blood pressure were measured with standard instruments. Descriptive and Chi square analysis were used to analyze the data.

**Results:** operational definition of hypertension was defined as systolic blood pressure  $\geq 140$  mmHg, and/or diastolic blood pressure  $\geq 90$  mmHg and/or use of antihypertensive drugs. Overall prevalence of hypertension among tribes of Tamil Nadu was found to be 16.5 % and 35 % of them were male 65 % of the study participants were female.

**Conclusion:** The prevalence of hypertension is high, hence there is need for primordial prevention efforts on large scale. Prevalence of undiagnosed hypertension number is high in India and this indicate there is need for regular screening.

**Keywords:** Hypertension, Prevalence, Tribal, and Non-communicable disease

## Introduction

World is undergoing the epidemiological transition and the non-communicable disease are overtaking the communicable disease and this phenomena not only

applicable among developed country; it is applicable among developing country as well. According to world health organization, among all non-communicable disease, cardio vascular diseases are considered as major public health problem. <sup>1,2,3</sup> High blood pressure is the commonest cardiovascular disease, causing a major public health challenge to people in the way of epidemiological transition and in socioeconomic transition. Various epidemiological study conducted in all over world have continuously identified that, there is a significant association between hypertension and coronary heart disease, congestive cardiac failure, decreased renal function and stroke.<sup>4</sup> Alcohol

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consumption, smoking, fatty diet and high body mass index are positively associated with high blood pressure and physical activity has negative association with hypertension. According to the National Nutrition Monitoring Bureau (NNMB) report the prevalence of high blood pressure among the rural adult (aged 18 and above) population was 25 % during 2004-2005.<sup>5</sup>

**Rationale:** Although several studies have been carried among different population on non-communicable disease, very few studies conducted among tribal population in India.<sup>3</sup> With this background, the current study aimed to study the prevalence of hypertension among economically productive tribal population in Tamil Nadu. A study conducted by **Ishibashi T** states that people aged 20 to 69 is considered as economically productive population group.<sup>6</sup>

**Operational Definition:** Operational definition of hypertension was defined as systolic blood pressure  $\geq 140$  mm Hg, and/or diastolic blood pressure  $\geq 90$  mm Hg and/or use of antihypertensive drugs.

### Methodology

The present community based cross-sectional study was conducted among tribes of economically productive age group of the tribal population in Mozhal and chittoor of Tamil Nadu. As per health record of the local Primary Health Centre (Pudur Nadu PHC), there were a total of 216 houses in Mozhal and chittoor hamlet. Complete enumeration survey was used to identify the study subjects, in this way it was possible to study 85 subjects after obtained informed consent. The data was collected by using a semi-structured and piloted questionnaire. Nurse assistant measured the blood pressure followed by height and weight is measured. After the minimum of five minute rest, two blood pressure readings were obtained on non-dominant arm for the purpose of validation of results. Seated position was used to obtain the blood pressure by using mercury sphygmomanometer. Average of two readings was taken as a result. Study population who is newly diagnosed as a hypertension was referred to nearby primary health center at Pudur Nadu. Body mass index (BMI), was calculated by dividing the weight in kilograms with the square of height measured in meters. WHO classification of obesity was used for the categorization.<sup>7</sup> Inclusion criteria includes, individual

who is aged of 20-69 years and even 64-69 years also considered if they are still capable of economically productive, and permanent residence of Mozhal and chittoor hills. Exclusion criteria include the teenagers who are still in school and colleges. Study participants were categorized into young adults (ages 18-35 years; n =23), middle-aged adults (ages 36-55 years, n =43), and older adults (55 years and above, n =19).<sup>8</sup>

**Ethical Consideration:** The study was approved by the Ethics Committee, SRM medical college hospital & research center, SRM Institute of Science and Technology, Kattankulathur. Written informed consent was obtained from the respondent after explain the research objectives.

### Results

Mean age of study participant were 43.8. For further analyzing purpose study participants were categorized into young adults (ages 18-35 years; n =23), middle-aged adults (ages 36-55 years, n =43), and older adults (55 years and above, n =19). Proportion of middle adults were 50.6% followed by young adult 27.1% and old adults 22.4%. Among the respondents 35 % of them were male 65 % of the study participants were female.

**Prevalence of Hypertension:** The overall prevalence of hypertension among tribes of Tamil Nadu was found to be 16.5 % and 7.10 % of them were male 9.40 % of the study participants were female.

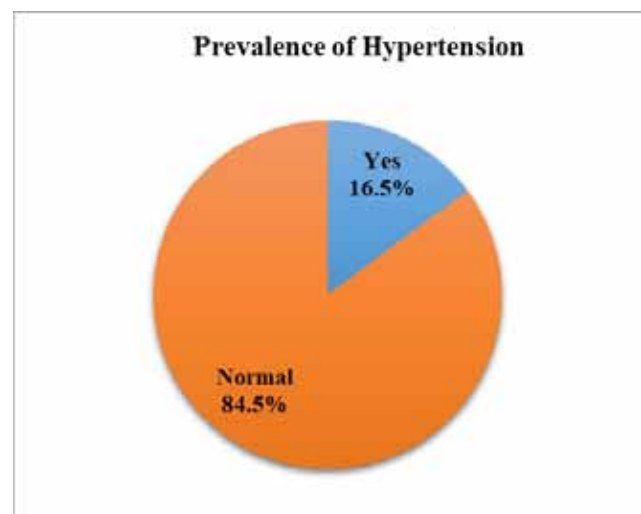
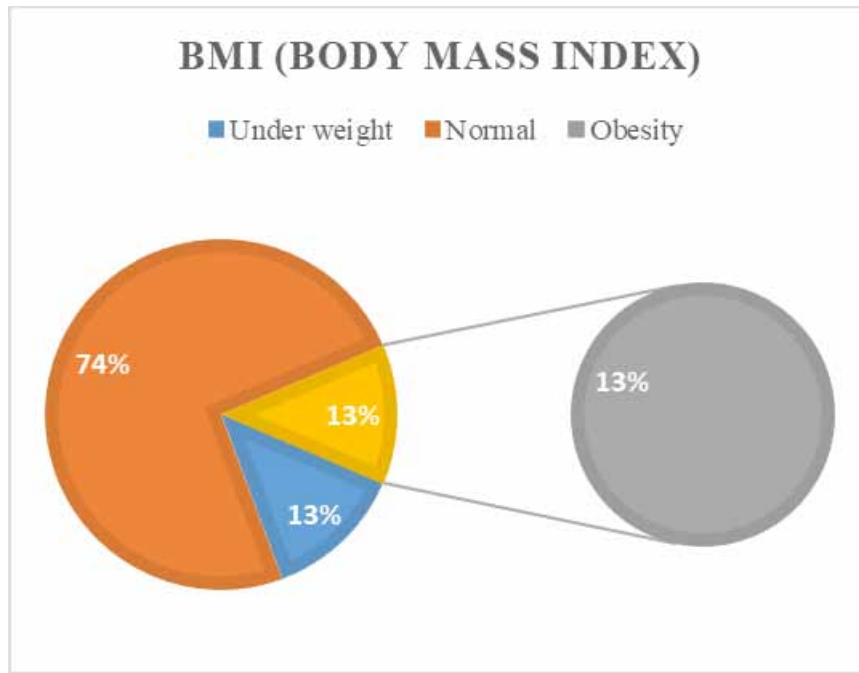


Figure 1: Prevalence of hypertension



**Figure 2: Body Mass Index**

Figure 2 shows that the prevalence of obesity among tribes population was 13%, underweight was 13 % and normal weight was found to be 74 %.

**Table 1: Magnitude of hypertension with identified risk factors**

Hypertension			
Variables		Yes	No
Gender	Male	7.10%	29.40%
	Female	9.40%	54.10%
Body mass index	Under weight	0%	12.90%
	Normal	11.80%	62.40%
	Obesity	4.70%	8.20%
Age	Young adults	0%	27.10%
	Middle-aged adults	7.10%	43.50%
	Older adults	9.40%	12.90%

Female found to have increased prevalence of hypertension 9.40 % and male found to be 7.10%. magnitude of problem is increasing with age, advancing age has increased risk of developing hypertension as above table describes prevalence of hypertension was higher among older adults 9.40%, followed by middle adult 7.10 %.

**Discussion**

Hypertension is an important non communicable disease. Comparison with a cross sectional study

conducted by **Bhadresh et al** among tribal population in Gujarat shows the overall prevalence of hypertension was 16.9% and only smoking has significant association with hypertension and Current study reveals that the prevalence of hypertension among the tribal population was found to be 16.9%.<sup>3</sup> A study conducted by **Radhakrishnan et al** found that about 42% men’s and 30% women’s were in the stage of prehypertension and around 36% men’s and 26% women’s are diagnosed as hypertensive. Magnitude of hypertension was higher among respondent aged 40 and 60 years and this study

states that the prevalence of hypertension did not have much difference when compared with urban or rural population, but our study states that prevalence of hypertension among female was higher 9.40 % compared to male 7.10 %.<sup>9</sup> A community based cross sectional study conducted by **Kokiwar et al** among rural community with 924 study subjects aged 30 years stated that the prevalence of hypertension was 19.04%. Higher prevalence was found in females (23.4%) than males (14.4%). Our study also states that the prevalence of hypertension was higher among female than males and current study also reveal the same result as the prevalence of hypertension was found to be higher among female 9.40% and as age increases the risk of developing hypertension also increases.<sup>10</sup>

### Conclusion

The two giant chronic morbidities diabetes and hypertension are two giant chronic morbidities in the modern world. Hypertension is pandemic and new challenge. The magnitude of hypertension is vary from country to country, region to region. It was seen that prevalence of hypertension increased with age. Difference of magnitude is decided by their cultural, topographical social, and economical, conditions. In further studies can be done to assess the magnitude of hypertension, determinants and preventive strategy, interventions for hypertension among tribal areas. By strengthening healthcare delivery and health education programs among tribal community about chronic diseases awareness and preventive measures among tribal population will reduce the incidence of hypertension among tribes.<sup>9</sup>

**Recommendation:** Screening and brief intervention for hypertension among tribes in diverse medical and community-based settings.

A study can be done to find out the relationship between prevalence of hypertension and region.

Replication of a similar study can be done with a large number of samples.

**Limitation:** This study has participants only from tribal, so it cannot be generalized to other population.

**Funding:** None.

**Conflict of Interest:** Nil

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# New Born Care Practices in a Resettlement Colony of Delhi

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## Abstract

**Background:** Newborn death accounts for 40% of all deaths among the under five children. Most of the newborns are born and die at home in developing country. Newborn health intervention trials at the home and community is identified as one of the key strategy to prevent most newborn death.

**Objectives:** The study was conducted to assess the newborn care practices and the associated factors among the mothers of resettlement colony in Delhi.

**Method:** Cross sectional study was conducted among mothers of newborn in an urban slum of East Delhi. Systematic random sampling method was adopted to interview 360 mothers who had live newborns under 28 days old. The data was collected using a pretested, validated and semi structured questionnaire. Appropriate statistical tests were applied.

**Results:** Among 360 study participants, 206(57.2%) preferred home delivery and 154(42.7%) of deliveries was conducted by skilled birth attendant. 31.1% of newborns were dried immediately. The cord was cut after the delivery of placenta among 189(52.5%) of the newborns. 85.3% of mothers something applied on the cord. 18.1% of mothers discarded colostrum. 81.9% of newborns were given prelacteal feeding. Mothers literacy, birth order, no of antenatal visits, place of delivery were significantly associated with the newborn care practices.

**Conclusion:** It is observed that detrimental newborn care practices were more common than the beneficial practices in the study. Understanding newborn care practices at home and community level is essential to improve existing intervention to reduce neonatal mortality.

**Keywords:** *Newborn care practices, neonatal mortality, thermal care, cord care, breast feeding, behavior change strategy.*

## Introduction

The newborn period is defined as the first 28 days

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of life which is exceptionally characterized by transition from intrauterine to extrauterine life. This phase of life has the highest risk of morbidity and mortality [1]. Newborn care immediately after birth is of immense importance for the proper growth and development of the baby [2]. It is reported that nearly 3 million babies die within 28 days of life [3] and a further 2.6 million stillbirths each year [4]. India contribution to the global burden of newborn deaths is higher when compared to that of maternal and under-5 deaths. India contributes 16% of global maternal death and 21% of under-5 deaths in which newborn mortality contributes to 27%. The

inadequate newborn care practices immediately after the delivery contribute to the important cause of morbidity and mortality among the newborns<sup>[5, 6-8]</sup>. Lack of quality antenatal care, unskilled attendant during labor, inadequate thermal and cord care, colostrum avoidance, delayed initiation of breastfeeding poses the main threat to newborn survival in India. Maternal literacy, socio-economic aspects of poverty, the health status of the mother, lack of decision making, self-autonomy, no or less antenatal and postnatal visits, the poor linkage between health centers and community were found to be an unforeseen cause of both maternal and neonatal mortality<sup>[1]</sup>. The most effective measure in saving newborn especially in developing countries is focusing on household and community level where most newborn death occurs<sup>[9]</sup>

Essential newborn care (ENC) is a set of measures every newborn baby requires regardless of where it is born or its size. It is designed to protect the newborn in adverse environmental condition and is a framework that should be applied immediately after birth, continued at least for the first seven days<sup>[5]</sup>. Components of ENC and neonatal resuscitation are proven interventions for reducing neonatal mortality rate and stillbirth rate<sup>[10-12]</sup> ENC begins during pregnancy- provision of iron/folate supplements, tetanus toxoid immunization, early identification and management of high-risk pregnancy and maternal infection which has an influence on newborn health and survival. The important strategies of ENC comprises of (a) Basic preventive newborn care such as clean delivery practices, prevention of hypothermia, eye and cord care, early initiation and exclusive breastfeeding on demand (b) Early detection of problems or danger signs (with priority for sepsis and birth asphyxia) and appropriate referral and care seeking and (c) Treatment of key problems such as sepsis and birth asphyxia <sup>[10]</sup>

Since many births and neonatal deaths take place at home, away from the reach of skilled providers, innovative community-based approaches are instantly needed to bring substantial improvement in newborn survival in India. Hence it is not possible to sustain the whole ENC strategies at the community level but feasible interventions like tetanus toxoid immunization, skilled birth attendant, warming baby, clean cord care and breastfeeding have been identified as proven interventions to save newborn lives <sup>[8]</sup>. Understanding these practices at the domiciliary level can help in designing and improvising existing interventions to

reduce neonatal morbidity and mortality <sup>[13]</sup>. Hence this study was carried out to assess the newborn care practices and the associated factors among the mothers of resettlement colony in Delhi.

## Material and Method

A cross-sectional study was carried out among mothers of newborns residing at an urban slum of Delhi of East Delhi. Mothers who had live babies under 28 days old were included and babies with congenital malformation was excluded. Using the prevalence of early initiation of breastfeeding as 36.6% from a previous community-based study <sup>[6]</sup> conducted, the sample size was calculated to be 356. A total of 360 mothers were recruited for this study. The urban slum chosen was the field practice area of a tertiary care teaching hospital of Delhi. HMIS system has an updated list of newborns. The total population of the slum was 70501 and eligible couples comprised approximately 17.88% of the total population (i.e. n=12605). Systematic random sampling was done with every 5th house chosen and mothers with newborns were covered till sample size of 360 was arrived. As the births and deaths were regularly updated, there was no delay in carrying out the interviews.

A pretested, validated, semi-structured questionnaire in local language i.e. Hindi was used for data collection. The tool has four sections- sociodemographic details, antenatal care and delivery related services cum practices, newborn care practices, and feeding practices. The study tool was pretested with 40 mothers of neonates in a rural area and required changes had been incorporated.

The mothers recruited in the study were explained about the purpose of the study and were given a participant information sheet. The participants were interviewed at their doorsteps with the study tool.

Data entry and data analysis was done in Statistical Package for Social Sciences (SPSS IBM) version 21.0. Data validation checks were done for the data entered. Proportions and mean with standard deviation were calculated. Chi-square test was used to find a difference in proportions. A p value of <0.05 is considered significant. The study was approved by the institutional ethical committee. Confidentiality was secured at all phases of the study.

## Results

The mean age of the mothers were  $24.04 \pm 3.69$



years. Majority of the mothers were in the age group of 21-30 years. All the study participants delivered a single live baby. Among these 26.4% had given birth to first child whereas 11.7% mothers who had given birth to 5<sup>th</sup> or more child. The study included 220(61.1%) male and 140(38.9%), female babies. The sex ratio was calculated to be 637 girls born for every 1000 male babies.

Among the study participants, 113(31.4%) women were illiterate whereas 96(26.7%) women had primary level education followed 151(20.2%) women had the education of middle school and higher level. 73.1% of the participants were of the upper lower class. 54.7% of these belonged to the nuclear family. 52.8% belong to the Muslim religion and 44.2% to Hindu religion.

Out of 360 participants 11(3.05%) did not utilize antenatal services, 61(16.9%) had <3 ANC visits and 288( 80%) had ≥ 3 ANC visits.(Fig 1)197(56.44%) women consumed IFA tablets for ≥100 days while 17(4.9% ) women did not receive it during their antenatal visits. Two doses of tetanus toxoid (TT) was given to 200(57.3%) women of which 54% were primigravida, 31% was the second gravida and 15% were the third gravida. On the other hand, 145(41.5%) mothers received a single dose of TT of which 68% were of ≥ 3 parity, 29% were of second parity and 3% were primigravidae. Mean estimated gestational age of the newborns was 37± 1.3 weeks.

\*The eleven (11) mothers who did not have any ANC visit were excluded

Among the study participants, 206(57.2%) deliveries were conducted in the home. Only 154(42.7%) deliveries were conducted by the skilled birth attendant (doctor, nurse or Auxiliary Nurse Midwife (ANM)) and 206(57.3%) deliveries were conducted by an unskilled birth attendant (untrained traditional birth attendants (dais), family members or neighbors).(Fig2) Birth weight was recorded for 252(70%) newborns of which

18.5% of newborns were below 2500gms and 81.5% were above 2500gms.

The mothers were questioned regarding the time of drying of the baby after birth, out of which 190(52.8%) baby was dried after delivery of the placenta and 112(31.1%) was immediately after birth and 47(13.1%) did not know when the baby was dried. 48(13.3%) baby was kept skin to skin contact with the mother after the delivery. All the newborns, except one, were covered immediately after birth. Among 359(99.7%) of the newborns wrapped,93.1 % were wrapped in clean cloth.

The cord was cut and clamped after two minutes of birth among 8(2.2%) newborns. The cord was cut using a new shaving blade among 147(40.8%) newborns followed by scissors 98(27.2%). The most common substances applied on the cord was antibiotic powder in 141(45.9%) followed by oil in 129(42.0%) and haldi in 91(29.6%) of newborns .

Among the study participants, 140(38.9%) mothers initiated breastfeeding within one hour after the birth of the newborn. 65 (18.1%) of mothers discarded colostrum of which 50.8% of mothers considered that giving colostrum is unsafe to the baby. Majority of the mothers (81.9%) has given pre-lacteal feeding within the first three days after the birth. And the most common substances given as pre-lacteals were Janam Ghutti (60.9%), tea (9%) honey (10%), unboiled plain water (10.0%). Other substances are given as pre-lacteals included cow’s milk (13.5%) and powder milk (7.0%). Janam Ghutti is an herbal preparation that is given as a bowel cleaner and during bouts of abdominal colic. Only 52(14.4%) of newborns were exclusively breastfed.

In table 1, Univariate analysis was applied on appropriate newborn care practices and antenatal and sociodemographic variables. There was a significant association between mother’s literacy, birth order, number of antenatal visits and place of delivery and newborn care practices.

**Table 1: Association between newborn care practices and sociodemographic & antenatal factors**

S.No.	Variables	Frequency (%)	P value	χ <sup>2</sup>
1.	Applying Nothing on the cord (N=53)			
a.	Birth order			
	≥3	35 (20)	0.005	7.56
	<3	18 (9.7)		

S.No.	Variables	Frequency (%)	P value	$\chi^2$
b.	Mothers education			
	Middle school & above	151(25.2)		
	Primary school & Illiterate	15(7.2)	0.000	22.59
c.	Place of Delivery			
	Institutional	47(30.5)	0.000	53.49
	Home	6(2.9)		
<b>2.</b>	<b>Bathing the baby after three days of birth (N=95)</b>			
a.	Place of Delivery			
	Institutional	81 (52.6)	0.03	4.37
	Home	14 (6.8)		
b.	ANC visits			
	$\geq 3$	85(29.5)	0.03	4.37
	$< 3$	10(16.4)		
<b>3.</b>	<b>Exclusive Breastfeeding During The Neonatal Period (N=52)</b>			
a.	Birth Order			
	$\geq 3$	40(21.6)	0.000	15.86
	$< 3$	12(6.9)		
b.	Place of delivery			
	Institutional	42(27.3)	0.000	35.84
	Home	10(85)		
<b>4.</b>	<b>Skilled birth attendant (N=154)</b>			
a.	Mothers education			
	Middle and above	130,(86.1)	0.000	199.35
	Primary and illiterate	24,(11.5)		
b.	ANC visits			
	$\geq 3$	140,(48.6)	0.0002	13.44
	$< 3$	14,(22.9)		

Chi-square applied,  $p > 0.05$  is considered significant

## Discussion

The present study was carried out with the objectives to determine the existing newborn care practices in a resettlement colony in East Delhi and to identify critical behaviors and barriers that influence the survival of newborns.

The study included 360 participants from resettlement colony among which 349(97%) had only one antenatal visit. This finding is consistent with Nimbalkar et al in which 94.4% of antenatal women had only one antenatal visits in the rural area and

79.9% in urban slums of Gujarat [14]. Among the study participants, 349(96.9%) women who utilized antenatal care on  $\geq 3$  occasions, the abdominal examination was done only in 33.8% of participants and ultrasound examination in 27.8% which shows that antenatal care provided was not adequate. 197(56.4%) consumed Iron and folic acid tablets for  $\geq 100$  days and 17(4.9%) women did not consume during their pregnancy. According to the National Family Health survey-4(NFHS-4) 53.8% women in Delhi consumed iron and folic acid for 100 days which is consistent with the present study [15]. 206(57.2%) study participants preferred home delivery

and 154(42.8%) institutional delivery, similar findings were reported by Rahi et al in an urban slum of Delhi (43.9%) and Meerut by Ahmad et al in urban slums of Mumbai (16.08%)<sup>[16,17]</sup>

In 73.6% of the deliveries clean instrument was used to cut the cord which is similar with findings of Baqui et al, where a clean instrument was used to cut the cord in 72.7% deliveries in rural areas of Lucknow<sup>[13]</sup>. In 115(31.9%) the cord was cut immediately after birth and 189 (52.5%) was cut after the delivery of the placenta. This is similar to the results of Kesterton et al in their study in rural Karnataka where the cord was immediately cut after the delivery<sup>[18]</sup>. The time of cutting the cord varied with the type of birth attendant at the time of delivery. The cord was cut immediately after birth in 101(65.58%) newborns delivered by skilled attendants (doctor, nurse, ANM) whereas, in the majority of deliveries conducted by unskilled personnel, the cord was cut after delivery of the placenta. Similar results were reported by Kesterton et al from rural Karnataka.<sup>[18]</sup>

A clean material was used to tie the cord in 301(86.1%) of the deliveries which are higher than the findings of the study done in urban slums of Indore by Agarwal et al<sup>[19,20]</sup>. Among the women who were delivered by unskilled birth attendants majority used unsterile material to tie the cord compared to those delivered by skilled personnel. This is consistent with the findings of the study by Rahi et al in urban slums of Delhi where the cord was tied using a clip in all institutional deliveries and sterile thread or a clip (available in delivery kits) was used only in 28.3% home deliveries.<sup>[16]</sup>

307(85.3%) mothers applied something on the cord. This is similar to the findings of the study by Verma et al in districts of Uttar Pradesh where 83 percent of women reported applying something on the cord stump<sup>[21]</sup>. 156(50.8%) of study participants used oil/ghee in the cord stump of the newborns. Iyengar et al reported a similar finding of use of ghee or powders and ointments on the cord in a slum and urban area of Chandigarh<sup>[19,22]</sup>. Majority of study participants(30.5%) delivered by skilled attendant applied nothing on the cord stump as compared to those delivered by unskilled personnel (2.9%). This is consistent with the finding of the study by Rahi et al in urban slums of Delhi where nothing was applied to the cord in newborns born in the institution (86.1%) than those born at home (63%)<sup>[16]</sup>. The study

also showed that education of the mother and delivery by the skilled birth attendant was significantly associated with cord care practices. This finding was similar to that of the study by Baqui et al in rural Lucknow where clean cord care was associated with a maternal education level of secondary school or higher and skilled birth attendance<sup>[13]</sup>.

In this study almost all the newborns were dried after birth to prevent hypothermia among which 112(31.1%) of them were dried immediately after birth and 190(52.8%) of them were dried after delivery of the placenta. Baqui et al reported that in rural Uttar Pradesh 34.8% of the newborns were dried immediately after birth and before the delivery of the placenta.<sup>[13, 23]</sup> 48(13.3%) practiced skin to skin contact with the newborns. A study by Waiswa et al reported that only 2% of mothers practiced skin to skin contact in a rural area<sup>[13]</sup>. Delaying bath helps in preventing hypothermia and infection. In this study 100(27.8%) of newborns was bathed immediately after birth which is lower compared to Rahi et al where 82.6% of newborns were bathed immediately after birth<sup>[24]</sup>. In rural Uttar Pradesh, 26% of newborns were bathed immediately after birth and 56.8% within 6 hours of birth.<sup>[13]</sup>

Initiation of breastfeeding within one hour of birth was reported by 140(38.9%) mothers and 270(75%) newborns were initiated on breastfeeding within 6 hours of birth. Similarly, early initiation of breastfeeding is reported in urban slums of Lucknow (36.6%), Unnao (5%) and Barabanki districts of Uttar Pradesh (19%)<sup>[13, 25, 26]</sup>. Baqui et al reported from rural areas of Unnao and Barabanki districts a high prevalence of pre-lacteal feeding (95.8%) which is similar to the current study(81.9%)<sup>[13,26]</sup>.

In this study, 18.1% of mothers avoided colostrum. The main reason for avoiding colostrum was that the mothers considered colostrum as stagnant breast milk which had accumulated during the entire period of gestation and so, according to them it could be harmful if given to the newborn. This is similar to the findings in the study by Kesterton et al in rural Karnataka, Gupta et al in urban slums of Lucknow and Mrisho et al in rural Tanzania.<sup>[18,25,27]</sup> Colostrum avoidance is higher in those mothers delivered by unskilled personnel along with a high prevalence of giving top feed when compared with the delivery conducted by skilled attendants. Differences in colostrum feeding based on the place of delivery i.e. home vs. institution had been documented by Varma et

al in Uttar Pradesh where a higher percentage (79%) of women who delivered in an institution fed colostrum as compared to those delivered at home (59%) and this difference was statistically significant ( $p < 0.01$ ).<sup>[21]</sup>

The prevalence of Exclusive breastfeeding was 14.4% subjects among the study participants which is lower than slums in Indore where Agarwal et al reported the prevalence of exclusive breastfeeding as 44.6%<sup>[20]</sup>. Early initiation of breastfeeding was more in those newborns who were delivered by skilled personnel compared to those delivered by unskilled care providers. The differences reflect the gap in knowledge regarding correct newborn care provided by the skilled and unskilled personnel and it further stresses upon the need to involve unskilled care providers in the health system and educate them in context of essential newborn care practices

#### **Recommendations:**

1. Increasing awareness and utilization of antenatal care to form an essential component in each pregnant mother and promote institutional deliveries or deliveries by skilled personnel.
2. Community mobilization and behavior change communications if amalgamated together might promote the adoption of evidence-based newborn care practices and increased uptake of neonatal services

#### **Conclusion**

This study emphasizes the need for newborn care counseling of the mother during antenatal check-ups. Expanding skilled birth attendance can be viewed as an effective strategy to promote essential newborn care. Various behavioral change communication strategies through mass media and interpersonal education during antenatal visits could be studied for their effectiveness in changing critical behavior and barriers among the mothers and birth attendants. High-risk traditional newborn care practices need to be addressed by culturally acceptable community-based health programs to improve newborn care practices. The findings of our study underline the need for more targeted approaches to change newborn-care practices at home and community level.

**Source of Funding:** Nil

**Conflict of Interest:** Nil

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# Morphological Study of Placenta in Low Birth Weight Infants

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## Abstract

**Objective:** To study placental morphological changes in low birth weight neonates

**Material and Method:** This prospective case-control study was carried out on 100 cases at Muzaffarnagar Medical College, Muzaffarnagar. Placentas of Low Birth Weight term babies were collected from department of gynaecology and obstetrics during the period from March 2016 to May 2017. Placental morphological changes were studied.

**Conclusion:** The mean placental weight, thickness and diameter for the case group was lower than the control group. Also the mean placental thickness and diameter of case group was found to be lower than in control group. Highest placental weight in both cases and control was found in 18-22 years age group mothers. However highest neonatal weight in both cases and control was found in 28-32 years age group mothers

**Keywords:** PET and eclampsia, APH, Idiopathic IUGR.

## Introduction

Low birth weight is defined by W.H.O as birth weight < 2500 grams. This is based on epidemiological observations that neonatal mortality in infants weighing less than 2500 g was 20 times more than in heavier babies.<sup>1</sup>

Perinatal mortality and morbidity is highest among LBW babies and babies who have survived are at increased risk of long term physical and intellectual impairment. In developed countries, the incidence is 4-8% and in developing countries it is about 6-30%.<sup>2</sup> It was estimated that 20 million infants worldwide (15.5%)

were LBW and 95.6% of these infants were born in developing countries.<sup>3</sup>

IUGR or small for gestational age (SGA) is defined as birth weight below tenth percentile of estimated gestational age. In India 15-30% of babies born at term are "small for date", under nutrition and toxemia of pregnancy are considered to be important maternal causes. In India, about 6-8% of the pregnancies belong to the high risk category.<sup>4</sup>

Since 19th century, basic understanding of the cell biology, molecular biology, biochemistry, physiology, pharmacology and immunology of the placenta has increased almost exponentially. There are later studies to suggest that placental volume in the second trimester can predict birth weight and newborn anthropometry and identify the fetus in danger of being LBW.<sup>5</sup>

Asian Indian newborns may be classified as SGA because of ethnic, physiological factors more so than pathological factors; thus, we hypothesized that infants

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of Asian Indian origin classified as SGA would be less likely to have increased morbidity compared with SGA White infants and less likely to be admitted to a special care nursery setting. Previous studies have shown that despite the increased incidence of LBW and SGA in Asian Indian infants, no corresponding increased risk of neonatal mortality was reported compared with White infants.<sup>6,7</sup>

**Factors for low birth infants can be divided in to maternal and placental.**

**Maternal Factors are:** Pregnancy with medical diseases, Diseases related to pregnancy, Obstetrical conditions & miscellaneous factor<sup>8</sup>

**Placental Causes:** Infarction, Premature separation of placenta, haemangiomas, thrombosis of fetal vessels, presence of single umbilical artery and vascular terminal villi. Human placenta is hemochorial and it is the only organ in the body which contains maternal and fetal tissues. The study of placenta is an opportunity to obtain information about the two individuals, the mother and fetus.<sup>8</sup>

Medical diseases are hypertension, chronic renal diseases, heart diseases, diabetes, venereal diseases, infections like rubella, herpes simplex, toxoplasmosis. The diseases related to pregnancy include Toxaemia, Eclampsia, Anaemia, Rh incompatibility and obstetrical conditions like Placenta praevia, Abruption placenta, multiple pregnancy and post maturity. Miscellaneous factors- smoking, alcoholism, inadequate maternal nutrition, teratogenic drugs, radiation, genetic defects and chromosomal disorders.<sup>8</sup>

**Objectives:**

- To study the spectrum of placental changes associated with LBW infants.
- To enumerate possible etiological factors responsible for low birth weight in view of placental abnormalities.

**Material and Method**

This prospective case-control study was carried out on 100 cases at Muzaffarnagar Medical College, Muzaffarnagar. Placentas of Low Birth Weight term babies were collected from department of gynae and obstetrics during the period from March 2016 to May 2017.

**Study Design:** Prospective case-control Study

**Study Location:** This is a tertiary care teaching hospital based study done in Department of gynae and obstetrics at Muzaffarnagar Medical College, Muzaffarnagar, India.

**Study Duration:** March 2016 to May 2017

**Sample size:** 100 patients (75 cases & 25 controls)

**Statistical analysis**

Data was analyzed using Statistical Package for Social Sciences, version 23 (SPSS Inc., Chicago, IL). Results for continuous variables are presented as mean ± standard deviation, whereas results for categorical variables are presented as number (percentage). Student test (two tailed, independent) or Chi-square/Fisher's exact test has been used to find the significance of study parameters on categorical scale between groups. The level  $P < 0.05$  was considered as the cutoff value or significance.

**Inclusion Criteria:**

- Gestational age ≥ 37 weeks & Appropriate for gestational age.
- All placentas delivered to mothers with Low birth weight infants (birthweight<2500 grams)

**Exclusion criteria:**

- Multiple pregnancy (twins, triplets etc.)
- Not consenting to participate in the study

**Observations:**

**Table I-Distribution of patients on the basis of various etiological factors:** Mothers of 13 (17.3%) infants were the patient of PET &Eclampsia, 11 (14.7%) were the patient of Essential Hypertension, 11 (14.7%) were Anaemia patient, 8 (10.7%) were the patient of APH and 32 (42.7%) suffered due to Idiopathic IUGR.

Various factors (n=75)	Frequency (%)
PET &Eclampsia	13 (17.3)
Essential Hypertension	11 (14.7)
Anaemia	11 (14.7)
APH	8 (10.7)
Idiopathic IUGR	32 (42.7)

**Table II-Gross morphology of placenta in case group and control group:** Gross placental parameters

in control group as well as in cases group was recorded in the table. While mean Placental Weight (grams) in cases was 386.4±24.06 grams the same was 503.7±16.5 grams in control group. Likewise the mean Placental

Thickness (cm) in cases was 1.76±0.19 cm. the same was 2.47±0.22 cm. in control group. Further the mean Placental Diameter (cm) in cases was 16.73±0.63 cm. the same was 19.3±0.65 cm. in control group.

Placental Parameters	Case(n=75)(mean±SD)	Control (n=25) (mean±SD)	P value
Weight (grams)	386.4±24.06	503.7±16.5	<0.001
Thickness (cm)	1.76±0.19	2.47±0.22	<0.001
Diameter (cm)	16.73±0.63	19.3±0.65	<0.001

**Table III-Comparison of Placental weight (gram) of both groups on the basis of mother's age:** Comparison of Placental weight of both cases as well as control groups on the basis of mother's age was made and mentioned in the table. Whereas for mothers under cases in the age group of 18-22years, Placental weight (gram) was 401.2±19.9, the same was 502±9.4 gram for mothers under control group. For mothers under cases in the age group 23-27years, Placental weight was

403.9±6.8 (gram), & the same was 520.7±13.1 gram for mothers under control group. For mothers under cases in the age group 28-32years, Placental weight was 377.58±19.9(gram), & the same was 498.1±18.1 gram for mothers under control group and for mothers under cases in the age group of >32years, Placental weight was 363.03±21.1(gram),& the same was 491.25±13.2 gram for mothers under control group.

Mother's Age (in years)	Case (n=75) (%)	Mean Placental weight (gram)	Control (n=25) (%)	Mean Placental weight (gram)	P value*
18-22	20 (26.7)	401.2±19.9	8 (32.0)	502±9.4	<0.001
23-27	16 (21.3)	403.9±6.8	6 (24.0)	520.7±13.1	<0.001
28-32	24 (32.0)	377.58±19.9	7 (28.0)	498.1±18.1	<0.001
>32	15 (20.0)	363.03±21.1	4 (16.0)	491.25±13.2	<0.001

P value\* = Mean placental weight (case & control)

**Table IV-Comparison of neonatal weight (gram) of both groups on the basis of mother's age:** Comparison of neonatal weight (gram) between both cases as well as control groups on the basis of mother's age was made and mentioned in the table. Whereas for mothers under cases in the age group of 18-22years, neonatal weight (gram) was 1945±336.4, the same was 3025±291.5 gram for mothers under control group. For mothers under cases in the age group 23-27years,

neonatal weight was 1893±276.8(gram),& the same was 2833±355.9 gram for mothers under control group. For mothers under cases in the age group 28-32years, neonatal weight was 2042±224.4(gram), & the same was 3157±257.3 gram for mothers under control group and for mothers under cases in the age group of >32years, neonatal weight was 1953±247.5(gram), & the same was 2975±359.4 gram for mothers under control group.



Mother's Age (in years)	Case (n=75) (%)	Mean neonatal weight±SD (gram)	Control (n=25) (%)	Mean neonatal weight (gram)	P value*
18-22	20 (26.7)	1945±336.4	8 (32.0)	3025±291.5	<0.001
23-27	16 (21.3)	1893±276.8	6 (24.0)	2833±355.9	<0.001
28-32	24 (32.0)	2042±224.4	7 (28.0)	3157±257.3	<0.001
>32	15 (20.0)	1953±247.5	4 (16.0)	2975±359.4	<0.001

P value\* = Mean neonatal weight (case & control)

## Result and Discussion

- In our study, out of 75 cases, there were maximum 32 (42.7%) cases of Idiopathic IUGR followed by 13 (17.3%) of PET & Eclampsia while 11 (14.7%) of Essential Hypertension & Anaemia each and least patients was 8 (10.7%) of APH. Maximum number of cases i.e. 32% were between 28-32 years age group, 26.7% were in 18-22 years, 21.3% were in 23-27 years & 20.0% were in >32 years group as compared to maximum i.e. 32% in 18-22 years & 28% in age group of 28-32 years & 24% were in 23-27 years and only 16% of cases were in >32 years age group among controls. Mean placental weight in every age group of case group was less than mean placental weight in control group i.e. 401.2 gms, 403.9 gms, 377.58 gms and 363.03 gms in case group in comparison to 502.0 gms, 502.7gms, 498.1 gms and 491.25 gms in control group. In these entire group P values were statistically significant (P value <0.05). Mean foetal weights in every age group was less than mean foetal weight in control group i.e. 1945 gms, 1893 gms, 2042 gms and 1953 gms in Case group in comparison to 3025 gms, 2833 gms, 3157 gms, 2975 gms in control group, P values were statistically significant in all age group. (P value <0.05). Similar findings were reported by Acharya V<sup>4</sup> et al i.e. maximum number of cases i.e. 72% were between 21-30 years age group, 20% were in 15-20 years & 8% were between 31-35 years in IUGR group as compared to maximum cases i.e. 58% in 21-25 years & number of cases in age group of 15-20 years & 26-30 years were almost equal i.e. 18% & 20% and only 4% of cases were between 31-35 years. Mean placental weight in every age group was less than mean placental weight in control group i.e. 422.5gms, 405gms, 411.11gms and 350gms in IUGR group in comparison to 496.11gms, 501.03gms, 502gms and 525gms in control group. In these entire group P values were statistically significant (P value <0.05). Mean foetal weights in every age group was less than mean foetal weight in control group i.e. 2090gms, 2120gms, 2150gms and 2000gms in IUGR group in comparison to 2930gms, 2870gms, 2980gms, 3150gms in control group, except in age group 15-20 years, P values were statistically significant (P<0.01)
- Findings in our study were similar to that of Dawson L et al<sup>9</sup> and according to them there is an adverse effect on the newborn at both extremes of child bearing age. Highest incidence of low birth weight has been found among mothers under age of 20 years and incidence falls, as the age of mother increases and incidence of LBW increases after the age of 30-35 years. Placenta is said to be affected by ageing process, because as the age advances pregnant women are more prone to develop hypertensive disease, chronic vascular diseases, PET, Eclampsia and anaemia and these affect placenta in their turn causing IUGR. Various diseases like hypertension, Diabetes, PET and Eclampsia, which are related to advanced maternal age may cause placental ischemia and cause reduced placental blood flow leading to chronic hypoxia and chronic subnutrition to fetus, Donald<sup>10</sup>
- In our study, the mean placental weight ± standard deviation (SD) for case group was 386.4±24.06 in grams while for controls was 503.7±16.5 in grams and the difference between them was statistically significant. (p<0.05), placental thickness ± standard deviation (SD) of case group was 1.76±0.19 in cms while in control group it was 2.47±0.22 in cms. Placental diameter ± standard deviation (SD) of case group was 16.73±0.63 in cms while in control groups 19.3±0.65 in cms. The difference between case & control was statistically significant. (p<0.05). Similarly, these placental findings were similar to findings of Londhe P S et al<sup>11</sup>, they reported that

mean placental weight  $\pm$  standard deviation (SD) was  $321.2 \pm 63.7$  g in SFA group (case group) and  $388.9 \pm 54.1$  g in normal weight/ control group. The mean placental surface area  $\pm$  SD was also lower in SFA group (cases) ( $184.0 \pm 61.6$  sq.cm) than control group ( $219.7 \pm 41.6$  sq.cm) and the difference was statistically significant. Londhe P S et al study shows that placental diameter and thickness measurements are valuable parameters for predicting low birth weight infants.

- In this study, neonatal weight  $\pm$  standard deviation (SD) was observed  $1966 \pm 273.8$  in grams for case group while  $3008 \pm 313.5$  in grams of control group. Londhe P S et al<sup>11</sup> it was reported  $2833 \pm 234$  in grams of control group while  $2131 \pm 293$  in grams of case group. This was statistical different from both groups. In another study, Ranga SS<sup>12</sup> et al reported the mean birth weight of neonates of case group (hypertensive group) was  $2.5 \pm 0.7$  kg while the mean birth weight of babies of control (non-hypertensive) group was  $2.9 \pm 0.4$  kg. Udainia et al<sup>13</sup>, Majumdar S et al<sup>14</sup>, Rosana R.M. et al<sup>15</sup> and Abdul Hafeez Baloch et al<sup>16</sup> observed similar finding in the birth weight of neonates.

**Source of Funding:** Nil

**Conflicts:** None

**Ethical Clearance:** Permitted by the Ethical committee.

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# Isolation, Identification and Antibiogram Studies of *Escherichia coli* from Ready-to-Eat Foods in Tiruchirappalli, Tamil Nadu

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## Abstract

The aim of this study was to isolate and identify *Escherichia coli* in most common ready-to-eat vegetables and meat and meat products from roadside shops and local markets of Tiruchirappalli. A total of 740 samples (10 samples each of 37 vegetables and 37 meat and meat products) were randomly purchased. Out of 740 samples, 500 (68%) samples were positive for Enterobacteriaceae. The findings showed 162 positive strains of *E. coli*. The study highlighted prevalence of *E. coli* in ready-to-eat vegetable products than ready-to-eat meat and meat products. The vegetable products of mixed vegetable salad (80%), pani puri (70%) and veg cutlet (60%) showed higher positives results for *E. coli*. Whereas boti masala (80%), chicken tandoori, fish finger, brain masala and prawn curry (50%) had the highest number of isolates in ready-to-eat meat and meat products. The antibiotic susceptibility of isolated strains showed alarming drug resistance against many antibiotics. The antibiotic susceptibility test revealed multi-drug resistance among 115 (71%) *E. coli* isolates and among these isolates, 21 (12.9%) were 100% resistant to all the 12 antibiotics. The study revealed that unhygienic food handling platforms are becoming a serious issue on public health point of view.

**Keywords:** Ready-to-eat foods, *Escherichia coli*, Public health, Antibiotic resistance, Enterobacteriaceae.

## Introduction

*Escherichia coli*, which belongs to the family Enterobacteriaceae, is gram-negative, rod shaped, flagellated, lactose fermenters and facultative anaerobe. *E. coli* is a commensal found in the intestine of warm blooded humans and animals. *E. coli* is the major water pollutant mainly due to the disposal of human and animal excreta<sup>1</sup>. Gastrointestinal disorders like diarrhea are the important causes of illness and death. Still diarrhea

remains a global public health issue. Infectious diarrhea increases morbidity and mortality in India among children under 5 years of age. In 2010, India had 0.212 million deaths among children with infectious diarrhea by bacteria, virus and parasites<sup>2</sup>. Mostly, *E. coli* are non-pathogenic. Some strains of *E. coli* acquire virulence and become pathogenic, which induces diarrhea<sup>3</sup>.

*E. coli* is reported to cause illness with consumption of ready-to-eat vegetable foods<sup>4,5,6</sup> and meat products<sup>7,8,9</sup>. The consumption of ready-to-eat foods has increased gradually in developing countries<sup>10</sup>. Different parts of Indian subcontinent reported that *E. coli* has developed multi antibiotic resistance.

Worldwide, treating *E. coli* infection became complicated due to the increasing effect of drug resistance<sup>11,12</sup>. The emergence of resistance to most antibiotics causes a serious threat to consumer's health<sup>13</sup>. This study was conducted to understand the real cause of infections through street food vendors during food

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processing and to fill the lacuna in ready-to-eat foods sold in Tiruchirappalli, center of Tamil Nadu and also to create awareness among public. In this study, we have isolated, identified and screened antibiotic susceptibility from different ready-to-eat foods.

## Materials and Method

**Sample Collection:** Ten samples each from 74 ready-to-eat food items including 37 vegetable products such as steamed corn, sandwich, mixed veg salad, cutlet, noodles, channa masala, samosa, ragi porridge, masala dosa, pani puri, sprouts masala, mango pickle, honey amla, mayonnaise, fruit salad, paneer tikka masala, veg shawarma, bonda chat, bhel puri, mushroom masala, burger, capsicum bajji, kuli paniyaram, jiggardhanda, coconut boli, cheese cake, mixed dry fruits in honey, dhal vada, potato shots, kulfi, fresh cream, grated coconut, tapioca, cheese shots, pasta, string hoppers and peanut butter. The meat and meat products like chicken sausage, chicken tawa, fried chicken, chicken tandoori, chicken cutlet, chicken kabab, chicken soup, fish fry, chilli fish, sheek kabab, fish finger, fish kabab, prawn kabab, prawn fried rice, prawn gravy, crab masala, chicken shawarma, boti masala, chicken wrap, tuna subway, chicken keema paratha, liver fry, brain masala, shami kabab, chicken kalmi, chicken shots, crab lollypop, chicken tikka, fish tikka, chicken fried rice, chicken stuffed kulcha, mutton keema, mutton chukka, barbeque chicken, chicken briyani, meat balls, meat vada were collected from different street food vendors, roadside small scale restaurants, hotels and fast food stalls in Tiruchirappalli, Tamil Nadu. These items are pre prepared either by sauting or frying and toppings were added just before serving. Samples were parceled by vendors serving utensils and collected in sterile polythene zipper pouch. Samples were transported to laboratory in an iced thermocol box and stored at 4°C until processing. The samples were analyzed within 12 h of collection.

**Preparation of culture media:** All the culture media used in this study were purchased from Himedia, Mumbai and prepared as per manufacturer instructions.

**Preparation of sample:** A ten grams portion of each food sample was finely chopped with sterile blade and smashed uniformly in mortar and pestle. The homogenized mixture was mixed in 90ml of buffered peptone broth (BPB) with the pH 7±0.2 and incubated at 37°C for 24 h as pre-enrichment to recover the injured

cells of *E. coli* present in the samples. Thus 1:10 dilution was obtained. One ml of pre-enriched mixture was further enriched with 9 ml of lactose broth and tryptone phosphate broth and incubated for 18 h at 37°C.

**Enumeration of total viable count:** The water samples collected along with ready-to-eat food samples were tested for total bacterial count. It was serially diluted up to 10<sup>-6</sup> and 100µl of each dilution was spread plated using Nutrient Agar (NA). The plates were incubated at room temperature (25-27°C) for 24-48 h. Isolated colonies that formed in each plate with 30-300 colonies were counted taking into account the dilution factor. The total viable count was expressed as colony forming unit (CFU) per ml.

**Isolation and identification of *E. coli*:** A loop full of culture from both lactose and tryptone phosphate broths was streaked onto Xylose Lysine Deoxycholate (XLD) and MacConkey (MAC) agar plates and the plates were incubated at 37°C for 18±2 h. The suspected colonies were isolated based on colony morphology. To confirm, screening test was done by re-streaking the suspected colonies on to EMB agar plates and incubated for 18±2 h at 37°C. The colonies which produced metallic green sheen with dark centered purple colonies were selected. The isolated colonies were sub-cultured on to Luria Agar (LA) plates. All the typical colonies were subjected for various biochemical tests to confirm *E. coli*. Pure cultures from non-selective media were tested for IMViC, Triple Sugar Iron (TSI) agar, Lysine Iron Agar (LIA) and urea formation in test tubes incubated for 18 h at 37°C.

**Antibiotic susceptibility test:** Antibiotic susceptibility test was performed by Kirby-Bauer disc diffusion method on Muller-Hinton agar, as per the guidelines of clinical and laboratory standards institute<sup>14</sup>. The antibiotic discs were purchased from Himedia, Mumbai. The 12 antibiotics used in this study were, ampicillin (AMP, 2 mcg), ceftriaxone (CTR, 30 mcg), chloramphenicol (C, 30 mcg), ciprofloxacin (CIP, 5 mcg), doxycycline hydrochloride (DO, 30 mcg), gentamicin (GEN, 10 mcg), norfloxacin (NX, 10 mcg), ofloxacin (OF, 5 mcg), streptomycin (S, 300 mcg), tetracycline (TE, 30 mcg), co-trimoxazole (COT, 25 mcg) and cefixime (CFM, 5 mcg). All the cultures were streaked on to LA plates and incubated at 37°C for 24 h. After incubation the isolated single colony was transferred and mixed in 5ml of Luria Bertani broth and incubated for 4 to 6 h until it develops moderate turbidity. The bacterial growth was measured by optical density (OD<sub>600</sub>) and

adjusted to  $1.5 \times 10^8$  CFU/ml by diluting the inoculum. Sterile cotton swabs were dipped in broth and excess broth was squeezed at the rim and swabbed onto Muller Hinton Agar (MHA) plates. Aseptically, antibiotic discs were placed with sterile forceps on swabbed MHA plates. The plates were inverted and incubated for 24 h at 37°C. The results were recorded as Sensitive (S), Intermediate (I) and Resistant (R).

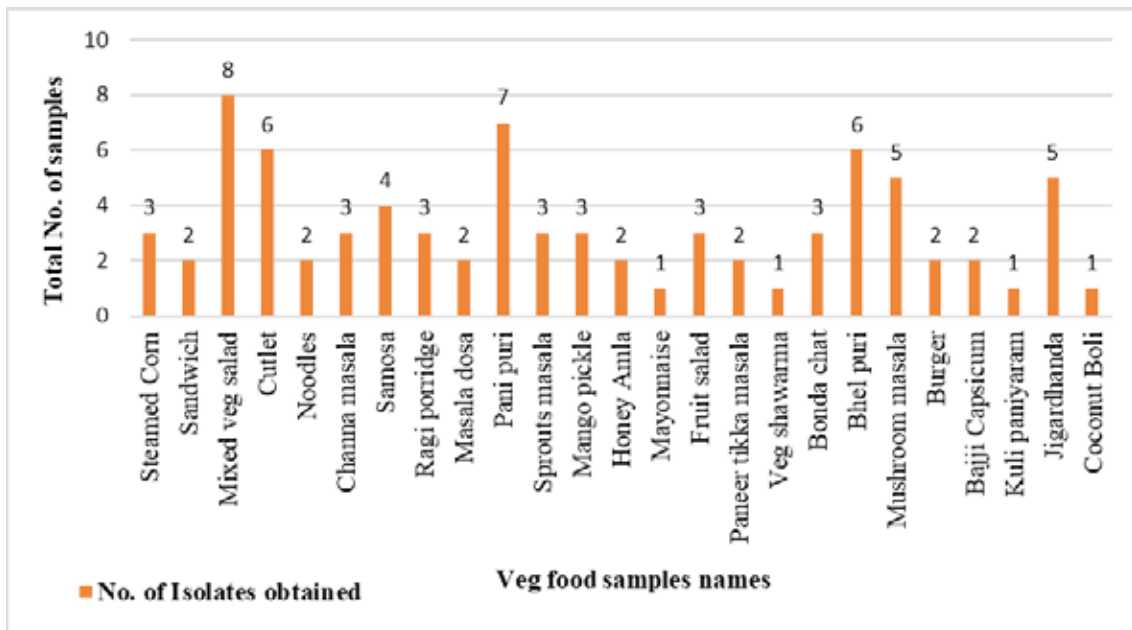
**Results**

Out of 740 samples analyzed, 240 samples did not contain any Enterobacteriaceae. From the rest of 500 (68%) food products, 162 (32.4%) strains of *E. coli* were isolated [Fig 1, 2].

Out of 10 samples each, the highest numbers of 8 strains were isolated from mixed veg salad and boti masala respectively. The second highest *E. coli* was isolated from pani puri. *E. coli* isolates on EMB agar plate were smooth, circular, dark purple with metallic green sheen. Whereas on MAC agar plate, the isolates were pink in color. The phenotypic identification with biochemical tests confirmed *E. coli* with the results of indole-positive, methyl red-positive, voges-proskauer-negative, citrate-negative, H<sub>2</sub>S-negative, TSI test-positive and LIA test-positive. The water samples collected from respective street food shops were with the highest number of bacterial counts. The bacterial count in water samples varied between  $8.4 \times 10^5$  to  $9.5 \times 10^8$

CFU/ml [Fig 3]. Boti masala prepared shop water has significant count.

All the 162 isolates were subjected to antibiotic susceptibility test against 12 different antibiotics and it was observed 40.3% were susceptible, 15.4% were intermediate and 44.3% were resistant against 12 different antibiotics. A high level of antibiotic resistance among *E. coli* was observed against streptomycin (59.3%) and moderate resistant to ceftriaxone (50%), ampicillin (48.7%), cefixime (48.2%), ciprofloxacin (45.7%), gentamycin (44.4%), doxycycline (43.2%) tetracycline (43.2%), co-trimoxazole (41.9%), chloramphenicol (32.7%), norfloxacin (36.4%) and ofloxacin (37.7%). On the other hand, majority of the isolates were moderately susceptible to ofloxacin (51.2%), chloramphenicol (48.7%), norfloxacin (48.1%), co-trimoxazole (47.5%), gentamicin (45.1%), ampicillin (41.4%), tetracycline (40.1%), doxycycline (38.9%), ceftriaxone (35.2%), cefixime (33.9%), ciprofloxacin (33.3%) and streptomycin (20.4%) [Fig 4]. Noticeably, 115 (71%) *E. coli* isolates have multidrug resistance. Among these isolates, 21 (12.9%) *E. coli* strains were 100% resistant to all the 12 antibiotics. The results of this study revealed that ready-to-eat foods that are cheap and economically convenient to buy are not healthy due to multidrug resistant *E. coli* associated microbial contamination.



**Fig 1: Number of *E. coli* isolates in ready-to-eat vegetable food samples**

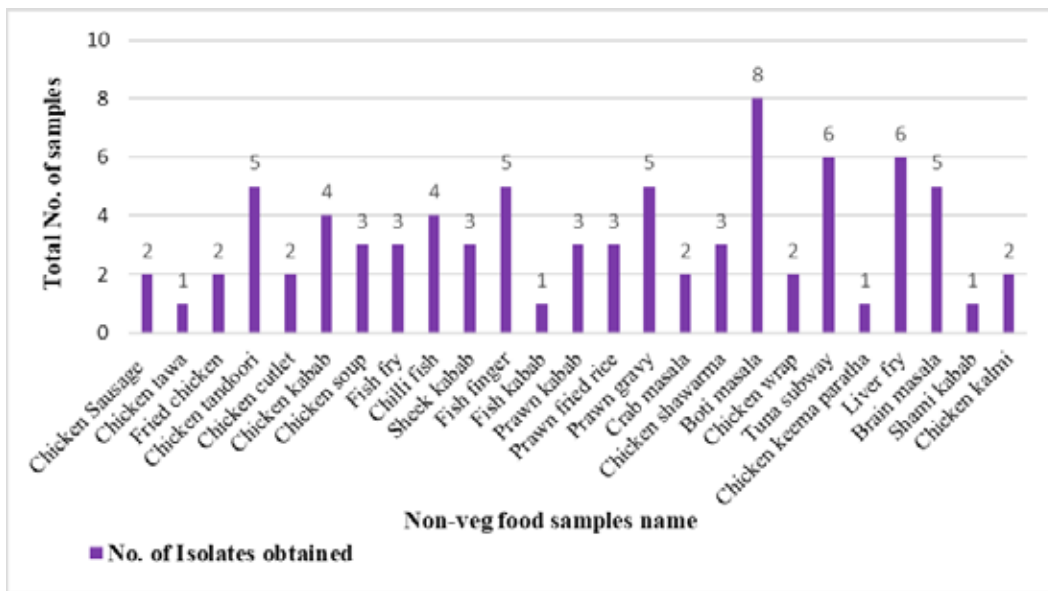


Fig 2: Number of *E. coli* isolates in ready-to-eat meat and meat product

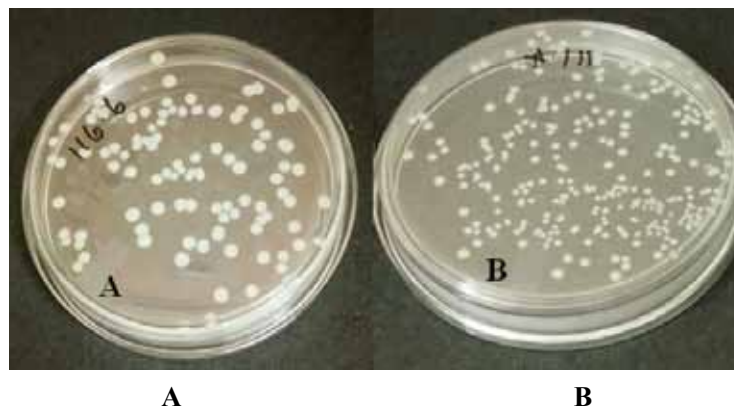


Fig 3: Enumeration of TVC from water samples using spread plate on NA plates (with colonies exhibiting A - water sample collected from steam corn shop  $8.4 \times 10^5$  CFU/ml and B - water sample collected from boti masala shop  $9.5 \times 10^8$  CFU/ml).

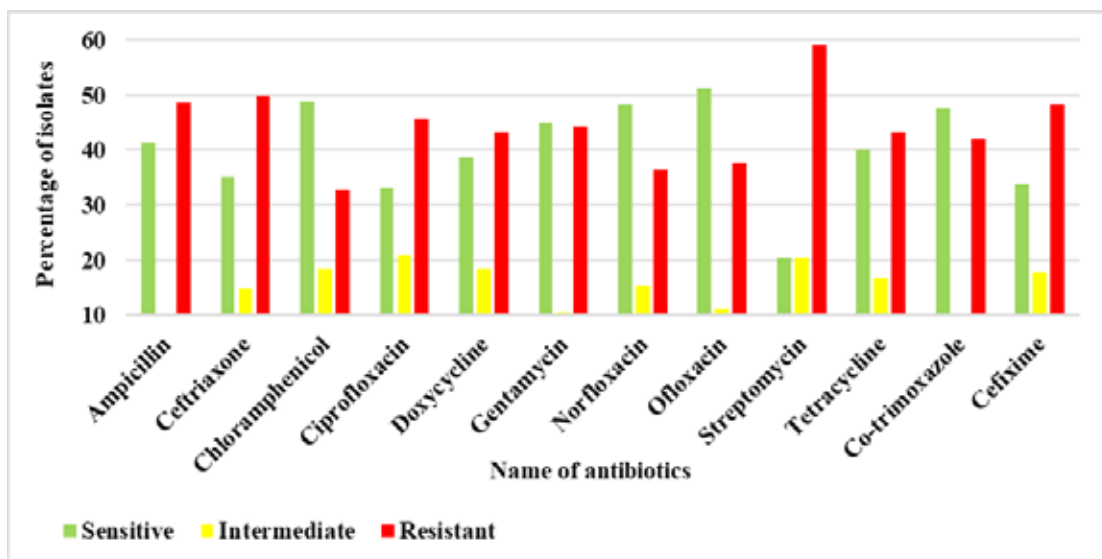


Fig 4: Antibiotic susceptibility tests of isolated *E. coli* from ready-to-eat food sample

## Discussion

A total of 740 samples were analyzed and 162 *E. coli* strains were isolated. The presence of *E. coli* in ready-to-eat food sample indicates fecal contamination. The present isolation of 30% of *E. coli* from sprouts masala was substantiated by Tzschoppe *et al.* (2011) who have observed that sprouted seeds, green leafy vegetables can become a vehicle of bacterial transmission<sup>15</sup>.

In Tiruchirappalli, chilled ready-to-eat foods were not maintained at proper temperature, thereby enhancing the growth of microbes. Most chilled foods which were pre-prepared in restaurants and hotels are cooked in high temperature for few seconds, to make more counts and to minimize the cooking time to serve customers fast. It prevents meat and marinated vegetable products to cook in deep. The meat remains uncooked. A study suggested that tandoori chicken was highly contaminated and found 88% street foods were contaminated with pathogens associated with health risk<sup>9</sup>. Nowadays, people prefer semi-cooked vegetables without changing the color to prevent degradation of nutrients. The fresh ready-to-eat vegetable salads are not subjected to pasteurization, elimination of old leaves, washing, rinsing and storage as these are an important point of transmission of *E. coli*. This could be evidenced through this study as 80% of *E. coli* was isolated from mixed veg salad.

In Tiruchirappalli, most food vendors prepare handmade fruit juices and ice cream by using raw unpasteurized milk. Mayonnaise which is used to dress up sandwich, shawarma was also prepared manually in open air with bare hands could also be contaminated with *E. coli*. The deep oil fried snacks and kebab dishes were seemed to be hot, charred and well-cooked but the superficial layers were roasted and inside the meat or vegetable remains uncooked. Most street food stalls do not have refrigerator for storage. The left over chopped onions, tomato, green chilly were stored in buckets with wet cloth. Spoiled curd is mixed in raitha for biryani. These improper cooking practices enable *E. coli* to multiply and cause disease. In this study, 32.4% of ready-to-eat food samples carried *E. coli*.

The presence of *E. coli* in ready-to-eat vegetables and meat and meat products indicated cross-contamination from water, slaughtering and storage of meat prior to cooking, lack of hygienic practices in preparation area, inappropriate cooking temperature, uneven cooking, improper cleaning of meat, unwashed vegetables, uncleaned utensils, knives and low quality

of raw materials. The isolates of *E. coli* were observed to be multi drug resistant which may pose severe threat to public health. Researchers have observed that the antibiotics at low concentration are commonly fed to animals in poultry industry to promote growth which may be the causative factor of resistance in bacterial strains<sup>8, 16, 17, 18</sup>. The drug resistance noticed in *E. coli* from meat products could be linked to the above observation, though substantive evidence is needed to confirm the same.

The high rate of resistance to more antibiotics showed increased antibiotic resistance among *E. coli*. Multidrug resistance in *E. coli* emphasized the need for creating awareness among public, physician, animal husbandry and proper actions to be addressed. Nearly, 44.3% of the isolated *E. coli* strains were resistant to all the 12 antibiotics. This was substantiated by the observation of Kumar and Jangir (2017) who have observed similar results and suggested that access to clean water, health education to sellers and proper disposal of waste materials are more important to improve the quality of food<sup>9</sup>.

## Conclusion

This study demands food vendors to adopt proper hygiene and sanitary practices such as sterilizing cookware before or after processing the foods every day and hand washing is recommended. Also, the source water needs to be clear of microbial contamination. The handling, storage should be appropriately managed to avoid contamination. The study highlighted the growing menace of contamination in ready-to-eat foods which can be preventable through creation of awareness and strict enforcement of regulations.

**Acknowledgement:** We would like to thank Bharathidasan University for providing the space to carry out research work. The authors are grateful to Dr. A. Murugan, Assistant Professor, V.O.C College, Tuticorin for his assistance with correcting the manuscript.

**Conflict of Interest:** None declared

**Source of Funding:** None

**Ethical Clearance:** Not Applicable

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# A Study of Prevalence and Determinants of Nomophobia (No Mobile Phobia) among Medical Students of Ballari: A Southern District of India

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## Abstract

**Background:** Smart phones today have become an extension of ear and an essential part of life, to such an extent that discomfort, nervousness or anxiety caused by being out of contact with a mobile phone is termed as “Nomophobia”.

**Objectives:** To study patterns, prevalence and determinants of nomophobia.

**Methodology:** A cross-sectional study was done among the medical students of Vijayanagar Institute of Medical Sciences, Ballari, Karnataka where a total of 419 medical students across all phases of MBBS course were enrolled for the study. A predesigned, validated questionnaire with three sections including a NMP-Q scale with 20 questions with 7 levels of agreement for each was used. Levels of nomophobia was calculated by summing up the responses to each item and then categorising them to grade the level of Nomophobia. The outcome variable was compared with respect to socio-demographic variables, years of smart phone usage, number of apps, internet access, daily time spent on smart phone.

**Results:** Prevalence of nomophobia was 62.8% (95%CI: 58.1% - 67.4%). Access to internet [OR: 2.07; 95%CI: 1.2-3.6], more than 3 hours of time spent on smart phone daily [OR: 1.49; 95%CI: 1.0-2.2], more than 30 apps used in smart phone [OR: 1.58; 95%CI: 1.03-2.4] were the important determinants of nomophobia.

**Conclusions:** The prevalence of Nomophobia among the medical students was high when compared to other studies. Availability of internet access, time spent on Smart Phone usage, number of apps used were the important determinants of Nomophobia.

**Keywords:** *Nomophobia, prevalence, determinants, medical students.*

## Introduction

Smart phones today have become an extension of ear and an essential part of life, especially among the younger

population. Discomfort, nervousness or anxiety caused by being out of contact with a mobile phone is termed as “Nomophobia”- No Mobile phobia. Nomophobia is on the rise across the globe. Nomophobia is considered a modern age phobia introduced to our lives as a by-product of the interaction between people and mobile information and communication technologies, especially smartphones. Though smart phones provide number of benefits by satisfying basic needs of the people, it may also induce many problems related with smart phone usage<sup>1</sup> and nomophobia is the most prevalent problem of modern world associated with smart phone usage. Although there has been lot of academic interest in

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studying effects of smart phones there is dearth of studies on Nomophobia among medical students. Hence this study was planned to conduct among medical students.

**Objectives:**

1. To know the prevalence of Nomophobia among the Medical Students.
2. To study the pattern of smart phone usage among medical students
3. To study the determinants of Nomophobia among the Medical Students.

**Methodology**

**Study Design, study setting, study period:** A cross sectional descriptive study was done among medical students from all phases studying in Vijayanagar Institute of Medical Sciences (VIMS), Ballari district, Karnataka state during the period of June 2018 to September 2018.

**Study population, inclusion and exclusion criteria:** study population consisted of all the medical students studying in VIMS, Ballari during the study period. All the medical students who were willing to participate and who were present on the day of study were included in the study. Medical students who were absent and who had just completed their final year were excluded from the study.

**Sample size:** During the study period there were a total of 520 students, out of which 85 students were absent at the time of data collection. A total of 435 students were enrolled for the study. Out of 435 students who participated in the study, 16 (3.6%) students did not answer more than 10% of the questions in the tool and therefore were excluded during the analysis. So, a total of 419 students were considered for the analysis.

**Data Collection:** A predesigned, validated questionnaire with three sections including a NMP-Q scale with 20 questions with 7 levels of agreement for each was used.<sup>2</sup>

**Section 1:** Included socio-demographic variables

**Section 2:** Included variables related to smart phone usage

**Section 3:** Nomophobia Questionnaire (NMP-Q)

Under section 3, Likert scale was applied for every question and a scoring system was applied. Levels of nomophobia was calculated by summing up the responses to each item and then categorising them to grade the level of Nomophobia as follows-

Score	Interpretation
20	Absence of Nomophobia
21 – 59	Mild level of Nomophobia
60 – 99	Moderate level of Nomophobia
100 – 140	Severe Nomophobia

**Ethical Clearance:** Ethical clearance for the study was obtained from Institutional Ethical Committee of VIMS, Ballari, for the conduct of the study.

**Data Analysis:** For analysis, Descriptive statistics like percentages and mean were used to describe the data. Appropriate inferential statistics like chi square tests, Mann Whitney U test and Odds ratio with 95% confidence intervals were used to study the association between study variables and the outcome variables.

**Note:** For analysis levels of nomophobia was categorised as nomophobia absent (score <59) and nomophobia present (score 60- 100).

**Results and Observations**

**Table No. 01:**

Prevalence of Nomophobia among the study subjects			
Nomophobia	No. of subjects	Percentage	95% CI
Present	263	62.8	58.1 - 67.4
Absent	156	37.2	32.6 - 41.8
<b>Total</b>	<b>419</b>	<b>100</b>	

A total of 419 MBBS students were enrolled for the study. Among them, the prevalence of Nomophobia was at 62.8% (95% CI: 58.1% - 67.4%). [Table no. 01]

**Table No. 02:**

<b>Patterns of smart phone usage among the study subjects</b>		
<b>Patterns</b>	<b>Frequency</b>	<b>Percentage</b>
<b>Purpose of SP usage*</b>		
Listening to music	354	84.5
Talking with family or friends	341	81.4
Looking information up on the Internet	331	79.0
Texting family or friends	310	74.0
Checking social media	301	71.8
Gaming	245	58.5
Getting news	215	51.3
Checking lecture notes	184	43.9
Killing time	165	39.4
Checking email	163	38.9
Scheduling meetings and events	74	17.7
<b>Time of SP usage*</b>		
When I'm bored	378	90.2
When I'm alone	326	77.8
While waiting for someone or something	301	71.8
On public transportation	249	59.4
Between classes	178	42.5
In the restroom	172	41.1
While watching TV or a movie	146	34.8
While hanging out with friends	136	32.5
While talking to somebody	116	27.7
At a dinner table	112	26.7
While walking	102	24.3
During a class	81	19.3
While driving	21	5.0

\*Multiple answers

Patterns of smart phone (SP) usage was assessed among the study population where in some of the common reasons for SP usage were listening to music (84.5%), talking with family and friends (81.4%), looking for information up on the internet (79%), checking social media (71.8%) and gaming (58.5%). [Table no. 02]

Apart from assessing the purpose of usage of SP, we also assessed the usual time of usage of SP among

the study population. Majority of the students used their SP whenever they are bored (90%), when they are alone (77.8%) and while waiting for someone (71.8%). Nearly half of the students used SM during the transit on public transportation (59.4%), in between classes (42.5%) and while in rest rooms (41.1%). Few students used SP while driving (5%). [Table no. 02]

**Table No. 03:**

<b>Patterns of smart phone usage among the study subjects</b>			
<b>Patterns</b>	<b>Male (n=237)</b>	<b>Female (n=182)</b>	<b>P Value*</b>
	<b>Mean±SD</b>	<b>Mean±SD</b>	
No. of phone calls made per day	4.5 ± 7.2	3.3 ± 21	0.065
No. of phone calls received per day	5.8 ± 11.3	3.5 ± 2.6	0.006
No. of text messages sent per day	21.3 ± 35.7	22.7 ± 35.4	0.131
No. of text messages received per day	32 ± 49	37.5 ± 53	0.144
No. of emails sent per day	2.5 ± 1.5	1 ± 1.5	0.001

\*Mann Whitney U test

Some of the proxy indicators of frequency of usage of smart phones were assessed where in the number of emails sent per day ( $2.5 \pm 1.5$ ) and number of phone calls received per day ( $5.8 \pm 11.3$ ) where more among male students compared with their female counter parts and

this difference was found to be statistically significant. However the number of text messages sent per day was similar in both the sexes (males:  $21.3 \pm 35$ ; females:  $22.7 \pm 35.4$ ). [Table no. 03]

**Table No. 04:**

<b>Determinants of Nomophobia among the study subjects</b>				
<b>Variable</b>	<b>Nomophobia Present n (%)</b>	<b>Nomophobia Absent n (%)</b>	<b>OR (95% CI)</b>	<b>P value</b>
<b>Age group</b>				
17-19 yrs (n=158)	107 (67.7)	51 (32.3)	0.7 (0.5-1.1)	0.051
20-24 yrs (n=261)	156 (59.8)	105 (40.2)		
<b>Sex</b>				
Male (237)	150 (63.3)	87 (36.7)	0.9 (0.6-1.4)	0.4
Female (182)	113 (62.1)	69 (37.9)		
<b>Year of Study</b>				
1st & 2nd Yr (249)	158 (63.5)	91 (36.5)	0.9 (0.6-1.4)	0.72
3rd & 4th Yr (170)	105 (61.8)	65 (38.2)		
<b>Yrs of SP usage</b>				
<2Yrs (174)	105 (60.4)	69 (39.7)	1.2 (0.8-1.8)	0.19
>2Yrs (245)	158 (64.5)	87 (35.5)		
<b>Internet Access</b>				
Yes (360)	235 (65.3)	125 (34.7)	2.07 (1.2-3.6)	0.01
No (59)	28 (47.5)	31 (52.5)		
<b>Daily time spent on SP usage</b>				
<3Hrs (202)	117 (58)	85(42)		0.041
>3Hrs (217)	146(67.3)	71(32.7)	1.49 (1.0-2.2)	
<b>No of apps used</b>				
<30 apps (274)	162 (59)	112 (41)		0.033
>30 apps (145)	101 (69.7)	44 (30.3)	1.58 (1.0-2.4)	

Some of the factors influencing nomophobia were studied among the study population where the prevalence of nomophobia were higher in teenage students (67.7%) compared to students in the age group of 20 – 24 years (59.8%) and this difference was not found to be statistically significant. The prevalence of nomophobia was similar with respect to determinants like sex of the student, year of MBBS course pursuing and years of SP usage. [Table no. 04]

Higher prevalence of nomophobia was observed in students who had access to internet in their SP (65.3%) compared to students without internet (47.5%) [OR: 2.07; 95%CI: 1.2 – 3.6]. Higher the daily duration of time spent on SP, higher was the prevalence of nomophobia (>3 hrs: 67.3%, <3 hrs: 58%) [OR: 1.49; 95%CI: 1.0 – 2.2]. Similarly higher the number of applications used by the students higher was the prevalence of nomophobia (>30 apps: 69.7%, <30 apps: 59%) [OR: 1.58; 95%CI: 1.0 – 2.4]. This association of access to internet, higher duration of time spent on SP and higher number of applications used with higher prevalence of nomophobia was found to be statistically significant. [Table no. 04]

## Discussion

Mobile phones have become an essential part of everyone's life and since mobile phones have many attributes, it makes them especially attractive to the younger generation. The present study was conducted among 419 medical students which included 56.56% males and 43.43% females and the prevalence of Nomophobia, that is the fear of being out of mobile phone contact was found to be 62.8% which was high when compared to another study conducted in Bangalore by Pavitra M B where in the prevalence was 39.5%.<sup>3</sup> Lower prevalence was also seen in studies reported in some other cities of India like 21.1% in Bhuvaneshwar<sup>4</sup> and 18.5% in Indore.<sup>5</sup> Many other studies done in different countries like Poland<sup>6</sup> & Spain<sup>7</sup> have confirmed that Nomophobia is universally wide-spread.

In our study there was no significant association between Nomophobia and gender. Similar findings were also seen in studies conducted by Pavitra B M<sup>3</sup> and Bianchi and Phillips<sup>8</sup> indicating that mobile phone use is universal and also equally distributed among male and female students.

The present study revealed that Nomophobia was higher (67.3%) in students who used mobile phones for more than three hours, compared to students using

for less than three hours in a day and was found to be significant. ( $P < 0.05$ ) Similar significance was noted in study conducted by Choliz<sup>7</sup> indicating that longer the duration of mobile phone use higher is the addiction to it.

Prevalence of nomophobia was higher among those students who had internet access (65.3%) and was significant association in our study. Similar higher prevalence (42.5%) was seen in a study by Dasgupta P.<sup>9</sup>

Students who used >30 apps per day had a higher prevalence of nomophobia (69.7%) in our study. This finding was in consistent with a study conducted by Dasgupta P wherein 35% of medical students used many apps and kept on installing new applications.<sup>9</sup> Sharma N et al in their also stated the use of number of apps by the students.<sup>10</sup> This automatically increases the time spent on mobile phone leading .

Majority of students in present study used smartphones to listen to music (84%), to talk to family and friends (81%), to surf the internet (79%) and used it more when they were alone or when bored (90%) or while waiting for someone (72%). This pattern of smartphone usage was also seen in other studies conducted in various part of the country.<sup>5,9-11</sup> In a study done in Bangalore 67% of the students stated that they purchased mobile phone to call n keep in touch with family members,<sup>3</sup> Sahin S et al also found same reason for using mobile phone was given by more than half of the students in their study.<sup>12</sup>

In this study males preferred phone calls as a mode of communication ( $P < 0.006$ ) while females were more comfortable with texting messages ( $P < 0.001$ ). This difference was found to be significant. However there was no much difference in the prevalence of nomophobia among the gender.

Mobile phone usage during student life has both pros and cons. The advantage of any technology will be maximum only when it is used within limits.

## Conclusions

The prevalence of Nomophobia (62.8%) among the medical students was high when compared to other studies. Variables like availability of internet access, time spent on Smart Phone usage, number of apps used were the important determinants of Nomophobia.

Majority of them used smartphones to listen to

music, to talk to family and friends, to surf the internet and used it more when they were alone or when bored or while waiting for someone.

Males preferred phone calls as a mode of communication while females were more comfortable with texting messages.

**Acknowledgements:** Authors sincerely thank the Institution, the Principal and Professor and Head of the department of community medicine, Medical Students for their cooperation in carrying out the study. Authors also thank the teaching staff and my colleagues for their valuable guidance. The authors are also grateful to authors/editors/ publishers of all those articles, journals and books from where the literature for this article has been reviewed and discussed.

**Ethical Clearance:** Ethical clearance for the study was obtained from Institutional Ethical Committee of VIMS, Ballari.

**Source of Funding:** Self

**Conflict of Interest:** None

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# Knowledge and Practice of Dietary Management in Patient Undergoing Hemodialysis

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## Abstract

The kidney plays an essential function in one's body by eliminating nitrogenous waste products. Loss of renal function gives rise to uremia, which is a progressive increase in the level of the metabolites of protein breakdown circulating in the blood<sup>1</sup>.

Dialysis is a process used to extract a nitrogenous substance from blood and to remove excess water. It usually carried out three times a week for 3-4 hours. During the process, kidneys are not able to get rid of enough waste products and fluid from the blood and body<sup>2</sup>.

Diet is essential. Patient must have the right amount of protein, fluids, calories, vitamins and minerals each day. Malnutrition is common in dialysis patients and closely related to morbidity. Therefore assessment of nutritional status and nutritional management of dialysis patients play a central role in every day Nephrological practices<sup>3</sup>

**Methodology:** A descriptive survey design is adopted for this study. The participants were 30 hemodialysis patients who met the inclusion criteria were selected as the sample. The tool was prepared to assess knowledge and practice regarding dietary regulation in hemodialysis patients.

**Results:** The findings shown that majority of the samples (70%) were males, 90% of subjects were not having the history of kidney disease in their family and with regards to the years of having the history of Chronic Kidney Disease (46.7%) were diagnosed to have CKD with less than 6 yrs.

According to the level of knowledge regarding dietary management (10%) of the subjects had poor knowledge, (73.3%) of the subjects had average knowledge, (16.7%) of the subjects had good knowledge. With regards to the management of dietary regulation, 50% of patients scored between the ranges 10-13, in their practices were beneficial, and 50% of patients scored between the ranges 13-16 in their practices were non-beneficial. Chi-square test was used to find out the association between the knowledge and practices, and the results showed that there is no statistically significant relationship between knowledge and practices at 0.05 level of significance ( $P > 0.05$ ).

**Discussion:** The purpose of the health care system is to provide quality services, and communication is the best way to gain patients satisfaction. Thus results of this study, shows that there is no relationship between knowledge and practice of hemodialysis patients regarding dietary regulations.

**Keywords:** Knowledge, Dietary management, Hemodialysis patient, Practice.

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## Introduction

Chronic kidney disease is a significant issue in various parts of the world; about one in 10 people have CKD. It can develop at any age and also can occur through various other conditions. The number of patients with CKD is increasing in both developed and

developing countries, greatly expanding the need for chronic dialysis and renal transplantation<sup>2</sup>. The number of CRF clients alive with hemodialysis is increasing day by day in the world, more than 1,00,000 new cases of chronic renal failure are present each year in India<sup>4</sup>.

The dietary restriction is also vital to maintain optimal health for the CKD patients, because of certain substances present in the foods and drinks. When these foods taken in excess damaged the kidney and may not be available to remove the waste, which is harmful to the body so the foods and drinks containing those substances which are harmful to the body must be regulated.<sup>5</sup> The dietary considerations are among the most important modifiable behaviors that can adjust to dialysis clients. Following dietary regulations can help the clients to keep healthy along with the dialysis<sup>6</sup>. Malnutrition is common in dialysis clients and with a lack of knowledge and inadequate nutritional intake that can lead to a higher risk of infection, hospitalization, and even death. Therefore, assessment of nutritional status and knowledge about dietary management of dialysis clients plays a central role in everyday Nephrological practice.<sup>7</sup> The purpose of dietary management is to maintain a balance of electrolytes, minerals, and fluid in patients who are on dialysis. The special diet is essential because dialysis alone does not effectively remove all waste products. These waste products can build up in the body between dialysis treatments. These changes achieved if patients have adequate knowledge regarding disease and therapeutic regimen.<sup>8</sup>

A study conducted by Nakao T. nutritional, management of dialysis patients, balancing among nutrient intake, dialysis patients, balancing among nutrient intake, dialysis dose, and nutritional status. It showed that the amount of protein intake significantly correlated with body protein mass and there were significant positive relationships between the amount of protein intake and energy intake in hemodialysis patients, lower intake of protein with sufficient energy intake required a lower dose of dialysis and both gave the same effects on nutritional status.<sup>9</sup>

During our clinical posting in the dialysis unit, we came across patients undergoing hemodialysis who had poor knowledge and practice regarding nutrition and not following dietary regimen were prone to get malnourished. Thus we felt that dietary management is a significant factor of CRF patients on hemodialysis. Hence to assess the practice and knowledge of CRF patients about the nutritional requirements during the hemodialysis, we proposed this study.

### **Objectives of the Study:**

- To assess the knowledge and practice of dietary management among dialysis patients.
- To find out the relationship between knowledge and practice of dietary management with selected demographic variables

### **Method**

A non-experimental study conducted among 30 hemodialysis patients who hospitalized at Justice K.S Hedge Charitable Hospital, Mangalore, from October to November 2017. In order to accomplish the main objective of assessing the knowledge and dietary practice among hemodialysis patients, a descriptive survey design adopted for the study. Hemodialysis patients selected through a convenient sampling technique. The samples were identified based on the inclusion criteria like, Patients who are undergoing hemodialysis in K.S Hegde Hospital, Could understand and speak Kannada, English, and Malayalam. The age group of above 25yrs. The study conducted at Justice K.S hedge Charitable Hospital, Mangalore. The Hospital situated at Deralakatte with 1200 bedded capacity. The hospital is having a dialysis center with ten beds. A structured knowledge questionnaire and practice checklist translated to Kannada and Malayalam for the purpose collected the data from dialysis patients. The collected data was entered into the master data sheet and analyzed using the SPSS package.

### **Results**

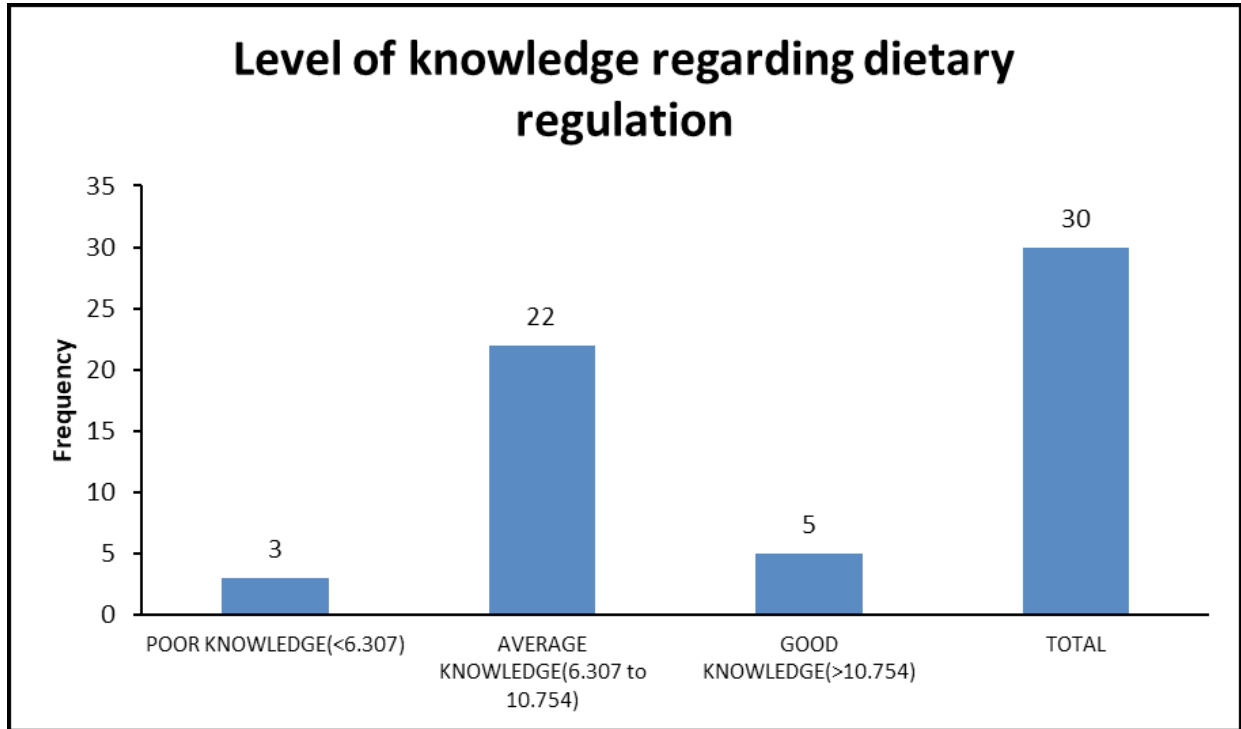
The data collected from the subjects organized and presented under the following sections:

**Section 1:** Distribution of demographical characteristics.

The majority of clients, 8 (26.7%) were in the age group of 30-40 years of age and 41-50 years. The majority are 21(70%) were males. Moreover, it belongs to the Hindu 19 (63.3%) religion. 12(40%) are with primary school educational status. The majority of them, 14(46.7%) are with less than six years of duration of illness. 13(43.3%) are having income less than 5000, 11(36.7%) 19(63.3%) are having a nuclear family. More than half of the samples 27(90%) were not having a family history of chronic kidney disease, the majority of the samples 27(90%) got information from health professionals.



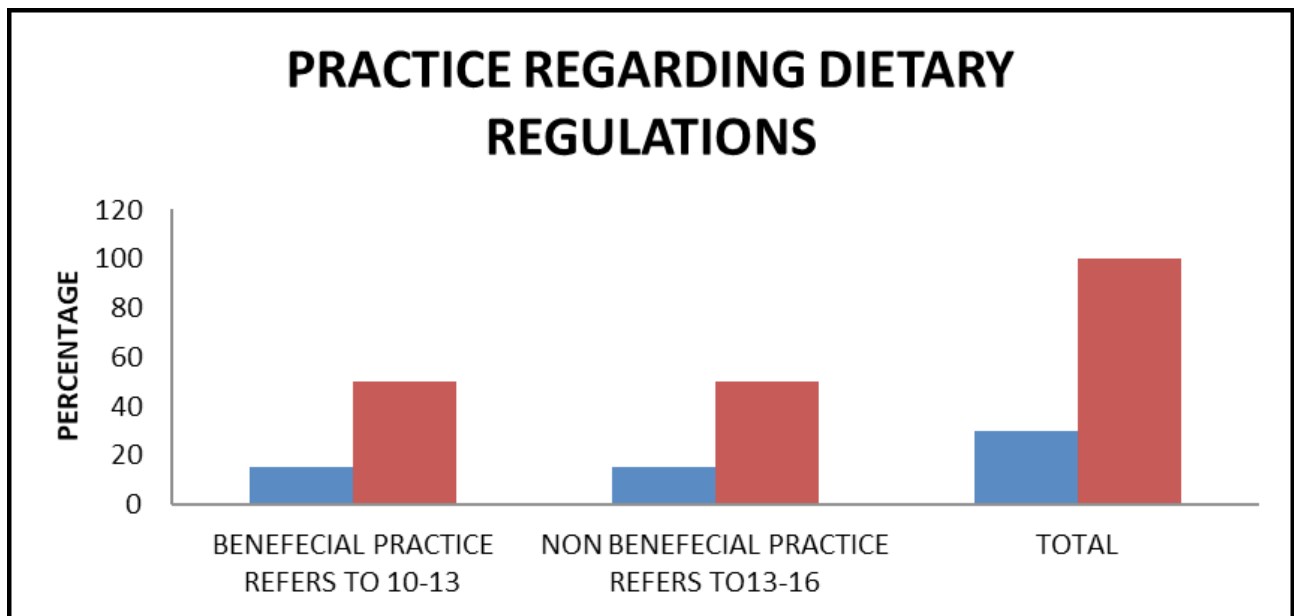
**Section 2:** Assessment of knowledge regarding dietary regulation of hemodialysis patients



**Fig I: Knowledge regarding dietary regulation**

Fig 2: Bar diagram representing the distribution of knowledge of samples regarding dietary regulations. According to the level of knowledge regarding dietary management, Majority (73.3%) of the subjects had average knowledge, (16.7%) of the subjects had good knowledge, only (10%) of the subjects had poor knowledge

**Section 3:** Assessment of practice regarding dietary Management on hemodialysis patients



**Fig II: Practice regarding dietary regulation**

With regards to the management of dietary regulation, 50% of patients scored between the ranges 10-13, in their practices were beneficial, and 50% of patients scored between the ranges 13-16 in their practices were non-beneficial.

**Section 4: Relationship between knowledge and practice of hemodialysis patients regarding dietary regulationn:**

Practices	Yes		No		“t	P
	Mean	Standard Deviation	Mean	Standard Deviation		
PQ3	8.43	1.51	8.57	2.43	-0.140	0.890
PQ4	8.57	2.28	8.00	1.41	-.346	0.732
PQ5	8.25	2.51	8.851	1.87	0.740	0.465
PQ6	8.44	2.21	9.0	2.44	0.474	0.654
PQ7	9.0	1.97	7.25	2.49	-2.002	0.055
PQ8	8.33	2.60	8.73	1.83	0.486	0.631
PQ9	8.66	1.21	8.50	2.43	-0.161	0.873
PQ10	8.00	2.50	9.07	1.80	1.300	0.205
PQ11	8.76	2.23	7.00	1.63	-1.514	0.141
PQ12	8.00	2.41	9.00	2.00	1.240	0.225

Chi-square test was used to find out the association between the knowledge and practices, and the results showed that there is no statistically significant relationship between knowledge and practices at 0.05 level of significance ( $P > 0.05$ ) The obtained “p” values are  $> 0.05$ . Hence, there is no relationship between knowledge and practice regarding dietary regulation.

### Discussion

The finding of the study and discusses them concerning similar studies conducted by the other researchers.

- Most of the subjects (90-93%) are not aware of what type of diet is preferable for non- diabetic patients with chronic renal failure and which of the food items contain more amount of phosphorous. There were (83.3%) people do not know about which chronic renal failure patients avoid cooking oil.
- There is (93.3%) subjects are taking food as per the menu is given to them. About (83-87%) subjects are limiting oil and restricting salt in their diet.
- The obtained p values are  $> 0.05$ , and hence, there was no relationship between knowledge and practice regarding dietary regulation.

### Conclusion

The purpose of the health care system is to provide quality services, and communication is the best way to gain patients satisfaction. Thus according to the results,

shows that there is no relationship between knowledge and practice of hemodialysis patients regarding dietary regulations.

Hence, from the above findings, the following conclusions were drawn:

- Knowledge of dietary regulations in CRF patients undergoing hemodialysis was average.
- A practice of CRF patients undergoing hemodialysis was average.
- There is no significant association between knowledge and practices at 0.05 level of significance.
- Hence it can be concluded that though the patients know, they do not comply with the dietary regimen

**Acknowledgment:** The authors sincerely acknowledge the hemodialysis patients from (dialysis Unit) KSHEMA Hospital, Deralakatte, Mangalore for their participation in the study.

**Conflict of Interest:** Nil

**Source of Funding:** Nitte University

Ethical clearance has taken an institutional ethical committee, Nitte Usha Institute of Nursing Science, Nitte University.

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# Spatial Sampling Technique: Method to Collect Data Randomly with Geographical Indicators in Public Health Research

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## Abstract

Spatial epidemiology is description and analysis of geographically indexed health related data which contains demographic, environmental, socioeconomic, behavioral factors. Spatial sampling techniques is to collect samples/data in two or three dimensional space. Design based sampling, Model based sampling, adaptive sampling, optimal sampling and kriging are some of the types of spatial sampling techniques. This article aims to discuss various types of spatial sampling techniques which will sensitize the medical and public health researchers about this Methodology.

**Keywords:** *Sampling, Model based, Design based, Adaptive sampling, balanced sampling.*

## Introduction

Spatial research studies mainly focus on Physical, Environmental and social attributes which may require carefully designed strategy for collection of data.<sup>1</sup> In recent years understanding and quantifying the non-localized symptoms need large scale study efforts to address the issues regarding spatial attributes.<sup>2</sup> Spatial analyses techniques help us to study the spatial patterns of variables which influences the conditions of life and wellbeing of communities and individuals in areas.

Sampling techniques in a spatial data is usually done for the purpose of estimating a proportion of population

or to identify regions of high values for further study. The main aim of spatial sampling approaches will be calculating mean of given attribute in an area; to test the effects of difference between ecological conditions; to establish spatial investigation or describe spatial distribution.<sup>3</sup> In traditional community based research studies use cluster random or multistage sampling to increase the precision of the objective which may increase the cost as well. In geospatial studies the final output of research depends upon the location of the analyzed objects which explains that the nature of local spatial points had an impact on their spatial dependence and heterogeneity. So depend upon the objective of research investigator can choose probability or non-random sampling techniques.

**Resources of spatial data:** There are many resource populations may be represented as collection of points, lines, areas. For sampling purposes the major distinctions occur between finite, linear and areal population.<sup>2</sup> Finite populations are those with discrete, identifiably distinct units that occupy fixed locations within boundary area.<sup>2</sup> Linear resources are populations such as streams or rivers that are present only on a linear network within boundary area. Attributes are defined at all points of a stream or river network.<sup>2</sup>

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An areal resource is a continuous population that is present everywhere within a bounded area.<sup>2</sup> This extends over large regions in a more or less continuous and connected manner although they may comprise disconnected polygons.<sup>2</sup> In public health research we are dealing with areal resource data; here the population were clustered as polygons or strata.<sup>2</sup>

**Types of Spatial sampling:** There were many spatial sampling procedures established for environmental studies. The two main types were design based or traditional sampling and model based or stochastic process sampling.

**Design Based Sampling:** It is also known as traditional sampling method which applied in random spatial fields. In this population values are unknown but fixed. This method can be used both population and super populations.<sup>4</sup> Design based sampling method classified based on three assumption sampling of independent and identically distributed populations, sampling considering spatial auto correlation, sampling considering spatial heterogeneity.<sup>4</sup>

**(a) Sampling based on iid populations:** It is based on probability theory which calculate precise estimates in order to select efficient samples.<sup>4,5</sup> In this method further classified as *Simple random sampling* where the sampling units chosen with equal probability, *Systematic Random Sampling* where first unit is drawn from population the other units are drawn in given preset order (k) relative to this first point, *Stratified Random Sampling* where the heterogeneous spatial data divided into homogeneous subgroups called strata which are non-overlapping, SRS then applied in each stratum, *Cluster Sampling* where population divided in to groups and all the observations in the selected clusters are included randomly, Two Step random and multistage sampling are extension of cluster random sampling.<sup>4</sup>

**(b) Sampling based on Spatial autocorrelation:** This method consider that the geographical observations close to each other are more likely to be similar than observations further apart.<sup>4,5</sup> The sample size should be higher than iid since the variance estimate may be inflated due to autocorrelation for super population sampling estimate where in decrease sample units for higher spatial autocorrelation for population mean estimate.<sup>4</sup>

**(c) Sampling Based on Spatial heterogeneity:** Spatial heterogeneity of attributes comprises two variations: population variance and population spatial auto correlation.<sup>4</sup> Purposive sampling and spatial stratified sampling are appropriate techniques to deal with spatial heterogeneity in design based sampling methodology.<sup>4</sup>

**Model Based Sampling:** The observations in a region are unfixed and set of values observed across the region represent a single realization of a stochastic, which called as super population.<sup>4</sup> Here to compute an estimator weights of the sample data are determined by covariance between the observations which are given by model as function of the coordinates of the sampling locations.<sup>4</sup> This method has three objectives relevant to spatial contexts: minimizing the error variance, equal spatial coverage and equal coverage in feature space. Kriging is model based spatial sampling with minimum error variance.<sup>4</sup>

**Adaptive Sampling:** This is also known as Progressive sampling.<sup>3</sup> This sampling methodology is essentially used all the information gathered during data collection process; it consists of two steps whole study area will be split as block contiguous blocks and further non overlapping plots.<sup>3</sup> Numerical criterion is formulated, if that plot obeys, four neighbourhood plots depending only upon physical proximity will be selected as sample plots. Secondary units will be included in the sampling after selection of primary unit.<sup>3</sup> Again quantitative criterion will evaluated, if its met then further neighboring plots will be added.<sup>3</sup>

**Optimal Sampling:** The variograms between current and future observation points can be used to calculate the optimal grid space for sampling,<sup>3</sup> necessary to monitor each variable in the regular grid to achieve a predetermined standard deviation of prediction error.<sup>3</sup> Starting with largest spacing, grid spacing reduced until the required accuracy reached.<sup>3</sup>

**Spatially balanced Sampling:** This sampling procedure can be used in point line and areal resources of data. It is generalization of spatial stratification sampling, to select spatially well distributed probability samples.<sup>2</sup> The spatial coordinates taken with one dimensional base map and hierarchical randomization used to randomly order the address and then apply a transformation which will produce equal probability plots.<sup>2</sup> Systematic sampling along with random ordered linear structure is analogues to sampling a random tessellation of two

dimensional space and results well balanced random sample.<sup>2</sup>

**Kriging:** Kriging is a geo statistical technique for optimal spatial prediction.<sup>6</sup> kriging variance depends only on the spatial locations and not on the data values themselves, prediction errors from kriging can be determined for any particular sampling plan before the sampling is actually performed.<sup>6</sup> We may then choose the sampling plan that minimizes the average prediction error.

There are many types of Kriging techniques. Simple kriging which is linear prediction assuming a known mean, Ordinary kriging is linear prediction with a constant unknown mean, Universal kriging is linear prediction with a non stationary mean structure, Filtered kriging for smoothing and prediction for noisy data which is also known as kriging with measurement error.<sup>6</sup> Lognormal kriging used for optimal spatial prediction based on the lognormal distribution, Trans-Gaussian kriging used for spatial prediction based on transformations of the data.<sup>6</sup>

Cokriging calculate multivariate linear prediction; Disjunctive kriging for nonlinear prediction based on univariate functions of the data; Bayesian kriging use to incorporate prior information about the mean and/or covariance functions into spatial prediction and Block kriging calculate optimal linear prediction of areal data from point data.<sup>6</sup>

Indicator kriging will calculate probability mapping using indicator functions and Probability kriging for probability mapping based on both indicator functions of the data and the original data.<sup>6</sup>

## Conclusion

This article may be helpful for public health, medical researchers and students to empower them to carry out research in a better manner by choosing appropriate sampling procedures in order to get precise inference in geographical / spatial data.

**Conflict of Interest:** Nil

**Funding:** Nil

**Ethical Clearance:** The ethical clearance was obtained from Institutional Ethics Committee, Karpaga Vinayaga Institute of Medical Sciences & Research Centre, Kancheepuram district, Tamilnadu (EC No: 24/2016).

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# The Role of the National Health Insurance Program in the Use of Health Services in City X

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## Abstract

The National Health Insurance Program (JKN) is estimated to affect the use of health services in Indonesia. The purpose of this study is to analyze whether the JKN program as a national insurance system can increase the use of health services, especially in City X. The increase use of health services may indicated by the Contact Rate. Based on the data processed, 56% of First Level Clinics (Klinik Pratama) in City X in 2017 that collaborated with BPJS did not reach the Contact Rate targets, only 44% of the clinics reached the target. The achievement of low Contact Rate indicates the low utilization of health services by health insurance participants. These findings indicate that even though there is already a JKN program in City X the health utilization shown through Contact Rate is still quite low. The results of the descriptive data processing showed that even though there was a national health insurance system the use of health services in City X was still quite low. This is not in line with the studies conducted by Sho-Hsia & Tung Liang (1997), Kondo & Shigeoka (2013), and Wang et. al (2018). Therefore, this study requires a further deepening of arguments regarding what factors will affect the utilization of health services by the City X's community.

**Keywords:** *Contact rate, insurance, health service.*

## Introduction

The National Health Insurance Program (JKN) aims to protect all Indonesian citizens in the insurance system so that they can meet the basic needs of an adequate public health. This program was launched in order to provide convenience and access to health services for participants throughout the health facility network in collaboration with BPJS and encourage improvement in health services for participants in a comprehensive, standardized, quality and cost-controlled management system. As a form of universal insurance the JKN program overcomes barriers to health services because of the problem of high costs.

The JKN program is expected to influence the use of health services. This influence has attracted the attention of researchers in the countries that implement universal health insurance. In general the influence that occurs is the increased use of health services

Sho-Hsia & Tung Liang<sup>1</sup> reported that the implementation of national health insurance in Taiwan in 1995 had increased the use of health services. Outpatient visits by new participants insurance twice as much compared to before the program was run. Kondo & Shigeoka<sup>2</sup> found that the introduction of universal health insurance through the expansion of health insurance coverage in Japan has significantly increased the use of health services. Similar findings were obtained by Wang et. al<sup>3</sup> in middle-aged and elderly citizens in China

Utilization of health services is expected to affect public health. Andersen<sup>4</sup> in the behavior model of health service use shows that ultimately the use of health services has an impact not only on satisfaction, but also on improving health status. That is the health status of individuals and communities is also determined by the functioning of health services. Or, in other words the public health is improved by increasing the use of health services by individuals who need them.

Therefore the purpose of this study is to analyze whether the JKN program as a national insurance system

can increase the use of health services, especially in City X. Increased use of health services, among others, can be demonstrated through the Contact Rate figures. Contact Rate is the indicator to determine the level of accessibility and utilization of primary services in First Level Health Facilities (FKTP) by participants and FKTP care and efforts towards participant health in every 1000 (one thousand) registered participants in FKTP in collaboration with BPJS Health.

Contact Rate is the indicator used by BPJS to assess FKTP's commitment to provide quality health services to JKN participants. The indicator reflects the utilization of basic health service facilities. So, research related to Contact Rate studies the use of health care facilities by JKN participants.

### **Material and Method**

To improve the quality of primary health care, BPJS applies Capitation Based Services Fulfillment of Service Commitments (KBKP). The application of the KBKP is part of the development of a service quality control system that aims to improve the efficiency and effectiveness of the delivery of health services. This payment method has been implemented in many countries that use social insurance. This payment system is proven to be able to improve the performance of FKTP in providing services to health insurance participants. Improved performance requires a strong commitment in providing the services.

KBKP payment is stipulated in BPJS Health Regulation No. 2 of 2015 concerning Norms of Determination of Capitation Amounts and Capitation Payments Based on Fulfillment of Service Commitments at FKTP. Fulfillment of service commitments is assessed based on the achievement of FKTP service commitment indicators. The indicator covers three aspects, namely:

- a. Contact Rate (AK)
- b. Non-specialist Case Outpatient Reference Ratio (RRNS)
- c. Ratio of Prolanis Participants Visiting Routine (RPPB)

Contact Rate is an indicator to find out the level of accessibility and utilization of primary services in FKTP by participants and the concern and efforts of FKTP for participants' health in every 1000 (one thousand) registered participants in FKTP in collaboration with BPJS Health. Non-specialist Case Outpatient Ratio

indicator is used to determine the quality of service in FKTP so that the referral system is organized according to medical indications and FKTP competencies. The third indicator the Prolanis Participant Ratio (Chronic Disease Management Program) Routine Visit to FKTP is an indicator to determine the continuity of chronic disease services agreed by BPJS Health and FKTP to Prolanis participants.

Each aspect of the indicator has its own fulfillment targets. The target of fulfilling the Contact Rate is  $\geq 150\%$ , RRNS of  $< 5\%$ , and RPPB of  $\geq 50\%$ <sup>5</sup>. Meeting these targets determines the amount of capitation received by FKTP. FKTP that reaches the service commitment indicator standard will get a maximum capitation payment.

Of the three aspects that are indicators of fulfilling commitments, Contact Rate is an aspect that needs more attention. As stated earlier the Contact Rate indicates the accessibility and utilization of health services in FKTP by JKN participants. In accordance with the agreement between the BPJS and the First Level Health Facilities Association the target of fulfilling the Contact Rate is at least 150 % (one hundred fifty per mile) every month. FKTP that has achieved such a score means that it is in a safe zone or in a safe condition, while the value of the Contact Rate below the target means it is in the unsafe zone<sup>5</sup>.

Contact Rate determines the amount of capitation payments FKTP receives. If the Contact Rate target and two other indicators are achieved, FKTP receives a capitation payment of 100% of the specified capitation norm. If the other two indicators reach the target, while the Contact Rate does not, FKTP receives a capitation payment of 95%. If Contact Rate and one other indicator are not safe, FKTP receives a capitation fund of 92.5%. FKTP will only receive a capitation fund of 90% if all indicators of service commitments are not met<sup>5</sup>. So, even though the target of the other two indicators is achieved, while the Contact Rate target is not, FKTP only gets a maximum of 95% capitation payments.

In this study, a descriptive comparison method used in the realization of the Contact Rate data with targets set through the Ministry of Health, including safe or unsafe categorization of the Contact Rate achievements.

### **Result and Discussion**

As of December 31, 2017, as many as 21,763 FKTP



throughout Indonesia had collaborated with BPJS Health and committed to provide quality primary services to 187,982,949 JKN participants. The FKTP covers Puskesmas, Primary Clinics, Private Practice Doctors, Primary Type D Hospitals, and Private Dental Practices<sup>6</sup>. Because it is included in the FKTP group the payment system to Pratama Clinic for services provided to JKN participants uses the capitation payment system. All provisions that apply to the capitation payment system apply to Pratama clinics, including KBKP payments. To get capitation payments the clinic must meet all three aspects of the indicators mentioned above. Achieving targets on these three aspects will result in maximum capitation payments (100%) at the clinic.

KBKP payments have been implemented since 2016 for 995 Puskesmas in 33 provincial capitals in Indonesia. Since 2017 the implementation has expanded, including Puskesmas (provincial capitals and other than provincial capitals), doctors' practices, pratama clinics, and type D pratama hospitals, except FKTP in remote and very remote areas. As of March 20, 2017, a total

of 483 districts / cities out of a total of 515 districts / cities (93.97%) have agreed to implement the KBKP. The implementation of KBKP payments at the Pratama Clinic, individual physician practice and Type D Pratama Hospital is done through an assessment of the fulfillment of service commitments every month, but the capitation adjustment has not been implemented until December 31, 2017<sup>6</sup>. Capitation adjustments began in January 2018.

Pratama clinics play a major role in providing basic health services in City X. Until 2017 as many as 101 Pratama clinics have worked closely with BPJS Health to succeed the JKN Program. Although new capitation adjustments were implemented in January 2018 the Pratama clinic in City X has already implemented the KBKP.

Based on BPJS Health data from Main Branch Office (KCU) of the City X the following is the achievement of Contact Rate in 25 pratama clinics in the City X region from April to August 2017.

**Table 1. Contact Rate from April to August, 2017 in 25 Pratama Clinics in the City X**

Period (Month)	Contact Rate				FKTP Total	
	Safe Zone (≥150%)		Unsafe Zone (<150%)			
	N	%	N	%	N	%
April	13	52	12	48	25	100
May	15	60	10	40	25	100
June	5	20	20	80	25	100
July	15	60	10	40	25	100
August	15	60	15	40	25	100

**Source:** Monthly Report from BPJS Health KCU Kota X, year 2017

The table above shows the achievement of the Contact Rate target at 25 Primary clinics in City X within a certain time period. Contact Rate is categorized into two conditions, safe and unsafe. Safe means the achievement is ≥ 150 per mile, while the performance is not safe <150 per mile. Contact Rate achievements appear to be volatile. From the table it is known that at least 40 percent of the 25 primary clinics in City X are in an unsafe condition. In fact, these unsafe conditions occurred in 80 percent of the clinics in June, 2017.

The data presented above is an each month achievement data. Meanwhile, annual data also shows similar conditions. Data on the number of participants and Contact Rate at City X's pratama clinic in 2017 from BPJS KCU City X Health revealed that 56% (n = 57) of Pratama clinics in City X who cooperated with BPJS did not reach the Contact Rate target (Contact Rate achievement <150 %). Only 44% (n = 44) clinics achieved the target (Contact Rate ≥150 %). This means that more than half of the Pratama clinics in City X are

in an unsafe zone of Contact Rate. This unsafe condition will affect the capitation funds received by the clinics. If Contact Rate is an unsafe position the clinic will not get a hundred percent capitation fund. One hundred percent payment will be obtained by the clinics if the Contact Rate and two other indicators are in a safe position.

Actually, in addition to the problem of capitation payments for clinics the low level of Contact Rate needs to be considered given the frequent accumulation and long queues of patients in the hospitals as reported by the mass media. In fact, FKTP is the first place JKN participants contact with health services and the filtering visits to FKTL. JKN participants must obtain health services in stages, except in certain circumstances such as medical emergencies.

A low level achievement of Contact Rate indicates the low utilization of health services by health insurance participants. The Contact Rate target ( $\geq 150\%$ ) was not achieved by more than half (56%) of Pratama clinics in City X in 2017. These findings indicate that although there is a JKN program in City X, health utilization is still quite low. The results of descriptive data processing show that although there is a national health insurance system the use of health services in City X is still quite low. This is not in line with the studies previously mentioned, including Sho-Hsia & Tung Liang<sup>1</sup>, Kondo & Shigeoka<sup>2</sup>, and Wang et. al<sup>3</sup> which shows an increase in health utilization due to national insurance programs in several countries (Taiwan, Japan, and China).

Therefore, this study requires a deeper argumentation in more detail about what factors will influence the utilization of health services by City X people. Factors that influence the use of health services are mentioned in the Andersen Model the Health Belief Model of Rosenstock<sup>7</sup>. Andersen's model divides factors that influence the use of health services into three major groups, namely predisposing, enabling, and need factors. Scheppers<sup>8</sup> also divides factors that can influence the use of health services into three groups, namely factors at the patient level, service providers, and the system.

Further research is needed considering the national health insurance system that has been implemented through JKN is estimated to only be one of the factors that determine the increase in the use of health services. In fact, it is possible for individual (demographic), socioeconomic, and individual perceptions to influence the use of health services.

Paudel et. al.<sup>9</sup> for example found that contributors to its use were education, family income, and knowledge. Adam and Awunor<sup>10</sup> reported that the use of health services was influenced by respondents' perceptions. Poor perceptions about services, namely inadequate staff, lack of drugs, high service costs, long waiting times, incompetent staff become a barrier to the use of services. Akerman et al.<sup>11</sup> research on the use of reproductive services found that the low use of health services is associated with less knowledge about health services. Ayers<sup>12</sup> found satisfaction, education, and gender influence the use of health services.

## Conclusion

Based on processed monthly data, at least 40 percent of the 25 pratama clinics in City X are in unsafe conditions. In addition, based on annual data 56% of pratama clinics in City X in collaboration with BPJS did not reach the Contact Rate target, only 44% of clinics achieved the target. This means that more than half of the Pratama clinics in City X are in an unsafe Contact Rate condition.

A low level achievement of Contact Rate indicates the low utilization of health services by health insurance participants. The Contact Rate target ( $\geq 150\%$ ) was not achieved by more than half (56%) of Pratama clinics in City X in 2017. These findings indicate that although there is a JKN program in City X, health utilization is still quite low.

This is not in line with the studies previously mentioned, including Sho-Hsia & Tung Liang (1997)<sup>1</sup>, Kondo & Shigeoka (2013)<sup>2</sup>, and Wang et. al (2018)<sup>3</sup>. Therefore, this study requires further argumentation regarding what factors will influence the utilization of health services by the City X people.

This research is useful as an input for pratama clinics in City X to seek to increase the number of JKN participants who come into contact with clinics, especially for healthy visits. The number of participants who contact will affect the Contact Rate. Contact rate that reach the safe level will make the clinic get maximum capitation funds.

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

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

**Source of Funding:** Self

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# Prediction Model of Appendicular Muscle Mass using Mid-thigh Circumference, Calf Circumference, and Mid-upper Arm Circumference in Community-dwelling Elderly in Indonesia

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## Abstract

Muscles play an important role in daily activities. Aging causes low muscle mass, which has many negative effects such as weakness, decreased mobility, limitation to do daily activities, etc. However, not all appendicular skeletal muscle mass measurements are easy to use and not expensive. This study aimed to identify a prediction model as an alternative method to measure appendicular muscle mass based on mid-thigh circumference, calf circumference, and mid-upper arm circumference. A cross-sectional study design was used; the study included 99 individuals, aged  $\geq 60$  years (37 men and 62 women) in Kadumanggu Village in West Java, Indonesia. The subjects were recruited, then anthropometric parameters were measured using nonelastic ONEMED OD 235 tape; body height was measured using the GEA Staturemeter 2M, weight and appendicular skeletal muscle mass were measured using a Bioimpedance Analysis (BIA) Omron HBF-375 Karada Scan by trained examiners. Multiple regression analysis was performed on SPSS version 16 software to obtain the best prediction model. The prediction model results were: Appendicular Skeletal Muscle Mass (kg) = (64.171 x Height (m)) + (1.710 x Body Mass Index (kg/m<sup>2</sup>)) – (0.109 x Mid-Upper Arm Circumference (cm)) + (0.178 x Calf Circumference (cm)) + (0.033 x Mid-Thigh Circumference (cm)) – (0.535 x Weight (kg)) – (0.065 x Age (years)) – 98.098 for men ( $R^2 = 0.710$ ; SEE = 1.43 kg;  $p < 0.05$ ) and Appendicular Skeletal Muscle Mass (kg) = (8.987 x Height (m)) – (0.170 x Body Mass Index (kg/m<sup>2</sup>)) – (0.117 x Mid-Upper Arm Circumference (cm)) + (0.121 x Calf Circumference (cm)) – (0.025 x Mid-Thigh (cm)) + (0.160 x Weight (kg)) – (0.059 x Age (years)) – 6.491 for women ( $R^2 = 0.700$ ; SEE = 1.23 kg;  $p < 0.05$ ). Difference model based on sex, showed satisfactory result for predicting appendicular skeletal muscle mass in the elderly in Indonesia. However, further research is needed to validate these findings.

**Keywords:** *Appendicular muscle mass, prediction model, elderly.*

## Introduction

In the human body, muscles have many functions, such as transforming chemical energy to mechanical energy (body movements), storing nutrition, and

contributing to basal metabolism. Skeletal muscle mass (SMM) comprises approximately 40% of total body weight<sup>(1)</sup>. As human gets older, fat mass tends to increase while SMM and skeletal mass decrease<sup>(2)</sup>. Some studies have reported on the negative effects of low muscle mass, such as weakness, decreased mobility, limitations in doing daily activities, difficulty maintaining balance, and increased risk of fracture<sup>(2-4)</sup>. Appendicular skeletal muscle mass (ASM) is the component of muscle mass that comprises approximately 75% of total SMM. ASM measurement is important in a nutritional and physiological study related to aging, muscle wasting, and obesity.

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Anthropometry measurements can be used as a body composition method to obtain information on ASM<sup>(5)</sup>. On the one hand, Dual-energy X-ray Absorptiometry (DXA) is known to be the gold standard for this measurement<sup>(6)</sup>. On the other hand, this method cannot be used in community-based clinical settings due to its high cost, limited access, and risk of radiation exposure to users<sup>(5)</sup>. Therefore, another method is needed to measure ASM that is community-friendly. Some studies have reported that body measurements can be used as a predictor to estimate ASM in the elderly<sup>(7-10)</sup>. The present study focuses on three body measurements: mid-thigh circumference (MTC), calf circumference (CC), and mid-upper arm circumference (MUAC). MTC is selected because the thigh has the highest percentage of muscle in the human body (25% of total SMM); CC has the second highest percentage of muscle (9.5% of total SMM), and MUAC has the highest muscle mass percentage in the upper extremities (5% of SMM)<sup>(11)</sup>. These measurements are also relatively easy to conduct, and, to the best of our knowledge, no other research has been conducted to develop a prediction model from these body measurements to estimate ASM in the elderly. Thus, this study aimed to develop a prediction model of ASM using MTC, CC, and MUAC in an elderly population in Indonesia.

## Method

This cross-sectional study was conducted using a convenience sample of community-dwelling elderly in Kadumanggu Village, Bogor District, West Java. This study's sample consisted of 99 elderly individuals; most of the participants were women (62.6%). Mean age was 71.68±7.26 years for men and 69.14±7.47 years for women. Mean ASM was 8.13±3.03 kg and mean body mass index (BMI) was 22.33±4.04 kg/m<sup>2</sup>.

The inclusion criteria were: individuals aged ≥60 years, those who do not stoop, have never had a part of their body amputated, and are not disabled. The exclusion criterion was anyone who was suffering from bone fracture at the measurement area. After the 99 subjects were recruited the anthropometric parameters

(MTC, CC, and MUAC) were measured using nonelastic ONEMED OD 235 tape<sup>(12)</sup>; body height was measured using the GEA Staturemeter 2M<sup>(13)</sup>, weight and ASM were measured using Bioimpedance Analysis (BIA) Omron HBF-375 Karada Scan<sup>(14)</sup> by trained examiners. After collecting all the anthropometric data, multiple regression analysis was performed on SPSS version 16 software to identify the best prediction model using single to multiple variables for the sex-specific (Men-Only and Women-Only) and combined sex (Both-Sexes) prediction models.

Weight and ASM were performed with subjects wearing a minimum amount of clothing that was free of metallic objects. ASM data were collected by multiplying the total percentage of upper and lower extremity muscle mass with body weight; height was measured with the subject removing any kind of footwear or headgear. MTC was measured by wrapping nonelastic tape around the skin between the thigh crease and the upmost part of the patella. CC was measured at the widest part of the calf. MUAC was measured on the skin at the middle point of the acromion and olecranon bones.

Eight predictors were used in this study: weight, height, BMI, MTC, CC, MUAC, age, and sex. The researcher used 338 possible combinations from these predictors, differing by sex and by combining both sexes, beginning with one predictor and then all eight predictors to obtain the highest r square (R<sup>2</sup>) possible from each category. The paired t-test, Pearson's linear correlation coefficient, and the coefficient of determination (R<sup>2</sup>) were used to assess the validity of selected prediction models.

## Findings

Data for the general characteristics of the study participants is shown in Table 1, expressed as frequencies or means ± standard deviation (SD), with minimum-maximum given in the brackets. The data showed that ASM and height were significantly higher in the men than the women.

**Table 1. General Characteristics of the Sample and Differences based on Sex**

	Whole Sample (n=99)	Men (n=37)	Women (n=62)
Age (Years)	70.09±7.46 (59.70-90.50)	71.68±7.26 (60.20-90.50)	69.14±7.47(59.70-86.00)
Weight (kg)	52.28±1.19 (28.70-78.10)	53.37±8.10 (34.30-73.30)	51.62±1.38 (28.70-78.10)
Height (m)	1.52±0.71 (1.31-1.70)	1.50±0.54 (1.42-1.70)	1.50±0.68 (1.31-1.65)
BMI (kg/m <sup>2</sup> )	22.33±4.04(11.53-34.25)	21.61±2.81 (14.65-28.91)	22.76±5.09 (11.53-34.25)
ASM (kg)	8.13±3.03 (2.54-16.27)	10.46±2.69 (5.06-16.27)	6.75±2.30 (2.54-14.31)
MTC (cm)	41.20±6.29 (27.30-55.40)	40.42±5.61 (29.22-52.60)	41.66±6.67(27.30-55.40)
CC (cm)	30.96±3.72 (21.10-40.70)	31.27±2.90 (26.60-36.50)	30.77±4.14 (21.10-40.70)
MUAC (cm)	27.30±4.59 (18.50-38.90)	26.26±3.25 (18.50-33.10)	27.91±5.16 (19.70-38.90)

Three prediction models (Men-Only, Women-Only, and Both Sexes prediction models) were found to have the highest R<sup>2</sup> from three categories, and each had a p

value <0.001. Table 2 shows the development and cross-validation for the selected ASM prediction model.

**Table 2. Development and Cross-validation of the ASM Prediction Model**

Sex	Prediction Model Development			Cross-validation		
	Equations	R <sup>2</sup>	SEE	Difference Mean (SD)	Paired t-test*	R
Men	= 64.171 x height + 1.710 x BMI – 0.109 x MUAC + 0.178 x CC + 0.033 x MTC – 0.535 x weight – 0.065 x age – 98.098	0.710	1.43	0.02	0.915	0.843
Women	= 8.987 x height – 0.170 x BMI – 0.117 MUAC + 0.121 x CC – 0.025 x MTC + 0.160 x weight – 0.059 x age – 6.491	0.700	1.23	-0.03	0.846	0.837
Both Sexes	= 0.301 x weight – 0.688 x height – 0.065 x age + 0.139 x CC + 0.125 x MUAC – 2.466 x sex – 0.487 x BMI + 9.933	0.777	2.51	-2.01	<0.001	0.882

BMI: Body Mass Index; MUAC: Mid-upper Arm Circumference; CC: Calf Circumference; MTC: Mid-thigh Circumference; Sex: 1 for men and 2 for women, \*Paired t-test performed to compare actual ASM with predicted ASM

Satisfactory results were found in the Men-Only and Women-Only model due to its high R<sup>2</sup> (men=0.710, women=0.700) with low Standard Error of Estimate (SEE) (men=1.43 kg, women=1.23kg), while the models for Both-Sexes prediction model had a high R<sup>2</sup> (0.777) and the highest SEE (2.51 kg). Data from the actual ASM measured by BIA were applied to cross-validate these three models. The result of the paired t-test showed that there were no significant differences between the ASM measurements obtained by BIA and the Men-Only prediction model and Women-Only prediction model; however, there was a significant difference between the measured ASM and the Both-Sexes prediction model. The correlation coefficient between the measured and predicted ASM ranged from 0.837 to 0.882.

## Discussion

This study aimed to identify the best ASM prediction model for Indonesian elderly using body measurements due to the impractical use of DXA as the gold standard to measure ASM in community-dwelling elderly. This measurement is important for a nutritional and physiological study related to aging, muscle wasting, and obesity<sup>(15)</sup>. Furthermore, many studies have reported that weakness, decreased mobility, limitations for doing daily activities, difficulty maintaining balance, and increased risk of fracture are related to low muscle mass<sup>(2-4)</sup>.

In our study, most of the subjects were women, and many of them were living with their children after

their husbands had passed away. This is also because women have a higher life-expectancy than men. The Central Bureau of Statistics declared that Indonesian women's life expectancy is 73.06 years; for men, it is 69.16 years<sup>(16)</sup>. In our study, ASM was greater in the men than the women, because, in men, testosterone had a positive correlation with muscle mass and muscle strength. Although testosterone decreases with age the testosterone level is still higher in men than in women<sup>(17)</sup>.

The MTC measurements were higher in women than in men; in contrast the ASM was lower. This means that there was another body composition underneath the muscle mass, which is fat. Women have higher levels of estrogen before menopause; this hormone is responsible for fat distribution in the thighs, hips, and arms. This is why our results showed that the women had greater MUAC than the men<sup>(18)</sup>.

The  $R^2$  for men, women, and the Both-Sexes prediction model were 0.710 (SEE = 1.43 kg), 0.700 (SEE = 1.23 kg), and 0.777 (2.51 kg), respectively. The results for the Men-Only prediction model were similar to the findings reported in previous studies; the ASM models from Martin et al.<sup>(19)</sup> had  $R^2 = 0.74$  with SEE=1.94 kg and the models from Doupe et al.<sup>(20)</sup> had  $R^2 = 0.77$  with SEE=1.94 kg. The results for the Women-Only prediction model were similar to the findings reported in Santana et al.<sup>(9)</sup> which had  $R^2 = 0.650$  with SEE = 1.83 kg. The result for the Both-Sexes prediction model was not satisfactory due to high SEE, and the difference in the mean was approximately 2 kg, which was underestimated. Based on the positive predictive value using the Asian Working Group on Sarcopenia (AWGSOP) cut-off for healthy muscle mass (7.0 kg/m<sup>2</sup> for men and 5.7 kg/m<sup>2</sup> for women)<sup>(21)</sup>, this ASM prediction model could find 100% positive cases (low muscle mass) for men, 99% for women, and 99% for both sexes. Thus the Men-Only prediction model and Women-Only prediction model performed satisfactory and can be used as a screening tool to identify low muscle mass in the elderly.

### Conclusion

In general, based on data from a population of Indonesian elderly, two prediction models were found to be satisfactory for estimating ASM. The result suggests that the developed equations had satisfactory prediction qualities and could be applied to measure ASM in community-dwelling elderly in Indonesia, although a

validation study is still needed to determine the validity of this prediction model.

**Conflict of Interest:** The authors have no conflicts of interest to declare.

**Source of Funding:** This research was self-funded by the authors.

**Ethical Approval:** This study was approved by The Research and Community Engagement Ethical Committee Faculty of Public Health Universitas Indonesia (number 20/UN2.F10/ PPM.00.02./2019).

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# Liver Segmentation Algorithms for Clinical Diagnosis

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## Abstract

**Background:** In the recent years, segmentation of the liver has appeared to play a vital role in field of medical applications. Segmentation is one of the important aspect of image processing, that is applied to organs in the human body to identify the tumors and the cancerous cells. Images that are obtained by the Computed Tomography or Magnetic Resonance Images are processed with the help of segmentation to detect the damaged or the infected areas in the body.

**Method:** Lots of algorithms have been implemented for the segmentation purposes in the practice of medicine nowadays. Here, a survey of various liver segmentation algorithms are analyzed and precised.

**Keywords:** *Liver, Segmentation, CT, MRI, Algorithms.*

## Introduction

Liver is the major digestive gland present in the human body. It is found in the upper right area of the abdomen and underneath the diaphragm. The human liver does not possess a uniform shape and hence they are irregular with a reddish brown color. The liver cells are otherwise known as the hepatocytes which help to perform the utmost functions of the liver. As a result of performing the multifunctional activities the liver is susceptible to a number of crucial diseases. Some of the diseases might include alcoholic liver diseases, pediatric liver diseases and blocks in the hepatic veins as well as hepatomegaly. Liver diseases can be diagnosed and the subjected to a CT scan where the damage in the liver can be identified and detected through the segmentation processes.

**Related Works:** Yongchanget al<sup>4</sup> developed an automatic approach of liver segmentation, where the appearance of the liver in addition to the facts of the context could be regulated. The details of the appearance of the liver could be approximated and put to use in blocks. The adjacent pixels can be pre-owned for training the classifier that is obtained in the beginning and the map of the probability distribution. Along with the quality of the appearance the conditions and the details of the information are extracted by the map in order to

train the forthcoming classifier. Lots of computations are performed and refined by the improved random walk technique for the segmentation of the liver in the absence of the human interposition.

Baochun et al<sup>8</sup> developed a new active shape model that was used to partition the magnetic resonance images. It was found that the traditional ASM model was a little fragile and hence a novel approach for the image segmentation was implemented. The proposed work included the AFL-PBT classifier and the CNN method of deep learning to direct the boundary of the liver. The results were more accurate and the performance tended to outperform the other state of art procedures.

Weiwei et al<sup>5</sup> developed a method for instinctively outlining the volume of the CT images with the support of supervoxel based Graphcut method. In the initial phase the abdomen was determined and extracted based on the thresholding method followed by the morphological functions. The SLIC method was then used to produce the supervoxels of the livers volume of interest accompanied by the graph cut algorithm. The results of the proposed work appear to produce better results with good accuracy and minimum processing rate.

Xuehu et al<sup>6</sup> developed a novel method named as

the sparse a priori statistical shape model for the purpose of liver segmentation. In this proposed work, problems dealing with the initialization of the deformation of the liver model could be resolved and the accuracy of the priori method could also be identified and satisfied. According to this method the marks points and the sparse coefficient are selected and calculated and a sparse statistical model can be created based on the theory of sparse coding.

Lianfen et al<sup>11</sup> developed the fastest single block linear detection algorithm that was used for the extraction of the liver from the CT images. The proposed work showed better results when compared with the earlier method. The computing time was more decreased along with the complexity and it did not require any iterations. The performance of this segmentation algorithms were very much improved in their accuracy in addition to sensitivity and their specificity.

### Comparative Analysis of Liver Segmentation

**Algorithms:** A Semantic Segmentation Algorithm was proposed in the year 2019, in which the efficiency of the segmentation can be enhanced. The disadvantage of this algorithm states that the boundary region of the liver has been blurred in certain cases. An Automatic Feature Learning Algorithm was derived in the same year, in which the computational time could be saved, but the boundary area was found to be less sensitive to tumor. In 2018, a slope-difference distribution on Threshold Selection Method was developed which did not require much datasets and the accuracy was not well guaranteed in this method. In 2017, an appearance and context based liver segmentation algorithm was proposed that achieved more accurate results. It required the details of the shape of the liver for the processing. In the same year an Improved Fuzzy C-Means and GraphCut Algorithm was developed to improve the overall time efficiency of segmentation. Here the variations along the boundary of the liver caused errors. A sparse a priori Statistical Shape Model was created in 2017, which produced very accurate segmentation results, but the sparse matching was found to reduce the efficiency of segmentation. In 2016, an automatic and fast processing supervoxel based GraphCut Algorithm was developed that required only minimum number of datasets. In 2015, a CNN-ASM segmentation produced more accuracy, but still the performance was seen to be low compared to the other results. In 2014, a modified K-Means Algorithm proposed higher results of accuracy was provided for liver having variations in sizes. Finally in the year 2013,

a Snakes Model and GrowCut Algorithm was developed that minimized the running time and reduce the time of segmentation.

**Segmentation Algorithms:** There are innumerable segmentation algorithms available in image processing. They are mainly applicable for medicinal purposes such as identification or detection of brain tumor or cancerous cells in the body. They also help to distinguish and identify the organs in the human body. Segmentation can broadly classified into fully automated and semi-automated segmentation algorithms. Some of the segmentation algorithms can be contextual and non-contextual. Contextual techniques might be region based, boundary based and so on, whereas non-contextual techniques can include intensity based thresholding.

### Algorithm: Iterative (Optimal) Threshold Selection

1. Consider that the background pixels are found in the first four ends of the image and object pixels are found in the rest of the part.
2. At step t, compute the mean background and the object gray level respectively, where segmentation can occur in the background and according to the earlier step the object can be noted by the threshold value T.

$$\mu_B^t = \sum_{(i,j) \in \text{background}} f(i,j) / \# \text{background\_pixels} \quad \text{Eq. (A.1)}$$

$$\mu_0^t = \sum_{(i,j) \in \text{objects}} f(i,j) / \# \text{objects\_pixels} \quad \text{Eq. (A.2)}$$

3. Set

$$T^{(t+1)} = \mu_B^t + \mu_0^t / 2 \quad \text{Eq. (A.3)}$$

4. If the value of  $T^{(t+1)} = T^{(t)}$  then exit; else go to step 2.

**Algorithm:** Eviction of the smaller regions of images.

1. Explore the smallest region  $R_{\min}$  of the image.
2. Locate the neighbor R that is somewhat or more or less equivalent to  $R_{\min}$ , based upon the uniformity. Integrate both R and  $R_{\min}$ .
3. Continue and repeat 1 and 2 until you reach the smaller regions than any of the preselected size that can be removed from the image.

### Algorithm: Semantic Region Merging

1. Choose a number of smaller regions to initialize the segmentation.

2. In case, there is only one edge present along the common boundary, then combine all the adjacent regions.

3. For constants values taken as  $c_1$  and  $c_2$ , and the Threshold value as  $T1$ , merge the adjacent regions termed as  $R_i$  and  $R_j$  and if the value of  $S_{ij} \leq T1$  then

$$S_{ij} = (c_1 + a_{ij}) / (c_2 + a_{ij}) \quad \text{Eq. (E.1)}$$

$$A_{ij} = (\text{area}_i)^{1/2} / \text{perimeter}_i + (\text{area}_j)^{1/2} / \text{perimeter}_j \quad \text{Eq. (E.2)}$$

### Algorithm Gaussian Mixture Parameters via Expectation Maximization

1. Select the target number of Gaussian  $K$ .
2. Initialize  $K$  Gaussians: Use  $K$ -Means on  $X$  and set the parameters from the clusters so determined.  $K$ -Means itself is susceptible to initialization and alternatives are to choose points randomly from the dataset, or to select randomly from within the data bounding.
3. Expectation: Calculate for each data point  $x_j$  and  $p_{jk}$  from the known  $\mu_k, \Sigma_k$ .
4. Maximization: Update the Gaussian parameters
5. Iterate from (3) until convergence

### Discussion

Almost all the segmentation algorithms appear to be unique and they possess their properties for the segmentation to be more systematic and methodological. Segmentation algorithms are very essential for the recognition of the damages that occur in the parts of the human body. Here, algorithms for the segmentation of the liver are dealing with the accuracy and they are compared with the other segmentation algorithms. Most of the algorithms achieve better results with a few datasets itself. The running time and the computation processing is also decreased when compared to the traditional algorithms. However in certain cases the boundary of the liver does not produce good results and hence better segmentation algorithms can be used in order to attain good quality outcomes.

### Conclusion

In this paper the segmentation algorithms are analyzed and reviewed based on performance parameters of accuracy. The other performance measures like the sensitivity and specificity also can be considered on

the segmentation process in order to enhance the liver regions. There are quite a lot of segmentation algorithms that are available in the image processing concepts and they can be utilized in the segmentation of the human organs such as liver, brain and so on.

**Ethical Clearance:** Not required for this review article.

**Source of Funding:** Self

**Conflict of Interest:** Nil

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# Evaluation of Laparoscopic Resection of Hepatic Focal Lesions, Short Term Outcome

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## Abstract

**Aim:** Even though laparoscopic hepatectomy (LH) has proved to be both safe and effective in specialized centers; the restricted indications for resection in the case of benign liver lesions has resulted in poorly reported outcomes. Our aim was to describe the short term results of LH to treat benign hepatic lesions, including quality of life (QoL) evaluation.

**Method:** Thirty-one LHs were performed between 2016 and 2018 in 31 patients. We evaluated QoL with the short form (SF-36) questionnaire and a body image satisfaction questionnaire by personal interview before surgical treatment and at 1 month, 3 months, 6 months and 1 year after surgery.

**Results:** Median age was 38 years (range 21-71) and the majority were females (68%). The most frequent etiology was hepatic adenoma in (n = 16) patients (52%), followed by focal nodular hyperplasia (n = 4), cavernous hemangioma (n = 3), hepatic abscess (n = 3), cystadenoma (n = 5). The majority of resections were minor (66%) and the conversion rate was 6.2%. Pathological examination confirmed negative margins in all patients. Postoperative mortality was nil, while morbidity was 6.2%. Median hospital stay was 4 days (range 1-32 days). In a median follow-up of 48 months (range 2-120), 2 patients experienced recurrence. QoL variables were similar between the preoperative and postoperative periods.

**Conclusion:** LH should be considered the main therapeutic approach for treating selected patients with benign liver lesions who require surgical resection because it presented both null mortality and low morbidity, along with rare recurrence, a good quality of life and high esthetic satisfaction.

**Keywords:** *Laparoscopic liver surgery, liver neoplasms, adenoma, liver cell, focal nodular hyperplasia, hemangioma, cavernous, quality of life.*

## Introduction

Since the early 90s, when the first laparoscopic anatomical resection of the liver was reported, laparoscopic hepatectomy (LH) has gained increasing

importance for treating hepatic tumors<sup>[1]</sup>. Several advances in laparoscopic instruments such as parenchymal transection devices, staplers and hand-assisted equipment, together with improved expertise in laparoscopic surgery, have led to increasing use of LH, especially in referral centers. Given its many advantages over open hepatectomy, including less postoperative pain, less use of opiate analgesia, better cosmetic results, decreased blood loss, decreased postoperative complications (both hepatic-specific and pulmonary) and shorter hospital stay, LH has become the preferred approach for treating benign hepatic tumors<sup>[2-7]</sup>. Even though LH has been shown to be both safe and effective;

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the restricted indications for resection in the case of benign liver lesions have resulted in poorly reported long-term outcomes. In addition, there is a need to know whether LH might improve the overall postoperative quality of life (QoL) of patients with benign lesions<sup>18-151</sup>.

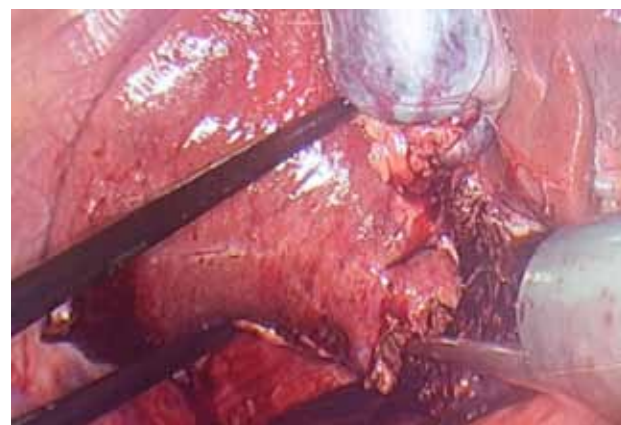
### Method

Between June 2016 and March 2018, 31 LHs performed in 31 patients bearing benign hepatic lesions formed the study population.

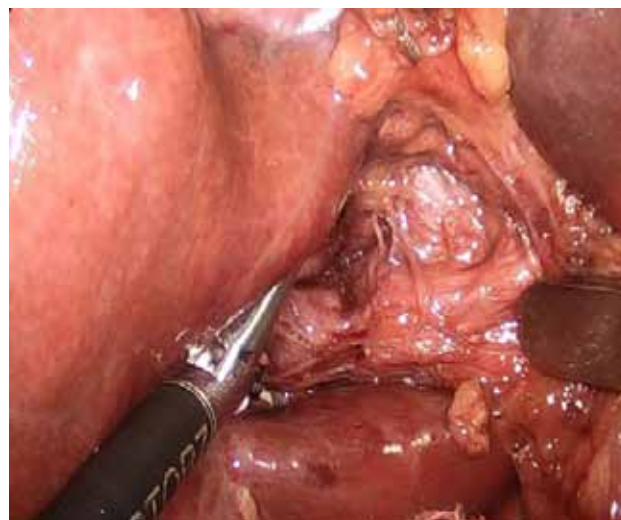
The indications for resection of benign liver lesions were as follows: symptomatic patients, presence of cystadenoma, presence of cavernous hemangioma and uncertain diagnosis based either on imaging or on biopsy findings (when it was not possible to rule out malignant hepatic neoplasm). Hepatic adenoma (HA) was also resected in the following circumstances: larger than 4-5 cm, female gender with intention to conceive, presence of beta-catenin mutation or male gender. Resection of pyogenic liver abscess (PLA) was indicated after failure of percutaneous drainage. All patients were studied with serum tumor markers (CEA, AFP and Ca 19.9), abdominal ultrasonography, computed tomography and magnetic resonance imaging (MRI). For the last seven cases, MRI with hepatobiliary contrast (Primovist; Bayer-Schering, Berlin, Germany) was also carried out. All liver resections were defined in accordance with the International Hepato-Pancreato-Biliary Association terminology through the Brisbane Nomenclature, 2000. Major hepatectomy was defined as resection of three or more hepatic segments. The surgical techniques used for LH were either the intra-hepatic Glissonian approach [Figures 1 and 2] or the extra-hepatic Glissonian approach [Figures 3 and 4], in accordance with previous standardization<sup>[7,11-13]</sup>. Intraoperative ultrasonography was performed whenever available. Surgical specimens were preferentially removed in an Endobag [Figure 5], by means of a Pfannenstiel incision [Figure 6] or a small right subcostal incision. On the liver bed, a hemostatic Surgicel was used, along with fibrin glue (Eviscel) when available, to finish the hemostasis.



**Figure 1. Intrahepatic Glissonian approach for right posterior sectionectomy. Demarcation of liver surface around right posterior Glissonian pedicle**

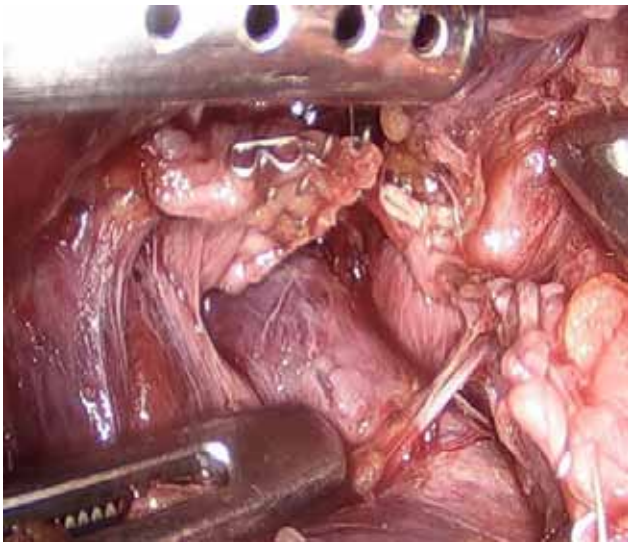


**Figure 2. Intrahepatic Glissonian approach for right hepatectomy. En-bloc stapling of right glissonian pedicles by means of vascular stapler (after two hepatotomy procedures)**



**Figure 3. Extra-hepatic approach. En-bloc dissection of the right posterior hepatic pedicle**





**Figure 4. Extra-hepatic approach. Right posterior hepatic pedicle stapled en-bloc**



**Figure 5. Segmentectomy 3 surgical specimen placed in Endobag before retrieval**



**Figure 6. Late result after left lateral laparoscopic segmentectomy**

### Discussion

Since initial experiences, LH has been proven to be a good choice for treating benign hepatic lesions,

especially for minor resections of lesions arising in easily accessible hepatic segments at anterolateral positions, so-called “laparoscopic hepatic segments”<sup>[2-6]</sup>. Since 2008, two major international expert consensus conferences have been held to review the role of LH. The first of these was held in Louisville, USA, where it was established that LH was best indicated for solitary lesions measuring 5 cm or less that were located in segments 2 to 6<sup>[6]</sup>. It was accepted that laparoscopy should be considered the standard approach for left lateral sectionectomy and that indications for surgical treatment of benign hepatic lesions should not be widened simply because laparoscopic approach was feasible. Six years later, a new consensus meeting involving many worldwide experts was held in Morioka, Japan, where hepatic resections of greater complexity became more accepted, including major resections or resections of posterosuperior liver segments, especially at referral centers<sup>[7]</sup>. Therefore, LH is nowadays considered a safe and feasible alternative to open operations, even for left or right major hepatectomies and malignant liver lesions.

Given that LH is a complex laparoscopic procedure, laparoscopic left lateral sectionectomy has been considered by many experts the ideal anatomical resection for initial training because of its anatomical accessibility and the possibility of using the aid of staplers<sup>[14-18]</sup>. Therefore, laparoscopic left lateral sectionectomy has been one of the most performed types of LH along the learning curve of many authors<sup>[8,10,12]</sup>. Even though laparoscopic left lateral sectionectomy and right posterior sectionectomy were the most frequent LHs performed in the present series, more complex LHs including left hepatectomy, right hepatectomy and even mesohepatectomy were also performed, reflecting the strong trend in the literature towards performing more complex procedures for treating hepatic lesions<sup>[2-13]</sup>.

Many studies, including meta-analyses, have confirmed the benefits of LH in comparison with open hepatectomy, namely: lower levels of postoperative pain, fewer peritoneal adhesions, shorter hospital stay, earlier return to daily activities, lower blood loss, reduced morbidity, fewer operative complications and less mortality<sup>[2-15]</sup>. Among the short-term outcomes from our study, a low blood loss (mean 125 mL), short hospital stay, low morbidity (6.4%) and no mortality are clearly in accordance with the many advantages reported in previous studies. The surgical margin was adequate in all cases, despite the lack of intraoperative palpation

that is inherent to this method. Late recurrence in this series was a rare event (only 6%), and given that they occurred distant in liver parenchyma, they could perhaps be attributed to more aggressive biological behavior in those cases.

Benign lesions of the liver usually occur in young patients, who care not only to achieve an early return to work and sports practice, but also to maintain a good QoL and a pleasing body image. Giuliani et al.<sup>[19]</sup> have demonstrated that the laparoscopic approach was superior regarding the QoL of patients who underwent operations due to benign liver lesions. In the present study we observed that there was an excellent QoL among the patients who underwent successful LH without open conversion. Seven out of eight variables measured by the SF 36 questionnaire presented similar results between preoperative period and postoperative period (after three months of surgical procedure). In our view point, this finding may indicate that LH allows QoL maintenance in patients operated from benign diseases. In the present study, an early return to work and sports practice was observed and, since most of the patients were young and in a productive phase of their lives, a significant socioeconomic gain could be expected from this population group. The main limitations of this study are its retrospective nature, as well as the heterogeneous and relatively small patient population. However, to our knowledge, no case series in Brazil have evaluated early and late postoperative outcomes along with the QoL of patients after LH performed solely on benign lesions of the liver. In addition, this report is unique because most of the patients in this sample were young women who live in a tropical country where body image is a very important tool for evaluating the overall QoL. Thus, a simple satisfaction questionnaire was applied in addition to the QoL questionnaire and showed that about 93% of our patients were satisfied in relation to the general esthetic aspects of the laparoscopic approach.

In conclusion, LH presented low morbidity, null mortality and rare recurrence in the present series. Furthermore, LH offered a good QoL and high esthetic satisfaction. Therefore, LH performed by expert liver surgeons should be considered the main therapeutic approach for treating selected patients with benign liver lesions who require surgical resection. Further prospective studies are needed to confirm our findings.

**Ethical Statement:** The material has not been published anywhere. Authors of the manuscript have

no financial ties to disclose and have met the ethical adherence.

**Disclosure of Interest:** The authors declare that they have no competing interests.

**Declaration of Authorship:** All authors have directly participated in the planning, execution, analysis or reporting of this research paper. All authors have read and approved the final version of the manuscript.

**Conflict of Interest:** None

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# The Correlation Between Worm Infection and Stunting Incidence in The First-Third Grade Students of Pematang Limau Elementary School, Gunung Mas District

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## Abstract

The highest prevalence of worm infection in Central Kalimantan was in Gunung Mas Regency (76.67%). Elementary school students especially grade I, II, and III were vulnerable to worm infection because they still actively play in the dirt and paid less attention to personal hygiene, thus facilitate the contamination of worm eggs. Prolonged worm infestation causes stunted child growth, leading to stunting. Pematang Limau Elementary School in Pematang Limau Village, Sepang District, Gunung Mas Regency was located in a riverside region, which is a high risk region of worm infection. This research aim to determine the correlation between worm infection and personal hygiene knowledge and stunting incidence in Pematang Limau Elementary School, Sepang, Gunung Mas. This cross-sectional study was conducted in Pematang Limau Elementary School, in Pematang Limau Village, Sepang, Gunung Mas. The samples were Grade I-III students obtained by total sampling. Weight and height measurement, fecal microscopic, and assessment of personal hygiene knowledge were conducted on the students. Out of 47 participants, 3 students had worm infection (6.4%) and 2 students experienced stunting with low personal hygiene knowledge. There was insignificant correlation between worm infection and stunting. There was, however, a correlation between personal hygiene knowledge and stunting incidence in Grade I-III students in Pematang Limau Elementary School.

**Keywords:** *Worm infection, personal hygiene, stunting.*

## Introduction

Worm infection is the infiltration of parasites in the form of worms into human body.<sup>1</sup> Worm infection is affected by various factors, including tropical climate, low awareness of personal hygiene, poor sanitation, low socioeconomic status, and population density.<sup>2,3</sup> This infection can lead to reduced nutritional status, immunity, intelligence, and productivity of those infected, thus

indirectly affects economic loss.<sup>1</sup> The negative impact on nutritional status caused by *Ascaris lumbricoides* infection is the absorption of 0.14 gram/worm/day carbohydrates, 0.035 gram/worm/day protein, while *Trichuris trichiura* absorbs 0.005 ml/worm/day blood.<sup>4</sup> This condition can lead to chronic nutritional deficiency and chronic anemia, thus causing chronic malnutrition which lead to stunting.

Worm infection is often found in areas with high humidity, especially in population with poor personal hygiene and environmental sanitation.<sup>2</sup> Central Kalimantan is a tropical region with wide freshwater, such as rivers, lake, and peat swamps ideal for worm growth, and the population mostly lives in the riverside, which is a high risk region of worm infection.<sup>5</sup> According to the result of data recapitulation on anthelmintic administration on pre-school children and school

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children in Central Kalimantan, only five regencies were given anthelmintics, i.e. Sukamara, Kotawaringin Barat, Barito Utara, Murung Raya, and Palangka Raya, while the rest nine regencies, including Gunung Mas had not received worm infection mass prevention drug administration (Provision of Bulk Preventive Medicine; POPM).<sup>6</sup> According to the data from Basic of Health Research in 2018 the prevalence of stunting in Gunung Mas Regency was 32%, more than the national rate of stunting in Indonesia.<sup>7</sup>

A study in Dodap Pantai Village, North Sulawesi found that there was a correlation between personal hygiene and poor neighborhood sanitation on worm infection in toddlers.<sup>8</sup> Good personal hygiene can cut off the transmission chain of worm egg derived from dirt or other materials contaminated with worm eggs. Based on a study by Ahdal, prolonged worm infection can cause growth inhibition, thus leading to stunting.<sup>9</sup>

This study was aimed to determine the correlation between worm infection and personal hygiene knowledge on stunting incidence in Pematang Limau Elementary School, Gunung Mas Regency.

**Materials and Method**

This study used observational analytical method with cross-sectional approach. This study was conducted in Pematang Limau Elementary School, Sepang, Gunung Mas from July 2019. The samples were Grade I-III students obtained through total sampling. Fecal assessment was conducted to identify worm egg or larvae using 2% eosin and reading was performed through microscope. Data on personal hygiene knowledge was obtained by interview using previously validated and rehabilitated questionnaire. Stunting assessment was conducted using the 2007 WHO height-by-age growth curve indicator. Stunting is considered if Z-score is < -2 SD.<sup>10</sup> The independent variables were worm infection and personal hygiene knowledge, while the dependent variable was stunting. Data were analyzed using SPSS 15.0. The correlation between variables were analyzed using Chi-square with p value < 0.05. Alternative test if the requirements for Chi-square was not met was Fisher’s test.

**Findings and Discussion**

The results of characteristic data of participants according to Table 1 showed that the total participants of 47 students were dominated by male, with 59.6%.

The mean age of grade I-III students was 7-9 years old. More than 50% of grade I-III students had good personal hygiene, although 34.1% of them had poor personal hygiene. According to the data in Table 2, stunting incidence in grade I-III students of Pematang Limau Elementary School was 21.3%.

**Table 1. Characteristics of grade I-III students in Pematang Limau Elementary School**

Characteristic	Frequency (n)	%
<b>Age</b>		
7 years	15	31.9
8 years	19	40.4
9 years	13	27.7
<b>Gender</b>		
Male	28	59.6
Female	19	40.4
<b>Grade</b>		
Grade I	17	36.2
Grade II	16	34
Grade III	14	29.8
<b>Personal Hygiene</b>		
Good	31	65.9
Poor	16	34.1

**Table 2. Characteristics of nutritional status of grade I-III students in Pematang Limau Elementary School based on height-by-age**

Characteristic	Frequency (n)	%
<b>Age</b>		
7 years	15	31.9
8 years	19	40.4
9 years	13	27.7
<b>Gender</b>		
Male	28	59.6
Female	19	40.4
<b>Grade</b>		
Grade I	17	36.2
Grade II	16	34
Grade III	14	29.8
<b>Personal Hygiene</b>		
Good	31	65.9
Poor	16	34.1

The result of fecal assessment (Table 3) performed on 47 participants found worm infection of 6.4% and the worm eggs identified were of *Ascaris lumbricoides*. The infected students were grade I and II.

**Table 3. Distribution of worm infection incidence in grade I-III students in Pematang Limau Elementary School**

Grade	Ascariasis			
	Positive		Negative	
	Frequency (n)	%	Frequency (n)	%
I	2	4.3	15	31.9
II	1	2.1	15	31.9
III	0	0	14	29.8
Total	3	6.4	44	93.6

The data of worm incidence and its relation to stunting in participants (Table 4) showed that there was insignificant correlation between both variables ( $p = 0.11$ ). Significant correlation was found between worm infection and personal hygiene knowledge ( $p = 0.042$ ).

**Table 4. Correlation between worm infection incidence and stunting in children based on height-by-age indicator**

		Stunting				p	PR
		Yes		No			
		n	%	n	%		
Worm infection	Positive	2	4.3	1	2.1	0.11*	3.7
	Negative	8	17	36	76.6		
<b>Total</b>		<b>10</b>	<b>21.3</b>	<b>37</b>	<b>78.7</b>		

The participants of this study were 47 grade I-III students of Pematang Limau Elementary School. The results of this study showed that worm infection incidence in grade I-III students affected 3 people (6.4%) in grade I and II students. Microscopic examination in this study revealed that the worm egg found was those from *Ascaris lumbricoides*. Helminthiasis is prevalent in the tropical region.<sup>11</sup> There are 1.2 million cases of *Ascaris lumbricoides* infestations in human throughout the world.<sup>12</sup> Helminthiasis often affects 5-7 years old children in developing countries, including Indonesia.<sup>11</sup> In Indonesia, ascariasis in children reached 14.5% and the prevalence was higher than other worm species.<sup>13</sup> The risk factor of ascariasis such as high humidity, poor sanitation and hygiene and population of tropical region with poor hygiene.<sup>14,15</sup> In this study, 65.9% grade I-III students had good personal hygiene, while 34.1% had poor personal hygiene. In this study the students who had worm infection had poor personal hygiene. Personal hygiene is important because poor personal hygiene will lead to vulnerability to infectious disease such as worm infection.<sup>16</sup> The personal hygiene mentioned in this

study was skin, hands, legs, and nails hygiene. Worm infection transmitted through dirt is often found in elementary school children and contact with dirt became the cause of worm egg transmission that enters the body along with food.<sup>16</sup>

Worm infection can cause decrease of nutritional status, intelligence, work productivity and chronic anemia.<sup>16,17</sup> In this study, stunting incidence of grade I-III students of Pematang Limau Elementary School was 21.3% and 2 students infected with *Ascariasis lumbricoides* experienced stunting. According to the analysis of correlation between worm infection and stunting found insignificant result between the two of them. However, ascariasis became a risk factor to stunting due to  $> 1$  prevalence ratio. Based on previous studies, worm infection can affect nutritional status because it causes anorexia, increase energy need, inhibit the ability of intestinal mucosa to absorb nutrition and loss of blood.<sup>13,18</sup> The infection of *Ascaris lumbricoides* is related to growth disorder. According to a cohort study in North Eastern Brazil in 2-7 years old children for 9

years, children who experienced helminthiasis were 4.63 cm shorter by the time they were 7 years old.<sup>13</sup> Other studies found that elementary school students in China who had moderate to severe worm infection became a risk factor of stunting.<sup>19</sup>

The limitation of this study was inadequate observation on the risk factors of stunting such as socioeconomic status, history of antenatal care and parent's education. Future studies are expected to observe those risk factors and better assess worm eggs using Kato-Katz method.

### Conclusion

There was insignificant correlation between worm infection and stunting. However, worm infection became a risk factor of stunting in grade I-III students of Pematang Limau Elementary School.

**Ethical Clearance:** Before conducting the data retrieval the researchers conducted a decent test of ethics conducted at the Faculty of Medicine, Palangka Raya University to determine that this study has met the feasibility. Information on an ethical test that the study is eligible to continue. The feasibility of the research was conducted to protect the human rights and security of research subjects.

**Source Funding:** This study was done by self-funding from the authors.

**Conflict of Interest:** The authors declare that they have no conflict interests.

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# Health Belief towards Cardiovascular Disease Risk and Prevention among Hypertensive Patients in Calabar, Nigeria

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## Abstract

**Background:** Hypertensive patients have increased risk of life-threatening complications, if they do not practice preventive measures. This study aimed at assessing behavioural determinants using Health Belief Model (HBM), among hypertensive patients in Calabar, Nigeria.

**Method:** Using descriptive cross-sectional study design, a 25-item questionnaire was used to obtain sum scores for each HBM component. Higher scores indicated higher degree of belief in risk of CVD event.

**Result:** Two hundred and twelve (212) respondents were studied, with mean age of  $45.5 \pm 10.8$  years. Most respondents (86.8%) had none/low degree of belief in susceptibility to CVD event. Also, most respondents had moderate to high degree of belief in severity of CVD (78.3%), benefits prevention (82.1%), and barriers against practice of preventive measures (70.8%). Females had higher mean scores for belief in severity and benefits of CVD prevention ( $p < 0.05$ ). Respondents seen at the wards compared with those seen at clinics, had significantly higher mean score for belief in susceptibility to CVD, and barriers against practice of preventive measures ( $p < 0.05$ ). Consumers compared with non-consumers of alcohol had significantly lower mean score for susceptibility, but higher mean scores for severity, benefits, and barriers against practice of preventive measures ( $p < 0.05$ ). Significantly higher means score for belief in benefits of practice of preventive measures was found for more frequent compared with less frequent consumers of fresh fruits ( $p = 0.00$ ).

**Conclusion:** Most hypertensive patients in the study setting have low level of belief in their susceptibility to having CVD event. The implications of these findings for better prevention of CVD are discussed.

**Keywords:** cardiovascular disease, health belief, hypertensive, prevention, Calabar, Nigeria.

## Introduction

Nigeria with its large population of an estimated 200 million people, makes the greatest contribution to CVD morbidity and mortality in the sub-Saharan African region<sup>(1)</sup>. Unfortunately, this burden of disease has persisted, despite high degree of preventability of

CVDs through adoption of evidence-based behavioral practices, especially among high-risk individual<sup>(2)</sup>. The initiation and sustenance of these practices, is dependent on individual's belief in susceptibility and severity of CVDs, as well as benefits and barriers towards these practices<sup>(3)</sup>. The degree of presence of these components of Health Belief Model (HBM) in at-risk individuals, are therefore key determinants of onset and progression of CVDs<sup>(3)</sup>. Assessment of these key components of the model is key towards improvement in best practices for cardiovascular disease prevention.

Yet, in Nigeria and most other developing countries, there is little research on the role of HBM and other

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behavioural theories, for better understanding and prevention of CVDs<sup>(4,5)</sup>. Considering the multicultural diversity of many countries in sub-Saharan Africa, there is need to better understand the behavioural determinants of adoption of healthy practices which may vary in the different settings<sup>(1)</sup>. This will enable adaptation and improvement in best practices for cardiovascular disease prevention, towards attainment of the health-related Sustainable Development Goals (SDGs) in developing countries<sup>(6)</sup>. This study was therefore aimed at contributing to bridging existing knowledge gap in the application of HBM for CVD prevention among at-risk individuals in a sub-Saharan African setting.

## Materials and Method

This cross-sectional study was conducted among hypertensive patients recruited using random sampling method, from medical wards and outpatient clinics in the University of Calabar Teaching Hospital, Calabar, Nigeria. The pretested interviewer-administered 25-item Likert-scaled question naire used, was an adaptation of the validated Health Belief Model Questionnaire-Revised, with higher scores indicating higher degree of Health Belief in the item/component assessed<sup>7</sup>. Prior ethical approval from UCTH health research ethics committee, and consent from subjects were obtained before data collection. Data analysis was done using SPSS version 21.0. Total and mean scores for each component were obtained and compared between sociodemographic and behavioural characteristics group's using chi-square, independent t-test and ANOVA. P-value was set at 0.05.

**Findings:** Response rate was 94%. Mean age of 212 respondents surveyed was  $45.5 \pm 10.8$  years, and most were married (84.0%), and had at least secondary level of education (91.5%). Regular physical exercise, consumption of fresh fruits, smoking, and alcohol intake, were found in 10.4%, 25.5%, 1.9%, and 35.5%, respectively. Most respondents (86.8%) had none or low degree of belief in susceptibility of having CVD (table 1). On the other hand, most respondents had moderate to high degree of belief in severity of CVD (78.3%), benefits of CVD prevention (82.1%), and barriers for CVD prevention (70.8%).

Females compared with males, had significantly higher mean scores for belief in severity of CVD and benefits of CVD prevention ( $p < 0.05$ , table 2). Married compared with unmarried respondents had significantly higher mean score for belief in susceptibility to CVD

( $p < 0.05$ ). However, unmarried compared with married respondents, as well as civil servants compared with other workers, had significantly higher mean scores for belief in severity of CVD, benefits of its preventive practices, and barriers against practice of preventive measures ( $p = 0.00$ ). Respondents seen at the wards compared with those seen at clinics, had significantly higher mean score for all components assessed, but statistical significance was found only for belief in susceptibility to CVD, and barriers against practice of preventive measures ( $p < 0.05$ ).

**Table 1: Distribution of sub-scores for health belief towards CVD (N=212)**

Variable	Frequency	Percentage
<b>Susceptibility score</b>		
None / low ( $\leq 10$ )	184	86.8
Moderate (11-15)	22	10.4
High ( $> 15$ )	6	2.8
Mean $\pm$ SD (range)	$8.37 \pm 2.96$ (5-19)	
<b>Severity Score</b>		
None / low ( $\leq 10$ )	46	21.7
Moderate (11-15)	126	59.4
High ( $> 15$ )	40	18.9
Mean $\pm$ SD (range)	$13.20 \pm 3.9$ (5-20)	
<b>Benefits score</b>		
None / low ( $\leq 11$ )	38	17.9
Moderate (12-17)	32	15.1
High ( $> 17$ )	142	67.0
Mean $\pm$ SD (range)	$16.82 \pm 4.8$ (6-24)	
<b>Barrier score</b>		
None / low ( $\leq 17$ )	62	29.2
Moderate (18-26)	142	67.0
High ( $> 26$ )	8	3.8
Mean $\pm$ SD (range)	$19.36 \pm 4.5$ (9-28)	
<b>Total health belief % score</b>		
$< 50\%$	46	21.7
$\geq 50\%$	166	78.3
Mean % $\pm$ SD (range)	$57.75 \pm 11.5$ (27-79)	

Consumers compared with non-consumers of alcohol had significantly lower mean score for susceptibility, but higher mean scores for severity, benefits, and barriers against practice of preventive measures ( $p < 0.05$ , table 3). Smokers compared with non-smokers had higher



mean score for all components of belief concerning CVD, but statistical significance was found only for severity of CVD ( $p < 0.05$ ). Respondents with higher weekly frequency of active physical exercise had higher mean score for severity, benefits, and barriers, but statistical significance was found only for barriers

against practice of preventive measures ( $p < 0.05$ ). Significantly higher means score for belief in benefits of practice of preventive measures was found for more frequent compared with less frequent consumers of fresh fruits ( $p = 0.00$ ).

**Table 2: Sociodemographic factors associated with health belief towards CVD (N=212)**

Variable	Total score Mean ± SD	Susceptibility Mean ± SD	Severity Mean ± SD	Benefits Mean ± SD	Barriers Mean ± SD
<b>Gender</b>					
Male	56.15±12.0	8.06±2.9	12.77±4.0	16.30±5.2	19.02±4.8
Female	60.35±10.1	8.86±3.0	13.91±3.4	17.67±3.9	19.90±3.9
t-test (p-value)	2.6(0.05)	1.9(0.05)	2.1(0.04)	2.0(0.04)	1.4(0.17)
<b>Age group (in years)</b>					
<30	55.79±10.3	7.21±2.5	13.86±2.5	16.64±5.9	18.07±4.3
30-39	59.42±9.0	8.04±2.2	14.18±3.1	17.96±3.1	19.24±4.4
40-49	58.07±12.4	7.46±2.3	13.44±4.1	17.10±4.9	20.07±4.7
50-59	60.30±9.6	9.28±3.1	13.83±3.0	17.43±4.5	19.77±3.5
≥60	51.17±14.0	10.17±4.1	9.77±4.6	13.40±5.3	17.83±5.3
F-test (p-value)	3.5(0.01)	6.9(0.00)	8.1(0.00)	5.1(0.00)	1.7(0.14)
<b>Marital status</b>					
Married	56.48±11.9	8.60±3.0	12.74±4.0	16.39±5.0	18.85±4.6
Unmarried	64.41±5.2	7.18±2.4	15.65±1.8	19.59±2.0	22.00±2.7
t-test (p-value)	3.8(0.00)	2.6(0.01)	4.2(0.00)	3.8(0.00)	3.9(0.00)
<b>Educational level</b>					
Primary or none	61.89±10.9	8.00±3.0	14.33±4.4	18.67±4.5	20.89±3.0
At least secondary	57.37±11.5	8.40±2.9	13.10±3.8	16.65±4.8	19.22±4.6
F-test (p-value)	1.6(0.11)	0.6(0.58)	1.3(0.20)	1.7(0.09)	1.5(0.13)
<b>Occupation</b>					
Civil servant	62.18±6.9	7.87±2.8	14.64±2.7	18.69±3.2	20.98±3.0
Public servant	55.65±11.6	8.88±3.0	12.82±3.5	15.59±4.7	18.35±5.7
Business/trader	50.57±14.4	9.07±3.2	10.80±4.7	13.77±5.7	16.93±4.6
Others	59.75±10.3	7.75±2.4	13.25±3.0	19.25±3.2	19.50±5.7
F-test (p-value)	16.8(0.00)	2.7(0.05)	15.6(0.00)	19.0(0.00)	13.2(0.00)
<b>Source of respondent</b>					
Ward	64.00±5.0	10.67±4.8	13.67±3.8	17.78±2.4	21.89±0.4
Clinic	57.18±11.8	8.15±2.6	13.16±3.9	16.73±5.0	19.21±4.6
t-test (p-value)	2.4(0.02)	3.5(0.00)	0.5(0.60)	0.8(0.38)	2.5(0.01)

**Table 3: Behavioural risk factors associated with health belief towards CVD (N=212)**

Variable	Total score Mean ± SD	Susceptibility Mean ± SD	Severity Mean ± SD	Benefits Mean ± SD	Barriers Mean ± SD
<b>Consume alcohol</b>					
Yes	63.63±4.8	7.68±2.5	15.50±2.1	18.53±1.7	21.92±2.4
No	54.47±12.8	8.75±3.1	11.93±4.0	15.87±5.6	17.93±4.7
t-test (p-value)	6.0(0.00)	2.5(0.01)	7.2(0.00)	4.0(0.00)	6.9±0.00
<b>Smoke</b>					
Yes	68.00±1.2	9.00±0.0	18.00±0.0	18.50±0.6	22.50±0.6
No	57.56±11.5	8.36±2.9	13.12±3.8	16.79±4.8	19.30±4.5
t-test (p-value)	1.8(0.07)	0.4±0.67	2.5±0.01	0.7(0.48)	1.4(0.16)
<b>Active physical exercise</b>					
Never	52.17±12.6	7.25±2.2	12.33±5.1	15.75±6.5	16.83±4.1
Occasionally (<once a week)	59.25±9.5	9.06±3.4	13.50±3.5	16.78±4.1	19.92±3.5
Once or twice weekly	57.43±12.4	8.21±2.8	13.04±3.9	17.00±5.0	19.19±5.0
Three or more times weekly	60.36±11.2	8.00±2.6	13.91±3.0	17.45±4.4	21.00±4.1
F-test (p-value)	2.8(0.04)	2.7(0.05)	0.8(0.47)	0.6(0.64)	4.1(0.01)
<b>Consume fresh fruits</b>					
Never	60.44±8.3	6.89±1.8	15.56±3.0	17.22±2.9	20.78±3.9
Occasionally (<once a week)	56.14±10.6	9.00±3.1	12.68±4.0	15.54±4.4	18.93±4.5
Once or twice weekly	55.60±14.3	8.26±2.9	12.45±4.5	16.02±5.9	18.86±5.2
Three or more times weekly	61.89±6.0	8.37±3.1	14.15±1.8	19.26±2.6	20.11±3.1
F-test (p-value)	4.2(0.01)	2.4(0.07)	5.0(0.00)	7.4(0.00)	1.7(0.18)

## Discussion

This study was aimed at assessing perceptions and health belief towards cardiovascular disease events among hypertensive patients in a developing country setting, using the key components of the Health Belief Model (HBM). Most respondents believed that CVD events were severe and preventable, but that they were not susceptible, despite high prevalence of risk factors including physical inactivity and non-consumption of fresh fruits. Unfortunately, though most subjects in this study were at risk of CVD events due to non-practice of preventive measures, they do not perceive themselves to be susceptible, perhaps due to optimistic bias of not being objective or imagining it could ever happen to them, based on religious or other sociocultural grounds<sup>(8,9)</sup>. High prevalence of perception of barriers found in this study, may have contributed to potential optimistic bias in low perception of susceptibility to CVD events<sup>(10)</sup>.

Females compared with males in this study, had significantly higher degree of belief in severity of CVD events and benefits of practice of preventive measures. This finding is key, considering that most females in this study were premenopausal, with generally less risk of CVD events compared with males<sup>(11)</sup>. This finding may explain significantly higher prevalence of practice of physical exercise and consumption of fresh fruits among females compared with males in this study. Gender difference in level of knowledge of CVD, personal experience of witnessing CVD events, and degree of success in previous attempt at practice of preventive measures, may have contributed to men's lower level of belief in severity and benefits of practice of preventive measures<sup>(12)</sup>.

In this study, consumers compared with non-consumers of alcohol had lower degree of belief in susceptibility to having CVD event, despite believing in its severity and benefits of practice of preventive

measures. In other words, consumer of alcohol believed in the severity of CVD and benefits of its practice, but did not think they were susceptible. There was also high degree of belief in barriers towards practice of preventive measures, which may potentially yield perception of low self-efficacy in these practices. In developing countries, most others barriers as due to lack of secure and enabling environment for healthy living, suggesting the vital role of government in infrastructural development towards cardiovascular disease prevention<sup>(13)</sup>. Also, increasing frequency of active physical exercise was associated with increasing degree of belief in barriers towards practice of CVD prevention. In other words, perception of barrier was not sufficient to prevent more frequent practice of preventive measures. This may be due to significantly higher degree of perception of susceptibility to CVD by subjects engaged in more frequent physical activities. These subjects may therefore have devised strategies for overcoming these perceived barriers towards improved self-efficacy<sup>(14)</sup>.

Due to potentially better laboratory investigation and health communication capacity by healthcare providers, tertiary compared with non-tertiary health facilities, may be providing more information for guiding assessment and perception of risk by respondents. This rationale for differential perception of cardiovascular risk, suggest need for caution in generalizing findings from this study. Also, there may have been response bias, due to desire to provide perceived appropriate response of risk perception and practice of preventive measures, in tune with theory of social desirability. Nevertheless, findings from this study make significant contribution to sparse literature on measures and effects of cardiovascular risk perception among hypertensive patients in the study region.

### Conclusion

There is high prevalence of perception of low susceptibility to CVD event, amidst poor practice of preventive measures among hypertensive patients in the study setting. Low risk perception may be contributing to poor compliance with pharmacologic and non-pharmacologic therapies. More effort should be aimed at improving quality of cardiovascular health education and counseling provided by healthcare providers, considering the various factors that may influence perception of disease susceptibility and severity, and practice of preventive measures.

**Conflict of Interest:** There is none to declare

**Funding:** There was no external source of funding

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# The Mantel-Haenszel Analysis to Control Confounding Variable between Birth-Weight And early-Onset Neonatal Sepsis at Hajj Hospital, Surabaya, Indonesia

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## Abstract

The association of birth-weight and early-onset neonatal sepsis has not been consistent for decades. Classifying birth-weight as high risk group without clear evidence of a consistent association can lead to economic burdens to the health systems. Its evidence namely confounding variables. The Mantel-Haenszel test represents a simple and useful tool to obtain estimates of association adjusted for the effect of one or more confounders. This study explored the association of confounding variable between birth-weight and early-onset neonatal sepsis (EONS) using the Mantel-Haenszel Test. A cross-sectional study was undertaken at Hajj Hospital, Surabaya City, Indonesia and using retrospective documents review in NICUs. The sample size of this study was 1.461 neonates were born from January 2018 to December 2018. The confounder of this study was amniotic fluid. Bivariate analysis showed that there was a correlation between amniotic fluid and EONS ( $p < 0.001$ ); and there was a correlation between amniotic fluid and birth-weight ( $p = 0.006$ ). It means that amniotic fluid was proven as a confounding variable. Without considering amniotic fluid condition the result of binary logistic-regression shows that early-onset neonatal sepsis was influenced by birth-weight ( $p < 0.001$ ; cRR: 20.498; CI: 13.464-31.208). With considering amniotic fluid the result of mantel-haenszel test shows that early-onset neonatal sepsis was influenced by birth-weight ( $p < 0.001$ ; aRR: 24.632). It could be concluded that amniotic fluid condition can increase the chance of neonatal sepsis among neonates who had low birth-weight.

**Keywords:** *Mantel-haenszel test; early-onset neonatal sepsis; birth-weight; amniotic fluid*

## Introduction

Confounding variable occurs when the relationship between an exposure variable and an outcome variable is distorted by the influence of a third variable between on it <sup>1</sup>. Confounding variable can be controlled by the study design phase and or during data analysis. There

are 3 phase of study design: randomization, restriction, and matching. While the data analysis consists of stratification analysis and multivariate analysis<sup>2</sup>

Stratification is the simplest method to control confounding variable during the data analysis. The Mantel-Haenszel test is a one of data analysis applying stratification method. It represents a simple and useful tool to obtain estimates of association, adjusted for the effect of one or more confounders<sup>2</sup>. This technique was applied to explore whether the birth-weight is causally implicated in the high frequency of early-onset neonatal sepsis independently of the confounding effect of the amniotic fluid.

Neonatal sepsis is an infection occurring in neonates within 28 days of life and cause of mortality in newborns.

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It is classified into two major categories based on the time of onset: early-onset neonatal sepsis (EONS) and late onset neonatal sepsis (LONS). Early-onset neonatal sepsis appears within the first seven days of life and most cases appear within 72 hours of birth. While late onset neonatal sepsis occurs after 8 days of neonates life and is mostly acquired after delivery<sup>3,4</sup>

WHO showed that almost 45% child deaths under 5 years in 2016. Mostly (75%) neonatal death in the first week of life and 45% of them died at 24 hours first. That caused by neonatal sepsis<sup>5</sup>. Early-onset neonatal sepsis causes high morbidity and mortality in newborns. The incidence of early-onset neonatal sepsis is higher in developing countries (1.8 to 18 per 1000 live births) than in developed countries (1 to 5 per 1000 live births). The case fatality in EONS ranges from 16.7% to 19.4%<sup>6</sup>. The incidence rates of neonatal infection in several referral hospitals in Indonesia is approximately 8.76%–30.29% with the mortality rate is 11.56%–49.9%. The incidence rates of neonatal sepsis in several referrals hospital in Indonesia is 1.5%–3.72% with the mortality rate is 37.09%–80%<sup>7</sup>.

In Hajj Hospital Surabaya there was an increase in cases of newborn infections in 2015-2017 to 21.50%. There are several factors that affect early-onset neonatal sepsis (EONS), including maternal factors, neonates' factors, and environmental factors. Amniotic fluid is a one of factors which affect (EONS). Romero etc. (2014) said that meconium-stained amniotic fluid was containing a huge bacteria than clear amniotic fluid and it was affected to infection. The microorganism were Gram-negative rods, *Ureaplasma urealyticum*, Gram-positive rods, and *Mycoplasma hominis*<sup>8</sup>

Other factor caused neonatal sepsis is birth-weight. The incidence and mortality of neonatal sepsis in LBW neonates was still high. In United State showed that incidence of early onset sepsis in VLBW neonates was 1.5% and that of late-onset sepsis was 25%<sup>9</sup>. In Dr. Soetomo General Hospital Indonesia showed that the mortality of LBW neonates with sepsis was 69%. Some condition that may contribute to the mortality of low

birth weight neonates are hypothermia, hypoglycemia, overcrowding and understaffing in NICU and apneic attacks beside the sepsis condition. The LBW infant can increased the risk of sepsis by relatively immunodeficiency and may got some invasive, monitoring procedure, and longer duration of stay that may lead to nosocomial infection<sup>10</sup>

Meconium-stained amniotic fluid has greater bacteria than clear amniotic fluid and low-birth weight neonates had immunodeficiency. It will make the infection badly, including neonatal sepsis. This study explored the association of amniotic fluid as a confounding variable between birth-weight and early-onset neonatal sepsis (EONS) using the Mantel-Haenszel Test.

### Materials and Method

This study was observational analytic with a cross-sectional design. This study using retrospective documents-medical record-review was conducted in NICUs of Hajj Hospital. The sample size of this study was 1461 neonates were born from January 2018 to December 2018. The confounder of this study was amniotic fluid. A confounding variable must have two association: a confounder must be associated with the disease and a confounder must be associated with exposure. It was using Chi Square Test.

After know that amniotic fluid was proven as a confounding variable, this study used Mantel-Haenszel test for stratification between birth-weight and early-onset neonatal sepsis. This study used SPSS Statistics 17.0 for data analysis and  $\alpha=0.05$ .

**Findings:** This study was received ethical approval from the Health Research Ethics Committee, Faculty of Medical, Universitas Airlangga. This study involved 1461 neonates with one hundred seventy-eight suffered of early-onset neonatal sepsis; one hundred twenty-one had low birth-weight; and one hundred eight had meconium-stained amniotic fluid. Almost half of neonates (42.7%) had low birth-weight and suffering early-onset neonatal sepsis.

**Table 1. Association between Amniotic Fluid and Birth-Weight**

Variables	Birth-Weight				Total		p-value
	Low (<2500 gr)		Normal (>2500 gr)				
	n	%	N	%	n	%	
<b>Amniotic Fluid</b>							
Meconium-Stained Amniotic Fluid	17	14.0	91	6.8	108	7.4	0.006*
Clear Amniotic Fluid	104	86.0	1249	93.2	1353	92.6	

\* Significantly correlate using Chi-Square Test (p < 0.05)

**Table 2. Association between Amniotic Fluid and Early-Onset Neonatal Sepsis**

Variables	Early-Onset Neonatal Sepsis				Total		p-value
	Yes		No				
	n	%	n	%	n	%	
<b>Amniotic Fluid</b>							
Meconium-Stained Amniotic Fluid	53	29.8	55	4.3	108	7.4	0.001*
Clear Amniotic Fluid	125	70.2	1228	95.7	1353	92.6	

\* Significantly correlate using Chi-Square Test (p < 0.05)

A confounding variable must have two requirements: a confounder must be associated with the disease, and a confounder must be associated with exposure. This study used Chi Square Test for correlation analysis.<sup>11</sup> **Table 1 and Table 2** shows that there was a correlation

between amniotic fluid and early-onset neonatal sepsis (p=0.001); and there was a correlation between amniotic fluid and birth-weight (p=0.006). It means that amniotic fluid was proven as a confounding variable.

**Table 3. Association between Birth-Weight and Early-Onset Neonatal Sepsis (ignoring Amniotic Fluid strata)**

Variables	Early-Onset Neonatal Sepsis				Total	
	EONS		Non-Sepsis			
	n	%	N	%	N	%
<b>Birth-weight</b>						
Low(< 2500 gram)	76	42.7	45	3.5	121	8.3
Normal (> 2500 gram)	102	57.3	1238	96.5	1340	91.7
Result of Chi-Square Test	$\chi^2 = 316.039$ p < 0.001 crude RR = 20.498					
Result of Logistic-Regression Test	B = 3.020 p < 0.001; CI = 13.464-31.208 crude RR = 20.498					

As shown in **Table 3** there was a correlation between birth-weight and early-onset neonatal sepsis (p<0.001). Most of neonates who had normal weight

(96.5%) did not suffer sepsis than neonates who had low birth-weight. In contrast almost half of participants (42.7%) who had low birth-weight were suffer early-

onset neonatal sepsis highly than neonates who had normal birth-weight. It could be concluded that the early-onset neonatal sepsis was more suffered by neonates who had low birth-weight (less than 2500 gram). The result of binary logistic-regression shows that early-onset neonatal sepsis was influenced by birth-weight

without considering amniotic fluid condition ( $p < 0.001$ ; crude RR: 20.498; CI: 13.464-31.208). It means that the neonates who had low birth-weight were at risk for getting early-onset neonatal sepsis 20.498 times greater than neonates who had normal birth-weight.

**Table 4. Association between Birth-Weight and Early-Onset Neonatal Sepsis (Amniotic Fluid strata)**

Variables	Meconium-Stained Amniotic Fluid						Clear Amniotic Fluid					
	Neonatal Sepsis						Neonatal Sepsis					
	EONS		Non-Sepsis		Total		EONS		Non-Sepsis		Total	
	n	%	n	%	n	%	n	%	n	%	n	%
<b>Birth-weight</b>												
Low (< 2500 gram)	16	30.2	1	1.8	17	15.7	60	48.0	44	3.6	121	8.3
Normal (> 2500 gram)	37	69.8	54	98.2	91	84.3	65	52.0	1184	94.8	1340	91.7
Result of Mantel-Haenszel Test	$\chi^2_{MH} = 283.809$ $p < 0.001$ adjusted RR = 24.632											
Result of Logistic-Regression Test	B = 3.212 $p < 0.001$ ; CI = 15.645-39.436 adjusted RR = 24.839						B = 3.151 $p = 0.003$ ; CI = 2.967-183.789 adjusted RR = 23.351					

**Table 4** shows the association of amniotic fluid as a confounding variable between birth-weight and early-onset neonatal sepsis using the Mantel-Haenszel Test. Relative Risk (RR) for both of amniotic fluid strata increased 4 times greater than without considering amniotic fluid conditions. The result of binary logistic-regression shows that early-onset neonatal sepsis was influenced by birth-weight with considering amniotic fluid condition ( $p < 0.001$ ; adjusted RR: 24.632).

In meconium-stained amniotic fluid group the neonates who had low birth-weight were at risk for getting early-onset neonatal sepsis 24.839 times greater than others ( $p < 0.001$ ; adjusted RR: 24.839; CI: 15.645-39.436). It could be concluded that amniotic fluid condition can increase the chance of neonatal sepsis among neonates who had low birth-weight.

**Discussion**

Following approval from the institutional ethical committee, this study involved 1461 neonates with one hundred seventy-eight suffered of early-onset neonatal

sepsis. Almost half of neonates (42.7%) had low birth-weight and suffering early-onset neonatal sepsis. Otherwise, 96.5% neonates had normal birth-weight and did not suffering early-onset neonatal sepsis. The result of binary logistic-regression shows that the neonates who had low birth-weight were at risk for getting early-onset neonatal sepsis 20.498 times greater than neonates who had normal birth-weight. This condition was similar with the previous study done by Kardana (2011) low birth-weight was significantly associated with neonatal sepsis (RR=8.4;  $p = 0.001$ ). Some condition that may contribute to the mortality of low birth weight neonates are hypothermia, hypoglycemia, overcrowding and understaffing in NICU and apneic attacks beside the sepsis condition. Neonates, who has low birth-weight, can increased the risk of sepsis by relatively immunodeficiency and may got some invasive, monitoring procedure, and longer duration of stay that may lead to nosocomial infection<sup>10,12</sup>

The result of Mantel-Haenszel analysis shows that meconium-stained amniotic fluid (MSAF) can make



the incidence of sepsis badly. Relative Risk (RR) for both of amniotic fluid strata increased 4 times greater than without considering amniotic fluid conditions. The neonates who had low birth-weight and meconium-stained amniotic fluid (MSAF) were at risk for getting early-onset neonatal sepsis 24.839 times greater than others. This condition is caused by MSAF has greater bacteria than clear amniotic fluid and low-birth weight neonates had immunodeficiency. It will make the incidence of sepsis badly<sup>8,10</sup>

### Conclusion

The birth-weight affected early-onset neonatal sepsis, and there was amniotic fluid as a confounding variable. It is suggested to Health Service Centre to focus on the intensive treatment for neonates who had low-birth-weight and suffered MSAF. It is also suggested to society, especially for husband, to keep supporting the pregnant-mommies for check their pregnancies regularly using USG to know baby's weight and her amniotic fluid condition.

**Conflict of Interest:** There was no conflict of interest in this study.

**Ethical Clearance:** This study was received ethical approval from the Health Research Ethics Committee, Faculty of Medical, Universitas Airlangga.

**Source of Funding:** This study was supported by the authors.

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# The Relationship between Gaming Addiction, Aggressive Behaviour and Narcissistic Personality Traits among University Students in Malaysia

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## Abstract

The impact of gaming addiction to all the university students in Malaysia have been concerned by the public as it can cause a lot of problem especially on violence behaviour and the development of narcissistic personality traits. This research aimed to examine the relationship between gaming addiction, aggressive behaviour and narcissistic personality traits among university students in Malaysia among university students in Malaysia. The target sample will be 100 university students between 18 to 30 years old from universities in Malaysia. The survey will include three instruments which are Internet Gaming Disorder Test questionnaire, Aggression Questionnaire and Narcissistic Personality Inventory. The result of data analysis showed that gaming addiction and aggressive behaviour have significantly positive correlation but there is no relationship found between gaming addiction and narcissistic personality traits. The implication of this research is gaming addiction might cause gamer that are addicted to possess aggressive behaviour.

**Keywords:** *Aggressive behaviour; gaming addiction, narcissistic personality traits, university students.*

## Introduction

The definition of aggressive behaviour is behaviour that can cause emotional and physical harm to others people. It can range from physical to verbal abuse<sup>1</sup>. Meanwhile, Narcissistic personality traits is the characteristics of people that have excessive self-love<sup>2</sup>. Some of us have Narcissistic personality traits but it doesn't mean we have Narcissistic Personality Disorder (NPD) which is a mental disorder<sup>3</sup>. So, gaming addiction is always a very controversial thing among all of us

because a lot of the people doesn't have a clue on what behaviour should be considered as addictive to video game. But according to American Medical Association definition of video game addiction in the year of 2007, they suggested that playing for more than two hours per day is considered to have gaming addiction or heavy game usage<sup>4</sup>.

Gaming addiction has another name known as Internet Gaming Disorder and it is a "Condition for Further Study" in the DSM-5<sup>5</sup>. This means that it is not an "official" disorder in the DSM, but one on which the American Psychology Association request additional research in the year of 2013. In conclusion the full criteria of diagnostic for Internet Gaming Addiction including strong urges and obsession on playing online games, withdrawal symptoms appeared when the gamer didn't play the game, spent more and more time on online gaming the gamer try to stop themselves from playing but in the end fail miserably the gamer has lost their interest on other hobbies or life activates the game know there is bad consequences of spending too many

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hours on gaming but still continue to do so the gamer tell lies to their friend and family about the time they spent on playing online game the gamer uses online gaming to reduce the anxiety and feeling of guilty the gamer has risk or lost a friend or relationships because of annoying his or her friend to play online game with them. Although currently gaming addiction is still not an official disorder that can be included to the mighty DSM-5 the APA has always spent their time encouraging more research to conduct on this matter. The present study wants to test the relation between the independent variable which is gaming addiction and does it have any correlation with aggressive behaviours and narcissistic personality traits among university students in Malaysia that spent more than 2 hours in playing online game either alone or with their friends since this criterion is set by American Medical Association. By the way, another famous American psychiatrist Michael Brody have set his definition of online gaming addiction as two condition the first condition is the person will need more and more of time in gaming to keep him going. The second condition is if the person couldn't play more, he will become irritable and felt miserable on his life<sup>6</sup>.

Based on a research in Malaysia, it is confirmed that a lot of people spending their time for entertainment purpose such as playing online game<sup>7</sup>. This study will focus on undergraduate university students or college students because they are the generation who have grown with the technology and Internet access, a lot of them have the highest potential to become heavy virtual world users. According to a study in the year of 2005 the ages between 18-30 are more likely than older users such as those users that are over age 30 to play online games<sup>8</sup>.

**Literature Review:** The research problem of this study is to find out whether there are any relationships between gaming addiction and aggressive behaviour, narcissistic personality traits among university student in Malaysia. According to past studies and research journal articles that most of the research focus on internet addiction or social media addiction instead of gaming addiction. One of the research is about what would be the possible causes and effects of internet addiction that are published online on the year of 2013<sup>9</sup>. The research for how social media addiction influence in Malaysia has also been done by faculty of business and law of Multimedia University<sup>10</sup>. Malaysia do have research study about the impact of online gaming on undergraduate students. This study mainly focuses

on whether online gaming positively or negatively impact this three aspects, time management, social life and emotion<sup>11</sup>. But, this study didn't try to find out the effect of addiction of gaming will causes the undergraduate students to have aggressive behaviour and narcissistic behaviour or not which is a research gap. So the deficiencies of this research and knowledge will be improved parents will also have benefited from this research because it can help them to decide whether or not they need to control the time their children play online game. The gamer will also have benefited from this research because it can help them to decide whether they want to continue play game or not if the positive correlation between gaming addiction, aggressive behavior and narcissistic personality traits is proven.

## Methodology

The data collection of this research can be separate into two parts. The first part of the research is to find around 100 participants that have gaming addiction. In order to do that IGD-20 Test which stands for Internet Gaming Disorder Test questionnaire will be distribute to all the potential people that have gaming addiction such as those people that are playing game in cyber centre near UCSI University and other places cyber centre because all of this people are highly suspect to have gaming addiction compares to other people. The link of google form for IGD-20 Test have also been posted to all the online gaming Facebook group in Malaysia to search for potential gaming addicted university students. After the calculation and screening of the participants that have completed the IGD-20 Test is done, participants that have obtained the scored of 71 or above in the IGD-20 Test is selected as the sample of this research since they have fulfilled the criteria of addicted gamer because the cut-off point of this test is 71.

Participants that are addicted gamer will have received the google form of Aggression questionnaire and Narcissistic Personality Inventory (NPI) which commenced the second part of the research. Aggression questionnaire is used to assess whether the participants have aggressive behaviour. There is no cut-off point for this questionnaire so the higher the total score of the participants the greater the severity of the aggression he or she possess. Meanwhile the test for narcissistic personality traits will be using Narcissistic Personality Inventory (NPI). The cut-off point of this test is 25. Although based on previous study male are more susceptible to gaming addiction compared to female

gamer (12-14) but this research is participated by both gender instead of just male participant.

### Results

**Table 1. Age and Gender Profiles of the Participants**

Variable	n	%
<b>Gender</b>		
Male	100	91
Female	10	9
<b>Age</b>		
18-20	13	11.8
20-25	66	59.9
25-28	31	28.2
Mean	23.34	
SD	3.50	

After data analysis have been conducted using SPSS for the demographic information the demographics results in TABLE 1 show that most of the participants are males which is 91%. More than half of them are in their young adult period because the Mean of the data is 23.34 while Standard Deviation is 3.50. Participants that have gaming addiction are around the age of 20 till 25 because this age ranges have the most percentage in the data collected which is 59.9 percent.

**Table 2. Number of Students in Each Faculty**

Faculty	n	P
Faculty of Business and Information Science	36	32.1
Faculty of Science	3	2.7
Faculty of Social Science and Liberal Arts	14	12.1
Faculty of Engineering and Technology	24	20.9
Faculty of Computer and Information Technology	16	13.8
Faculty of Creative Arts and Design	3	2.6
Faculty of Hospitality	2	1.7
Faculty of Medicine and Health Science	6	5.2
Faculty of Divinity	1	0.9
Faculty of Architecture and Surveying	3	2.7

For the numbers of participants in faculty based on TABLE 2, most of the participants are from the faculty of Business and Information Science which consists of 32.1 percent of participants. The lowest participant's percentage is 0.9 which come from the faculty of

divinity.

**Table 3. Using Internet**

Variable	n	P
≤ 5 hours	3	2.7
6-10 hours	64	58.2
11-14 hours	23	20.9
15≤ hours	20	18.2
Mean	10.54	
SD	4.64	

For the hours in using internet based on TABLE 3, most of the participants spent 5 till 10 hours online because the percentage is 58.2%. More than half of the participants would spent around 10 hours in using internet because the mean is 10.54 and the Standard Deviation is 4.64.

**Table 4. Correlation between Gaming Addiction and Aggressive Behaviour**

Variable	r	P
Gaming Addiction	1	0.00
Aggressive Behaviour	0.39	0.00

\*\*p<0.01

**Table 5. Correlation between Gaming Addiction and Narcissistic Personality Traits**

Variable	r	P
Gaming Addiction	1	0.00
Narcissistic Personality Traits	-0.02	0.82

\*\*p<0.01

The relationship between gaming addiction and aggressive behaviour, narcissistic personality traits was explored by using the Pearson's product moment correlation. The result in TABLE 4 show that gaming addiction (r=1, p<0.01) and aggressive behaviour (r=.39, p<0.01) were significantly associated. As opposed to the hypothesis the correlation coefficient showed that there was positive weak correlation between gaming addiction and aggressive behaviour. This also mean that gaming addiction promoted gamer toward aggressive behaviour. However, Table 5 shows that there is no significant relationship between gaming addiction and narcissistic personality traits. This is most probably due to the fact that gamer that participate in this research are from Malaysia which is a country that are more collectivistic

oriented compared to those western countries such as United States of America.

### **Conclusions, Implications and Recommendation**

The conclusion for this research study is online game such as Massively Multiplayer Online Role Playing Game are more competitive and include a lot of aggressive stuff because a lot of online games involved violent content such as Dota 2, Righteous Army, Counter Strike series, Left 4 Dead and Dead By Daylight where the player that take on the killer role need to find and sacrifice all the survivors to the sacrificial hooks so they can win the game<sup>10</sup>. Game that are violence in nature can seriously causes aggressive behaviour of the player that are addicted to the game itself. Based on the demographic information, most of the participants are males because they are 91% of male game addict compared to female that only have 9 percent. This result is congruent with the findings of an ethnographic and grounded theory research which concluded that men are more likely than females to identify as a gamer and are more prone to gaming addiction<sup>15</sup>.

Gaming addiction can and will potential harm the player that are addicted to it without the player itself realise the potential harmless while playing it. So, in line with the literature review which are done in this study the findings from this research study have showed that there is significant relationship between gaming addiction and aggressive behaviour but no relationship between gaming addiction and narcissistic personality traits have been found. Thus the parents, teacher or anyone that suspect their friends, sons or students have gaming addiction should have paid attention to their behaviour to see whether they have aggressive behaviour towards other or not because if they have most probably they are one of the victim of gaming addiction since both of this variable are positively correlated. Meanwhile the findings of this research shows that narcissistic personality traits have no relationship with gaming addiction are incongruent with the findings results of a research study about the relationship between online game addiction and self-control, narcissistic personality traits and aggression in South Korea that have reach a conclusion of there is positive correlation between online game addiction and aggression. The differences in research findings shows that researcher around the world should discover and conduct more research on relationship between gaming addiction and narcissistic

personality traits so that everyone can gain a better understanding in this area of knowledge. By the way, we need to advice our friends and any relatives that have narcissistic personality traits to seek help from professional psychologist or counsellor to prevent them developed into narcissistic personality disorder which is one of the mental illness that have the symptoms of abnormal behaviour that are characterized by the exaggerated feelings of excessive need for admiration, self-importance, and lack of empathy towards those people that are in trouble with their life<sup>16</sup>.

**Conflict of Interest:** The authors certify there is no conflict of interest for this manuscript.

**Source of Funding:** This research is funded by UCSI University.

**Ethical Clearance:** The ethical considerations for this paper cleared and all inform consent collected from respondents.

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# Knowledge and Compliance with the Use of Insecticide-treated Nets in Manalu Sangihe Islands Regency of North Sulawesi Indonesia

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## Abstract

**Background:** Insecticide-treated nets is essential in prevention of malaria parasite transmission and morbidity. Almost in every year, malaria cases always increase. At least in the last 5 years, malaria morbidity rate is so high, with the Annual Parasite Incidence (API) of more than 5 per 1,000 populations; with the highest number of cases occur at the Public Health Center of Manalu Sub-district of South Tabukan, with 226 positive cases. Based on these data, this region has become one of the target areas of netting intervention. Since 2011, insecticide-treated nets have been distributed at Manalu Public Health Center which has the category of malaria endemic. Each household gets 1 or 2 insecticide-treated nets. If there are pregnant women or infants, they will get extra insecticide-treated nets.

**Method:** This study aims to determine the level of knowledge and compliance of the use of Long lasting insecticidal nets by people who have received the distribution since 2011. This observational study was conducted in Manalu Public Health Center of Sangihe Islands Regency from April to June 2017. Then, an interview was made towards 103 household heads who received insecticide-treated nets.

**Result:** Results of study found that most respondents (98%) had a good knowledge of insecticide-treated nets and were compliant in using of insecticide-treated nets when they slept (83.1%); approximately 96.1% of respondents installed the nets correctly; approximately 85.7% of respondents took care and washed the nets and approximately 93.9% of respondents dried the nets in the sun. Currently, communities in the area own insecticide-treated nets (96.8%) and ordinary insecticide-treated nets (3.2%).

**Conclusion:** Although they have good knowledge of and compliance with the use of insecticide-treated nets, in fact, up to now there are still relatively high cases of malaria endemics (API > 5). Therefore, we need to look for other factors, such as geographical conditions, social conditions, and the age of insecticide-treated nets. Geographical areas in this regency are mostly in form of swamps and beaches (98.1%). This condition can affect many breeding places because most people work as fishermen with activities outside of their homes, from dawn until evening. Age of nets is now about 6 years so it needs a replacement program of insecticide-treated nets by the government to optimally prevent mosquito bites while sleeping at night.

**Keywords:** Knowledge, compliance, insecticide-treated nets, malaria.

## Introduction

Insecticide-treated nets is essential in prevention of malaria parasite transmission and morbidity.<sup>[1]</sup> It is estimated that around 1.2 billion of the world's

population have a high risk of malaria with the highest number is in Africa (47%) and followed by south-east Asia (37%). The malaria cases have reached 216 million cases and 81% of them occurred in Africa with the mortality rate reaches 655,000 cases (86%).<sup>[2]</sup> Based

on the Indonesian Ministry of Health's malaria program report, in North Sulawesi Province, especially in Sangihe Islands Regency is one of the malaria-endemic areas that almost every year it experiences cases of malaria. In 2013, a report shows that malaria morbidity rate (Annual Parasite Incidence) was 5.44 per 1,000 populations. At least, number of positive malaria cases that were reported as many as 686 cases. The number of *P.falciparum* and *P.vivax* cases is almost the same. Most of those cases occurred at Manganitu Public Health Center (220 cases) and Enemawira Public Health Center (174 cases). In 2014 the incidence of malaria dropped to 4.75 per 1,000 populations, with the number of cases coming from Manalu Public Health Center. Thus, this district has become one of pockets of endemic malaria in Sangihe.

In an effort to lower endemic malaria at Manalu Public Health Center the insecticide-treated nets are distributed with free of charge to all households. Based on data from the Health Department, each household gets one or two insecticide-treated nets in 2011. The Health Department also conducted an awareness drive through public health centers on the procedure and the installation of nets inside the house. Since the distribution and socialization was done, it has not been known regarding the knowledge and compliance of public in the use of insecticide-treated nets to prevent malaria. This fact is very important to know, considering the fact that up to 2015, status of a public health center with API > 5 /% population relatively has high endemic.

### Method

This study uses descriptive cross-sectional study design with a structured interview and observation method. This study was conducted at Manalu Public Health Center of South Tabukan Sub-District. The study was conducted in April-June 2016. Population of the study is all households at Manalu Public Health Center, covering 792 households. Samples are heads of household who obtained insecticide-treated nets. The number of samples is calculated using the proportion of sample 1 of which a sample of 96 households has been obtained.<sup>[12]</sup>

### Result

Most of respondents (95.1%) are in the age group of initial elderly category and final elderly category. Research subjects in this study are the heads of family

who are assumed to have more authority in the family. There's 92 people as male subjects (89.5%), 85 families have members generally 1-4 members (82.5%). Geographical condition of those who live at beach are 101 households (98.1%), families who have children under five are 18 families (17.5%) as well as families who have pregnant women consist of 6 households (6%).

**Table 1. Respondents Distribution Based on Characteristics**

Variables	n	%
<b>Age Group</b>		
15-24 years	4	3,9
25-44 years	36	35,0
45-64 years	51	49,5
65-78 years	12	11,7
<b>Number of family members</b>		
1-4 members	85	82,5
5-8 members	18	17,5
<b>Gender</b>		
Male	92	89,3
Female	11	183,3
<b>Village Name</b>		
Lesabe	42	40,8
Bentung	31	30,1
Batuwingkung	30	29,1
<b>Geographical Condition</b>		
Beach	52	50,5
Paddy field	1	1,0
Forest	1	1,0
Swamp	49	47,6
<b>Children under five</b>		
Exist	18	17,5
Not exist	85	82,5
<b>Pregnant Women</b>		
Exist	6	5,8
Not exist	97	94,2

The majority of respondents understand well and install insecticide-treated nets correctly (80%) (Table 2).



**Table 2. Respondents Distribution Based on the Usage Method of Insecticide-treated nets**

Variable	N	%
Use and install a insecticide-treated net correctly	74	80
Use a insecticide-treated net but done it inccorectly	3	3
Do not use insecticide-treated net	16	17
<b>Total</b>	<b>93</b>	<b>100</b>

Based on netting maintenance procedures, most of people do the washing method. Meanwhile, drying is done in the direct sunlight where drying is supposed to be done in the areas that are not exposed to direct sunlight. This occurs because in general, people have a clothesline outside the home.

**Table 3. Respondents Distribution Based on the Method of Washing of Insecticide-treated nets**

Variables	N	%
<b>Washing of net</b>		
Yes	66	85,7
No	11	14,3
<b>Place of net washing</b>		
River	15	22,7
Gutter	39	59,1
Fish pool	0	0,0
Sewer	9	13,6
Other places	3	4,5
<b>Frequency of usage</b>		
Every month	13	19,7
Every 2 months	4	6,1
Every 3 months	45	68,2
Every 4 months	1	1,5
Every 5 months	0	0,0
Every 6 months	3	4,5
<b>Method of net drying</b>		
Drying in the direct sunlight	62	93,9
Drying not in the direct sunlight	4	6,1

There’s 98% of respondents have good knowledge about the method of insecticide-treated nets and 83% of them have complied in using of insecticide-treated nets.

Table 4. Respondents Distribution Based on Level of Knowledge and Compliance in the Usage of Insecticide-treated nets.

Variable	N	%
<b>Knowledge</b>		
Good	101	98
Moderate	2	2
Lack	0	0
<b>Use of Insecticide-treated net</b>		
Yes	74	83
No	15	17

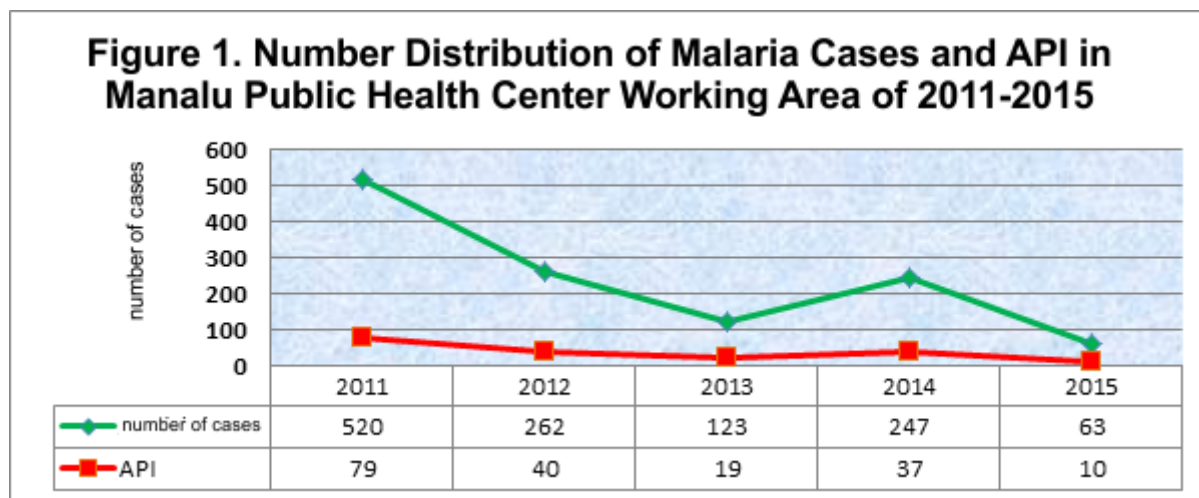
### Discussion

Proportion of respondents who comply in using of insecticide-treated nets while sleeping (slept under insecticide-treated nets the previous night) is around 83.1%. This is one of the fives indicators of insecticide-treated nets use based on WHO indicators.<sup>[5]</sup> These results are not much different from previous study in Brazil, India, Ghana that used insecticide-treated nets which the proportion was 85.7%, 70%, 91.9% in Vijayakumar’s study and 91.9% in.<sup>[6,7,8]</sup> But Findings made by Farchanny in Sikka regency was lower, proportion of respondents who comply in using of insecticide-treated nets while they sleep is only 40%.<sup>[9]</sup> A high proportion of respondents who comply in using of insecticide-treated nets can be used as an indicator of the success of malaria control programs. Compliance in using of insecticide-treated nets is associated with a decreased risk of malaria incidence. Residents in Sikka district of NTT province who do not comply in using of insecticide-treated nets are risky to suffer malaria 6.16 times greater.<sup>[8]</sup>

Knowledge of the community about the insecticide-treated nets is also noted. Knowledge will affect a person’s behaviour.<sup>[9]</sup> People who know insecticide-treated nets will protect themselves against mosquito bites malaria and will tend to use insecticide-treated nets while sleeping. This study finds that people that have been studied have a good knowledge about the use of insecticide-treated net (98%). Therefore in this study knowledge and attitudes are in line. Another study in Nigeria found that majority of sample had adequate knowledge (90,6%) but only 54,1% adhered to daily use.<sup>[9]</sup> Program of insecticide-treated nets has been implemented by the Ministry of Health since 2011. It’s output is that each household has insecticide-treated nets and those nets are used and installed properly during sleeping at night. Then what is needed to do is to measure the impact of prevention that has been already

done through insecticide-treated net program. One of its effects is the decrease of number of malaria cases. In this study, further assessment of trend is based on data

of malaria cases owned by the Public Health Center over the last 5 years.



Based on Figure 1 the number of cases and endemic level (API) show a decline trend in 2011-2015. However, this decline cannot change the status of the red zone (API=5) into the yellow zone (API = 1-4) or the green zone (API <1) of endemic malaria. In 2015 the API status at Public Health Center working area=10, which it means that it is still categorized as highly endemic. API is the Annual Parasite Incidence – the number of positive cases of malaria per 1000 population per year. Endemic status of malaria in the Manalu Public Health Center must be watched because there is a tendency to increase.

There are facts that need to be considered by the policy makers in malaria control. First the geographical condition of Manalu Public Health Center, which geographical conditions of most of the region (98.1%) are beaches and marshes of which the number of mosquito breeding places are considered as high. Without any intervention the environmental conditions like this will make anopheles mosquitoes continue to proliferate. The WHO recommendation is to modify the environmental, chemical and biological larvicides. [5] Secondly, activities or employment of most people in the region are fishermen. It means that activities outside the home at night or at dawn, exposed to high risk of being bitten by malaria mosquitoes. Thus, it is necessary for the socialization program about how

to avoid mosquito bites when performing activities outside the home. Another intervention are insecticide outdoor space spraying, and indoor residual insecticide spraying that are considered as quite expensive. Third the age of insecticide-treated nets has entered the 6<sup>th</sup> year. According to the Health Ministry the resilience of insecticide-treated nets will last only up to 5 years old, with appropriate washing and drying. Thus the nets are used by the people today do not meet the criteria for optimal prevention of mosquito bites. Secondly the geographical conditions of the working area of Manalu Health Centers. The result show that geographically majority of Manalu Health Centers (98.1%) are in areas of beaches and marshes. Geographical conditions such as these will increase the number of breeding places so that if it is not intervened properly the anopheles mosquito will continue to proliferate.

### Conclusion

Most of respondents (98%) have a good knowledge about the use of insecticide-treated nets. Most of respondents (83.1%) also comply in using of insecticide-treated nets at night. This condition is different from the status of endemic malaria at Manalu Public Health Center which there are decreasing of malaria cases during the last 5 years, but the area is still in a red zone (endemic) with API > 5.

On malaria control programs the factors of knowledge and usage of insecticide-treated nets in endemic areas have become important factors to be assessed. If these factors are already controlled but high endemic cases still high then it is important to assess other factors to be controlled and cared for by the policy makers. For example the factor of net age is associated with the effectiveness of insecticide-treated nets, environmental factors, and socioeconomic factors.

**Suggestion:** There are some efforts that can be made to optimize malaria control at Manalu Public Health Center. Firstly, it is important to assess the possibilities of other factors that may be the cause of high endemic malaria, nowadays. Among others, factor of usage age of insecticide-treated nets, environmental factors such as geographical conditions that affect mosquito breeding places, and employment factors with respect to activities outside the home. For all three of these factors the policy makers can perform replacement of insecticide-treated bed nets that are already 5 years of usage, conducting public awareness about the importance of preventing mosquito bites when performing activities outside the home, as well as controlling a vector with modification of the environment through community empowerment.

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

**Source of Funding:** This study supported by State Polytechnic Health of North Nusa Utara, Indonesia

**Ethical Clearance:** The ethical committee of Department of Health State Polytechnic of Nusa Utara. Patients were informed of the study purpose and provided written consent before participating.

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# The Relationship of Intelligence and Health Perceptions

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## Abstract

Perception is cognitive process. Perception influenced by intelligence. Until now there has been no research on intelligence and perception. The purpose of this study was to investigate on relationship between intelligence and health perception. The study was correlational descriptive . The sample consisted of 80 persons of Spiritual lectures at the Council of Dhikr, Sidoarjo, Indonesia. The Intelligence: Spiritual, Emotional and Adversity) Inventory were used as a research instrument. The Pearson correlation method were used for statistical analysis. The results show that there was a positive and significant relationship between spiritual intelligence and health perception. However, there were insignificant relationship between emotional and adversity with health perception. Spiritual Intelligence most related with health perception.

**Keywords:** *Cognitive, Intelligence, Spiritual, Emotional, Adversity, Perception.*

## Introduction

Perception is the knowledge we have of objects or of their movements by direct and immediate contact, while intelligence is a form of knowledge obtaining when detours are involved and when spatio-temporal distances between subject and objects increase. It is therefore essential that we should start with perceptual structures, to enquire whether we may not derive from them an explanation of the whole of thought, including groupings themselves<sup>[1]</sup>.

Processing cognition and emotional experiences interact with each other to systematically raise your behavior<sup>[2]</sup>. Thoughts and feelings for oneself and surrounding environment are interconnected, so it can affect the kind of behavior it appears<sup>[3]</sup>. Perception is cognitive process <sup>[4]</sup>. Cognitive embraces intelligence (emotional, spiritual and adversities).

Emotional intelligence (EI) is crucial in shaping perception. The better perception, understanding and management of emotion of those with higher emotional intelligence may prevent the development of maladaptive emotional states associated with mood and anxiety disorders <sup>[5]</sup>.

Spiritual intelligence (SI) is considered as developmental in nature, built through the accumulation of separate experiences, as manifestations of spiritual intelligence appear in an individual's life in an increasing manner <sup>[6]</sup>. Spiritual intelligence is capable of forming and organizing our perceptions about some notions, including health and disease. Spiritual intelligence improves not only personal health and welfare, but also helps people to tolerate difficult experiences such as grief and loss <sup>[7]</sup>

The concept of Adversity intelligence (AI) helps us in understanding how people react to challenges and different adversities in all the aspects of life. AI is the most widely used way of measuring and strengthening human resilience<sup>[8]</sup>.

Perception of health will affect someone in taking a health-related decision. Incorrect or negative perception can lead to errors in action. Therefore the purpose of this paper is to explain the relationship of intelligence with the perception of health.

## Method

**Study Design, Setting, and Sampling:** The

study method was correlational descriptive. Statistical population was comprised of Spiritual lectures at the Council of Dhikr, Sidoarjo, Indonesia.

The sample was selected randomly. The sample size consist of 80 person that 12 questionnaires were omitted because of the deficiency and 68 one were used.

**Study Variables:** The variables of this study were the intelligence that consist of spiritual intelligence, emotional intelligence, adversity intelligence; and perception.

The Spiritual Intelligence Inventory is a 26-item scale that measures spiritual intelligent. Spiritual intelligence components are Iman, Islam, and Ihsan. The alpha coefisien 0.894

The Emotional intelligence inventory is a 34-items scale that measures emotional intelligence. This inventory consist of self awareness, self regulation, social skill, empathy, and motivation. The alpha coefisien 0.862

The Adversity Intelligence inventory is a 28-items scale that measures adversity intelligence. Adversity intelligence components are Control, Ownership, Reach, and Endurance. The alpha coefisien 0.869

The Health Perception Inventory is a 20-items scale that measures perception of health. The alpha coefisien 0.742.

**Data Analysis:** The Pearson correlation method were used for statistical analysis.

**Result**

**Table 1. Correlation between Spiritual Intelligence with Health Perception**

Pearson correlation	Spiritual Intelligence	Health Perception
Spiritual Intelligence	1	0.243*
Health Perception		1

\*p<0.05

Table 1 shows a significant correlation between spiritual intelligence and health perception. Although the relationship between the two is weak (0.243). The correlation was positif.

**Table 2: Correlation between Emotional Intelligence with Health Perception**

Pearson correlation	Emotional Intelligence	Health Perception
Emotional Intelligence	1	0.193
Health Perception		1

p>0.05

Table 2 presents no significant correlation between emotional intelligence and health perception.

**Table 3 Correlation between Emotional Intelligence with Health Perception**

Pearson correlation	Adversity Intelligence	Health Perception
Adversity Intelligence	1	0.182
Health Perception		1

p>0.05

Table 3 presents no significant correlation between adversity intelligence and health perception

**Discussion**

Perception is the stimulus that the individual senses, organized and interpreted, so that individuals realize and understand what it senses. Perception as a fundamental person in taking decisions or actions. Similarly in terms of health, perception of health is essential as a basis for taking health-related decisions. Perception is cognitive process [4]. Cognitive embraces intelligence (emotional, spiritual and adversities).

Multiple intelligence needed to solve problems encountered, including to address health problems. Intelligence is composed of spiritual, emotional and adversity Intellegence. Emotional Intelligence (EQ) is defined as the ability to identify, assess, and control one’s own emotions the emotions of others, and that of groups[9]. Emotional Intelligence is the ability to recognize and understand emotions in yourself and others and your ability to use this awareness to manage your behavior and relationships[10].

There is a relationship between EI and health functioning[11]. Higher emotional intelligence was associated with better health [12]. The findings reflect

that emotional intelligence can play an important role in general health<sup>[13]</sup>. Emotional intelligence partially mediated the relationship between anxious insecurity and health outcomes<sup>[14]</sup>. Emotional intelligence is the ability to motivate yourself and survive face a frustrating, control impulses and heart does not surpass – exaggerated pleasure, set the mood and keep the burden of stress does not cripple the ability of thinking and Empath<sup>[9]</sup>.

Spiritual intelligence is the ability to put all the behavior and live in the context of broader meaningfulness<sup>[15]</sup>. Spirituality is a personal quest to understand the answer as the ultimate goal in life, about the meaning and relationship of the sacred or transcendent that arise from religious rituals and community<sup>[16]</sup>. The interconnectedness of spirituality with the healing process can be explained by the concept of holistic nursing<sup>[17]</sup>. Holistic model is a comprehensive model of looking at a variety of healthy pain response. This model explains that all disease psychosomatic component contain, biological, psychological, social, spiritual<sup>[18]</sup> and cultural<sup>[19]</sup>.

Spiritual intelligence allows us to reconsider our experiences and create meaning; Personal meaning production is an applicable component of spiritual intelligence<sup>[20]</sup>. Spiritual health is extremely important for many researchers, to the extent that it is seen as one of the key aspects of health<sup>[21]</sup>. Spiritual intelligence was positively associated with general health. Those who had higher levels of spiritual intelligence tended to have higher levels of health<sup>[22]</sup>. On the other hand, spiritual intelligence includes neurological processes, particular cognitive capabilities and spiritual personal and interests<sup>[23]</sup>.

Adversity Intelligence is considered to be the determinant of superior performance and success<sup>[24]</sup>. Adversity intelligence is a concept about personal qualities possessed someone to face many difficulties and in order to achieve success in many areas of his life<sup>[8]</sup>. Adversity intelligence as human capacity in the form of response patterns that are owned by a person in control and directing, admits, a difficult situation, acknowledge and rectify a difficult situation.

According to Stolz (1997)<sup>[8]</sup>Adversity intelligence (AI) is the most widely used way of measuring and strengthening human resilience. AI is rooted in three sciences: cognitive psychology (relationship between

thoughts and feelings), psychoneuroimmunology (mind-body relationship), and neurophysiology (study of brain)<sup>[8]</sup>. These three are the building blocks for the adversity quotient. Psychoneuroimmunologydeals with the feelings and emotions. Neurophysiology deals with how the brain learns and functions. Cognitive Psychology deals with the thoughts and feelings<sup>[24]</sup>. Stolz, further suggested AI is about how one responds to life especially the tough times many people encounter every day. AI is a gauge to measure how you respond and deal with challenges and adversities that many times catch us totally off guard and unprepared<sup>[8]</sup>.

Good AI of a person indicates that the person can fight against all the odds and achieve success. AI helps us to understand many other factors likeself-esteem, motivation, fighting spirit, creativity, sincerity, positive attitude, optimism, emotional stability<sup>[24]</sup>. AI can be improved of the person has empathy, sympathy and if the person is able to understand other's emotions.

## Conclusion

Spiritual intelligence relates significantly to health perception, as opposed to emotional intelligence and adversity. So that spiritual approaches can be used as an effort to improve perception of individual health.

**Ethical Clearance:** The ethical approval for this study was granted by the IRB committee of the Faculty of Medicine at the Universitas Airlangga in 2019.

**Source of Funding:** This study received funding support from Universitas Nahdlatul Ulama Surabaya, Universitas Airlangga and the Ministry of Research, Technology and Higher Education of Indonesia number 004/ADD/SP2H/LT/DRPM/VIII/2019.

**Conflict of Interest:** None

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# Factors Associated with the Risk Behaviors of Sexually Transmitted Diseases among Students in Ubon Ratchathani Province, Thailand

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## Abstract

**Background:** There is rarity on the study based on the risk behaviors of sexually transmitted diseases among students. This study aimed to determine the factors associated with the risk behaviors of sexually transmitted diseases among students in the study area and studied in grade 7-9 Ubon Ratchathani Province of Thailand.

**Method:** A cross sectional study was conducted between August 1 and October 31, 2017 among 291 students in Ubon Ratchathani Province of Thailand. The instrument used was a validated and reliable self-administered questionnaire. Logistic regression analysis was performed to identify the factors associated with the risk behaviors of sexually transmitted diseases with adjusted covariates.

**Results:** Findings revealed that 291 respondents were females 51.3% and males 48.7% with an average age of 14.1±2.1. Around 52.3% had experienced with sexual intercourse, their first sexual intercourse was found at the average age of 14 years old and did not use condom when having the latest sexual intercourse 43.5%. Respondents living with boy/girlfriend were less likely to have sexual partner more than one person. Respondents who were male, living with parent, and living with friend were less likely to report condoms use. Students who had more than one partner were likely to have the sexual value score less than students who had one partner. Respondents using condom all the time were likely to have self-esteem and sexual value score more than who did not.

**Conclusion:** The modernized and innovative training program in the accurate knowledge of sexuality and enhancing sexual values and self-esteem to prevent sexual risk behaviors with the appropriate gender, norms and the recent era among undergraduate students need to be considered.

**Keywords:** Risk behaviors; risk behaviors of sexually transmitted diseases (STDs); students.

## Introduction

Sexually transmitted diseases (STDs) is still the major public health problem in Thailand. There were

4.5-5.5 million HIV-infected people found in Asia and the Pacific.<sup>1</sup> These situations of Thai students contributed to the significant issues in public health including unsafe sexual behavior, sexually transmitted diseases, unwanted pregnancy, and abortion.<sup>2,3</sup> Early adolescence is a critical phase of development that is defined broadly between the ages of 10-14 years old and studied in grade 7-9. In this stage the development of the sexual organs characteristics is in a period of accelerated growth and changes. These changes also affect their emotional level that is taken place as puberty strikes in both positive and negative. Hence, these could encounter to the high risk of premature sexual intercourse among early adolescence

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that need to be considered as the issue and adopted for the involvement. In Thailand the rate of HIV infection is rising every year and increasing in younger patients because they have the first sexual intercourse activity at the early stage of adolescence.<sup>4</sup> Although condom usage is increasing in young men the rate of condom usage is still very low.<sup>3</sup>

Although many studies focused on sexual risk behaviors and their reduction interventions among adolescent aged group of 15 to 24 years old the findings did not represent the specific sample groups and settings. The students in the school and studied in grade 7-9 level aged between 12-15 years old are the unique sample group that have the transition between children and adolescents. Their social role and environment including self-esteem and sexual values has changes.<sup>4</sup> This could affect their risk behaviors of sexually transmitted diseases.

There is rarity on the study based on the risk behaviors of sexually transmitted diseases among students group which is the specific. This research aimed to determine the factors associated with the risk behaviors of sexually transmitted diseases, which provide the useful information for planning of an ongoing curriculum in school and the program for school, and parents.

**Material and Method**

A cross sectional study was conducted between August 1 and October 31, 2017 among students in Ubon Ratchathani Province of Thailand. The students aged between 12-15 years old resided in the study area and studied in grade 7-9 were selected by multistage random sampling. After sample size calculation by using the estimated population mean equation<sup>5</sup>, total 291 students (included 5% missing cases) with males and females were recruited from schools in Ubon Ratchathani province. Data were analyzed through descriptive statistics to characterize and risk factors were used to determine the behaviors of sexually transmitted diseases by univariate analysis and multivariate analysis at the 95% confident interval (95%CI).

**Results**

Total 291 participants were 97 (48.7%) males and 194 (51.3%) females, average age 14.1 ± 2.1 years old. The results from self-assessment about risk of premature sexual activity revealed that participants who ever have

sexual intercourse (68.8%). The mean age of their first sex was 14.5 ± 1.8 years old. The average scores of knowledge related to sexually transmitted diseases were in low levels (< 80% corrected answers). Table-1 shows the participants who ever have sexual intercourse were likely to have risk of sexual transmitted disease or did not use condom when having the latest sexual intercourse 56.5%.

The results from univariate analysis found the associations between participant characteristics and risk behaviors of sexually transmitted diseases among students. The odds of risk behaviors of sexually transmitted diseases among students were 3.01 times (OR =3.01, 95%CI = 1.62-5.59) significantly greater for males when compared to females, 4.76 times (OR =4.76, 95%CI = 2.35-9.63) significantly greater for students experience alcohol when compared to those who had no experience. Participants who had low knowledge about sexually transmitted diseases were 8.76 times (OR = 8.76, 95%CI = 4.57-16.79) sexually transmitted diseases compare to those had high knowledge level (Table-2). Table-3 shows the multivariate analysis (multiple logistic regressions adjusted for sex and experience alcohol) found the associations between participant characteristics and risk behaviors of sexually transmitted diseases. The results found the odds risk behaviors of sexually transmitted diseases were 3.95 times (OR<sub>adj</sub> =1.95,95%CI= 2.60-5.99) significantly greater for males compared to females, 5.66 times (OR<sub>adj</sub> = 5.66, 95%CI= 3.25-8.18) significantly greater for students living alone/lover/friend compared to who were living with parent, 8.47 times (OR<sub>adj</sub> = 8.47, 95%CI= 5.32-12.74) significantly greater for students experience alcohol consumption compared to those had no experience. The odds of risk behaviors of sexually transmitted diseases were 9.58 times (OR<sub>adj</sub> = 9.58, 95%CI= 4.62-12.39) significantly greater for participants who had low knowledge level compared to who had high knowledge level.

**Table 1: Sexual risk behaviors of sexually transmitted diseases among students in Ubon Ratchathani province, Thailand (n=20)**

Sexual Risk behaviours	n	%
<b>Using condoms when having last sex</b>		
No(Risk)	113	56.5
Yes (No risk)	87	43.5

**Table 2: The univariate analysis factors associated with risk behaviors of sexually transmitted diseases among students in Ubon Ratchathani province, Thailand**

Factors	Risk behaviors of sexually transmitted diseases		OR	95%CI	p-value
	Risk (n=113)	No risk (n=87)			
<b>Sex</b>					
Male	89	48	3.01	1.62-5.59	<0.001*
Female	24	39	1.00		
living with parents	85	58	1.00		
<b>Experience substance</b>					
Yes	106	82	0.92	0.28-3.01	0.895
No	7	5	1.00		
<b>Experience alcohol</b>					
Yes	99	52	4.76	2.35-9.63	<0.001*
No	14	35	1.00		
<b>Testing blood for sexual transmitted diseases</b>					
Yes	33	14	2.15	1.07-4.34	0.031*
No	80	73	1.00		
<b>Level of the knowledge sexually transmitted diseases</b>					
Low level (<80% of corrected answer)	92	29	8.76	4.57-16.79	0.001*
High level (≥80% of corrected answer)	21	58	1.00		

\*p-value &lt;0.05

**Table 3: The multivariate analysis factors associated with risk behaviors of sexually transmitted diseases among students in Ubon Ratchathani province, Thailand**

Factors	Risk behaviors of sexually transmitted diseases (n=113)	OR <sup>a</sup>	OR <sup>b</sup> <sub>adj</sub>	95%CI	p-value
<b>Sex</b>					
Male	89	3.01	3.95	2.60-5.99	0.002
Female	24		1.00		
<b>Living</b>					
living alone/lover/friend	28	0.65	5.66	3.25-8.18	<0.001
living with parents	85		1.00		
<b>Income (Baht)</b>					
≤ 5,000	75	2.93	3.57	2.42-5.82	<0.001
> 5,001	38		1.00		
<b>Experience Substance</b>					
Yes	106	0.92	10.43	7.84-12.39	<0.001
No	7		1.00		
<b>Experience Alcohol</b>					
Yes	99	4.76	8.47	5.32-12.74	0.001
No	14		1.00		

Factors	Risk behaviors of sexually transmitted diseases (n=113)	OR <sup>a</sup>	OR <sup>b</sup> <sub>adj</sub>	95%CI	p-value
<b>Having abnormality of sexual organ or anus in last 12 months</b>					
Yes	28	1.36	3.88	2.67-5.44	0.001
No	85		1.00		
<b>Testing blood for sexual transmitted diseases</b>					
Yes	33	2.15	3.99	2.89-6.69	<0.001
No	80		1.00		
<b>Level of the knowledge sexually transmitted diseases</b>					
Low level (<80% of corrected answer)	92	8.76	9.58	4.62-12.39	<0.001
High level (≥80% of corrected answer)	21		1.00		

p-value < 0.05, Goodness of fit = 0.739, Adjusted for sex and Experience alcohol

a Univariate analysis, Chi-Square test

b Multivariate analysis, Multiple logistic regression

### Discussion

This prevalence was also higher than that reported in the survey from undergraduate students in China and Nigeria.<sup>6,7</sup> Overall, almost half of students have ever had sex. The rate exceeded national estimates among adolescent samples.<sup>8</sup> Male students were tended to have more sexual activities due to socially independent more than female but the difference between contraceptive usage and sexual risk behavior exposes high proportion of woman at risk of unintended pregnancy and other sexual transmitted infections as majority of the participants were not using contraception.<sup>9</sup> This study presented earlier age than the previous study by the Ministry of Public Health that found adolescences aged 15-16 years for the first sexual activity.<sup>10</sup> This finding was supported by Baokhumkong, et al. that reported the causes of the first sexual activity in early adolescence were due to lack of knowledge and miss understand about sex education including only one time sexual intercourse cannot pregnancy.<sup>11</sup> Consequently, this should be considered as the effective level of the knowledge sexually transmitted diseases, living with single parent, experience alcohol. Almost half of them were relationship having girl/boyfriends, and almost one fourth of them were living with boy/girlfriends. Thus, this living pattern(without parents) was found at the high rate among undergraduate students and considered to be a risk factor.<sup>12,13,14</sup>

Although half of the respondents who had sex reported using condoms all of the time when having sex. The proportion of condom use reported in this study

was no using condoms when having last sex 56.5% which were found that the risk behaviors of sexually transmitted diseases among students and 40.3% reported among undergraduate students in Canada and China, respectively.<sup>15,16</sup> The number of sexual partner was found differently from the study in Thai student, but it was found similarly in Brazil that most of the student reported only one sexual partner.<sup>14</sup> These behaviors could increase the risk for sexually transmitted diseases and HIV/AIDs among students. Respondents who were male, living with parent, and living with friend were less likely to report using condoms all the time. These findings showed differently with the previous studies in the gender and living patterns.<sup>9,14</sup> Despite male was assumed to be the significant person for the decisions about sexual and reproductive health regarding the role of condom use, this effort and decision have to be empowered in both male and female to promote the safe sex.<sup>17,18,19</sup> Gender, tendency to use condoms and being sexually active had no significant relationship to levels of knowledge.<sup>19</sup> For our results regarding the living with parent or single parent and lover were less likely to report using condoms some time, but living with friend and living alone using condoms all time this could explain that in Thai culture parents do not talk openly about sex, and condom is uncommon to carry. It is believed that people who carry condoms are sex workers and obsessed with sex. Therefore, friends, parents and teachers should be suggested to be the considerable role for promoting the prevention of sexual risk behavior and encouraging to understand and talk openly regarding sexual issues.

The student's sexual values are a way of expressing a meaningful behavior and thinking about the behavior in their group or society. Condom was the most commonly known contraceptive and more frequently used while other method like intra uterine device, location amenorrhea and Norplant were rarely mentioned.<sup>20</sup> The previous studies suggest that students tend to accept sex more comfortably and feel less guilty about sex than younger students in high school.<sup>21,22</sup> Although Thai culture and society are conservative about sexual issues, they currently have been changed dramatically among undergraduate students in the university level.<sup>23,24</sup> The transition from high-school from university affects the social role to be more freedom and engaged with the risk behaviors.

### Conclusion

This study used in-depth interview and qualitative to collect the information about risk behaviors of sexually transmitted diseases among students which might contain bias data. The study should be used to increase reliability of result. The rate of condom used with this specific group found in this study is alarming. Finding for gender are supported to be involved in condom use skills for male students. The results for living patterns suggest that parents/friends and teachers are considerable to be the important persons and be the role for promoting the condom use among undergraduate students. The recommendations from this research were mentioned as follows. The government should develop the effective curriculum and active campaign in order to give knowledge and prevent risk behaviors of sexually transmitted diseases. However the modernized and innovative education and program should be focused more on the early age such as in high-school to cultivate the students' ability to anticipate the benefits of the prevention and the disadvantages of sexual risk behaviors. Especially in female students the rate of premature sexual activity in female students is rising. Therefore, female students should be provided more knowledge and correct attitude to prevent the problem from premature sexual activity

**Ethical Clearance:** Research tool was self-assessment questionnaire consist of questions related to sexual activities among early adolescences. This study was under Ubon Ratchathani Rajabhat University. Participants received both written and verbal information before they agreed to participate the study.

**Conflict of Interests:** This study has no conflicts of interest.

**Source of Funding:** This study was supported by Department of Diseases control, Ministry of Public Health- Thailand. And Faculty of Public Health, Ubon Ratchathani University-Thailand.

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# Association of PM<sub>2,5</sub> Concentration, Years of Work and Duration of Work with Blood Malondialdehyde Level of Workers in Fish Smoking Industry Bandarharjo Semarang

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## Abstract

Workers in fish smoking industry continue to be exposed to high concentrations of PM<sub>2.5</sub> that contain various free radicals. PM<sub>2.5</sub> are known to pose great health risk because of their ability to penetrate deeply into lungs and bloodstream. This study aims to analyze the relationship between PM<sub>2.5</sub> concentration, years of work and duration of work with MDA levels. The present study used cross-sectional design with 104 workers in fish smoking industry Bandarharjo Semarang as subjects. Data were collected through measurements of PM<sub>2.5</sub> concentrations in the air, blood sampling for MDA levels test, and questionnaires. The results showed that PM<sub>2.5</sub> concentrations in small and medium scale smoking houses were higher than the large one. The average MDA levels was 0.996 µg/mL. There was a significant association between MDA levels with PM<sub>2.5</sub> concentrations ( $p = 0.007$ ) and years of work ( $p = 0.019$ ), while the duration of work did not show any significant association ( $p = 0.616$ ). Correlation test results showed that there were no variables that have a strong association with MDA levels. These findings need to be followed up by increasing coaching for workers, improving air circulation, and regulating working hours of workers, so that health risks can be minimized.

**Keywords:** PM<sub>2,5</sub>, MDA level, years of work, duration of work, fish smoking.

## Introduction

Particulate Matter is a tiny and microscopic particulate that can be inhaled by humans and cause serious health problems. Particulates less than 2.5 µm in diameter (PM<sub>2.5</sub>) can penetrate deeply into the lungs and even the bloodstream. Based on these characteristics, PM<sub>2.5</sub> is known to pose the greatest risk

to human health<sup>1</sup>. Various studies have been conducted to determine the health effects caused by PM<sub>2.5</sub>.<sup>2,3</sup> Long-term exposure to PM<sub>2.5</sub> is associated with an increased risk of long-term cardiopulmonary death by 6-13% per 10 µg/m<sup>3</sup> PM<sub>2.5</sub>.<sup>4,5</sup> People with a history of lung or heart disease, parents and children, are a very vulnerable group<sup>6</sup>.

An increase in PM<sub>2.5</sub> concentration is associated with an increase in respiratory diseases such as Chronic Obstructive Pulmonary Disease (COPD), lung cancer, and cardiovascular disease<sup>6</sup>. According to The Global Burden of Disease Study the global prevalence of COPD in 2016 was 251 million cases. An estimated 3.17 million deaths are caused by COPD or 5% of all deaths worldwide with more than 90% of deaths occurring in low-income countries<sup>7</sup>. In Indonesia, COPD prevalence reaches 3.7% per mil, where most sufferers are male<sup>8</sup>.

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Industrial activity is one of the largest sources of PM2.5 emissions in the environment. The fish smoking industry involves a combustion process that produces concentrated smoke which is released directly into the air. In 2007, a study of the induction of inhaled particles on the lung capacity of workers in Bandarharjo fish smoking showed that workers experienced coughing, phlegm coughing, shortness of breath, and chest pain. The results of measurements using the Personal Dust Sampler obtained 12 people inhaling particles exceeding 3 mg/m<sup>3</sup> from 45 existing respondents<sup>9</sup>. Other research also show that workers who are exposed to PM2.5 are at risk of suffering from COPD or cardiovascular disease<sup>10,11,12</sup>. Years of work and duration of work could also influence the level of worker exposure to PM2.5. Several studies have shown a relationship between these two variables with an increase in oxidative stress biomarkers in workers<sup>13,14,15,16</sup>.

In general the induction of toxicity by PM is believed to involve oxidative stress. Particles in wood smoke contain free radicals that are capable of producing reactive oxygen species in cells<sup>17</sup>. Oxidative stress is known to be involved in the pathogenesis of lifestyle-related diseases, such as atherosclerosis, hypertension, diabetes mellitus, ischemic disease, and cancer<sup>18</sup>. Oxidative stress can be assessed by monitoring changes in biomarker excretion in blood, urine, and other biological fluids. Many biomarkers have been proposed to measure oxidative stress levels, and MDA is one of the most frequently used<sup>19</sup>.

Based on the results of previous studies, this study tries to further examine the risk of more serious illness

such as COPD and cardiovascular disease in workers through the measurement of oxidative stress levels using MDA biomarkers in the blood.

**Method**

The study design was cross-sectional and the subjects were 104 workers at Bandarharjo Fish Smoking Industry Semarang. Determination of the sample is done by the method of non-probability sampling. Data collection was carried out through PM2.5 concentration measurements at 8 sample points by officers from Envilab Environmental Laboratory using Particle Counter, blood sampling for MDA level testing at the Integrated Biomedical Laboratories at the Faculty of Medicine, Sultan Agung Islamic University, Semarang, and questionnaires to obtain age-related information, sex, years of work, and duration of work. The results of the study were analyzed by univariate and bivariate analysis to see the association between the independent variables with MDA levels by Chi-Square and Correlation Test.

**Results**

The results showed different concentrations of PM2.5 at 8 different points in small, medium and large-scale smoking houses. PM2.5 at small and medium scale are actually higher than the large one as shown in Table 1. PM2.5 in each small and medium scale showed the same value, that were 500 µg/m<sup>3</sup>. This is the highest value that Particle Counter can measure, so there was probability that the actual PM2.5 concentration in the two houses exceeded 500 µg/m<sup>3</sup>. The number of workers exposed to high PM2.5 was 32.0% (Table 2).

**Table 1. Concentration of PM2,5 in 8 sampling points**

Sampling Point	Concentration of PM2,5 (µg/m <sup>3</sup> )	Tempe-rature (°C)	Relative Humidity (%)	Wind Direction to (°)	Wind Speed (m/s)
Entrance gate	23	32,3	48,4	235	2,3 – 4,5
Small-scale A	500	33,1	51,3	270	0,1 – 0,7
Small-scale B	500	34,2	54,3	235	0,1 – 0,8
Medium-scale A	500	31,9	56,6	270	0,1 – 0,3
Medium-scale B	500	35,4	57,9	270	0,1 – 0,2
Big-scale A	271	33,2	56,5	270	0,1 – 0,3
Big-scale B	332	33,3	56,1	270	0,1 – 0,2
Exit gate	350	33,2	53,8	235	0,3 – 3,3

**Table 2. Distribution of Workers based on PM2,5 Concentration**

PM2,5 Concentration	N	Percentage (%)
Low	66	68,0
High	31	32,0
Total	97	100,0

The median value of MDA levels was 0.996 µg/mL, with an inter quartile distance of 0.455 µg/mL - 1.464 µg/mL. It was known that workers with MDA levels below the median were 50.5%, slightly more than workers with MDA levels above the median (Table 3).

**Table 3. Distribution of Workers based on Blood MDA Level**

MDA Level	N	Percentage (%)
≤ median	49	50,5
> median	48	49,5
Total	97	100,0

The average age of workers is 47.14 years, with the youngest and oldest age was 20 and 65 years old respectively. Table 4 showed that there were more workers with age above average (53.6%) and more female workers (70.1%) compared to male (29.9%). The average years of work was 16.79 years with the shortest working period was 1 year and the longest was 35 years. It was known that there were more workers who have years of work above the average (58.8%). While the average duration of work was 8.24 hours per day, with the shortest and longest duration were 4 hours and 13 hours respectively. The results showed that there were

more workers with working hours above the average (66.0%).

**Table 4. Distribution of Workers based on Independent Variables**

Variables	N	Percentage (%)
<b>Age</b>		
≤ mean	45	46,4
> mean	52	53,6
<b>Sex</b>		
Female	68	70,1
Male	29	29,9
<b>Years of Work</b>		
≤ mean	40	41,2
> mean	57	58,8
<b>Duration of Work</b>		
≤ mean	33	34,0
> mean	64	66,0

Chi-Square Test results showed that there were 71.0% workers who had MDA levels above the median. The test for variable PM2.5 concentration and MDA levels obtained p value 0.007, so it can be concluded that there was a significant association between the two variables. OR value = 3.761 means that workers exposed to high concentrations of PM2.5 have 3.761 times greater opportunity to have MDA levels above the median than those who exposed to low PM2.5. The years of work also showed a significant association with MDA levels (p value = 0.019). While for age (p = 0.925), gender (p = 0.340), and duration of work (p = 0.616) showed no significant association (Table 5).

**Table 5. Chi-square Test Results**

Variable	MDA Level				Total		OR (95% CI)	P value
	≤ median		> median		N	%		
	N	%	n	%				
<b>Concentration of PM2,5</b>								
Low	40	60,6	26	39,4	66	100,0	3,761 (1,50 – 9,43)	0,007
High	9	29,0	22	71,0	31	100,0		
<b>Age</b>								
≤ mean	22	48,9	23	51,1	45	100,0	0,886 (0,399 – 1,968)	0,925
> mean	27	51,9	25	48,1	52	100,0		



Variable	MDA Level				Total		OR (95% CI)	P value
	≤ median		> median					
	N	%	n	%	N	%		
<b>Sex</b>								
Female	37	54,4	31	45,6	68	100,0	1,691 (0,702 – 4,075)	0,340
Male	12	41,4	17	58,6	29	100,0		
<b>Years of Work</b>								
≤ mean	14	35,0	26	65,0	40	100,0	0,338 (0,146 – 0,784)	0,019
> mean	35	61,4	22	38,6	57	100,0		
<b>Duration of Work</b>								
≤ mean	15	45,5	18	54,5	33	100,0	0,735 (0,317 – 1,708)	0,616
> mean	34	53,1	30	46,9	64	100,0		

Correlation Test was also carried out to see the strength and direction of the association between MDA levels and age, years of work and duration of work.

However the test results showed none of variables that have a strong association with MDA levels. It was proven by a very small r value as presented in Table 6.

**Table 6. Spearman-Correlation Test Results**

Variable	r	R <sup>2</sup>	Equation	P value*
Age	0,024	0,001	MDA = 0,901 + 0,002* Age	0,816
Years of Work	-0,169	0,018	MDA = 1,194 – 0,011* Years of Work	0,097
Duration of Work	-0,061	0,0005	MDA = 0,993 + 0,002* Duration of Work	0,556

**Discussion**

**PM2.5 concentration with MDA levels:** The present study showed that number of furnaces did not affect the concentration of PM2.5. In small scale houses with 3-5 furnaces, PM2.5 concentrations were known higher than in the large ones. This may be influenced by the area of the smoking house, ventilation system, wind direction, and the number of chimneys. In small scale houses the smoking room tends to be narrower and there are not many air holes to drain the smoke out. This may be one of the causes of the high concentration of PM2.5.

However the MDA results showed that workers on small and medium scale house have higher median of MDA than workers on large-scale ones. Mann-Whitney Test results also showed a significant difference in MDA levels in workers exposed to low and high concentrations

of PM2.5. Workers exposed to high PM2.5 had an opportunity to have higher MDA levels than those who exposed to low PM2.5. These results are in line with several previous studies.

Study conducted in South Korea showed a significant relationship between PM2.5 and MDA in elderly people after adjusting for age, sex, BMI, passive smoking, child care facilities, alcohol consumption, smoking, and medical history. The identification of oxidative stress caused by PM2.5 explains the mechanism of adverse health effects such as cardiovascular or respiratory diseases, especially in the elderly<sup>20</sup>.

Similar results were shown in Copenhagen where there was a 3.7% increase in MDA concentrations per 10 µg/m<sup>3</sup> increase in personal exposure to PM2.5 in women (p <0.05). This shows that exposure to particles in

moderate concentrations can cause oxidative stress and increase red blood cells in peripheral blood. However, this study explained that personal exposure to PM<sub>2.5</sub> is known to be more related to MDA biomarkers that are potentially associated with cardiovascular disease than PM<sub>2.5</sub> concentrations in ambient air<sup>21</sup>.

Personal exposure does better reflect the shape and number of each worker's apparent exposure to PM<sub>2.5</sub>. This becomes one of the limitations in this study, because the measurement of PM<sub>2.5</sub> was only conducted in the ambient air. In addition, measurements were not made on all 25 houses, but only at 8 sample points. These results may not reflect the actual PM<sub>2.5</sub> concentration in each smoking house.

**Years of Work and MDA Levels:** Years of work shows the total time spent by workers at work starting from the beginning of work until the time of conducting research. It is assumed to show how long the workers are exposed to PM<sub>2.5</sub>. Chi-square test results showed a significant relationship between years of work and MDA levels ( $p = 0.019$ ). However the correlation test showed a weak relationship and negative patterns between years of work and MDA levels. It was also known that OR = 0.338 which means that the length of service is actually a protective factor against MDA levels.

The results of this study are in line with research on firefighters which showed no significant relationship between years of work and MDA, but significant with other oxidative stress biomarkers, namely 8-oxo-dG in urine<sup>19</sup>. Similar results were obtained for bus drivers in Taiwan which showed that workers who had worked more than 10 years had higher levels of 8-OHdG of urine compared to those who worked for less than 10 years<sup>14</sup>.

**Duration of Work and MDA Levels:** Work duration shows the duration of time spent in a day at work. It is assumed that the longer the time spent at work the higher the level of exposure to PM<sub>2.5</sub>. However, result of Correlation Test showed a very weak relationship between duration of work with MDA levels. Similar results were also shown by the Chi-square Test. The results of this study are not in line with Yoshida's research on workers exposed to fly ash which shows that work duration is related to oxidative stress as indicated by several biomarkers such as 8-OHdG or MDA levels in both urine and blood. It is known that the longer the work the higher MDA levels in the blood<sup>13</sup>.

## Conclusion

The concentration of PM<sub>2.5</sub> were different in each scale of smoking house and it showed a significant association with the levels of MDA. Workers in environment with high PM<sub>2.5</sub> had greater risk to have high MDA levels. Workers with longer years of work also known to have more risk to pose health problem. These findings need to be followed up by increasing coaching for workers, improving air circulation in the smoking room, and regulating working hours of workers, so that health risks can be minimized.

**Conflict of Interest:** The author stated that there were no conflict of interest in writing and publication of research results with the source of funding or another associated stakeholders.

**Source of Funding:** The author thanks to Universitas Indonesia PITTA B Grant which has been the main sponsor of the research.

**Ethical Clearance:** The study has been approved by the ethics committee of the Public Health Faculty, Universitas Indonesia No. 287/UN2. F10/PPM.00.02/2019.

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# Effects of Golden Sea Cucumber (*Stichopus Hermanii*) Ethanol Extracts on Cholesterol Levels of Hypercholesterolemic Rats

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## Abstract

**Background:** Hypercholesterolemia is a condition characterized by an increase in cholesterol level in blood higher than normal limits. Hypercholesterolemia is a risk factor for cardiovascular disease with high mortality. Golden sea cucumbers are known to have antioxidant content. Objectives: This study aims to prove the effect of ethanol extract of golden sea cucumbers (*Stichopus hermanii*) on cholesterol levels in the blood of hypercholesterolemic rats.

**Method:** This study used a randomized post-test only control group method by randomizing 36 Wistar rats. Rats were divided into 4 groups namely KN, P1, P2, and P3 groups induced with high-fat feed. Ethanol extracts of golden sea cucumbers were given at different doses in the P1 group (4.25 mg/kgBW), P2 (8.5 mg/kgBW), and P3 (17 mg/kgBW) for 14 days. The blood cholesterol level was measured and compared with the KN group given the placebo.

**Result:** In the P1 and P3 groups, LDL levels were higher than in the KN group while in the P2 group were lower. In the measurement of HDL levels, obtained lower HDL levels in all groups of administration compared to the KN group. Total cholesterol and HDL level of all group were lower compared to the KN group.

**Conclusion:** When comparing LDL levels, there were no significant differences between the consenting group and the KN group. When comparing HDL levels, significant differences were seen in the P2 and P3 groups compared to the KN group. In the total cholesterol levels, a significant difference was only seen in the P2 group compared to the KN group.

**Keywords:** HDL, Hypercholesterolemia, Total Cholesterol, LDL, *Stichopus hermanii*.

## Introduction

Hypercholesterolemia is a condition when LDL cholesterol (low-density lipoprotein) and total cholesterol in the blood increases above normal limits and HDL

(high-density lipoprotein) cholesterol in the blood decreases below normal limits<sup>1</sup>. Hypercholesterolemia can occur due to weight, age, lack of exercise, stress, metabolic disorders, genetic disorders, and diets high in cholesterol and saturated fatty acids<sup>2</sup>. Total cholesterol and LDL cholesterol are harmful to health because they can cause atherosclerosis<sup>3</sup> in arteries, especially in the heart, brain, kidneys, eyes<sup>4</sup> so that they become one of the risk factors for cardiovascular disease such as coronary heart disease and stroke (coronary heart disease)<sup>5</sup>.

Indonesia is a country with the biggest sea cucumber potential in the world<sup>6</sup>. Golden sea cucumber (*Stichopus*

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*hermanii*) is one of the species of sea cucumber that is often traded<sup>6</sup>. The use of golden sea cucumbers (*Stichopus hermanii*) is not only a food ingredient but can also be used in the health sector for treatment<sup>7</sup>. Golden sea cucumbers (*Stichopus hermanii*) contain glycoprotein, collagen, glycosaminoglycan, hyaluronic acid, chondroitin sulfate, dermatan sulfate, heparin, heparin sulfate, mucopolysaccharide, proteoglycans, docosahexaenoic acid (EPA-DHA), flavonoids, saponin and so on so that golden sea cucumbers can accelerate the process of wound healing, have antibacterial, antifungal and antioxidant activity<sup>8-12</sup>.

Antioxidant activity of golden sea cucumbers can be seen in research (Revianti *et al.* 2016)<sup>13</sup> which states the administration of ethanol extracts of golden sea cucumbers has been shown to inhibit increased lipid peroxidase, decreased catalase activity, and increased horn (corneum) layer thickness. Research to observe the antioxidant activity of golden sea cucumbers against LDL, HDL and total cholesterol in the blood is important to be carried out as an alternative consideration for the treatment of hypercholesterolemia.

## Method

This research is a type of experimental research (true experimental study) with a randomized post-test only control group method.

**Extraction of golden sea cucumber:** The extraction process begins by freezing and drying the golden sea cucumbers that have been prepared using a freeze-drying tool. Then the golden sea cucumbers are ground into powder using a common blender. 200 grams of powder then dissolved using 96% ethanol for 1 day. After 1 day the solution is filtered using filter paper. The filter results are evaporated using an evaporator. Obtained golden sea cucumber extract which is then stored in a sterile state in the refrigerator at 4°C.

**Adaptation period:** The experimental animals used were 36 male Wistar rats which would be divided into 4 groups the negative control group (KN) and 3 treatment groups (P1, P2, P3). Each group consisted of 9 male Wistar rats. The adaptation process was carried out for 7 days and during the process of adaptation all mice were treated the same, that is, given a standard rat feed.

**Induction period of high-fat feed:** During the induction period, all groups of rats will be given a high-fat feed with a composition of 40% chicken feed,

40% duck egg yolk, and 20% pork fat for 2 months or 60 days obtained from the Faculty of Veterinary Medicine Airlangga University to be induced to become hypercholesterolemia. On the 60th day, a random sample of blood was collected in 1 rat and LDL, HDL and total cholesterol levels were measured at the Regional Health Laboratory to confirm the state of hypercholesterolemia in mice.

**Giving golden sea cucumber extract:** The negative control group was not given golden sea cucumber extract and replaced with placebo in the form of aquadest. Group P1 was given golden sea cucumber extract at a dose of 4.25 mg/kgBW per day for 2 weeks. P2 group was given golden sea cucumber extract at a dose of 8.5 mg/kgBW per day for 2 weeks. P3 group was given golden sea cucumber extract at a dose of 17 mg/kgBW per day for 2 weeks. The entire group of rats continued to be given high-fat feed during the treatment period to avoid the possibility of cholesterol returning to normal due to the standard rat feed.

**Collection of blood samples:** Blood samples are collected at the end of the 2nd week. Rat blood was obtained by taking blood using the cardiac puncture method. Blood sampling is done according to the procedure that has been studied by (Beeton, Garcia and Chandy 2007). After the blood sample is obtained the rat will be put into the freezer and then it will be taken as rat waste.

**Measurement of LDL and HDL levels:** Measurement of LDL and HDL levels from rat serum will use the precipitation (direct) method by using an analyzer and conducted at the Regional Health Laboratory.

**Data Analysis:** The data obtained were tested for normality using *Shapiro Wilk* or *Kolmogorov Smirnov* ( $n < 50$ ) and obtained normal distribution data which was then analyzed by parametric statistics using ANOVA. Data analysis using SPSS 23 program and p value  $< 0.05$  was declared significantly.

## Result

The results of this study were carried out by comparing LDL, HDL, and total cholesterol of Wistar rats induced using high-fat feed in all groups of Wistar rats can be seen in Table 1. Table 1 shows the average and standard deviation of LDL, HDL and total cholesterol levels in KN group (induced high fat feed and given a

placebo containing aquadest), P1 group (induced high fat feed and given a golden cucumber extract sonde with a dose of 4.25mg/kgBW per day), P2 group (induced high fat feed and given sonde sea cucumber extract golden with a dose of 8.5mg/kgBW per day), and group P3 (induced high-fat feed and given a sonde extract of golden sea cucumbers with a dose of 17mg/kgBW per day).

Overall data analysis showed significant results between all groups at HDL levels ( $p = 0.019$ ), but not significant between all groups at LDL levels ( $p = 0.366$ ) and total cholesterol levels ( $p = 0.182$ ).

### Discussion

Hypercholesterolemia, especially LDL cholesterol accompanied by an increase in free radicals in the blood will cause the LDL oxidation process which will eventually lead to atherosclerosis<sup>3</sup> which manifests clinically in coronary heart disease and stroke<sup>14</sup>. The content of flavonoids has antioxidant activity which has the potential to reduce LDL and total cholesterol and increase HDL. The mechanism is to prevent LDL oxidation thereby increasing the expression of LDL receptors so that LDL receptors will absorb LDL in the blood into cells as a whole. LDL will then be hydrolyzed by lysosomes and cholesterol will enter the cells thereby reducing cholesterol in the blood. The entry of cholesterol in the blood also inhibits the synthesis of enzymes that play a role in synthesizing cholesterol thereby reducing cholesterol synthesis<sup>15</sup>. In addition it is to increase the activity of lecithin cholesterol acyltransferase (LCAT). The LCAT activity and its activator will change discoid HDL to HDL3. HDL3 will then receive cholesterol from the tissue. Cholesterol is then esterified so that there is an enlargement in HDL3 and turns into HDL2. HDL2 will then carry cholesterol and cholesterol esters to the liver for extraction. An increase in LCAT activity will cause an increase in HDL resulting in an increase in the excretion of cholesterol by the liver through bile<sup>16,17</sup>.

In this study, it can be seen that total cholesterol levels, P2 group have lower total cholesterol levels compared to total cholesterol levels in the KN group and close to normal, which is 54.88 mg/dL (normal <54 mg/dL)<sup>18</sup>, but statistical test comparison of LDL levels and total cholesterol for each treatment group was not significant. This can be caused by giving extracts that are not long enough. Most studies on hypercholesterolemia provide treatment for 14 days<sup>14,19,20</sup> but research by Kasim, Kurniawati and Nurhidayat<sup>21</sup> which also has a hypercholesterolemia theme showed a decrease in total cholesterol. rats drastically on day 21 were given Angkak powder at a dose of 0.5g/day while on day 14 cholesterol levels were still high. It also found lower HDL levels in all treatment groups (P1, P2, and P3) compared to the KN group. This is thought to be due to the activity of the enzymes Hepatic Lipase (HL) and Endothelial Lipase (EL). HL is a lipolytic enzyme that is synthesized by hepatocytes and has TG lipase activity and phospholipase A1 activity. This enzyme has an important role in mediating HDL metabolism. HL has greater HDL activity than VLDL or chylomicrons and converts larger HDL particles into smaller, pre-HDL, and lipid-free or fat-free HDL remnants. The magnitude of the HL effect on HDL is highly dependent on the composition of HDL. HL postheparin activity is inversely correlated with low HDL-c levels in humans. Excessive HL expression in mice and rabbits results in a marked decrease in HDL-c and a reduction in HDL size<sup>22,23</sup>. EL is also an enzyme that plays an important role in modulating HDL metabolism. EL is synthesized by endothelial cells, functions on the surface of vascular endothelium, and mainly has phospholipase A1 activity. EL hydrolyzes HDL more efficiently than other lipoprotein fractions. Adenoviral vectors that mediate over expression in EL in mice resulted in significant decreases in HDL-c and apoA-I levels. In addition, inhibition of EL antibody activity in rats significantly increases plasma HDL-c, phospholipid, and apoA-I levels and results in greater HDL<sup>22</sup>.

**Table 1. Mean and Standard Deviation of LDL, HDL, and Total cholesterol level of each group**

Characteristic	Mean ± Standard Deviation				P
	KN	P1	P2	P3	
LDL (mg/dL)	14.14 ± 5.64	14.38 ± 3.89	13.13 ± 3.60	18.00 ± 8.44	0.365
HDL (mg/dL)	26.29 ± 2.22	25.50 ± 2.39	22.13 ± 3.40	23.00 ± 2.83	0.019
Total cholesterol (mg/dL)	70.14 ± 10.87	62.75 ± 10.12	54.88 ± 12.22	64.00 ± 17.47	0.182

## Conclusion

Hypercholesterolemia rats given ethanol extract of golden sea cucumbers (*Stichopus hermanii*) at a dose of 4.25 mg/kgBW and 17 mg/kgBW had higher LDL levels compared to hypercholesterolemia rats that were not given golden sea cucumber ethanol extract. Hypercholesterolemia rats given ethanol extract of golden sea cucumbers (*Stichopus hermanii*) at a dose of 8.5 mg/kgBW had lower LDL levels, but the ratio of each group was not significant.

Hypercholesterolemia rats given ethanol extract of golden sea cucumbers (*Stichopus hermanii*) at a dose of 4.25 mg/kgBW, 8.5 mg/kgBW and 17 mg/kgBW had lower HDL levels compared to hypercholesterolemia rats without golden sea cucumber ethanol extract.

Hypercholesterolemia rats given golden sea cucumber ethanol extract (*Stichopus hermanii*) at a dose of 4.25 mg/kgBW, 8.5 mg/kgBW and 17 mg/kgBW had lower total cholesterol levels compared to hypercholesterolemia rats that were not given golden sea cucumber extract, but the ratio of each insignificant group.

**Conflict of Interest:** There was no conflict of interest in this study.

**Ethical Clearance:** The Ethical Clearance is taken from the health research ethics committee at the Faculty of Medicine at Airlangga University, Surabaya, Indonesia.

**Source of Funding:** This study was supported by the authors.

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# Awareness About Physiotherapy among University Staffs

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## Abstract

**Aim:** This study aims to explore the awareness about Physiotherapy among University staffs in Malaysia

**Method:** This is an institution based cross-sectional study. This study was conducted as a whole population study as all the staffs in one campus of a reputed university in Malaysia was approached to participate in the study. The staffs of Physiotherapy department were excluded from the study. The obtained data was analysed using frequency and percentage.

**Results:** Most of the respondents recognize Physiotherapy as unique profession but still majority of them have a wrong perception like masseurs are Physiotherapist, Physiotherapy as indigenous treatment method and acupuncture as a branch of Physiotherapy. Majority of them aware about the use of Physiotherapy in Musculoskeletal, cardio-respiratory, Neurological specialties but the awareness in other specialties such as pediatrics and women's health are not satisfactory.

**Conclusion:** The awareness about the role of physiotherapy must be enhanced in fields such as Pediatrics, women's health and cardiorespiratory. The perception about the Physiotherapy profession need to be enhanced.

**Keywords:** Awareness, Perception, Physiotherapy, University, Cross-sectional study, Malaysia.

## Introduction

Physiotherapy or Physical therapy (PT) is a health care profession. "Physical therapists provide services that develop, maintain and restore people's maximum movement and functional ability"<sup>1</sup>. The scope for PT practice is dynamic and it is evolving with needs of the society<sup>2</sup>. According to Malaysian Physiotherapy association<sup>3</sup> the profession is existing more than 25 years and it is also expected there would be 19,000 physiotherapists by 2020 in Malaysia .

The term awareness refers knowledge that something exists, or understanding of a situation or subject at the present time based on information or experience<sup>4</sup>. A good awareness of the health care system would develop a faster recovery and an enhanced lifestyle<sup>5</sup>.

More reasonable number of studies about the awareness of physiotherapy have been conducted in the countries with very high Human development Index<sup>6</sup>. Most of the studies were conducted among higher secondary students<sup>7,8,9,10,11</sup>, health care students<sup>12</sup>, medical interns<sup>13,14</sup>, Medical practitioners<sup>15</sup>, Physicians<sup>16</sup>, specific potential client population such as sports players<sup>17</sup>, pregnant women<sup>18</sup> and other professionals like anganwadi workers<sup>19</sup>, Primary school teachers<sup>20</sup>. Most of this are regional studies.

Very few studies were conducted among general public. A study among rural population in Nigeria<sup>21</sup> concluded majority of the respondents heard about physiotherapy, another study in Australia<sup>22</sup> among

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general public shown a very good awareness about physiotherapy and reasonably very high awareness about the role of Physiotherapy in certain specialty when compared to others, which is similar to the research conducted among both health professional and public by Devanshi Doshi<sup>23</sup>. The research findings of the study conducted among residents of Kansas City and Topeka metropolitan in United states inferred, majority of the public recognized musculoskeletal as the practice areas of Physiotherapy followed by neurology and cardiopulmonary. Secondhand knowledge is the common source of information which include media, information from physician, family member or friends<sup>24</sup>.

To the best of our knowledge we are not able to track any study related to awareness about Physiotherapy conducted in Malaysia. This study is one of the pioneer studies in Malaysia intended to analyze the general awareness about physiotherapy, awareness to specific specialty of physiotherapy and the mode of awareness. Inferring the awareness among public regarding the development of Physiotherapy profession would gauge to build an appropriate promotional strategy<sup>25</sup>. It would also provide the data of existing misconceptions about the profession which need to be rectified.

This study selected university staffs as they can be considered as a community and moreover, they are potential clients or ambassadors for family members to seek physiotherapy treatment. The level of education has impact on knowledge related to scope of physiotherapy<sup>24</sup>.

**Aim:** The primary aim of this study is to know the awareness level about Physiotherapy among university staffs. The secondary aim is to know the level of awareness in different fields of Physiotherapy among university staffs.

## Materials & Method

**Materials:** A survey was conducted using a questionnaire that was adapted with permission from a similar study done by Thusharika D. Dissanyaka<sup>9</sup>. The questionnaire consists of three Parts. Part A consists of subjective information. Part B consists of seven close ended questions. Part C consists of a close ended question with multiple options.

**Methodology:** This study is an institution based cross-sectional study conducted with the approval from University ethics committee. This study was conducted as a whole population study as all the staffs (except

physiotherapy department staffs) in a Private University, Malaysia were approached to participate in this study.

## Results

The respondent's level of education is tabulated in Table 1. Majority of the participant possess bachelor's and above qualification.

**General Awareness about Physiotherapy:** The questions related to general awareness of Physiotherapy was provided in Part B.

Despite respondent recognize Physiotherapy as a unique profession rather than practiced by doctors (Table 2), majority of them believe Masseurs are Physiotherapist and it is associated as an indigenous treatment method. Almost majority of them recognize acupuncture as a branch of PT.

**Awareness about role of Physiotherapy:** Majority of them are aware about the role of physiotherapy (Table 2).

**Awareness about components of Physiotherapy unit:** Majority of them have awareness about the component of Physiotherapy unit (Table 3) The highest number of respondents believe Physiotherapy unit comprises of exercise machines (91%) followed by therapeutic pool (75%).

**Physiotherapy Service Provider:** Majority of them aware about the places to avail physiotherapy services (Table 3) perhaps the least number of respondents answered that Physiotherapy services are provided by Non-government organizations.

**Mode of Physiotherapy Treatment:** Majority of the respondents aware about all the listed modes of Physiotherapy treatment (Table 4).

**Consultation of team Physiotherapist:** Majority (>70%) of the respondents aware regarding when to meet the team Physiotherapist (Table 4).

**Uses of Physiotherapy in Various Specialty:** Among the various specialty listed (Table 5), respondents felt Physiotherapy is highly useful in Musculoskeletal condition (84%) followed by neurological conditions (63%). It was noticed moderate awareness about the uses of PT in chest conditions (55%) and less awareness in pediatric conditions (48%) and Women's health (41%).

**Sources of information about Physiotherapy:**

Tables 6 illustrates the sources of information about physiotherapy. The highest source of information through personal contacts would be from their friends in physiotherapy profession (46%). This also probable source of information about physiotherapy. The information about physiotherapy thru family physician is very least level (4%).

The social media such as internet (77.45%) and newspaper or magazine (51.56%) is the most common source of information about physiotherapy.

**Table 1. Level of Education**

Level of Education	Percentage
Diploma	1.96
Bachelors	34.31
Certificate	0.9
Masters	29.41
PhD	4.9
No Response	28.43

**Table 2. Basic awareness about physiotherapy & Role of Physiotherapy**

Physiotherapy is,	Correct answer %	Physiotherapy,	Correct answer %
practiced by the doctors	65	involved in rehabilitation of injuries	91
Acupuncture is a branch of Physiotherapy	51	helps in improving quality of life of injured person	98
Masseurs are physiotherapists.	39	helps in improving fitness level of sportsmen.	88
an indigenous treatment method.	47	helps in regaining activities of daily living.	92

**Table 3. Components of Physiotherapy Unit & Physiotherapy Service provider**

A Physiotherapy unit includes	Correct answer %	Places to get physiotherapy services,	Correct answer %
a gymnasium with exercising machines, gym balls and other equipment.	91	private clinics	75
electrical modalities	67	government hospitals	95
a section for manual treatments using bandages, tapes and splints	67	private hospitals	99
a therapeutic pool	75	NGOs	52

**Table 4. Modes of Physiotherapy treatment & Consultation of team Physiotherapist**

Physiotherapy include	Correct answer%	Do you know when to meet the team physiotherapist?	Correct answer %
Manual therapy	93	When you have an injury.	82
ice/heat therapy	86	When there is pain arising in any part with or without a known cause	83
Hydrotherapy	73	When you feel pain or discomfort in any of the sporting technique.	93
electrotherapy and exercise therapy	95	When you have fever or flu.	82

**Table 5. Uses of Physiotherapy in Various Specialty**

Uses of physiotherapy in any other conditions than in sport injuries	Correct answer %
Neurological conditions	63
Pediatric conditions	48
Chest conditions (Cardio respiratory conditions)	55
Musculoskeletal conditions (Orthopaedic conditions)	84
Women's health (Obstetric & Gynecological conditions)	41

**Table 6. Sources of information about Physiotherapy**

Personal Contact		Mass Media	
Family member was a client	26%	Television	42.18%
Friend was a client	21%	Films	17.65%
I was a client	26%	Internet	77.45%
Friend told me	28%	Newspaper or magazine	51.96%
My family physician told me	4%	Books	43.14%
Family member is a Physiotherapist	8%	Advertisements	28.43%
Friend is a therapist	46%	Radio	12.75%

## Discussion

This study was conducted to evaluate the level of awareness towards physiotherapy among University staffs. Majority of them recognize Physiotherapy as unique profession and aware about the role of Physiotherapy, components of Physiotherapy unit, Physiotherapy service provider, mode of Physiotherapy treatment, role of sports physiotherapist. Most of the respondents at least possess a bachelor's degree. A slight correlation between education level and the knowledge related to scope of Physiotherapy is noticed in a previous study<sup>24</sup>. More over the Physiotherapy programme is offered more than a decade in this university, this also would be the probable reason for good awareness.

It is also noticed that many university staff assume masseurs are Physiotherapist. Masseurs provide massages to the clients<sup>26</sup> whereas Physiotherapists offer services that enhance, maintain and reestablish people's maximum movement & functional ability<sup>1</sup>. The word masseur and Physiotherapist cannot be used interchangeably. Though Physiotherapist practice massage as a part of their treatment technique on the other hand all masseurs are not Physiotherapist.

Many respondents perceived physiotherapy

as an indigenous treatment but, Physiotherapy is a science-based profession<sup>27</sup> and the course is offered from diploma to doctorate level. Similarly, many university staffs responded acupuncture as a branch of Physiotherapy which is not correct. Acupuncture is a technique where certain points on the body are stimulated by inserting thin needles through the skin most often<sup>28</sup>. The above findings suggest that, though the public aware about Physiotherapy but there is a lack of complete understanding about the profession which is similar to the findings of Kacie Rognile<sup>24</sup>.

It was inferred majority of the respondent aware about the use of Physiotherapy in Musculoskeletal, cardio-respiratory, Neurological specialties but the awareness in other specialties such as pediatrics and women's health are not satisfactory. There is a need to enhance the awareness of physiotherapy to increase the functional outcome<sup>6</sup> especially the awareness must be increased in the field of women's health and pediatrics.

“Awareness is like the sun, when it shines on things, they are transformed<sup>29</sup>. Lack of adequate knowledge about the profession would be disadvantageous to the profession<sup>24</sup>. The awareness about the profession and the scope of practice required to be enhanced. This can be achieved by using digital and social media, TV

and newspaper<sup>30</sup>, celebrating world Physical therapy day<sup>31</sup>, developing online posters<sup>32</sup>, developing a strong partnership with general practitioner<sup>33</sup>, arranging interdepartmental continuous medical education programme to show case the professional development<sup>14</sup>. The main sources of information based on this study are Physiotherapy friends and internet and hence this medium can be used to promote physiotherapy. As doctors are vital for recommending and communicate about the physiotherapy<sup>22</sup>, they should be requested to be a part of Physiotherapy promotion campaigns in the future.

The Malaysian Physiotherapy Association also have a mission to increase the awareness about Physiotherapy in Malaysia<sup>34</sup>. Abd Razak Zakaria<sup>35</sup> advocated to include Physiotherapy as a subject in higher secondary curriculum in Malaysia. This measure also would enhance the awareness about the profession among the future work force. Apart from this, more studies to be conducted to know the existing level of awareness, attitude about the physiotherapy profession among the various communities in Malaysia to design the appropriate promotional strategies.

The findings of this study are not critically discussed in detail because there is lack of research evidences in Malaysia related to this topic and there are very limited studies about the awareness of Physiotherapy among general public and academic staffs globally.

### Conclusion

Majority of the respondents recognize Physiotherapy as unique profession but still they have a wrong perception about the profession. Most of them aware about the role of Physiotherapy, components of Physiotherapy unit, Physiotherapy service provider, mode of Physiotherapy treatment, role of sports physiotherapist. They aware about the use of Physiotherapy in certain specialty (Musculoskeletal, cardio-respiratory, Neurology) when compared to other specialty (pediatrics and women's health). Friends and internet are the major source of information about Physiotherapy. Measures need to be taken to enhance the awareness.

**Limitations:** The findings of this study cannot be generalized to public in Malaysia because this study is conducted among academic staffs in a private university. Moreover, there are few expatriate academic staffs participated in this study, so the findings are not attributed only to Malaysian academic staffs.

**Conflict of Interest:** Nil

**Sources of Funding:** Self

**Ethical Clearance:** We obtained approval from Ethics in Human Research Committee of Asia Metropolitan University.

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# Comparison of Expression of P16 Gene in DEN and Phenobarbital Induced HCC in Rats

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## Abstract

**Introduction:** Hepatocellular carcinoma (HCC) is one of the most life threatening cancers in the world. The *P16* protein is the product of tumour suppressor gene *P16* that plays a role in the regulation of cell cycle and hence in progression of cancer.

**Method:** Fifty rats were divided into three groups: DEN induced HCC group, phenobarbital induced HCC group, and control group. The rats were sacrificed after fourteen weeks. The relative expression of *P16* in liver tissue was measured. The liver enzymes were measured to confirm liver damage.

**Results:** The relative expression of *P16* was decreased in DEN induced HCC group than phenobarbital induced HCC group. It was confirmed by liver enzyme assay.

**Conclusion:** The relative expression of *P16* is a sign of the severity of HCC.

**Keywords:** HCC, *N*-nitrosodiethylamine (DEN), Phenobarbital, *P16*.

## Introduction

One of the most common fatal cancers in the world is hepatocellular carcinoma. It is the most common primary liver cancer<sup>[1]</sup>. The progress of liver cancer involves many genetic alterations, as proto-oncogenes activation and tumor suppressors inactivation<sup>[2]</sup>, which lead to uncontrolled cellular proliferation. *P16* protein is one of the regulators of cell cycle that acts as tumour suppressor protein<sup>[3]</sup>. The cell cycle proceeds from G1 to S to G2 to M phase. The G1 – S transition is regulated by the P16-retinoblastoma (Rb) pathway. *P16* protein binds to cyclin dependent kinases 4 and 6 (CDK 4/6) to block its kinase activity and stop phosphorylation of retinoblastoma tumour suppressor gene (Rb)<sup>[4]</sup>.

Inhibition of *Rb* phosphorylation affects its activity in the form of increasing the number of reprogrammed cells and the kinetic of differentiation of proliferating cells<sup>[5]</sup>. Inhibition of *P16* activity may occur due to gene deletion, methylation, or mutation, so comprehensive genetic analyses are required to determine the frequency of *P16* silencing in cancer and its relative expression in different degrees of cancer<sup>[6]</sup>.

Therefore the aim of this study was to measure the relative expression of *P16* mRNA in two models of induced HCC by DEN and phenobarbital in rats.

## Method

**Animals:** This study was carried out on fifty male Wistar albino rats. Rats were kept in animal house under standard conditions of boarding and feeding with free access to water. The rats were divided into 3 groups: 1- control group (10 rats) received single intraperitoneal injection of phosphate buffered saline (PBS). 2- HCC group induced by DEN only (30 rats) received single intraperitoneal injection of DEN (200 mg/kg). 3- HCC group (10 rats) had received phenobarbital only through

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drinking water (50 mg%) for 12 successive weeks after 2 weeks interval from single injection with PBS. During the injection period, animals were kept in their cages well ventilated, in 12 h day/night cycle. Ethical approval was obtained for the study from Research Ethics Committee, Faculty of Medicine, Minia University.

**Experimental Procedures:** Animals were sacrificed at the end of week fourteen and the blood was allowed to clot and centrifuged at 3000 rpm for 15 min to obtain serum. It was stored at -80 °C for determination of serum ALT and AST. The liver was excised and weighed. The liver tissue was immediately frozen in liquid nitrogen, stored at -80 °C for preservation of RNA for real-time PCR.

**Biochemical Analysis:** The levels of serum ALT, AST were estimated using Randox kits (UK) according to the method of **Reitman and Frankel** [7].

*Real-time reverse transcription polymerase chain reaction for the relative quantification of p16:*

Total RNA was extracted from liver tissues using trizol RNA extraction reagent (Amresco, Solon, USA) following the manufacturer's instructions. The relative expression of *P16* gene in liver tissue was analyzed with a relative quantification to *GAPDH* (Glyceraldehyde-3-phosphate dehydrogenase) as a reference gene. The set of primers used for *p16* (GenBank accession L81167) were as follows: forward primer was 5'-TGC AGA TAG ACT AGC CAG GGC-3', and reverse primer was 5'-CTC GCA GTT CGA ATC TGC AC-3'. Primers for

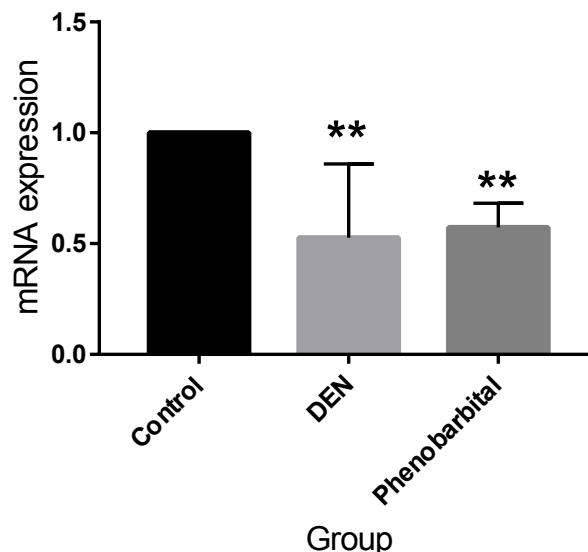
*GAPDH* (GenBank accession AF106860) were 5'-ACC AAC TGC TTA GCC CCC C-3' (forward primer) and 5'-GCA TGT CAG ATC CAC AAC GG-3' (reverse primer). Real-time polymerase chain reaction (qRT-PCR) was carried out using 20 µl of RealMOD Green qRT-PCR Mix kit (iNtRON biotechnology) with 0.02 µg RNA per reaction containing 10 Pmol of specific primers using StepOne Real-Time PCR Detection System (Applied Biosystems). The relative expression was calculated using the formula  $2^{-\Delta\Delta Ct}$  according to **Van Guilder et al.** [8]. They were scaled relative to controls where control samples were set at a value of 1. Thus, results for all experimental samples were graphed as relative expression compared to the control.

#### Statistical analysis:

Statistics were done using graphpad prism (version 7). All data were expressed as mean  $\pm$  standard error (SE). One way ANOVA followed by Tukey's post-hoc were used for assessment of the statistical significance. A p value of 0.05 was considered statistically significant.

## Results

**Relative expression of P16 by RT-PCR:** Liver *P16* relative mRNA expression was significantly decreased in experimental groups than control group ( $p \leq 0.05$  by ANOVA) indicating that the downregulation of *P16* occurred in HCC models. The mean relative expression was decreased in DEN induced HCC than phenobarbital induced HCC group (figure 1).



**Figure 1: Relative expression of P16 in liver tissues in control and experimental groups (\*\*= p< 0.001).**

**Liver enzymes assay:** Liver enzymes; ALT and AST showed highly significant increase in experimental groups when compared to control group (ANOVA  $p <$

0.001). They showed higher level in DEN induced HCC than phenobarbital induced HCC group (figure 2 and 3).

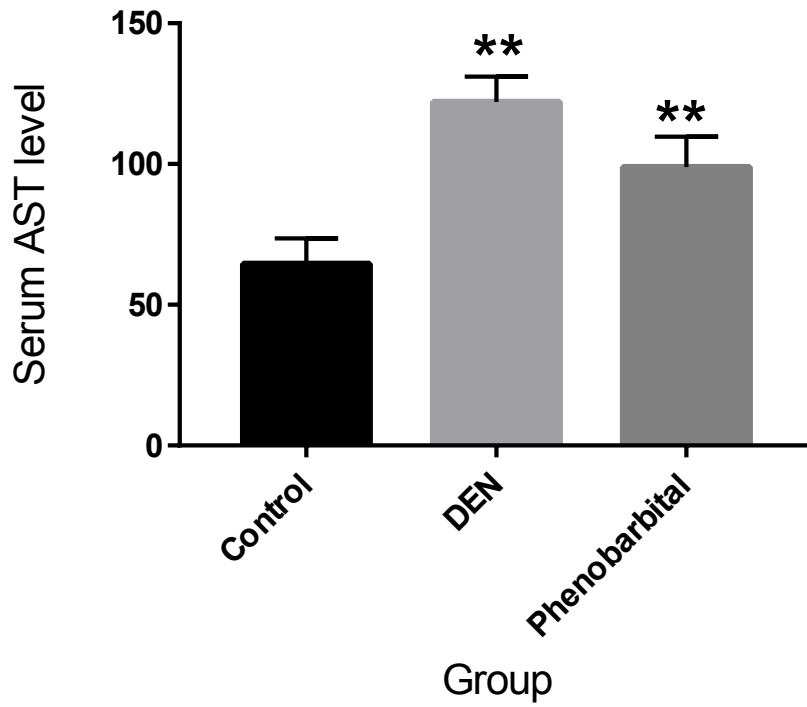


Figure 2: Serum level of AST in different groups (\*\*=  $p < 0.001$ ).

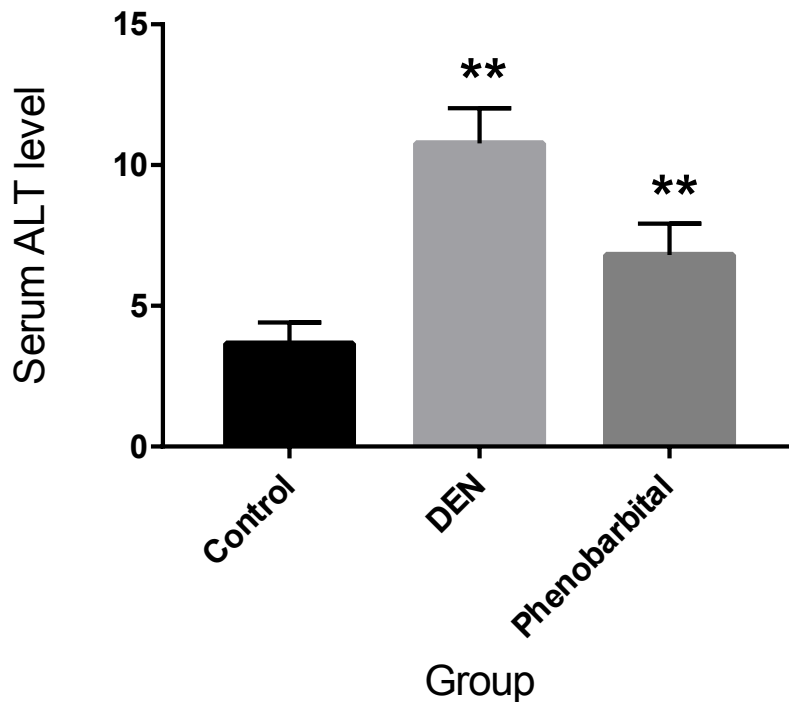


Figure 3: Serum level of ALT in different groups (\*\*=  $p < 0.001$ ).

## Discussion

Liver cancer can be induced in experimental animals by diethylnitrosamine (DEN) or phenobarbital which are good examples for studying carcinogenic changes which occur in liver tissue as they are strong hepatocarcinogens [9,10]. In our study, DEN and phenobarbital induced liver cancer in rats, demonstrating that Wistar albino rat is a suitable model in studying DEN and phenobarbital induced liver cancer and the DEN was more effective on liver than phenobarbital.

It was known that DEN causes liver cancer in experimental animals by damaging the enzymes share in DNA repair<sup>[11]</sup>. Also it causes oxidative damage of DNA by reactive oxygen species that aggravates carcinogenesis<sup>[12]</sup>.

Phenobarbital induces liver cancer by stimulation of cell proliferation and inhibition of apoptosis. It also induces changes in growth factors, gene expression, and cell cycle signal transduction<sup>[13]</sup>. Phenobarbital, as a non genotoxic carcinogen, affects DNA methylation enzymes activity and also affects the enzymes acting on acetylation and deacetylation of histones<sup>[14]</sup>.

We found that DEN induced HCC group showed significant decreased expression of *P16* gene that was confirmed by the liver enzymes which showed higher level than in phenobarbital induced HCC group indicating that the mRNA relative expression of *P16* correlates with the degree of changes in liver tissue<sup>[15]</sup>. The suppression of *P16* may occur by multiple mechanisms like direct inhibition of transcription activators binding to its promoter or indirect through binding of methyl binding proteins to the promoter at the methylated sequences of DNA<sup>[16]</sup>.

Finally, we conclude that there is a correlation between *P16* expression and the carcinogenic changes in the liver tissue, so it can be used as a marker of the severity of HCC.

### Declarations:

**Funding:** Personally funded by the authors.

**Authors' Information:** Available

**Competing Interests:** The authors declare that they have no competing interests.

**Conflict of Interest:** None.

**Financial Disclosure:** The authors have no financial relationships relevant to this article to disclose.

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# The Prevalence and Socio-Demographic Correlates of Consanguineous Marriage in the Region of Tanger-Tetouan, Morocco

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## Abstract

**Introduction:** Consanguineous marriage is a fairly common practice in the Tanger-Tetouan region in the north-west of Morocco, however, little is known about its exact prevalence. This study builds on our initial research on the prevalence of consanguineous marriage in this region by examining its prevalence and socio-demographic correlates.

**Method:** We gathered data on parental consanguinity and its correlates from a randomly selected sample of 213 university students during the year 2014 using an anonymous questionnaire. Logistical regression was used to study factors associated with consanguineous marriage.

**Results:** We found that the prevalence of consanguineous marriages was 45.3% in the current generation compared to 14.7% and 12.3% respectively for paternal and maternal grandparents in the previous generation, this difference between the two generation is significant,  $p < 0.001$ . The most common types of consanguineous marriages among the current generation were between first cousins (77.4%), followed by first cousins once removed (8.3%) and second cousins (2.2%), while 12.1% of marriages were between distant relatives. The multivariate analysis showed a strong association between consanguineous marriage and the husband's early age (OR=0.23;  $p=0.01$ ); the low education level of the wife (OR=5.72;  $p=0.02$ ). Having consanguineous parents is a predisposing factor for their children to choose a consanguineous partner at the time of marriage (OR= 21.58;  $p < 0.001$ ) for women and (OR=20.77;  $p < 0.001$ ) for men.

**Conclusion:** We observed a high rate of consanguineous marriages in the population of the Tanger-Tetouan region compared to data from other regions of Morocco and to data from Arab and Muslim countries.

**Keywords:** Prevalence, Consanguinity, Socio-demographic, Correlates, Morocco.

## Introduction

Linguistically the term consanguinity is derived from two Latin words, "con" meaning common, or of the same, and "sanguineous" meaning blood, hence, referring to a relationship between two people sharing

a common ancestor or blood<sup>1</sup>. This type of marriage is common practice in North Africa, West Asia and South India. It accounted 20–50% of all marriages<sup>2</sup>. Socio-economic, religious, and demographic are factors evoked to explain this trend, but the main reason for preference of consanguineous marriages in these regions is the appeal of high stability of the prospective relationship, fostered by the existence of common family members<sup>3</sup>. Other studies have shown that the practice of consanguineous marriages was associated with, early age at marriage, rural status and low socioeconomic and educational levels<sup>4</sup>. As opposed to the potential social and economic benefits, Health Care Providers and Geneticists consider the negative impact of consanguineous marriage in

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terms of the increased genetic risk to the offspring<sup>5</sup>. In Morocco, consanguineous unions are practiced in several areas, accounting for 22.8% and 20.6% respectively in the region of Charda Beni Hsen and Rabat-Salé-Zemmour-Zaer<sup>6,7</sup>. In a previous study, among the parents of a sample of 160 university students from the Tanger-Tetouan region the consanguinity rate was 39%<sup>8</sup>. The primary aim of the present study was to estimate the prevalence of consanguinity among the population in northern Morocco and to explore socio-demographic correlates among the parents of university students.

## Method

**Study Design:** This is a cross-sectional study which investigates the prevalence of consanguineous marriage and its correlated socioeconomic among university students' parents in Tanger-Tetouan 2014.

**Data:** Data on parental consanguinity and its correlates were collected from a randomly selected sample of 213 university students the region Tanger-Tetouan during the year of 2014. The data collection support used in this study was a questionnaire. This anonymous questionnaire included detailed questions about student's parents (current generation) and their paternal and maternal grandparents (previous generation). The data collected relate to on the socio-demographic and cultural characteristics of the current generation, in particular the place of birth, residence during childhood, age at first marriage, education level, employment status, ethnicity, presence or absence of consanguinity in the previous generation and the residence of the parents of students after their marriage.

**Area of the Study:** The study area is the region of Tanger-Tetouan, located in the extreme northwest of Morocco.

**Study Population:** The target populations for the study were university students aged 18 to 24 years. Two universities in this region were included in this study. The total number of students at the time of the study was 213 students.

**Sampling:** We used convenience sampling, random. We have issued anonymous, self-administered questionnaires to university students in their conference rooms after obtaining informed consent. All students available in the conference rooms were given the opportunity to participate.

**Statistical Analysis:** Factors associated with consanguineous marriages were studied in a logistic regression. Statistically significant variables in the univariate analysis were included in the multivariate logistic regression models. A p-value less than 0.05 was considered statistically significant. Statistical analyzes were performed using statistical software.

## Results

**Socio-Demographic Characteristics of Spouses Studied:** A total of 213 university students were interviewed for this study. They've responded questions about their parents and their grandparents. The total prevalence of consanguinity was 45.3% [IC 95%: 48.6 -61.3%] among student's parents and 14.7% [IC 95%: 10.4 -19.4%] and 12.3% [IC 95%: 8.5 -17.1%] respectively for paternal and maternal grandparents,  $p < 0.001$  (**Figure 1**). The most common types of consanguineous marriages among the current generation were between first cousins (77.4%), in particular patrilateral parallel cousins, followed by first cousins once removed (8.3%) and second cousins (2.2%), while 12.1% of marriages were between distant relatives. Consanguineous marriage is statistically significant among husbands and wives living in rural areas (59.1 % of the related couples vs. 41% of the non-related couples,  $p < 0.05$ ) and (61.9 % vs. 38.1 %,  $p=0.01$ ) respectively among the husbands and wives. The analysis of the results showed that the place of residence has a significant effect on the choice of marriage. This is reflected in the fact that consanguineous individuals have a tendency to marry a spouse from the same place of residence. The average age at first consanguineous marriage was  $27.06 \pm 5.45$  years for husbands and  $20.87 \pm 3.58$  years for wives. There were significant differences in consanguinity rate among different age groups, with consanguineous marriage rate decreasing as the age of the husband increases except for spouses who were 35 years of age or older. Spouses of 20 years old and younger have the highest rate of consanguineous marriages (87.5%) compared to husbands with non-consanguineous marriages (12.5 %),  $p=0.02$ . Consanguineous marriage is statistically significant among husbands and women whose their parents married a relative (87.1% of the related couples vs. 12.9 % of the non-related couples,  $p < 0.001$ ) and (92.3% vs. 7.7 %,  $p < 0.001$ ) respectively among the husbands and wives (**Table 1**). The data showed that consanguineous marriages decreased among women and men with higher education (20.8% and 41.9% respectively) and was significantly increased in woman

with primary education (51.9%) and among illiterates (48.9%) (Men, 52.5% and 42.9%, respectively).

**Choice of Consanguineous Marriage/Univariate and Multivariate Analysis:** In the univariate analysis, consanguinity were positively associated with rural areas (OR = 0.49; 95% CI: 0.25-0.97 and OR = 2.32; 95% CI: 1.16 - 4.64 respectively among husband and wife), low education level of the husband (OR = 2.25; 95% CI: 1.04-4.55 for secondary education), and the wife (OR = 3.64; 95% CI: 1.25-10.56, OR = 4.09; 95% CI: 1.18-14.15 and OR = 3.27; 95% CI: 1.09-9.79 for illiterate,

primary and secondary education respectively). Other factors were: younger age at marriage of the husband (OR = 0.30; 95% CI: 0.10-0.68 for class age 20-24 years) and consanguinity in the parental generation (OR = 10.95; 95% CI: 3.67-32.65 and OR = 18.83; 95% CI: 4.32-82.11 respectively among husband and wife). In the multivariate analysis, husband’s younger age at marriage, wife’s low education level and consanguinity in the parental generation remained significantly associated with consanguineous marriage of the spouses (Table 2, 3).

**Table 1. Socio-demographic characteristics of husbands and of wives (Region Tanger-Tetouan, Morocco).**

Background Characteristics	Husbands N (%)		Total	P	Wife N(%)		Total	P
	NCM N (%)	CM N (%)			NCM N (%)	CM N (%)		
<b>Residential setting</b>				0.03				0.01
Rural	18(41)	26(59)	44		16(38.1)	26(61.9)	42	
Urban	98(59)	70(41)	168		100(58.8)	70(41.2)	170	
<b>Total</b>	<b>116</b>	<b>96</b>	<b>212</b>		<b>116</b>	<b>96</b>	<b>212</b>	
<b>Age at first marriage</b> 0.02 0.57								
<20	1(12.5)	7(87.5)	8		42(53.2)	37(46.8)	79	
20-24	41(64.1)	23(35)	64		52(55.9)	41(44.1)	93	
25-29	41(53.2)	36(46.8)	77		9(39.1)	14(60.9)	23	
30-34	19(55.9)	15(44.1)	34		3(75.0)	1(25.0)	4	
≥35+	7(35.0)	13(65.0)	20		1(50.0)	1(50.0)	2	
<b>Total</b>	<b>109</b>	<b>94</b>	<b>203</b>		<b>107</b>	<b>94</b>	<b>201</b>	
<b>Consanguinity in parents</b>				<0.001				<0.001
No	112(61.9)	69(38.1)	181		113(61.1)	72(38.9)	185	
Yes	4(12.9)	27(87.1)	31		2(7.7)	24(92.3)	26	
<b>Total</b>	<b>116</b>	<b>96</b>	<b>212</b>		<b>115</b>	<b>96</b>	<b>211</b>	

NCM : Not Cconsanguineous Marriage .CM : Consanguineous Marriage

**Table 2: Factors associated with consanguineous marriages among the husband in the region of Tanger-Tetouan. Morocco.**

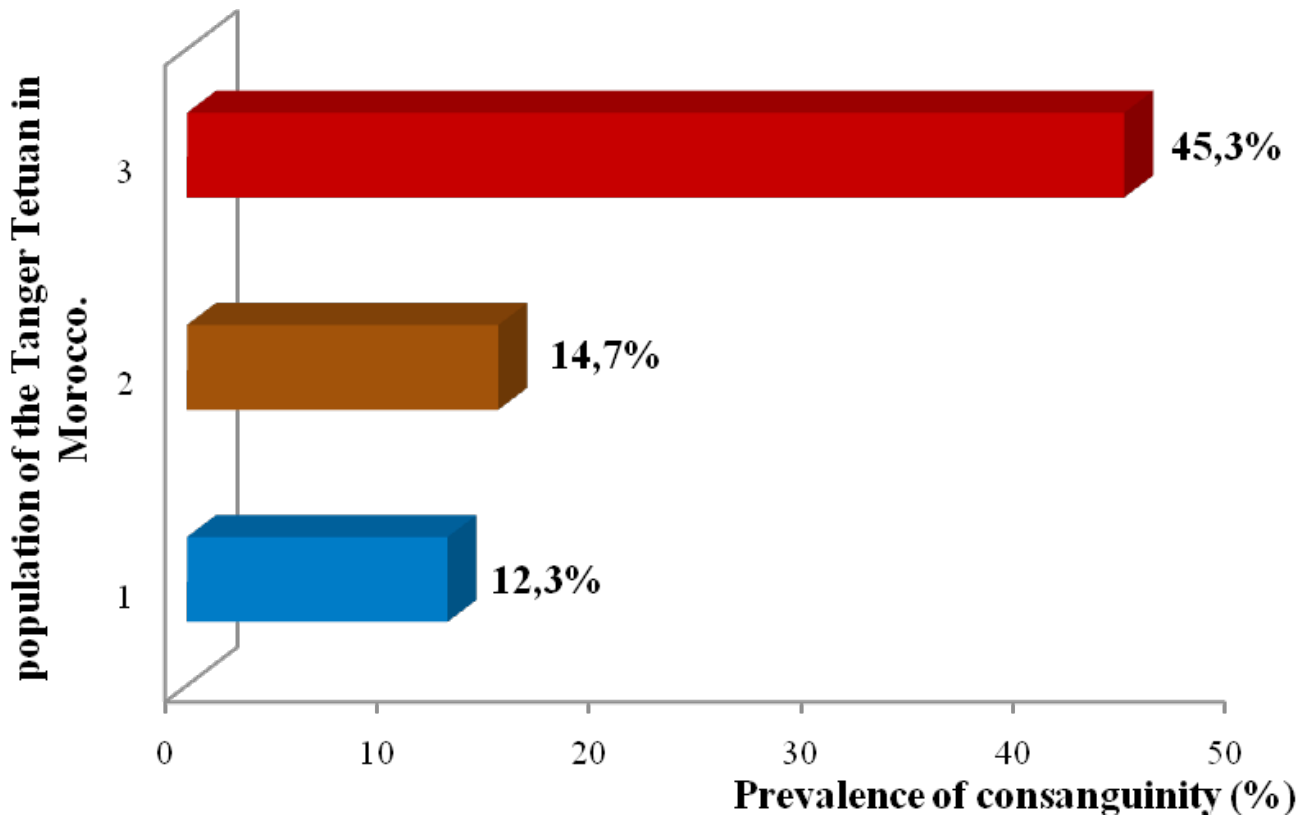
Associated Factors	Univariate model			Multivariate model		
	OR crude	95% IC	P	OR Adjusted	95% IC	p
<b>Residential Setting</b>						
Urban	1			1		
Rural	0.49	0.25-0.97	0.04	0.47	0.19-1.20	0.11
Age of husband’s first marriage	1.03	0.98-1.08	0.20			0.02

Associated Factors	Univariate model			Multivariate model		
	OR crude	95% IC	P	OR Adjusted	95% IC	p
35+	1			1		
<20	3.76	0.38-37.14	0.25	4.79	0.44-51.68	0.19
20-24	0.30	0.10-0.86	0.02	0.23	0.07-0.75	0.01
25-29	0.47	0.17-1.31	0.15	0.38	0.12-1.19	0.09
30-34	0.42	0.13-1.33	0.14	0.39	0.11-1.36	0.14
<b>Level of husband's education</b>						
University	1			1		
Illiterate	1.89	0.72-4.93	0.19	1.22	0.39-3.80	0.73
Primary	1.99	0.95-4.14	0.06	1.34	0.54-3.30	0.52
Secondary	2.25	1.04-4.55	0.03	2.19	0.93-5.16	0.07
<b>Consanguinity in the husband's parents</b>						
No	1			1		
Yes	10.95	3.67-32.65	<0.001	20.77	5.70-75.71	<0.001

**Table 3: Factors associated with consanguineous marriages among the wife in the region of Tanger-Tetouan, Morocco.**

Associated Factors	Univariate Model			Multivariate Model		
	OR crude	95% IC	p	OR Adjusted	95% IC	p
<b>Residential setting</b>						
Urban	1			1		
Rural	2.32	1.16-4.64	0.01	2.17	0.87-5.37	0.09
Age at wife's first marriage	1.02	0.94-1.10		Not introduced in the multivariate model		
35+	1					
<20	0.88	0.05-14.58	0.92			
20-24	0.78	0.04-12.99	0.86			
25-29	1.55	0.08-28.14	0.76			
30-34	0.33	0.01-11.93	0.54			
<b>Level of wife's education</b>						
University	1			1		
Illiterate	3.64	1.25-10.56	0.01	4.02	1.06-15.22	0.04
Primary	4.09	1.18-14.15	0.02	5.72	1.28-25.54	0.02
Secondary	3.27	1.09-9.79	0.03	3.51	1.06-11.64	0.04
<b>Consanguinity in wife's parents</b>						
No	1			1		
Yes	18.83	4.32-82.11	<0.001	21.58	4.71-98.82	<0.001





**Fig. 1: Prevalence of Consanguinity among the population of the Tanger-Tetouan in Morocco**  
**1: Wive's parents 2: Husband's parents 3: student's parents**

**Discussion**

The study of the profile of the consanguineous marriages in the region of Tanger-Tetouan revealed a highly significant difference in the rates of the consanguineous marriages between the current (45.3%) and previous generation (13.5%). This observed difference could be attributable to the university students' lack of information about their grandparents. This rate is high compared to other regions of Morocco such as Fritissa in the Middle Atlas of Morocco (30.32%) and the Doukkala region (26.03%)<sup>9,10</sup> and it is also high compared to data from Arab and Muslim countries, such as Tunisia (32.7%)<sup>11</sup>. This rate was higher compared to industrialized countries such as Chile (14.9%) and Spain (5.7%)<sup>12,13</sup>.

Indeed, socio-economic and cultural or demographic motivations were among the reasons which explain this type of the marriage<sup>14</sup>. Our results showed that consanguineous marriage is higher among couples who have lived their childhood in rural areas where

education level is low, and whose parents were also consanguineous. Early age at first marriage in men was also associated with consanguineous marriage. Men who married between 20-24 years of age were 77% less likely to marry a relative a consanguineous relative men who married after the age of 35 years (OR = 0.23; 95% CI: 0.07-0.75; p = 0.01). Among wives, and contrary to what we've expected, our results showed that age at first marriage is not significantly associated with consanguineous marriage. Consanguinity among parents of spouses was a discriminating factor. Husbands with consanguineous parents were ten times more likely to have a consanguineous unions in comparison with men from non-consanguineous parents (OR = 10.95; 95% CI: 3.67-32.65; p <0.001). For wives also the consanguinity among parents was strongly associated with women marrying a consanguineous relative. Indeed, wives with consanguineous parents were 18 times more likely to have a consanguineous union compared to women with non-consanguineous parents (OR = 18.83; 95% CI: 4.32-82.11; p <0,001). Women with low levels

of education were significantly more likely to marry consanguineously. The results showed that the illiterate wives and those with a level of primary education were five times more likely to marry consanguineously compared to their counterparts with a university level of education. Among husbands in the univariate analysis (but not in multivariate analysis) consanguinity was significantly associated with the level of education, husbands in secondary school are more than twice as likely to marry a related wife compared to husbands in university education (OR = 2.25; 95% CI: 1.04-4.55;  $p = 0.03$ ). Similarly, in the univariate analysis among wives, intermarriage was strongly associated with rural origin. A woman who spent her childhood in the countryside was as twice as likely to marry consanguineously than a woman raised in an urban area (OR = 2.32; 95% CI: 1.16-4.64;  $p = 0.01$ ). However, according to our study, husbands in rural areas were less likely to have a consanguineous marriage (OR = 0.49; 95% CI: 0.25-0.97;  $p = 0.04$ ).

### Conclusion

Our study showed that the rate of consanguineous marriage in the population of the Tanger-Tetouan region of Morocco is high compared to data from other regions of Morocco and to data from Arab and Muslim countries. Our results showed the presence of factors explaining the choice of consanguineous marriage. Rural origin, low level education, young age at first marriage of the husband and consanguinity among parents were strongly associated consanguineous marriage. As this type of union increases the risk of health problems in descendants, a study of hereditary diseases and congenital malformations in this population would be desirable to assess the impact of this kind of marriage and to plan health education and awareness. Also, if the marriage pattern reported for the students' parents were to persist among the university students themselves, it would certainly elevate the risk of ill health in the future generation.

**Conflict of Interest:** The authors declare that there are no conflicts of interest.

**Ethical Clearance:** Ethical approval was obtained from the university authorities (place of the survey). Free and informed consent was obtained from university students, giving it the opportunity them to express unequivocal voluntarily accept or refuse to participate in study. Target population was informed about the study

objectives and was consented prior filling questionnaires. Confidentiality and privacy of target population was guaranteed.

**Source of Funding:** Self funding

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# Correlation of Hearing Handicap Inventory for Adult (HHIA) Total Score and Number of Hemodialysis in Chronic Kidney Disease who Undergo Hemodialysis in Haji General Hospital Surabaya

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## Abstract

**Background:** Sensorineural hearing loss can occur in chronic kidney patients (CKD) who undergo hemodialysis. Haemodialysis sessions influence sensorineural hearing loss significantly. Hearing loss in CKD and hemodialysis patients need an assessment tool for early detection. HHIA questionnaire seems has potential to be used as an early detection of hearing loss in CKD patients with hemodialysis. The correlations of HHIA total scores and number of hemodialysis in this population remain unknown.

**Objective:** To analyze the correlation between HHIA (Hearing Handicap Inventory for Adult) total scores and number of hemodialysis in stage 5 chronic kidney disease patients in Haji general hospital Surabaya.

**Method:** This study is an analytical, observational, and cross-sectional study. There were 43 patients included in this study. HHIA scores and number of hemodialysis were obtained by interview the patients based on HHIA questionnaire and patient's status form. Patients Age, sex, history of hypertension and diabetes, and audiogram was conducted from medical record. All of the data were analyzed by using SPSS Statistic 22 software.

**Results:** 43 patients have responded to HHIA questionnaire. 42(95,3%) patients had no handicap and only 2(4,7%) patients had mild handicap. The correlation between HHIA total scores and number hemodialysis found not significant ( $r = 0,156$ ,  $p = 0,319$ ). Only 16 patients have PTA audiometry result, 10 patients (68,75%) had mild hearing loss, 1 patient (6,25%) had moderate hearing loss, and 4 patients (25%) were normal.

**Conclusions:** The questioner assessment to assess the hearing loss in CKD patients with hemodialysis may applied practically and tolerable to the patients. There was no correlation between HHIA and number of hemodialysis.

**Keywords:** Hearing loss, HHIA, Hemodialysis, Chronic Kidney Disease

## Introduction

Sensorineural hearing loss is common in Chronic Kidney Disease (CKD) patients<sup>(1,2)</sup>. Hearing loss occurs in 41.7% of CKD patients with a majority of mild hearing loss<sup>(3)</sup>. Hearing loss due to the influence of hemodialysis is still controversial. Some literature reports that hemodialysis has no effect on hearing function in at

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least the first five years of treatment, while some report hemodialysis affects hearing acuity<sup>(4)</sup>. Chronic Kidney Disease patients who undergo 3 sessions of hemodialysis have an effect on the sensorineural type hearing loss significantly<sup>(5)</sup>. A positive correlation was found between hearing loss and the frequency of hemodialysis<sup>(6)</sup>. Risk factors for chronic kidney failure and general hearing loss are same, those are age, hypertension, and diabetes mellitus. With these similarities, it is suspected that the similarity between the two causes of hearing loss in patients with chronic renal failure who undergo hemodialysis<sup>(7)</sup>. Hearing loss can affect quality of life and limit activity or participation in daily activities. This limitation can be referred as a hearing handicap<sup>(8)</sup>. Hearing Handicap or the impact of hearing loss can be assessed using the HHIA questionnaire<sup>(9)</sup>. There is a correlation between the average hearing threshold and the number of hemodialysis sessions in patients who have undergone hemodialysis for two years or more and a moderate correlation between the total HHIA score and the average hearing threshold<sup>(10)</sup>.

**Material and Method**

This study was an observational-analytical study with a cross-sectional study design. The study was conducted in Haji General Hospital Surabaya since December 2018-February 2019. **Participants.** The participants were all chronic kidney disease patients who undergo hemodialysis in Haji General Hospital Surabaya and matched with the inclusion criteria and were not included in the exclusion criteria. The inclusion criteria in this study were CKD patients who undergo hemodialysis at Haji General Hospital Surabaya, willing to take part in the study, and aged 18-65 years. The exclusion criteria from this study were uncooperative CKD patients and had a history of hearing loss. **Outcome.** From the results of total sampling with inclusion and exclusion criteria obtained 43 patients who fulfil the criteria as the study sample. All study samples were interviewed using the HHIA questionnaire and patient status form. The obtained data were age, gender, history of hypertension and diabetes, and audiogram from the patient’s medical record.

All data were analyzed using SPSS Statistics 22 software. The normality test was the One-sample Kolmogorov-Smirnov Test. Correlations were performed using bivariate correlation test with degree of linear relationship analyzed by Spearman for normally distributed data and Pearson test for the data that not

normally distributed. Differences were considered significant for the error value of  $\alpha=0.05$ .

**Findings:** The participants consisted 43 patients with age between 22-64 years and average 50.07 years. Comparison between male and female is 4:3,2.

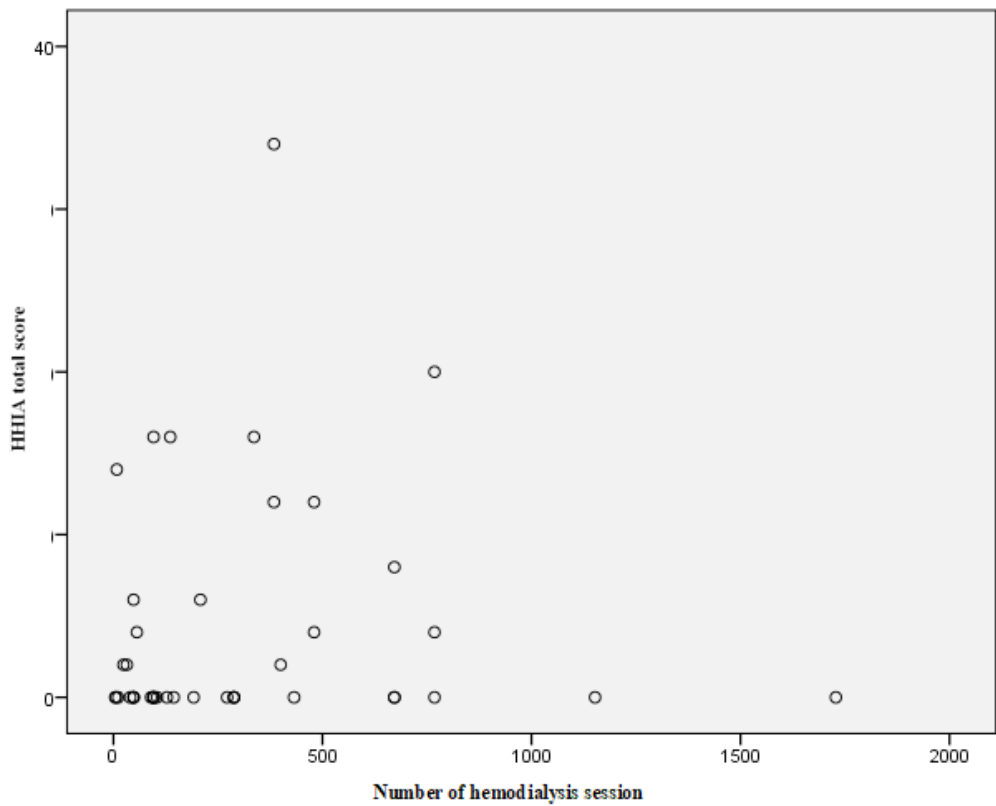
Age (Years)	n	Percentage (%)
15-24	1	2,3
25-34	2	4,7
35-44	9	20,9
45-54	15	34,9
55-64	16	37,2
<b>Total</b>	<b>43</b>	<b>100</b>

**Table 1: Age distributon ofCKD patient who undergo hemodialysis in Haji General Hospital Surabaya**

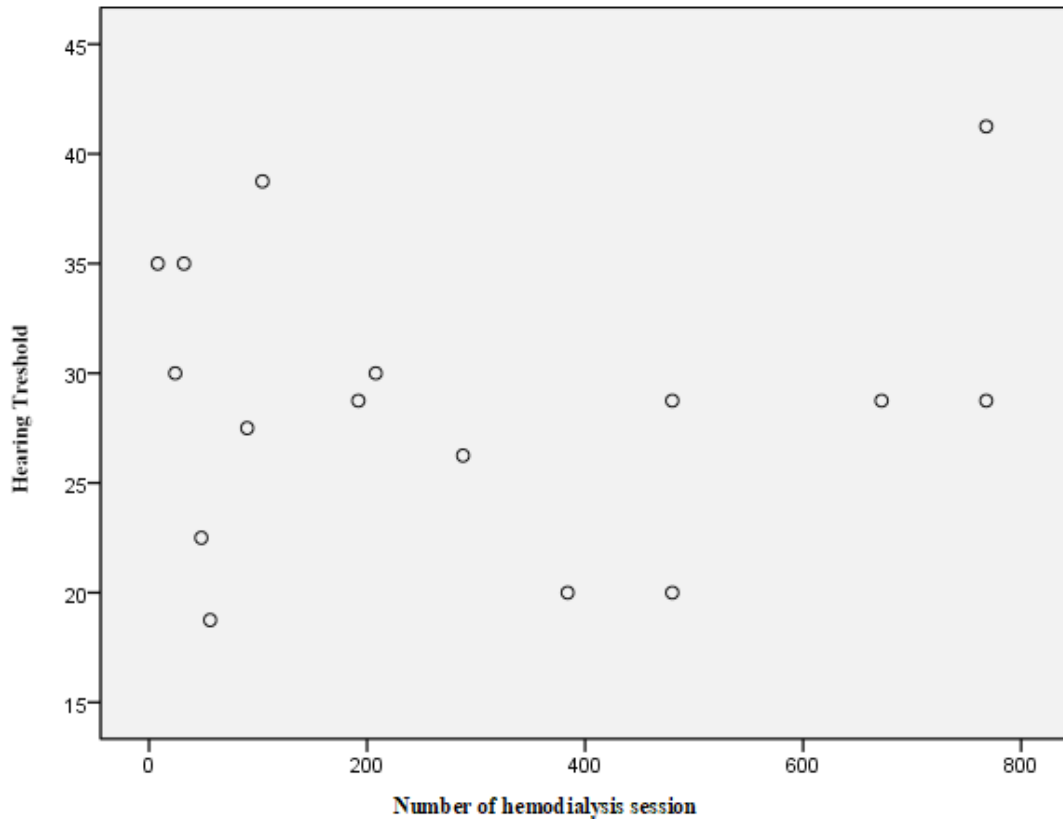
Sex	n	Percentage (%)
Male	24	55,8
Female	19	44,2
Total	43	100

**Table 2: Sex distributon ofCKD patient who undergo hemodialysis in Haji General Hospital Surabaya.**

The least number of hemodialysis sessions is 4 sessions or about 2 weeks of hemodialysis, and the majority reached 1728 hemodialysis sessions which meant the patient have undergone hemodialysis for 18 years. The average number of hemodialysis sessions from the study sample was 304 hemodialysis sessions which meant that the average study sample have undergone hemodialysis for 38 months or 3 years and 2 months. The average number of hemodialysis sessions from the study sample was 144 sessions. From the 43 patients, 88.4% have a history of hypertension and 23.3% Diabetes Mellitus. There were only 16 patients who have audiogram, 68.75% had mild hearing loss and 6.25% moderate hearing loss. The result of HHIA questionnaire of 43 patients shows 95.3% of patients had no disability and 4.7% had moderate mild disability. The Analysis of the correlation between number of hemodialysis sessions with HHIA total scores using the Spearman correlation test. From the analysis, there was no correlation between hemodialysis session with HHIA total scores ( $r = 0.156, p = 0.319$ ).



**Figure 1. Scatter Dot Diagram of the correlation between number of hemodialysis session (X axis) and HHIA total score (Y axis) in CKD patients in Haji General Hospital Surabaya.**



**Figure 2: Scetter Dot Diagram of the correlation between number of hemodialysis session and hearing threshold in CKD patients in Haji General Hospital Surabaya**

The analysis of the correlation between the number of hemodialysis sessions and hearing threshold in 16 patients using the Pearson test due to normally distributed data. There was no correlation between the number of hemodialysis and hearing threshold ( $r = 0.073$ ,  $p = 0.789$ ). The researchers also analyzed the number of hemodialysis sessions and hearing loss degrees in 16 patients with the spearman test and the result was no correlation between them ( $r = 0.193$  and  $p = 0.474$ ). Analysis the correlation between HHIA total scores and hearing threshold from the results of audiometry examination in 16 patients using the spearman test. From the results of the analysis, there was no correlation ( $r = -0.095$  and  $p = 0.727$ ). Correlation of the level of handicap and hearing loss degree was also analyzed, there was no correlation between level of handicap and hearing loss degree ( $r = -0.227$  and  $p = 0.398$ ).

### Discussion

The average age of the participant is 50.07 not very different from previous studies with the mean age was 49.9 years and 49 years<sup>(5, 6)</sup>. Based on sex distribution, male is more than female in this study. The same result found in Ulfa et al study with the ratio of male and female was 1,5:1. In the study of Jamaldeen et al and Sharma also found results that showed a greater number of male than female. This result can be caused by lifestyle, environment, and risk factors of chronic kidney disease, hypertension. Male-owned lifestyles such as alcohol consumption, smoking, lack of physical activity, and high-salt foods cause a tendency for high blood pressure<sup>(3, 5, 11)</sup>. History of hypertension and of the participants in this study also showed similarities with literature. In this study, 38 participants (88.4%) had a history of hypertension and only 10 participants (23.3%) had a history of diabetes mellitus. In another study, patients with hypertension were 87% and 50% DM. The same data was found in the Indonesian Renal Registry in 2015 which stated that hypertensive kidney disease is the most common cause of kidney failure in hemodialysis patients<sup>(5)</sup>. The 16 participants that had audiogram in their medical record, 68.75% experienced mild hearing loss. This is in accordance with other literature which mentions 7 of 8 subjects in the hemodialysis group experienced mild sensorineural hearing loss<sup>(5)</sup>. Similar to the research conducted by Ulfa et al, Jamaldeen et al and El-Anwar et al also found mild and moderate degree of hearing loss were dominant than the other degrees.

From the diagram in Figure 5.2, there are several data

that is not in accordance with the literature. Some patients who have undergone hemodialysis less than 200 sessions have had a hearing loss, but other patients had hearing loss after a more than 400 sessions of hemodialysis. The analysis showed different result with the study from Saeed et al which found significant positive correlation between hearing loss and hemodialysis<sup>(4)</sup>. Shreedaran et al also found a positive correlation between hearing loss and increased number of hemodialysis, number of urea, serum creatinine, serum sodium, and use of ototoxic drugs<sup>(6)</sup>. Three session of hemodialysis can significantly affect the incidence of sensorineural hearing loss. Age, hypertension, and diabetes mellitus has no correlation with hearing loss problem in hemodialysis patients<sup>(5)</sup>.

There are several factors can affect the result of this study is different with another study. In Haji General Hospital, audiometry is not a routine examination, so not all patients have audiometry examination result (audiogram). In a study conducted by Saeed et al in 2018, there were 59 patients studied with a threshold using audiometry, a study by Ulfa et al in 2016 examined the hearing threshold of 26 patients, and in this study there were 16 patients who had audiometry examination results. The difference in the number of participants can affect the results of this study. In addition, there are many other factors that are not examined and can affect the incidence of hearing loss in CKD patients in Haji General hospital surabaya. The difference in the specifications of the instruments used can also be one of the factors that cause differences in the results.

From the results of the correlation test there was no significant correlation between the total HHIA score and the number of hemodialysis sessions ( $r = 0.156$  with  $p = 0.319$ ). The researcher also analyzed the correlation of the number of hemodialysis sessions and handicap levels using the Spearman correlation test because the data were not normally distributed. From the results of the analysis also did not find a correlation between the two with a value of  $r = 0, 236$  and  $p = 0.127$  ( $p > 0.05$ ).

Although the results are not correlated, there is a tendency for a correlation between the two. From the diagram in Figure 1 it can be seen that some patients who have just undergone several times of hemodialysis have a higher handicap score compared to patients who have undergone more hemodialysis sessions. Therefore the relationship between total HHIA scores and the number of hemodialysis sessions became uncorrelated.

In addition, from the total HHIA score, the social score was greater than the emotional score. Total social score 106 and total emotional score 82. Emotional and social disorders due to hearing loss assessed using the HHIA questionnaire vary greatly and depend on life experience, health-related expectations, and even the adaptability of each individual. People with the same hearing loss will experience different communication, social and emotional difficulties in their daily lives so that they will have different perceptions of their quality of life. This can be one of the factors that influence the results of the analysis of the relationship between total HHIA scores and the number of hemodialysis sessions<sup>(8)</sup>.

### Conclusions

The conclusion of the study is there was no correlation between the total score of the Hearing Handicap Inventory for Adult (HHIA) questionnaire and the number of hemodialysis sessions in patients with stage 5 chronic kidney disease in Haji General Hospital Surabaya. It is better to use audiometry as gold standard to analyze the hearing loss in CKD patients. For further research, another factors that contribute in hearing loss in CKD patients are needed to be analyzed.

**Conflict of Interest:** There was no conflict of interest in this study.

**Ethical Clearance:** This study was received ethical approval from the Health Research Ethics Committee Haji General Hospital Surabaya.

**Source of Funding:** This study was supported by the authors.

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# Designing of Behavioral Pattern on Medication Adherence Patient of Children with Tuberculosis Based Android

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## Abstract

The incidence of pulmonary tuberculosis (TB) in Indonesia is estimated to have 539,000 new cases and 101,000 deaths each year. Data of children with TB in South Kalimantan Province from 2009-2011 found as many as 28 cases with BTA+ on age 0-14 years. In 2014 and 2015 the proportion of children with TB patients found in Banjarbaru City was 10.84% and 8.5% compared to all TB patients. In Banjarmasin City nearby Banjarbaru City, there were 28.6% reported TB cases that were handled by TB program managers in the Health Department. Based on these conditions, TB prevention is needed with a short-term pulmonary TB healing strategy with direct supervision. The general objective of this study was to analyze the design of behavioral patterns on medication adherence patients of children with TB in the working area of the public health centers in Banjarbaru. This type of research is quasi-experimental, with one group pretest-posttest design. There are significant differences in the average of knowledge, attitudes, family support, and health workforce support between pre-test and post-test. Knowledge enhancement occurred every week and remained after 6 weeks in both cases respondents at 87.5%, controls at 89.4%. An increase in attitude will occur every week if an intervention is carried out and settled after 6 weeks in both cases respondents as much as 89.08%, controls as much as 88.48%. Increased adherence will occur every week if an intervention is carried out and settled after 6 weeks in both cases respondents as much as 94.8%. The increase in family support occurs every week with an increase in week 6 of 97.72%. The increase in family support occurs every week with an increase in week 6 of 97.72%. The design of behavior patterns in android-based in the working area of the City of Banjarbaru can improve knowledge, attitudes, family support, health workforce support in improving health in TB patients with a cure rate in 2 (18%) respondents interrupted in 3 months.

**Keywords:** Design, behavioral pattern, medication adherence, TB, android.

## Introduction

The incidence of pulmonary tuberculosis (TB) in Indonesia is estimated to have 539,000 new cases and 101,000 deaths each year.<sup>1</sup> Data of children with TB

in South Kalimantan Province from 2009-2011 found as many as 28 cases with BTA+ on age 0-14 years. In 2014 and 2015 the proportion of children with TB patients found in Banjarbaru City was 10.84% and 8.5% compared to all TB patients. In Banjarmasin City nearby Banjarbaru City, there were 28.6% reported TB cases that were handled by TB program managers in the Health Department. Based on these conditions, TB prevention is needed with a short-term pulmonary TB healing strategy with direct supervision.<sup>2</sup>

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DOTS emphasizes the importance of the supervision of pulmonary TB patients in order to swallow the drug regularly according to the provisions until declared cured. The DOTS strategy is recommended by WHO

globally for tackling pulmonary TB because it produces a high cure rate of 95%.<sup>3</sup> The inability of the patient to complete the self-administered regimen will lead to treatment failure the possibility of recurrence of the disease is resistant to the drug, and will continue to transmit the infection.<sup>4</sup>

The low of medication adherence in pulmonary TB patients will slow the healing process of the disease, increase the risk of morbidity, mortality, and drug resistance both to one type of OAT (mono resistant), or more than one type of OAT (poly resistant, multidrug-resistant, extremely drug-resistant, or totally drug-resistant).<sup>5</sup>

### Materials and Method

This type of research is quasi-experimental, with one group pretest-posttest design. The population in this study were all TB patients seeking treatment in the Banjarbaru working area. Samples of 46 people were taken by simple random sampling technique. Independent variables are knowledge, attitude, family support, and health workforce role. While the dependent variable is drug adherence behavior.

### Findings and Discussion

**Knowledge:** Increased knowledge in 11 cases is that when the pre-test did not know the signs and symptoms of tuberculosis in children such as fever, cough and weight loss or difficulty rising, and sputum removal behavior. But in the post-test everything can be answered properly. Knowledge enhancement will occur every week if an intervention is carried out and settled after 6 weeks in both case respondents at 87.5%, control at 89.4%. Knowledge is considered very important for the success of TB treatment because patients will get information about the mode of transmission, stages of treatment, treatment goals, drug side effects, and complications of the disease. The knowledge possessed by a person can influence attitudes, plans, and decisions to be taken.<sup>6</sup> Parents who have good knowledge about their health will influence their behavior to live healthily.<sup>7</sup> Maternal knowledge is one of the factors associated with the incidence of pulmonary TB in children. Mothers who have less knowledge about pulmonary TB are at greater risk of developing pulmonary TB in children aged 1-12 years.<sup>8</sup> The results of this study are in accordance with the theory which states that health education or education can improve one's knowledge.

**Attitude:** Attitudes unknown to the respondents are related to the attitudes of fulfilling their own eating utensils, and ethics of speaking but after the post-test, there was an increase. An increase in attitude will occur every week if an intervention is carried out and settled after 6 weeks in both case respondents as much as 89.08 %, controls as much as 88.48%. Attitude plays a role in determining behavior and decisions taken by someone in the process of healing the disease. The positive attitude possessed by a person towards his illness will lead to positive health-seeking behavior so that the presence of a positive attitude will further encourage a person in his efforts to complete treatment.<sup>6</sup> The results showed that there were differences in the average attitude between pre-test and monitoring and evaluation carried out on a group of cases namely in Monev 2, Monev 3, and Monev 5. It showed that health education was proven to be able to improve one's attitude about pulmonary TB of children. Attitudes can be influenced by one's education. The higher the education of parents the easier it will be to understand health.<sup>9</sup>

**Adherence:** Adherence can be influenced by a number of factors, including a lack of patient understanding of treatment goals. One effort to improve patient knowledge and adherence is to convey information about treatment. Patient education is one of the important pillars of optimizing therapy.<sup>10</sup> The results of research that have been done show that there are differences in the average adherence between pre-intervention and monitoring and evaluation of monitoring and evaluation conducted namely in Monev 3, Monev 4, and Monev 5. This means health education or education can affect the level of adherence of a person to the incidence of TB in children.

**Family Support:** The increase in family support occurs every week with an increase in week 6 of 97.72%. The family support received by TB sufferers is influenced by his assessment of the family's role in encouraging healing, even as a Drugs Supervisor (PMO). Perception of the role of the family as PMO is the perspective and assessment of TB sufferers towards interactions with the family, in the form of information, attention, encouragement, and assistance from PMO so that it will bring up the quality of relationships that can affect the healing of patients.<sup>11</sup>

**Health Workforce Support:** Support of the health workforce is a support system for TB sufferers by assisting in the form of information or advice, tangible

assistance or actions that are emotionally beneficial or affect the recipient's behavior. The health workforce can play a role in monitoring the occurrence of side effects by teaching patients to recognize common complaints and symptoms of side effects and encourage sufferers to report their condition to the health workforce immediately.<sup>12</sup> The increase in family support occurs every week, with an increase in week 6 of 97.72%.

### **Design of Behavioral Pattern on TB Patient**

**Base on Android:** The design of behavior patterns on medication adherence of TB patients based android in the working area of the City of Banjarbaru can improve knowledge, attitudes, family support, and staff support in improving health in TB patients. Initially, there were nine intervention activities (81.8%) who took the medication in the first three months, and 2 (18%) people had been walking for four months, and the results were declared free of TB. This is because intervention activities are carried out every week by giving SMS reminders every three times a day and two weeks and monitoring are done after one week of intervention activities. The material provided is related to TB in children including symptoms, diagnosis, prevention, healthy lifestyle behavior in the household and fulfillment of children's nutrition, prevention of transmission, type of treatment. Additional activities by conducting counseling to mothers and cadres by holding a parenting class. The result is an increase in adherence will occur every week if an intervention is carried out and settled after 6 weeks on respondents with good cases as much as 94.8% along with increased knowledge will occur every week if interventions are carried out and settled after 6 weeks on respondents both cases as much as 87.5%, control as much as 89.4%, Increased attitude will occur every week if an intervention is carried out and settled after 6 weeks on respondents both cases as much as 89.08%, control as much as 88.48% and there is reinforced with an increase in family support occurs every week with an increase in week 6 as much as 97.72%. The increase in family support occurs every week with an increase in week 6 of 97.72%.

Knowledge about pulmonary TB is very important so as not to cause an increase in the number of cases of pulmonary TB due to transmission from patients to others so that a person needs to get information about TB and its prevention. The cognitive component of certain attitudes contains information that a person has about another person or thing. In addition to the knowledge and attitude of family support needed to

encourage pulmonary TB patients by showing care and sympathy, and caring for patients.<sup>13,14</sup> In a previous study by Gendhis Indra Dhewi, et al in 2012, there was a significant relationship between attitude and adherence to taking pulmonary TB medication in BKPM Pati ( $p = 0.0001$ ).

Family support, which involves emotional concern, assistance and affirmation, will make pulmonary TB patients not lonely in dealing with situations and family support can empower TB patients during the treatment period by supporting them continuously, such as reminding patients to take drugs and be sensitive to pulmonary TB sufferers if they experience side effects from TB drugs. There is a significant relationship between family support and medication adherence in pulmonary TB patients ( $p = 0.028$  and  $PR = 1.54$ ).<sup>15</sup>

In addition the role and support of the health workforce are very large for sufferers, where health workers are the most frequently interacting, so that understanding of physical and psychological conditions can be better and can affect the trust and acceptance of patients. The role of officers influences patient compliance in the treatment of pulmonary TB.<sup>16</sup>

### **Conclusion**

There is a difference in knowledge before and after the intervention of the pattern on medication adherence patients of TB based android in the working area of Banjarbaru City as much as 87.5% and 89.4% in the control group without intervention. There are differences in attitudes before and after with the intervention of the pattern on medication adherence patients of TB based android in the working area of Banjarbaru City as much as 89.08% and 88.48% in the control group without intervention. There is a difference in family support before and after with the intervention of the pattern on medication adherence patients of TB based android in the working area of Banjarbaru City as much as 97.72% and 97.72% in control group without intervention. There is a self-reliance design pattern on medication adherence patients of TB based android in the working area of Banjarbaru City as much as 94.8%.

**Ethical Clearance:** Before conducting the data retrieval the researchers conducted a decent test of ethics conducted at the Faculty of Medicine, Lambung Mangkurat University to determine that this study has met the feasibility. Information on an ethical test that the study is eligible to continue. The feasibility of the

research was conducted to protect the human rights and security of research subjects.

**Source Funding:** This study was done by self-funding from the authors.

**Conflict of Interest:** The authors declare that they have no conflict interests.

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# Laparoscopic Stripping of Ovarian Endometriosis in Relation to Ovarian Response and Reserve

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## Abstract

**Objective:** To evaluate the changes in ovarian reserve and response after laparoscopic stripping for ovarian endometrioma.

**Patients and Method:** Forty infertile women in reproductive age were submitted to laparoscopic cystectomy and stripping for symptomatic ovarian endometrioma(s) of at least 30mm in diameter. The evaluated parameters were follicle-stimulating hormone (FSH), Estradiol (E2), serum anti-Müllerian hormone (AMH), as well as ovulation and pregnancy rates.

**Results:** Three months after laparoscopy, preoperative antral follicle count (AFC) significantly increased ( $p < 0.001$ ), with a significant reduction in ovarian volume ( $p < 0.001$ ). The levels of AMH at 3 months reduced significantly ( $p = 0.02$ ), with non-significant changes in serum FSH and E2. AMH was significantly increased in bilateral lesions. There was a significant reverse correlation between preoperative AMH and age after laparoscopy. A significant positive correlation between AMH and AFC was detected preoperatively and after 3 months. The ovulation rate was 52.5% at 3 months, with a pregnancy rate of 42.5%.

**Conclusion:** Laparoscopic stripping of ovarian endometriomas may be associated with worsen ovarian reserve.

**Keywords:** Ovarian endometriosis, infertility, laparoscopic cystectomy, ovarian reserve, ovarian response.

## Introduction

Endometriosis has been estimated with a prevalence of 11% among women in reproductive age [1]. Even mild endometriosis can impair fertility, and severe disease can lead to tubal adhesions, reduced ovarian reserve and oocyte and embryo quality, and poor implantation [2-4]. Laparoscopic excision of ovarian endometrioma is performed on infertile women of reproductive age.

However, residual ovarian function after the procedure remains an important yet inadequately researched topic. [5,6]

Multiple clinical and biochemical indicators can evaluate ovarian reserve including antral follicle count (AFC), ovarian volume, Follicle-stimulating hormone (FSH), Estradiol (E2) and serum anti-Müllerian hormone (AMH) [7,8]. The aim of this study is to evaluate whether a change takes place in ovarian reserve laparoscopic stripping of ovarian endometrioma, using ultrasonographic parameters and biochemical markers.

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## Patients and Method

This prospective study included 40 patients submitted to laparoscopic excision of ovarian endometrioma(s) at department of Obstetrics and Gynecology, Faculty of Medicine, Minia University. The study was conducted

after an institutional approval and a formal consent taken from all patients. The study included infertile women in reproductive age with symptomatic endometriosis and an endometrioma diameter of at least 30mm. We excluded patients when there were refusal to participate, pregnancy, previous surgery for benign ovarian cysts, pre-surgical evidence of premature ovarian failure, body mass index (BMI)  $\geq 30$  kg/m<sup>2</sup>, therapy with estrogen or suppressive drugs, suspicion or history of malignancy, mural irregular lesions or septations, cystic lesions compatible with dermoid cyst, and extensive pelvic adhesions.

The antral follicle was defined on ultrasound as a small fluid filled sac that contains immature egg measuring 2-10 mm in diameter. AMH, FSH, E2 levels were measured by ELISA on the third day of the menstruation before the surgery, and three month after the procedure. The main steps of laparoscopic procedure were incision on the ovary at antimesentric border away from ovarian hilum, incision of the ovarian cyst, aspiration of the cyst by repeat irrigation suction which help to separate cyst wall from the ovarian parenchyma, followed by stripping of the cyst using two atraumatic grasping forceps by traction and countertraction after identification of correct cleavage plane so healthy ovarian tissue was not removed.

Statistical analysis was performed using Statistical Package for Social Sciences (SPSS) software version 18.0. Independent groups of continuous data were compared using Student t-test or Mann-Whitney for non-parametric data, while categorical data were compared using Chi-square or Fisher exact test. Intra-group comparisons were performed using paired t-test or Wilcoxon test for non-parametric data. Pearson's test was used to assess correlations. Significant p-values were defined at the level of 0.05.

**Findings:** Table 1 represents demographic, clinical, and operative characteristics of the studied 40 patients. The ultrasonographic and biochemical parameters before and three months after laparoscopic surgery are shown in (Table 2). Three months after laparoscopy, preoperative AFC significantly increased ( $p < 0.001$ ), with a significant reduction of ovarian volume ( $p < 0.001$ ). The levels of AMH reduced significantly ( $p = 0.02$ ) after 3 months, with non-significant decrease in serum levels of FSH and non-significant increase of E2 levels.

Bilateral lesions showed significantly higher preoperative AFC than unilateral lesions ( $p = 0.03$ ), with

non-significant differences in ovarian volume, AMH, FSH, or E2 between unilateral and bilateral lesions (Table 3). At 3 months of laparoscopy, AFC significantly increased and ovarian volume significantly reduced regardless to the laterality of the lesion. The levels of serum AMH at 3 months were significantly higher than preoperative levels only in bilateral lesions.

There was a significant reverse correlation between preoperative AMH and age of the patient, which became non-significant three months after surgery, reflecting that the influence of stripping on ovarian reserve is not dependent on age (Figure 1, A and B). On the other hand, there was a significant positive correlation between AMH and AFC preoperatively, and three months after surgery, reflecting the significant association of improved AFC with improved levels of AMH (Figure 1, C and D).

**Table 1: Demographic, clinical, and operative characteristics of the studied patients**

Variables	Patients (n=40)
Age (years)	30.45±2.36
BMI (kg/m <sup>2</sup> )	23.93±2.15
Primary infertility	23(57.5%)
Chronic pelvic pain	31(77.5%)
Parity	0.90±0.84
Menstrual cycle, days	27±1.81
Uni-/Bilateral lesions	30 (75%)/10 (25%)
Operative duration, min	90.03±28.11
Operative blood loss, mL	77.25±38.36

Data are expressed as mean±SD or number and percent. BMI: Body mass index.

**Table 2: Ultrasonographic and biochemical parameters for ovarian reserve, before and three months after laparoscopic stripping of ovarian endometrioma.**

Variables	Preoperative	3 months	P-value
AFC	5.53±2.34	7.28±2.84	<0.001*
Ovarian volume (ml)	13.1 ± 1.55	6.63 ± 2.46	<0.001*
AMH (ng/ml)	2.87 ± 0.24	2.66 ± 0.55	0.02*
FSH (mIU/l)	6.50 ± 2.69	5.90 ± 2.25	0.28
E2 (pg/ml)	118.65±70.86	112.50±46.29	0.34

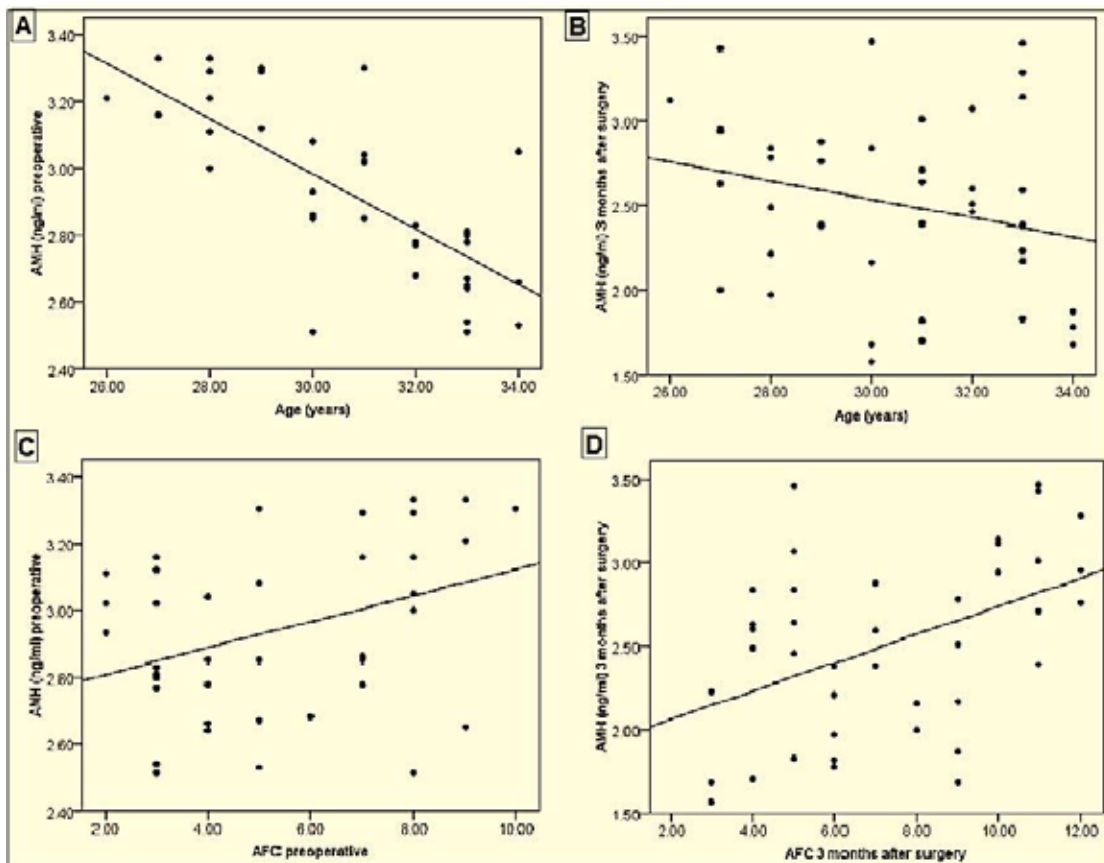
Data are expressed as mean±SD. AFC: Antral follicle count. AMH: Anti mullerian hormone. FSH: Follicular stimulating hormone. E2: Estradiol. \*Significant difference.

**Table 3: Comparison of ultrasonographic and biochemical parameters in patients with unilateral and bilateral lesions**

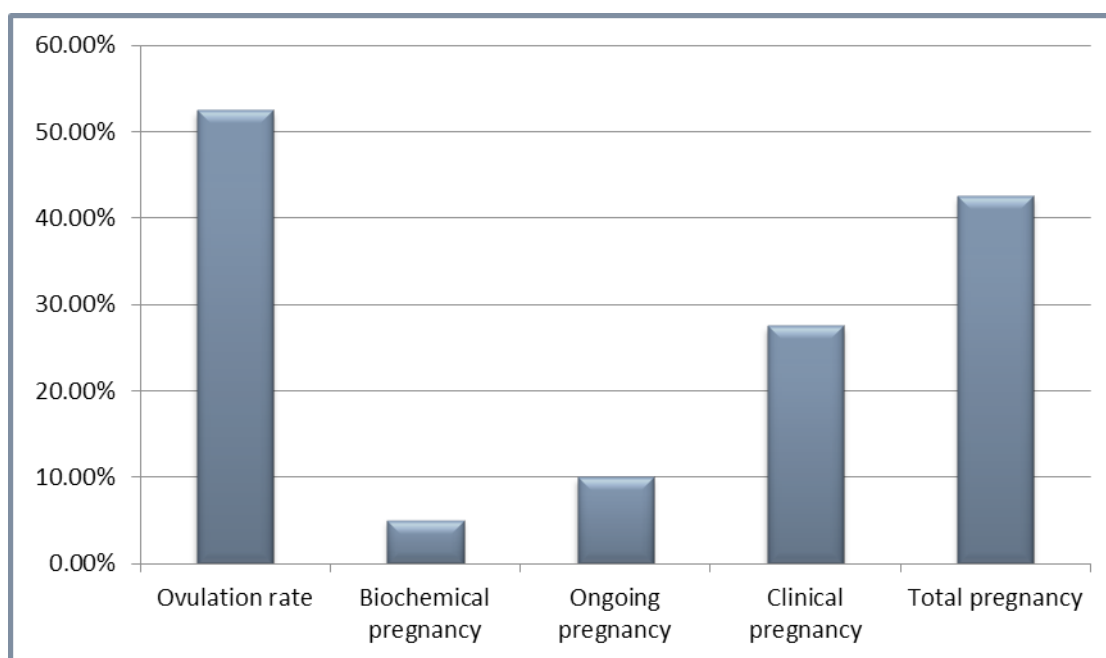
Variables	Unilateral (n=30)	Bilateral (n=10)	P-value
AFC: Preoperative	6±2.36	4.10±2.13	0.03*
AFC:3 months	7.43±2.93 #	6.90±2.81 #	0.61
Ovarian volume (ml): Preoperative	13.17±1.66	12.90±1.20	0.59
Ovarian volume (ml):3 months	6.50±2.39 #	7±2.75 #	0.62
AMH (ng/ml):Preoperative	2.87±0.25	2.85 ±0.23	0.82
AMH (ng/ml):3 months	2.72±0.55	2.47±0.52 #	0.21
FSH (IU/l):Preoperative	6.73±2.90	5.80±1.87	0.25
FSH (IU/l):3 months	6±2.41	5.6±1.78	0.58
E2 (pg/ml):Preoperative	119.33±66.61	116.60±86.37	0.93
E2 (pg/ml):3 months	107.90±43.78	99.30±55.21	0.66

Data are expressed as mean±SD. AFC: Antral follicle count. AMH: Anti mullerian hormone. FSH: Follicular stimulating hormone. E2: Estradiol. # Significant with baseline preoperative value, \*Significant inter-groups comparison.

The ovulation rate was 52.5% (21/40) at 3 months after laparoscopy, while the pregnancy rate was 5% (2/40) for biochemical pregnancy, 10% (4/40) for ongoing pregnancy, and 27.5% (11/40) for clinical pregnancy, with a total pregnancy rate of 42.5% (17/40) (Figure 2).



**Fig. 1: Correlations: (A) between serum anti-Mullerian hormone (AMH) and age before laparoscopic stripping of ovarian endometriomas, r-value = -0.769, p-value <0.001; (B) between serum AMH and age, three months after laparoscopic stripping of ovarian endometriomas, r-value = -0.241, p-value = 0.12; (C) between serum AMH and antral follicle count (AFC) before surgery, r-value = 0.375, p-value = 0.01; (D): between serum AMH serum concentrations and AFC three months after laparoscopic stripping of ovarian endometriomas, r-value = 0.445, p-value = 0.001.**



**Fig. 2: Ovulation and pregnancy rates after laparoscopic stripping in 40 patients with for ovarian endometriosis**

### Discussion

Laparoscopic cystectomy is recommended for symptomatic ovarian endometrioma because of higher pregnancy rate and lower recurrence rate<sup>[9, 10]</sup>; however the ovarian reserve may be negatively affected due to removal of normal ovarian tissue<sup>[7]</sup>. In our study, AFC was significantly increased 3 months after cystectomy with a significant decrease in ovarian volume, which is consistent with other studies<sup>[11, 12]</sup>. In contrary, other authors reported that AFC is similar or apparently increased after surgery with non-significant changes which can be explained by difficult and inaccurate estimation of AFC in the presence of the anatomical alteration caused by an endometrioma<sup>[13, 14]</sup>. Moreover, there may be a paradoxical increase in AFC in the postoperative period as a consequence of undercounted preoperative AFC beyond the ovarian lesion or due to a reactive response of ovarian parenchyma after surgery<sup>[11]</sup>.

The levels of AMH is probably the most reliable tool to assess ovarian reserve, being synthesized in the pre-antral and small antral follicles<sup>[15]</sup>, AMH provides information about the number of follicles relocated from the quiescent pool of primordial follicles to the pool of activated ones<sup>[13]</sup>. The significant reduction of AMH

after surgery while FSH and E2 did not, may be explained by the higher sensitivity of AMH to ovarian damage and by the existence of a selective damage caused by surgery on the primordial and small antral follicle pool (secreting AMH) that are hosted in the tissue near the cyst, with a rare detection of more developed ovarian follicles secreting inhibin, E2, and hence FSH near an endometrioma<sup>[13]</sup>. These findings may confirm that basal FSH and E2 have low sensitivity for early decrease in the ovarian reserve<sup>[16]</sup>. However, some studies reported that FSH levels were decreased after three months follow-up, which showed a good ovarian reserve<sup>[17, 18]</sup>.

The significant inverse correlation between age and AMH concentrations that the present study and other studies observed before surgery lost significance after the operation<sup>[13, 19]</sup>, suggesting that the surgical damage on healthy ovarian tissue is independent of age and can lower ovarian reserve in the same way in both young and older women. The finding of the significant positive correlation of postoperative serum AMH level with AFC three months postoperatively reflects the high sensitivity of both measurements for ovarian reserve.

The positive correlation between AMH and AFC, in addition to the significant postoperative increase in AFC with a significant reduction in AMH reflects a significant



reduction in ovarian reserve after laparoscopic stripping for ovarian endometrioma, which may be related to pre-surgery negative effects of the cyst, unintentional removal of a considerable amount of healthy tissue<sup>[20]</sup>, direct damage from electrosurgical coagulation<sup>[21]</sup>, damage to ovarian vasculature, or an inflammation-mediated injury<sup>[22]</sup>.

In the present study, bilateral ovarian lesions associated with a significant decrease of preoperative in AMH three months after surgery, which was not reported with unilateral lesions. Other studies demonstrated that bilateral ovarian cystectomy is a significant factor associated with the decline of serum AMH concentrations after cystectomy for ovarian endometriomas<sup>[20, 23-25]</sup>. The declines in the post-surgical serum AMH concentrations of patients who underwent bilateral cystectomy could be explained by a lower rate of recovery or a continuous decrease in AMH concentration because of the extended ovarian ischemia resulting from the bilateral surgery<sup>[25]</sup>.

The pregnancy rate in our patients is consistent with the reported pregnancy rates after surgery and laparoscopy for ovarian endometriosis which range from 24% to 67%, with an overall mean of about 50%<sup>[26-28]</sup>. It has been indicated that laparoscopic removal of an ovarian endometrioma can improve pregnancy outcome in infertile patients<sup>[29]</sup>. The findings of reduced ovarian reserve may add a disadvantage of a consequent reduction of the response to ovarian stimulation<sup>[30, 31]</sup>, however, it has been demonstrated that laparoscopic cystectomy may reduce the frequency of ovulation in the operated ovary, but it maintains the pregnancy rate per ovulation<sup>[32]</sup>.

### Conclusion

The laparoscopic stripping of ovarian endometriomas may further worsen ovarian reserve. Serum AMH could be a delicate marker to provide surgical impact on ovarian reserve. Larger studies could be recommended to clarify the relation between the change of serum AMH and actual loss of ovarian reserve.

**Conflict of Interest:** None to declare

**Funding:** None

**Ethical Clearance:** Taken from Faculty of Medicine, Minia University committee

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# Menstrual Pattern Disorder Related to Physical Activity and Stress Psychic Soldiers Female Student of Indonesian Navy

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## Abstract

A disorder of menstrual patterns in women of productive age can have an impact on quality of life, risk factors for menstrual pattern disorders include physical activity and psychological stress. The purpose of the study was to analyse the correlation between physical activity and stress relations with the pattern of correlations between female students in the Indonesian Navy's First Bintara Education. This research was an observational analytic study using cross sectional study. The sample in this study was 95 female students. For measuring the grade of physical activity using the International Physical Activity Questionnaire (IPAQ) the grade of psychological stress using Depression Anxiety Stress Scale 42 (DASS 42), and monitoring patterns of menstrual patterns in the first 3 months during military education, then analysed using bivariate. The results of statistical tests using Chi Square obtained p value of physical activity that has ( $p = 0.008$ ; OR 24.3) and stress ( $p = 0.019$ ), showing related correlations related to physical activity and psychological stress on the correlation of menstrual patterns in the troops female soldiers in military education.

**Keywords:** Disorders of menstrual patterns, Physical Activity, Stress, Female Soldiers.

## Introduction

Menstruation is the excretion of blood, mucus and remnants of cells originating from the uterine mucosa and occurs relatively regularly<sup>(1)</sup>. Menstrual bleeding patterns are one indicator of reproductive health and changes in menstrual patterns can affect a woman's quality of life<sup>(2)</sup>. Menstrual pattern disorders occur in 9-14% of women of childbearing age (between menarche and menopause) and have a significant impact on quality of life<sup>(3)</sup>. Risk factors that can affect menstrual

pattern disorders are physical activity, stress, polycystic ovary syndrome, hyperprolactinemia, hypothyroidism, immaturity of hypothalamic pituitary ovarian axis, obesity and anorexia<sup>(4)(5)</sup>. The level of moderate or heavy physical activity can affect the menstrual phase. Heavy physical activity can stimulate Gonadotrophin Releasing Hormone (GnRH) inhibition and Gonadotropin activity and reduce serum oestrogen levels. Resulting in changes in the menstrual cycle<sup>(6)</sup>. Physical activity coupled with calorie restriction affects the suppression of luteinizing hormone (LH), whereas exercise alone has no influence on pulsatility LH<sup>(7)</sup>. In times of stress the body's neurendocrine system becomes disrupted, resulting in the activation of the amygdala in the limbic system, then this system stimulates the release of corticotrophic releasing hormones (CRH) and stimulates an increase in adrenocorticotrophic hormone (ACTH). These hormones can affect the extension of the follicular stage or luteal stage in the menstrual phase, so that menstrual cycle disorders occur<sup>(8)</sup>. In accordance with Schneider et al<sup>(13)</sup> of female cadets at the USMA, almost all participants

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(91%) experienced secondary amenorrhea or menstrual irregularities as much as 48.2% during their first year of military training, where there is a perceptual experience of menstrual disorders caused by physical and emotional training. However, as many as 10.8% found that their menstrual data became more regular. This shows that the use of unbalanced energy can also cause a decrease in GnRH pulsatility in this case FSH, which results in an extension of the follicular phase.

From a previous preliminary study of 32 Indonesian Naval Academy Cadets, 25 people (78.1%) had menstrual disorders and 7 people (21.9%) had no menstrual disorders during military training. Referring to the above, a study was conducted to find out about the correlation between physical activity and psychological stress experienced by young women in military basic training against menstrual pattern disorders that are experienced.

**Method**

The cross-sectional study design was carried out on female student soldiers in the Indonesian Navy’s First Education, with a total population of 124 people. The sampling technique used is total sampling. The sample of the study were female students aged 18 - 21 years old, had menstruated, were willing to be a sample, were not pregnant, did not use drugs that affect the menstrual cycle, did not have a history of menstrual pattern disorders (at least 3 months before entering military education), and has no history of gynaecological surgery.

**Operational Definitions of Research Variables:**

- (a) Physical Activity Variable is any body movement produced by skeletal muscle that requires energy expenditure, in the form of activities carried out by respondents during military basic education during the first 3 months after starting education. The questionnaire uses the Automatic Report-IPAQ Short Form<sup>(9)</sup>.

**Table 1. Physical Activity category**

Category		Physical Activity	MET score
1	Weight	Heavy intensity for a minimum of 3 days	1500 MET-minutes / week
		Combination of walking, medium intensity or heavy intensity for 7 days or more that reaches a minimum value	3000 MET-minutes / week
2	Medium	Heavy physical activity for 3 days or more, for at least 20 minutes per day.	
		Conduct moderate-intensity physical activity and / or walk for 5 days or more, for at least 30 minutes per day.	
		Combination of walking, medium intensity or heavy intensity for 5 days or more that reaches a minimum value	600 MET-minutes / week
3	Light weight	Do not meet the criteria for categories 1 and 2 categorized as mild physical activity level	

- (b) Stress Variable is a condition perceived by female student soldiers to various stimuli that come, both in the form of support and pressure and can affect

the physical, psychological and behavioural balance during the first 3 months after starting education. The questionnaire used the DASS 42<sup>(10)</sup>.

**Table 2. Stress Category**

Category		Score
1	Normal/not stressed	0-14
2	Mild stress	15-18
3	Moderate stress	19-25
4	Stress weight	26-33
5	Very heavy stress	>34

(c) Menstrual Pattern Disorders Variable is a term used to describe all menstrual abnormalities in terms of frequency, duration and volume, in the form of menstrual pattern disorders experienced by respondents during their first military education during the first 3 months after starting education. The questionnaire uses a measurement of menstrual history<sup>(11)</sup>. Not experience menstrual patterns (normal) if, menstrual cycles 24-38 days, menstrual periods 4-8 days, lots of periods 5 ml-80 ml. Having menstrual patterns if, menstrual cycles <24 days or> 38 days, menstrual periods <4 days or> 8 days, lots of periods <5 ml or> 80 ml.

The independent variables in this research are physical activity and psychological stress with an ordinal scale. The dependent variable is disruption of menstrual patterns on a nominal scale. The grade of physical activity was measured using IPAQ the grade of psychological stress using DASS 42, and a history of menstrual pattern disorders during the first 3 months of entering military education. Data collection was carried out in April-May 2019. Respondents were given a questionnaire to measure physical activity, stress and menstrual pattern disorders. Data processing is done by editing, coding, entry and tabulating. Data that has been collected is processed using the Chi Square test with the help of the SPSS computer program.

**Result**

The population of respondents was 124 people. Respondents were present at the distribution of questionnaires as many as 120 people. Of the 120 people there were 95 respondents who met the inclusion criteria.

Table 3 shows the characteristics of the sample, most of them at the age of 19 years 29 people (30.5%) the majority experienced heavy physical activity 91 people (95.8%) the majority did not experience stress 73 people (76.8%), and 82 people (86.3%) had disorders menstrual patterns.

**Table 3. The characteristics of respondents**

Variables	f	Percentage (%)
<b>Age</b>		
18	26	27.4
19	29	30.5
20	22	23.2
21	18	18.9
<b>Total</b>	<b>95</b>	<b>100.0</b>
<b>Physical Activity</b>		
Medium	4	4.2
Weight	91	95.8
<b>Total</b>	<b>95</b>	<b>100.0</b>
<b>Psychic Stress</b>		
Normal	73	76.8
Light	12	12.6
Medium/rarely	8	8.4
Weight	2	2.1
Total	95	100.0
<b>Menstrual pattern disorders</b>		
There are no distractions	13	13.7
There is interference	82	86.3
<b>Total</b>	<b>95</b>	<b>100.0</b>

Source: Data: primary data processed

**Table 4. Frequency Distribution of Menstrual Patterns**

Types of Menstrual Pattern Disorders	Frequency n=95	
	Yes	%
<b>Frequency</b>		
Often	13	13.3
Normal	24	24.5
Rarely	29	29.6
<b>Long</b>		
Long-term	15	15.3
Normal	39	39.8
Short-term	12	12.2
<b>Blood Volume</b>		
Weight	5	5.1
Normal	56	57.1
Light	5	5.1
Secondary Amenorrhea	29	29.6

Source: Data: primary data processed

Table 4 shows that the frequency of menstrual patterns is almost half the rare frequency of 29.6% the duration of menstruation is almost half the normal menstrual period of 39.8% the blood volume of menstruation is mostly the normal blood volume of 57.1%, and secondary amenorrhea of 29.6%.

**Correlation between Physical Activity and Menstrual Pattern Disorders:**

**Table 5. Correlation between Physical Activity and Menstrual Pattern Disorders**

Physical Activity	Menstrual Pattern Disorders				Total		P value	OR
	No		Yes		Amount	%		
	n	%	n	%				
Light	0	0	0	0	0	0	0.008	24.3 CI 95% (2,302-256.484)
Medium	3	75.0	1	25.0	4	100.0		
Weight	10	11.0	81	89.0	91	100.0		
<b>Total</b>	<b>13</b>	<b>13.7</b>	<b>82</b>	<b>86.3</b>	<b>95</b>	<b>100.0</b>		

Source: Data: primary data processed

Table 5 shows that the proportion of respondents who experienced the most disruption of menstrual patterns in heavy physical activity was 81 people (89.0%). Statistical test results using Chi Square obtained p value of 0.008, when compared with an  $\alpha$  value of 0.05 the value of  $p < 0.05$ , which means the test results have

a significant correlation between physical activity and menstrual pattern disorders in respondents. Odds Ratio (OR) is 24.3 with 95% CI (2,302-256,484) meaning that respondents who experience strenuous physical activity are 24.3 times more likely to experience menstrual patterns.

**Correlation of Stress with Menstrual Pattern Disorders:**

**Table 6. Correlation of Stress With Menstrual Pattern Disorders**

Stress	Menstrual Pattern Disorders				Total		P value
	No		Yes		Amount	%	
	n	%	n	%			
Normal	8	11.0	65	89.0	73	100.0	0.019
Light	5	41.7	7	58.3	12	100.0	
Medium	0	0	8	100.0	8	100.0	
Weight	0	0	2	100.0	2	100.0	
Very Heavy	0	0	0	0	0	0	
<b>Total</b>	<b>13</b>	<b>13.7</b>	<b>82</b>	<b>86.3</b>	<b>95</b>	<b>100.0</b>	

Source: Data: primary data processed

Table 6 shows that the stress level of respondents who experienced menstrual pattern disorders, with no stress conditions (normal) 65 people (89%), experienced mild stress 7 people (58%), moderate and severe stress experienced menstrual pattern disorders 100%. Statistical test results using Chi Square obtained a p value of 0.019, when compared with a value of  $\alpha$  0.05 the value of  $p < 0.05$ , which means the test results have a significant correlation between stress and menstrual disorders in female students in military basic education.

**Discussion**

Based on the Chi Square test results for physical activity showed a significant correlation to menstrual pattern disorders. The results of the study of respondents who carry out heavy physical activity the majority experience menstrual disorders by 89%. In line with the results of the study of Sianipar et al<sup>(12)</sup>, two thirds of respondents who experience menstrual disorders have high intensity and frequency of physical activity

so that the greater possibility of menstrual disorders, while physical activity intensity is lowering the risk of menstrual disorders.

The results of the study stated that there was a significant correlation between menstrual pattern disorders and physical activity in female student soldiers in Indonesian military basic education. In line with research Quah<sup>(14)</sup> on a non-Leannes sports athletes in Malaysia with the results of 14.3% of athletes who experience oligomenorrhea. Accordance with Asmarani<sup>(15)</sup> the nature and severity of symptoms of the menstrual cycle depends on several things such as the type of exercise the intensity, and the duration of exercise and the rate of deepening of the training program. Excessive physical activity can cause hypothalamic dysfunction which causes interference with GnRH secretion. This causes delayed menarche and disruption of the menstrual cycle, with changes in steroid metabolism that affect the release or the release of gonadotropin. Menstrual pattern disorders and delayed menarche are experienced by adolescents and adult women who conduct intensive training for 15 hours or more every week<sup>(16)</sup>. The intensity of physical activity that is too high so that it cannot be compensated by the body can cause endocrine disruption in the body one of which is menstrual cycle irregularities<sup>(17)</sup>.

The results of research on cross tabulation between menstrual pattern disorders and stress, there is a significant correlation between menstrual pattern disorders and stress. According to Nepomnaschy et al<sup>(18)</sup> that stress causes activation of the hypothalamic-pituitary-adrenal (HPA) axis, which inhibits the hypothalamic-pituitary-gonad (HPG) axis. In addition, secretion of corticotropin-releasing hormone (CRH) secretion, vasopressin, and endogenous opioid peptides play a role in the occurrence of menstrual disorders. The researchers point out that psychological stress produces physiological responses, such as CRH activation, which tends to affect menstrual function, regardless of other adverse effects<sup>(19)</sup>. The research conducted by Nazish and Mona<sup>(20)</sup> at the Imam Abdulrahman Bin Faisal University health college, that 91% percent of female college students experience menstrual problems. Various menstrual problems were reported, and their incidents included irregular menstruation (27%), abnormal vaginal bleeding (9.3%), amenorrhea (9.2%), menorrhagia (3.4%), dysmenorrhea (89.7%), and premenstrual symptoms (46.7%), which was identified in 39% of students experiencing high stress. A significant

correlation was found between stress and menstrual disorder problems. Students with stress had 2 times, 2.8 times, and 4 times increased odds ratios for experiencing dysmenorrhea, amenorrhea, and premenstrual syndrome ( $p < 0.05$ ).

The above research contradicts the results of research conducted by Shahida Nagma et al<sup>(21)</sup> on 100 college undergraduate medical students that no correlation was found in students with PSS > 20 with dysmenorrhea, menorrhagia, hypomenorrhoea, short cycle length and long cycle length. High stress levels (PSS > 20) are associated with only menstrual irregularities and not with duration, amount of flow or Dysmenorrhoea. Therefore, research needs to be done on young women who complain about other causes of menstrual problems before stress is assumed to be the cause.

In this study it was found that respondents who did not experience stress, but still experienced abnormal menstrual patterns as much as 89%. This shows that disruption of menstrual patterns is not only influenced by stress factors in individuals, but there are still many other factors that affect the duration of menstruation in respondents who experience abnormal menstruation even though they are not stressed. According to the researchers' assumptions that menstruation is not normal in respondents who inexperience stress in this study is influenced by the physical activity of respondents who are likely to be excessive. This is reinforced by the results of observations and interviews with respondents at a glance when the distribution and filling of questionnaires where most respondents in the study carried out strenuous physical activity.

## Conclusion

Based on the research objectives the results of the above research analysis data can be concluded that the majority of respondents experienced heavy physical activity. Most respondents did not experience stress (normal) but experienced menstrual patterns and moderate and severe stress all experienced menstrual patterns. There is a correlation between physical activity and stress with disruption of menstrual patterns. Further research needs to be done related to physical activity with menstrual pattern disorders using all other variables. As well as knowing the effect of disruption of menstrual patterns in reproductive health is faced with dynamic assignments and assignments that are more severe in the future.



**Ethical Clearance:** Approval of research ethics was obtained from the Faculty of Medicine, Airlangga University, Surabaya.

**Conflict of Interest Statement:** There is no conflict of interest.

**Source of Funding:** Self.

**Acknowledgments:** Thank you for Commander of Education and Training of the Indonesian Navy's Training Doctrine and staff, who have given research permission and assisted in data collection.

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# Assessing Demographic Distribution of Dengue Infections in Seremban District, Malaysia

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## Abstract

This study aims to assess the trends of dengue incidence and socio-demographic characteristics of reported dengue cases in Seremban district, Malaysia during the last decade. Secondary data on reported dengue cases during 2003-2011 were collected from the District Health Office, Seremban. Trend analysis was conducted to assess the status of dengue incidence and demographic distribution of the disease in the district. Annual incidence rates of the disease were also calculated and compared. The district experienced a total of 11,936 dengue infections during 2003-2011. It was found that majority of the reported cases were among the Malays (62%), followed by Chinese (17%) and Indians (15%). The age-specific incidence rate was highest in young adult and adult group (15-44 years), followed by middle-age group (45-59 years). The analysis also revealed that majority of the reported cases (on average, 79% per year) came from urban areas of the district which highlights the fact that dengue is still an urban public health problem in Seremban. The study findings provide the critical data and information on trends of dengue incidence and socio-demographic characteristics of reported dengue cases which might assist the public health authorities to achieve dengue mortality and morbidity reduction goals in the district.

**Keywords:** *Dengue incidence, demographic distribution, Seremban, Malaysia.*

## Introduction

Dengue is a mosquito-borne viral infection which can be caused by one of the four antigenically distinct dengue viruses namely, DENV-1, DENV-2, DENV-3, and DENV-4<sup>(1-3)</sup>. From the clinical perspective, a dengue infection is usually classified as dengue fever (DF), dengue hemorrhagic fever (DHF) or dengue shock syndrome (DSS) according to severity of the disease<sup>(4)</sup>.

The dengue infection usually begins with a sudden onset of high fever, a severe frontal headache, pain behind the eyes, muscle and joint pains, nausea, vomiting, and rash<sup>(5,6)</sup>. The infection can manifest as DHF or DSS with plasma leakage, severe abdominal pain, respiratory distress, spontaneous bleeding, rapid breathing, fatigue, hypotension and organ impairment<sup>(7)</sup>. Currently, there is no specific medication for DF/DHF<sup>(8,9)</sup>. The patients are treated with paracetamol, oral rehydration and IV fluids in order to maintain the volume of the patient's body fluid<sup>(10)</sup>. Moreover the patient suffered from DHF or DSS is considered a medical emergency and requires hospitalization in intensive care unit.<sup>(10,11)</sup>

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Dengue is found in tropical and sub-tropical regions around the world, mostly in urban and semi-urban areas<sup>(12,13)</sup>. In recent years, dengue has become a major

international public health concern in terms of morbidity and economic impact<sup>(14)</sup>. The disease is now endemic in 124 countries of the world and all four dengue viruses are circulating in poor and developing countries in Asia, Africa and the Americas<sup>(15-18)</sup>. WHO currently estimates that there is 50-100 million dengue infections worldwide each year, 500,000 cases of DHF, and about 2.5% of whom die<sup>(19)</sup>. Southeast Asia and the Western Pacific regions are particularly vulnerable to dengue due to rapid urbanization and high densities of dengue vector<sup>(20)</sup>. Recently, DHF has become a leading cause of hospitalization and death among children in most of the Asian countries<sup>(12)</sup>. Approximately, 200,000 dengue cases have been reported annually during the last decade in Asia Pacific region<sup>(21)</sup>.

Currently, DF is one of the major public health problems in Malaysia<sup>(22,23)</sup>. The incidence of DF and DHF in Malaysia has increased steadily during the last decade<sup>(24)</sup>. The disease is predominant in urban areas where majority of the country’s total population resides<sup>(25)</sup>. Seremban is one of the highly affected districts by dengue infections in Malaysia. However the ongoing burden of the disease in the district is not well studied. This study aims to assess the trends of dengue incidence in Seremban during the last decade. It also analyses the socio-demographic characteristics of the reported dengue cases in the district. To our knowledge, this study is an important academic attempt to examine the

burden of dengue from socio-demographic perspectives that might be helpful in policy and decision making for sustainable public health in Malaysia.

### Material and Method

Seremban is one of the seven districts of the Malaysian state of Negeri Sembilan. It is the capital of the state and one of the most affected districts by dengue infections in Malaysia. The hot and humid climate of Seremban is favourable for Aedes mosquitoes to breed and survive. Moreover, rapid urbanization, infrastructure development, very active construction sector for housing and commercial buildings in the district play important role in transmission and outbreaks of dengue. We conducted a retrospective secondary-data based study and collected annual data on reported cases of DF and DHF and patients’ socio-demographic information in Seremban during 2003- 2011. Reported cases included all the clinically diagnosed and laboratory-confirmed cases notified to public health authority in the district. Data were extracted from record of the District Health Office, Seremban. Trend analysis was conducted to assess the status of dengue incidence from 2003 to 2011. Annual incidence rates were also calculated and compared for the nine-year period. Summary descriptive statistics (viz. summation, mean, frequency, ratio and percentage) were applied to analyze socio-demographic characteristics of reported dengue cases.

### Results and Discussions

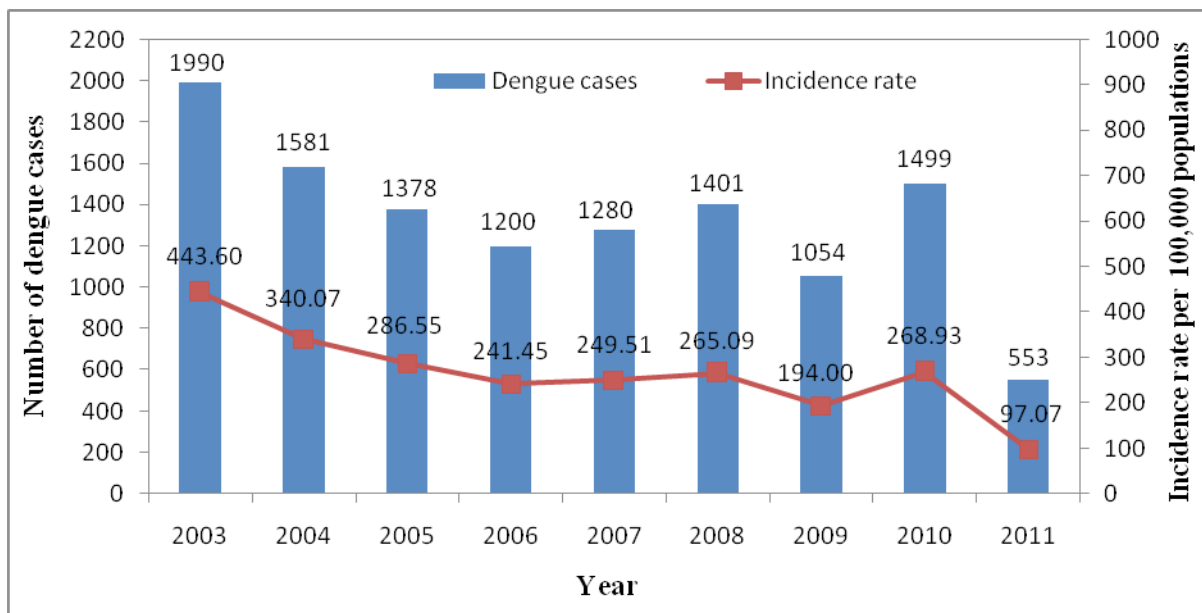


Figure 1: Number of dengue cases and incidence rate in Seremban

**Annual Incidence of Dengue:** Figure 1 shows the annual number of dengue (including DHF) cases in Seremban between 2003 and 2011. The findings suggest that dengue incidence has followed a cyclical pattern (i.e. down-up-down-up) during the last decade. However, a total of 11,946 dengue cases were reported in the district over a 9-year period. Incidence rate of dengue in Seremban is also shown in figure 1. The findings showed a great variation in yearly incidence rate of the disease during the last decade. The highest incidence rate (443.60 cases per 100,000 populations) was observed in the year 2003 while the lowest incidence rate was 97.07 cases per 100,000 populations in 2011.

**Distribution of Cases by DF and DHF:** Table 1 shows the distribution of dengue cases by DF and DHF

and incidence rate per 100,000 populations in Seremban between 2003 and 2011. It was found that out of the total 11,946 reported cases, 11,288 (95%) were DF with the remaining 648 (5%) being DHF. It was also found that the number of DF cases was substantially higher than that of DHF in each year during the last decade. The findings indicate that annual incidence rate of DF in every 100,000 populations was substantially greater (the range of 91.45-421.31) than that of DHF (the range of 5.62- 22.61) between 2003 and 2011. The DF/DHF ratios also reveal that DF was the predominant type of dengue illness in the district over the last 9 years. The predominance of DF over DHF in the district was observed to be the greatest (45.5: 1) in the year 2004 and the smallest (8.9: 1) in 2009.

**Table 1: Distribution of cases and incidence rate by DF and DHF in Seremban**

Year	Number of dengue cases		Incidence rate per 100,000 populations		Ratio (DF/DHF)
	DF	DHF	DF	DHF	
2003	1890	100	421.31	22.29	18.9: 1
2004	1547	34	332.76	7.31	45.5: 1
2005	1335	43	277.61	8.94	31.1: 1
2006	1123	77	225.96	15.49	14.6: 1
2007	1201	79	234.11	15.40	15.2: 1
2008	1350	51	255.44	9.65	26.5: 1
2009	948	106	174.49	19.51	8.9: 1
2010	1373	126	246.32	22.61	10.9: 1
2011	521	32	91.45	5.62	16.3: 1

**Distribution of Dengue Cases According to Sex:** Table 2 presents the distribution of dengue cases and incidence rate per 100,000 populations based on sex in Seremban for the period of 2003-2011. Of the total cases reported in the district over the nine years period, 7305 (61%) were males and 4631 (39%) were females. It can be also seen that majority of the reported cases per year were consistently male in the district between 2003 and 2011. Moreover the findings indicate that the annual number of male cases in every 100,000 populations was greater than that of female cases in the district during the last decade. However, there was a great variation in yearly incidence rate of dengue in both male and female population. The ratio of male cases to female cases (i.e.

male: female) ranged from 1.4: 1 to 2.1: 1 (table 2). The male/female ratios also reveal that there was a consistent trend of males having a higher incidence of dengue as compared to females.

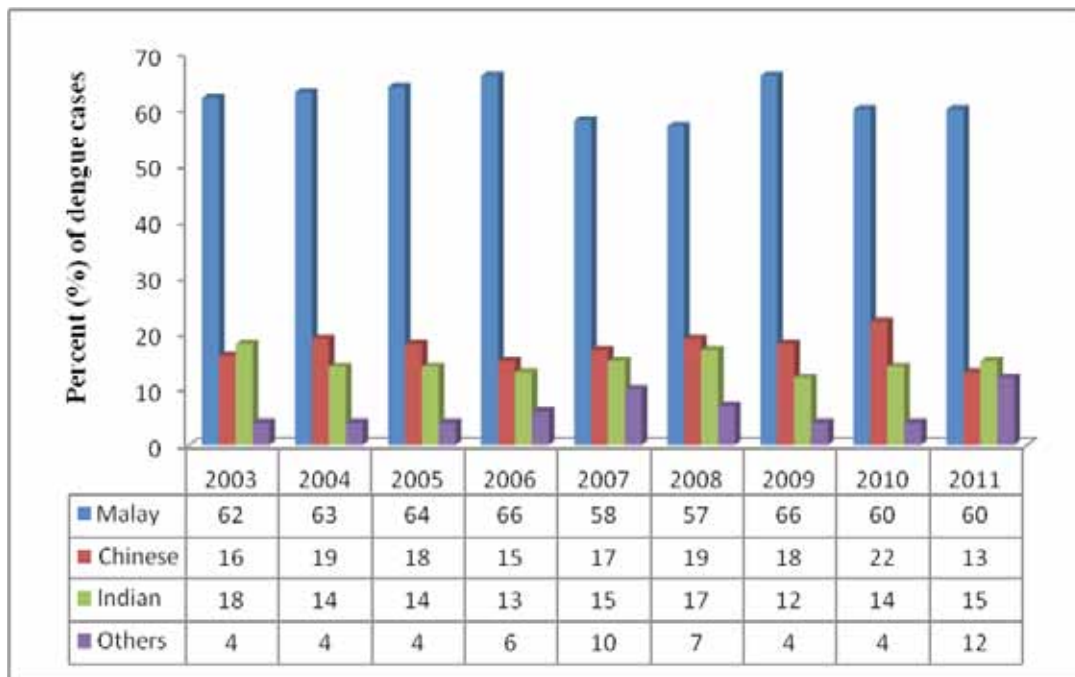
**Distribution of Dengue Cases Based on Ethnicity:** The distribution of dengue cases by ethnic group in Seremban between 2003 and 2011 is shown in figure 2. The findings revealed that while all ethnic groups were infected by the disease the majority of the reported DF/DHF cases were among the Malays. It can be seen that the Malays constituted, on average, 62% of notified cases per year in the district during the last decade. The data show that the Chinese had the second

highest proportion of dengue incidence in the district. This ethnic group shared, on average, 17% of the yearly reported cases for the period of 2003-2011. The Indians constituted an average of 15% of the annual reported cases of dengue during the last decade. The other groups

shared the smallest portion (on average, 6%) of annual dengue incidence in the district. Majority of the dengue cases under the other groups were foreign workers mainly from Indonesia, Bangladesh and Nepal.

**Table 2: Distribution of dengue cases and incidence rate according to sex in Seremban**

Year	Number of dengue cases		Incidence rate per 100,000 populations		Ratio (Male/Female)
	Male	Female	Male	Female	
2003	1144	846	494.81	389.32	1.4: 1
2004	936	645	390.65	286.16	1.5: 1
2005	833	545	336.02	233.91	1.5: 1
2006	770	430	300.43	178.65	1.8: 1
2007	868	412	327.92	165.93	2.1: 1
2008	934	467	342.50	182.49	2.0: 1
2009	625	429	222.97	163.12	1.5: 1
2010	874	625	304.11	231.48	1.4: 1
2011	321	232	109.52	83.88	1.4: 1



**Figure 2. Distribution (%) of dengue cases based on ethnicity in Seremban**

**Distribution of Dengue Cases Based on Locality:**

The distribution of dengue cases according to locality in Seremban for the period of 2003-2011 is presented in figure 3. The findings reveal that dengue cases were more prominent in urban areas of the district during the last decade. The percentage of cases reported from

the urban areas ranged from 62% to 98% highlighting the predominance of the disease in urban localities of the district. The highest predominance (98%) of urban incidence of dengue in the district was observed in the year 2011.

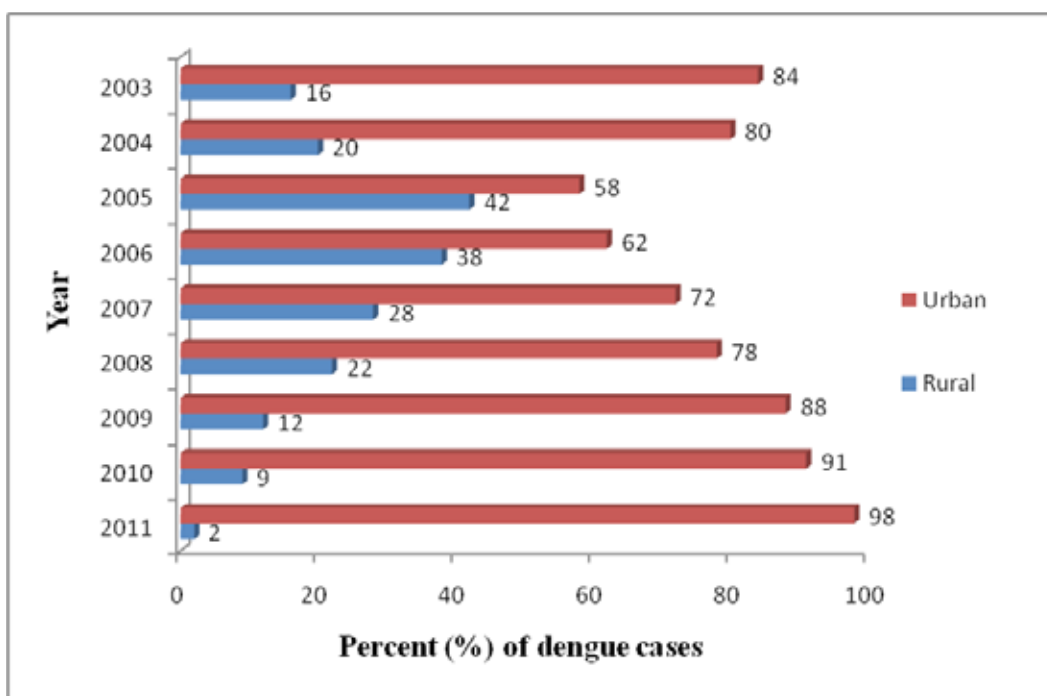


Figure 3. Distribution (%) of dengue cases based on locality in Seremban

**Distribution of Dengue Cases According to Age:**

Table 3 depicts the distribution of dengue infections according to age of the reported cases in Seremban between 2003-2011. It can be seen that the children (0-14 years) contributed 15% (1,759 cases) of total reported cases in the district during the last decade. The analysis shows that the adult (15-44 years) had the highest portion

(64%) of dengue incidence in the district. However the middle-age group (45-59 years) constituted 16% of total reported dengue cases in the district. On the other hand the proportion of dengue infections among older people (60 years and above) was significantly low (5% of total reported cases).

Table 3: Distribution of dengue cases based on age in Seremban

Year	Age Group								Total
	0-14 years		15-44 years		45-59 years		60 & above		
	Dengue cases	(%)	Dengue cases	(%)	Dengue cases	(%)	Dengue cases	(%)	
2003	390	20%	1,280	64%	243	12%	77	4%	1,990
2004	283	18%	1,025	65%	206	13%	67	4%	1,581
2005	215	15%	852	62%	245	18%	66	5%	1,378
2006	175	14%	754	63%	229	19%	52	4%	1,210
2007	169	13%	846	67%	201	15%	64	5%	1,280
2008	173	12%	877	63%	260	19%	91	6%	1,401
2009	114	11%	685	65%	184	17%	71	7%	1,054
2010	165	11%	984	66%	269	18%	81	5%	1,499
2011	75	14%	384	69%	71	13%	23	4%	553
<b>Grand Total</b>	<b>1,759</b>	<b>15%</b>	<b>7,687</b>	<b>64%</b>	<b>1,908</b>	<b>16%</b>	<b>592</b>	<b>5%</b>	<b>11,946</b>

## Conclusion

The present study investigates the trends of dengue incidence and socio-demographic distribution of the disease in Seremban, Malaysia between 2003 and 2011. The study found that among the three major ethnic groups in the district the Malays were the most commonly affected, followed by Chinese and Indians. While dengue affects all age group, incidence rate of dengue was highest in the young adult and the adult group (15-44 years), followed by the middle-age group (45-59 years). It was also found that dengue cases were more prominent in urban areas of the district during the last decade (on average, 79% per year). It highlights the fact that dengue is still an urban public health problem in Seremban. The findings of this study provide critical data and information on the trends of dengue incidence and socio-demographic characteristics of the reported dengue cases which might assist the public health authorities to achieve dengue mortality and morbidity reduction goals in the district. The public health authorities in the district should enhance integrated surveillance activities in this regard.

**Conflicts of Interest:** The authors declare that there is no conflict of interest among them.

**Source of Funding:** This research is supported by the research grant (project code:XX-2014-008) led by Prof. Dr. Joy Jacqueline Pereira in Universiti Kebangsaan Malaysia (UKM), Bangi, Malaysia.

**Ethical Clearance:** The study was approved by the Medical Research Ethics Committee (MREC), Ministry of Health, Malaysia (MREC Code No. NMRR-11-730-9099).

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# The Effect of Phototherapy on Apoptosis in Hyperbilirubinemic Preterm Neonates

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## Abstract

**Objective:** This study aimed to assess the impact of hyperbilirubinemia and Intensive phototherapy on apoptosis in peripheral blood of preterm infants.

**Patients and Method:** The study was conducted on 18 preterm infants with non-hemolytic hyperbilirubinemia and 9 control healthy preterm infants. Apoptosis markers (anti-apoptotic protein Bcl2, and pro-apoptotic protein BAX) was assessed using ELISA technique. Blood samples were obtained at enrollment in all infants and after 24 hours of exposure to intensive phototherapy in jaundiced infants.

**Result:** Before phototherapy, no significant difference in the serum levels of bcl2 and Bax protein between jaundiced and non-jaundiced preterm infants ( $P = 0.570$ ,  $p = 0.329$  respectively). After phototherapy The serum levels of Bcl2 decrease while The serum levels of BAX increased significantly ( $P = 0.003$ ,  $p < 0.001$  respectively).

**Conclusion:** Hyperbilirubinemia does not influence apoptosis whereas intensive phototherapy do in preterm infants with hyperbilirubinemia.

**Keywords:** Preterm, apoptosis, hyperbilirubinemia, bcl2 genes, Bax genes.

## Introduction

Jaundice developed in 80% of preterm babies in the first days of life<sup>[1]</sup>. bilirubin is entangled in the balance between antioxidant and pro-oxidant agents which are challenged especially in the transitional postnatal period. Preterm neonates are more susceptible to oxidative stress because of having immature antioxidant system<sup>[2]</sup>. during the first days of life the catabolism of fetal Hb ends with a tissue burden of heme that is probably pro-oxidant damaging molecule that not only provides a

lipophilic form of iron but also attack the lipid bilayer the cytoskeleton, and DNA<sup>[3]</sup>. Apoptosis is one of the cellular strategies to eliminate cells with high levels of unrepaired DNA damage<sup>[4]</sup>. In fact, low levels of DNA damage activate repair processes, while high levels of DNA damage influence apoptosis<sup>[5]</sup>. Mild genotoxic stimuli, such as low-energy radiations, influence cell apoptosis, but strong stimuli lead to cell necrosis<sup>[6]</sup>. Apoptosis plays a significant role in the prevention of cancer development in the body. As the cell cannot undergo apoptosis due to mutation by biochemical factors, it continues to divide and thus transforms into a tumor. At this point the most important factor is Bcl-2 oncogene, as its mutations lead to tumor development<sup>[7]</sup>.

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## Patients and Method

This is a prospective observational study was conducted on 27 preterm neonates in the 1<sup>st</sup> two weeks of life. 18 of them with indirect hyperbilirubinemia

admitted to the neonatal intensive care unit (NICU) Minia university children hospital, and had received intensive phototherapy based on AAP guidelines. The other 9 were apparently healthy preterm neonates with normal serum bilirubin levels, as a control group. Neonates with birth asphyxia, sepsis, infants of diabetic mothers, and neonates with congenital anomalies and neonates with cholestatic jaundice all were excluded from the study. All patients and healthy controls were subjected to full perinatal history and thorough clinical examination. Complete Blood Count, reticulocyte count, liver enzymes and serum albumin level, total and direct bilirubin, RH and blood group to mothers and babies, all were done to enrolled neonates.

Serum Bcl2 and serum BAX protein levels were assayed by ELISA technique. One sample was taken at the admission and another one after 24 hour of intensive phototherapy exposure (Bilisphere 360).

**Sampling:** Under complete aseptic technique before phototherapy five millilitre of peripheral venous blood was withdrawn: 1 ml in EDTA vacutainer for C.B.C., Reticulocyte count, 2 ml in plain vacutainer for Serum bilirubin level (total and direct bilirubin), RH and blood group, Liver enzymes and serum albumin level and 2 ml in EDTA vacutainer for, serum BCL2 level and BAX protein level.

After phototherapy 4 millilitre of peripheral blood was withdrawn; 2 millilitre in EDTA vacutainer for: serum BCL2 and BAX protein and 2 millilitre in plain vacutainer for serum bilirubin level.

**Phototherapy:** The type of phototherapy used in the study is Intensive phototherapy systems which consisted of 12 white fluorescent tubes (Philips TL03, Ontario, Canada) placed within 20 cm under and above the

infant's front and back. The infants were placed naked, except for a diaper and eye patches, in an incubator or intensive phototherapy unit (Bilicrystal, Medes-time, or Bilisphere 360, Marcinelle, Belgium). The light energy of the phototherapy units was 30–34  $\mu\text{Wcm}^{-2}\text{nm}^{-1}$  in the 430–490-nm band. Phototherapy was continuously applied to jaundiced neonates except during feeding and care.

## Results

A total of 27 preterm infants were enrolled in the study; 18 of them with indirect hyperbilirubinemia received intensive phototherapy and 9 apparently healthy non-jaundiced preterm infants as a control group. There were no differences between the groups in terms of postnatal age, birth weight, and sex. All laboratory data no differences between the groups in terms of CBC, reticulocyte count, liver enzymes and serum albumin levels. Comparison between hyperbilirubinemic preterm and controls regarding serum bilirubin level, serum levels of BCL2 and BAX Protein, there were highly significant higher level of total and direct bilirubin ( $p < 0.001$ ) before and after phototherapy in hyperbilirubinemic preterm neonates, but there were no significant difference in serum levels of bcl2 and Bax protein before phototherapy ( $P > 0.05$ ) but highly significant decrease in the serum levels of bcl2 after phototherapy ( $P = 0.003$ ) and highly significant increase in serum levels of Bax protein after phototherapy ( $P < 0.001$ ) (Table 2&3). Figure (1, and 2). There were a significant positive correlation between serum levels of Bcl2 and total bilirubin after phototherapy ( $r = 0.624$ ,  $p = 0.006$ ), and significant negative correlation between Bax and total bilirubin after phototherapy ( $r = -0.768$ ,  $p < 0.001$ ).

**Table (1) Clinical and some laboratory parameter in hyperbilirubinemic neonates and controls in preterm neonates.**

		Preterm		P value
		Cases N=18	Control N=9	
Age	Range	(2-5)	(1-5)	0.937
	Mean $\pm$ SD	3.2 $\pm$ 1.1	3.1 $\pm$ 1.5	
	Median	3	3	
Sex	Male	9(50%)	4(44.4%)	0.785
	Female	9(50%)	5(55.6%)	
Weight	Range	(1.6-2.6)	(1.9-2.8)	0.831
	Mean $\pm$ SD	2.1 $\pm$ 0.3	2.2 $\pm$ 0.3	

		Preterm		P value
		Cases N=18	Control N=9	
Hb	Range Mean ± SD	(11.6-19.2) 16.5±1.9	(16-19) 17.5±1	0.185
TLC	Range Mean ± SD	(5.3-17.8) 11.1±3.4	(7.9-13.8) 10.2±2.3	0.500
Platelets	Range Mean ± SD	(196-352) 252±41.9	(200-350) 277.1±52.7	0.190
Retix	Range Mean ± SD Median	(1-5) 2.7±1.1 2.7	(1.8-3.5) 2.3±0.6 2	0.377
ALT	Range Mean ± SD	(11-35) 23.7±6.6	(16-40) 26.3±8.2	0.378
AST	Range Mean ± SD	(15-70) 43.2±14.5	(30-42) 36.9±3.4	0.212
Albumin	Range Mean ± SD	(2.6-4.2) 3.2±0.4	(2.8-3.6) 3.2±0.3	0.690

P value is considered significant if less than 0.05,\*\*=highly significant.

**Table (2): Comparison between total and direct bilirubin, serum levels of BCL2 Protein and serum levels of Bax protein in hyperbilirubinemic neonates and controls in preterm neonates before and after phototherapy**

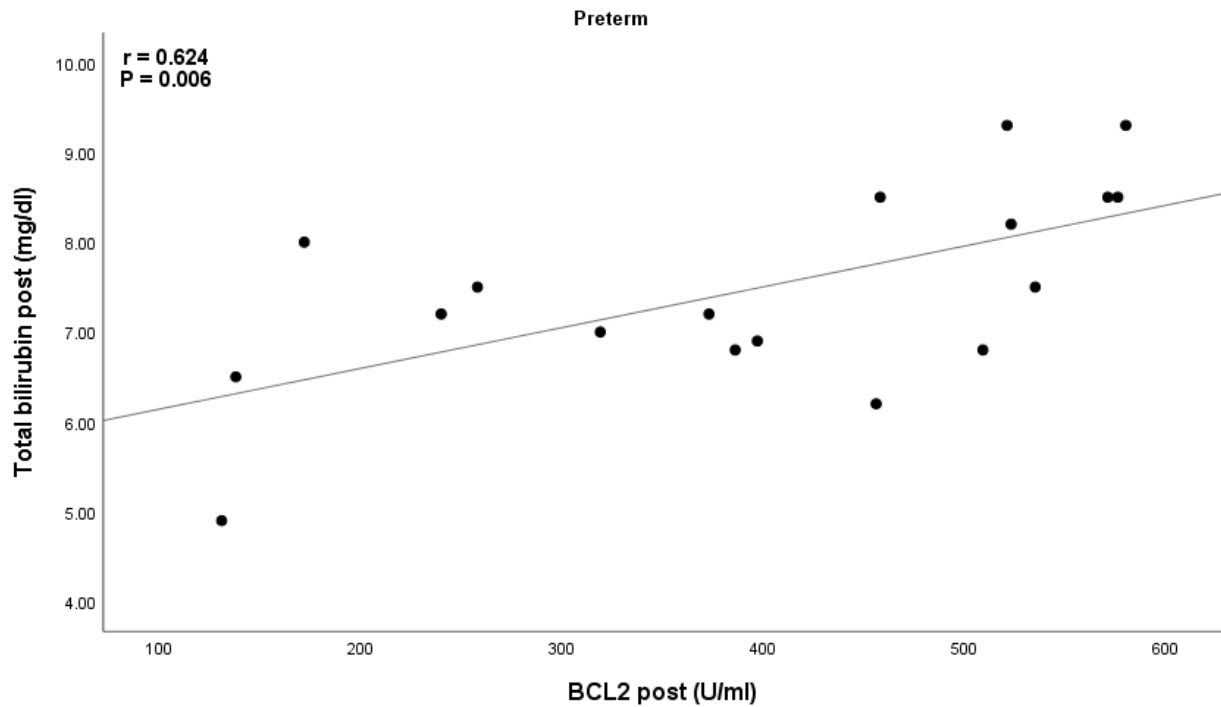
		Preterm		P value
		Cases N=18	Control N=9	
T.B. pre	Range Mean ± SD	(7.2-15.5) 10.4±2.3	(0.5-1.4) 0.9±0.3	<0.001**
T.B. post	Range Mean ± SD	(4.9-9.3) 7.5±1.1	(0.5-1.4) 0.9±0.3	<0.001**
D.B. pre	Range Mean ± SD Median	(0.1-2.9) 0.8±0.7 0.6	(0.1-0.4) 0.2±0.1 0.2	0.001**
D.B. post	Range Mean ± SD Median	(0.2-1.5) 0.7±0.3 0.7	(0.1-0.4) 0.2±0.1 0.2	<0.001**
BCL2 pre	Range Mean ± SD	(267-770) 554.6±113.8	(477-753) 580.2±98.1	0.570
BCL2 post	Range Mean ± SD	(131-580) 396.8±154.4	(477-753) 580.2±98.1	0.003**
BAX pre	Range Mean ± SD Median	(26-62) 47.7±11.5	(26-58) 43±11.9	0.329
BAX post	Range Mean ± SD Median	(68-92) 78.4±7.9		<0.001*

P value is considered significant if less than 0.05,\*\*=highly significant.

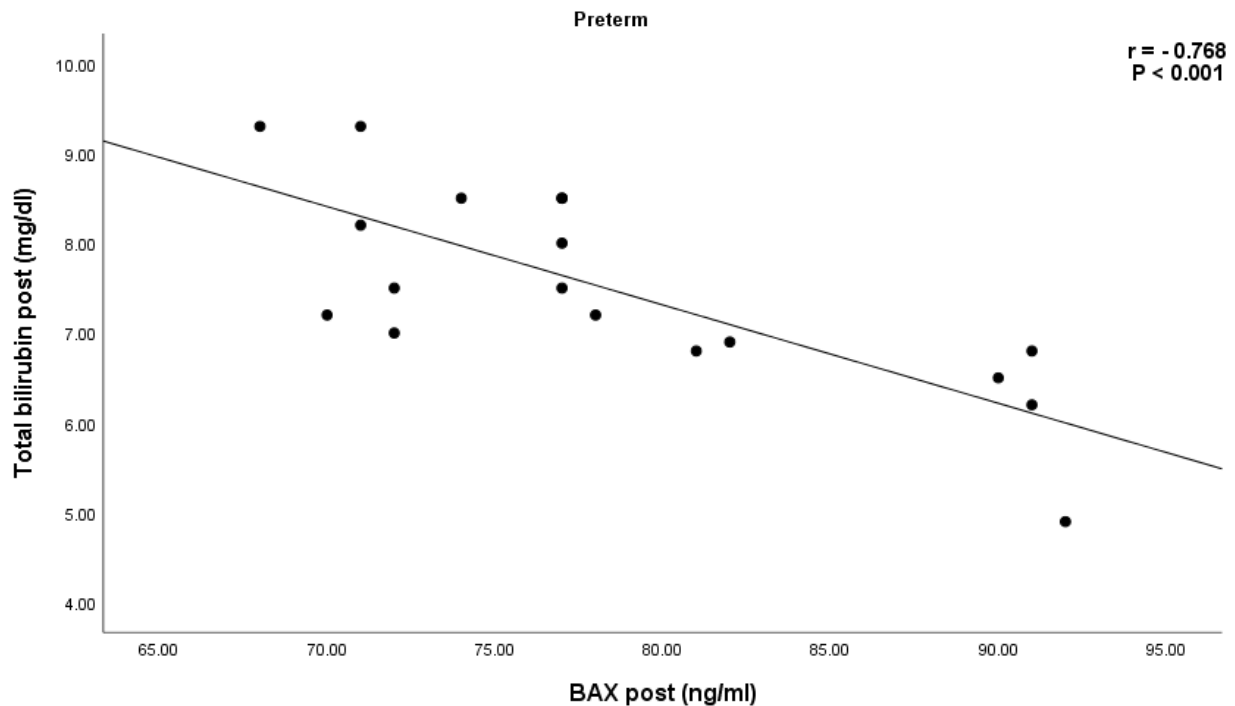
**Table (3): Comparison between total and direct bilirubin, serum levels of BCL2 and BAX Protein in hyperbilirubinemic preterm neonates before and after phototherapy.**

		Preterm Cases		P value
		Pre	Post	
T.B.	Range Mean ± SD	(7.2-15.5) 10.4±2.3	(4.9-9.3) 7.5±1.1	<0.001**
D.B.	Range Mean ± SD Median	(0.1-2.9) 0.8±0.7 0.6	(0.2-1.5) 0.7±0.3 0.7	0.995
BCL2	Range Mean ± SD	(267-770) 554.6±113.8	(131-580) 396.8±154.4	<0.001**
BAX	Range Mean ± SD Median	(28-77) 60.7±15.6 65.5	(68-345) 100.1±64.6 79.5	<0.001**

P value is considered significant if less than 0.05,\* \*\*=highly significant.



**Figure (1): Correlation of serum levels of BCL2 Protein and total bilirubin in hyperbilirubinemic preterm neonates after phototherapy.**



**Figure (2): Correlation of serum levels of Bax Protein and total bilirubin in hyperbilirubinemic preterm neonates after phototherapy.**

## Discussion

Our study is the first to assess the effect of extensive phototherapy on apoptotic markers in hyperbilirubinemic preterm neonates, to our knowledge; we do not have data from other studies to compare.

In the present study we found hyperbilirubinemia did not affect apoptosis but intensive phototherapy did, as no significant difference between serum levels of bcl2 and Bax protein before phototherapy between hyperbilirubinemic preterm neonates and controls. Also no correlation between total bilirubin, bcl2 and bax protein before phototherapy so hyperbilirubinemia did not influence apoptosis in peripheral blood of hyperbilirubinemic preterm neonates, also after phototherapy serum levels of bcl2 were significantly lower and serum levels of BAX proteins were significantly higher in hyperbilirubinemic preterm neonates. High level of bilirubin may lead to oxidative damage in newborns as photochemical reactions may produce toxic photoproducts, probably peroxides<sup>[8]</sup>. By removing unwanted and potential dangerous cells apoptosis kept normal tissue homeostasis<sup>[9]</sup>. Cells are generally

equipped with DNA repair mechanisms to decrease the levels of DNA damage<sup>[4]</sup>. However, neonates have been found to have lower DNA repair and antioxidant capacities compared with adults<sup>[10]</sup>. Zúñiga-González et al<sup>[11]</sup> found that erythrocytes of preterm newborns exposed to oxygen showed no significant increase in micronuclei, while significant increase in micronuclei in those exposed to phototherapy plus oxygen, although the study was done in erythrocytes from peripheral blood the conclusions are similar to ours and could support the results of the present study. Micronucleus assays have emerged as one of the preferred methods for assessing chromosome damage or loss and chromosome breakage to be measured reliably<sup>[12]</sup>. Interesting study done exclusively among preterm neonates, compared antioxidant-oxidant parameters following conventional and LED phototherapy, both conventional and LED phototherapy resulted in increased oxidative stress index. However, derangement of antioxidant-oxidant parameters was more pronounced after conventional as compared to LED phototherapy<sup>[13]</sup>. Unconjugated bilirubin is considered a potent antioxidant when present at moderate levels. However, at high concentrations,

it produces severe neurological damage and death associated with kernicterus due to oxidative stress and other mechanisms. While it is widely recognized that oxidative stress by different toxic insults results in severe damage to cellular macromolecules, especially to DNA. By using a mouse model of neonatal hyperbilirubinemia, they demonstrated that DNA damage occurs in vivo in the cerebellum the brain region most affected by bilirubin toxicity<sup>[14]</sup>.

### Conclusion

Hyperbilirubinemia doesn't affect on apoptosis but intensive phototherapy affect on apoptosis in full term neonates as there were down regulation of anti-apoptotic protein (bcl2) and up regulation of the pro-apoptotic protein (Bax).

**Acknowledgements:** The corresponding author would like to acknowledge the participants and the supporting staff in this study for their immense support.

**Disclosure:** The authors report no conflicts of interest in this work.

**Source of Funding:** By self.

**Ethical Clearance:** Taken from faculty of medicine, Minia University committee.

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# Efficacy of Maitland Mobilization and Myofascial Trigger Point Release in Patients of Osteoarthritis of Knee

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## Abstract

**Background and Purpose:** Osteoarthritis (OA) of knee is the most common type of arthritis and the leading cause of disability that impacts the elderly and middle-aged worldwide. In knee osteoarthritis degenerative changes occurs in joint and muscles of knee joint become weak. There are numerous previous studies in which Maitland mobilization with conventional was given but there are few research in which both maitland mobilization and myofascial trigger point release had been given.

**Aim and Objective:** To study the effects of Maitland mobilization and Myofascial Trigger point release on Pain, Range of Motion and function disability in patient of osteoarthritis with knee.

**Materials and Method:** A total number of 72 subjects were screened as per inclusion and exclusion criteria. The subjects were divided into two groups, Group A received Maitland mobilization with conventional therapy and Group B received Myofascial trigger point Release with conventional therapy. Treatment session was given for 3 days alternately a week for 6 weeks for 30-35mins. Pre and Post evaluation was done on Pain on VAS, Range of Motion on Universal Goniometer, Functional Disability on WOMAC scale.

**Results:** Results showed statistically significant improvement in both groups for VAS, ROM and functional disability by using student's Paired and unpaired t test. Group A showed more significant improvement than Group B. The level of significance was  $P < 0.0001$ .

**Conclusion:** In conclusion, Maitland Mobilization and Conventional therapy is more effective than Myofascial Trigger Point Release in relieving pain, improving range of motion and functional well-being in subjects with knee osteoarthritis.

**Keywords:** Osteoarthritis, Maitland Mobilization, Myofascial trigger Point release, knee joint.

## Introduction

Osteoarthritis (OA) is arthritis and the leading cause of that impacts the elderly and middle-aged

worldwide.<sup>(1)</sup> OA is a multi factorial entity that includes several causative factors such as Trauma, Mechanical forces, Inflammation, Biochemical responses and Metabolic disturbances.<sup>(2)</sup> The incidence of OA knee in rural and urban India is 3.9% and 5.5%.<sup>(3)</sup> It is recorded to be 5.78% and 10.20% respectively in Bangladesh and India. According to research in Pakistan, 28% of the metropolitan population and 25% of the rural population have knee arthritis.<sup>(4)</sup> The meta-analysis also revealed that women tend to be graphically evaluated with more serious knee OA radiographically than men, and sex differences boost with age  $> 55$  years.<sup>(5)</sup>

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Osteoarthritis is a complex disease whose

pathogenesis involves the contribution of biomechanical and metabolic variables that alters articular cartilage and subchondral bone homeostasis of the tissue and determine the predominance of destructive over productive procedures. The small bony formation “spur” will be formed in the lining of articular surface. The physical findings of Osteoarthritis of knee include: bony enlargement, crepitus, decreased range of motion, joint-line tenderness, and pain on passive range of motion.<sup>(6)</sup>

There are two terms of Mobilization and Manipulation, but they have the same meaning and can be changed. The variable speeds and amplitude can vary from a small-amplitude force applied at quick velocity to a big amplitude for ceappliedats low velocity, a continuum of intensities and velocity could be applied to the method. Gentle Joint mobilization stimulates neurophysiological and mechanical effects to treat pain and muscle guarding. In neurophysiological effects small oscillatory amplitude and distraction motion are used to boost mechanoreceptors which can prevent the transmission of nociceptive stimuli at the level of the spinal cord or brain stem.<sup>(7)</sup>

Myofascial pain is a prevalent muscle pain hat occurs from hyper irritable muscle foci that is referred to as ‘Myofascial Trigger Points’ (MTrP) within stiff muscle or fascia bands. It is frequently seen in muscle acute injury, overuse or repetitive strain.<sup>(8)</sup> Myofascial trigger points are painful when compressed and may result in referenced pain, tenderness, automatic symptoms of the nervous system, and ROM. Clinical characteristics MTrP include a tight muscle band that contains discrete nodule, tenderness, referred pain, local twitch reaction triggered by palpate snapping. Trigger points are categorized into two ‘Active’ or ‘Latent types.’<sup>(9)</sup>

This study is carried out to find out that which therapy effective i.e. Maitland Mobilization or Myofascial trigger point release in reducing Pain, ROM, functional impairment in OA kneepatients

## Materials and Methodology

Materials used are treatment table, universal half circle goniometer, Hydro collateral packs, sterlium, cotton and talcum powder.

**Methodology:** The study was conducted after taking approval from the institutional research ethics committee, approval no. in DMIMS(DU)/IEC/2018-19/7193 in

Department of Musculoskeletal Physiotherapy, Ravi Nair Physiotherapy College, Acharya Vinoba Bhawe Rural Hospital, Sawangi (Meghe), Wardha. Inclusion criteria was Kellegren and Lawrence grade 1 and 2 radiographic evidence of osteoarthritis, Both Genders, Age between 40 to 60 years, Knee osteoarthritis with duration  $\geq 1$  year, Average knee pain  $\geq 3$  on Visual Analog Scale, Subjects with Unilateral knee joint, Tibiofemoral and Patellofemoral knee joint, Tenderness over knee joint, Patient with tightness in Quadriceps, Hamstring, and Iliotibial band. Acute exacerbation in or around knee joints and Exclusion criteria was Traumatic injury to knee joints within 6 months of study, Any surgical intervention to the knee joints, Intra-articular steroid injection in knee joints within 3 months, Subject with Psychiatric disorders/Illness, Peripheral vascular disease, Tumours/malignancies/infections associated with knee joint, lower limb metallic implants, Impaired thermal sensation over the knee. Total 76 OA knee subjects were screened for the inclusion and exclusion criteria of the study, out of which 4 subjects were not willing to continue treatment. Therefore 72 subjects were included in this study. The procedure was well explained to all the eligible subjects and they were given informed consent (n=72) before allocating them into two groups. Pre and post VAS scale, Goniometer and WOMAC score was taken. Patients were distributed in two groups with 36 subjects in each group respectively and were chosen randomly.

Subjects in a Group-A Maitland mobilization with conventional therapy and Group B received Myofascial trigger point release with conventional therapy. The total duration of treatment was almost approximately, 35 minutes.

### I. Maitland Mobilization for Tibiofemoraljoint<sup>(7)</sup>

1. Tibiofemoral Distraction
2. Tibiofemoral Posterior Glide (To increase flexion)
3. Tibiofemoral Anterior Glide (To increase the extension)
4. Patellofemoral Joint, Distal Glide
5. To maintain patellar mobility for normal knee flexion

### II. Myofascial Trigger Pointrelease Examination of the Trigger Points and Application of Ice:

- To examine for a sensitive area the tip of the thumb or index finger was used. Therapist slowly



and deeply pressed until an area of sensitivity was found. This site received sustained pressure for up to ten seconds to see if a referred pain was felt in the target area.

- Once located and identified as an active trigger the point should receive up to one minute of sustained or intermittent pressure (or squeezing). Cryotherapy must be applied during and after which the muscles of the area must be stretched to their physiological limit.<sup>(8)</sup>

- Techniques

- **Iliotibialband<sup>(9)</sup>**

A. Ischemic compression technique

B. Neuromuscular technique (Longitudinalstroke)

- **Quadriceps and Hamstrings**

Muscle belly technique

**Conventional Therapy:** In conventional physiotherapy, subjects were receiving physical modalities such as Hydro collateral packs to reduce pain.

1. Static Quadriceps
2. Static Hamstring contraction
3. VMO (strengthening of vastus medialis)
4. Dynamic quadriceps
5. Wall slides
6. Partial lunges
7. One leg standing

**Home Exercise Program:**

1. Self stretching of Quadriceps muscle
2. Self stretching of Hamstring muscle
3. Self stretching of Calf muscle

**Outcome Measures**

1. Visual analog scale<sup>(15)</sup>
2. Knee flexion range of motion on universal Goniometer<sup>(16)</sup>
3. WOMAC scale for functional disability<sup>(17)</sup>

**Results**

Descriptive statistics included computation of means and standard deviation. Inferential statistics

using student’s paired ‘t’ test (for the quantitative data to compare pre and post observation) and unpaired t test (for quantitative data to compare within two groups) were used for comparison of all clinical indicators. Software used in the analysis was SPSS22.0 version. The results were concluded to be statistically significant with  $p < 0.05$ , very significant  $p < 0.001$  and highly significant  $p < 0.0001$ .

**Table 1: Comparison of mean difference in VAS Score in two groups Student’s unpaired t test**

Group	N	Mean	Std. Deviation	Std. Error Mean	t-value
Group A	36	4.86	1.22	0.20	10.85 P=0.0001, S
Group B	36	2.22	0.79	0.79	

Table 1 shows comparison of mean difference of pain on VAS in both group A and group B. By using student’s unpaired t test showing significant difference in both groups ( $t= 10.85$ ,  $P=0.0001$ ). Hence, Group A shows significant improvement in pain reduction than Group B.

**Table 2: Comparison of mean difference in Goniometer for ROM score in two groups Student’s unpaired t test:**

Group	N	Mean	Std. Deviation	Std. Error Mean	t-value
Group A	36	16.38	8.34	1.39	2.32 P=0.023, S
Group B	36	12.25	6.64	1.10	

Table 2 shows comparison of mean difference of ROM on Goniometer in both group A and group B. By using student’s unpaired t test showing significant difference in both groups ( $t=2.32$ ,  $P= 0.023$ ) Hence Group A is showed more significant result in knee flexion as compared to Group B.

**Table 3: Comparison of mean difference in WOMAC scale functional Score in two groups Student’s unpaired t test:**

Group	N	Mean	Std. Deviation	Std. Error Mean	t-value
Group A	36	13.77	3.61	0.60	1.89 P=0.042, S
Group B	36	12.19	3.46	0.57	

Table 3 shows comparison of mean difference of functional disability scale on WOMAC scale score in both groups. By using students unpaired t test showing significant decrease in functional disability scale on WOMAC scale ( $t=1.89$ ,  $P=0.062$ ) Hence, Group A shows significant improvement than Group B.

### Discussion

The current research was conducted to determine whether Maitland Mobilization and Myofascial trigger point release are efficient in knee osteoarthritis subject in the Department of Musculoskeletal Physiotherapy.

The outcome of this research shows that Maitland Mobilization with conventional therapy are more efficient in knee osteoarthritis. The mean data values from this research indicate that group A treated with Maitland Mobilization showed better improvement in Visual Analog Scale Pain relief, increased range of motion, WOMAC scale Physical functional ability.

Analysis of pain relief was ended by subjective VAS by statistical mean. When Intra group comparison was done there is significant difference in both groups i.e. Group A and Group B. When intergroup comparison was done within both groups there was significant difference, where group A showed significant improvement in terms of VAS.

**Dr. Manoj Kumar Mathur et al (2018)** <sup>(18)</sup> studied that the effectiveness of Maitland mobilization in decreasing the knee joint pain. In earlier research, pain decrease following passive joint mobilization has been already been stabilized. Mobilization may trigger local physiological processes and may also involve extra main procedures. These key mechanism could include activating the local inhibitory pathway in the spinal cord or lowering the inhibitory pathway from the brainstem.

Analysis of knee flexion was completed by subjective Goniometer by statistical mean. When Intra group comparison was performed there is significant difference in both groups i.e. Group A and Group B. When intergroup comparison was done within both groups there was significant difference, where group A showed significant improvement in terms of range of motion for knee flexion.

The outcome of the study is in agreement with **Ebtessam Fawzy Gomaa et al (2015)** <sup>(19)</sup> that Exercise program inc on junction with ITBMFR method has a

more important impact on improving ITB t flexibility and Patellar alignment in Knee OA subjects than exercise program alone.

Analysis of Functional Disability was conducted by subjective WOMAC scale by statistical mean. When Intra group comparison was done there is significant difference in both groups i.e. group A and group B. When intergroup comparison was done within both groups there was significant difference, where group A showed significant improvement in terms of WOMAC scale.

**Saqib Syed et al (2014)** <sup>(22)</sup> showed 56 percent increase in complete WOMAC results in disability after administering manual physical therapy and knee osteoarthritis. However, in this study, my of ascialmobilization group and Maitlandmobilization group respectively noted 56.35% and 52% improvement in WOMAC scores and reported the effectiveness of MFR at the knee joint in reducing knee OA pain and disability. **Aftab Ahmad et al (2016)** <sup>(4)</sup> researched that manual techniques and exercises generated an average 56 % rise in self- reporting functional capacity of 54 percent, stiffness of 54 percent, and pain of 60 percent as measured by the (WOMAC) scales.

Knee osteoarthritis presents a serious health issue and huge burden on society. Simple, safe, physical treatment procedures like Maitland Mobilization, Myofascial trigger point release and conventional exercises could be of great value. This provides low-cost, easy means of treatment in subjects with knee osteoarthritis.

### Conclusion

In conclusion the Present study provided evidence to support the use of physical therapy regimen in the form of Maitland Mobilization and Conventional therapy is more effective than Myofascial Trigger Point Release in relieving pain, improving range of motion and functional well-being in subjects with knee osteoarthritis.

**Ethical Clearance:** Ethical clearance obtained by Ethical Committee of Datta Meghe Institute of Medical Sciences.

**Conflict of Interest:** Nil.

**Source of Funding:** Self

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# Urinary Neutrophil Gelatinase-Associated Lipocalin in Hepatorenal Syndrome: Population Diversity Does it Matter Or Not?

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## Abstract:

**Background:** Hepatorenal syndrome (HRS) is a functional and potentially reversible form of AKI that occurs in cirrhosis patients with ascites caused by splanchnic vasodilatation, cardiovascular dysfunction and renal hypo-perfusion; all these hemodynamic changes are triggered by portal hypertension. SCr the clinical standard to define kidney function, poorly discriminates AKI type in cirrhosis so there is urgent need for new biomarkers for early detection and differential diagnosis of AKI in cirrhosis. This study was conducted in the Department of Internal Medicine, Minia University Hospital along the period from January and November .

The aim of our study was validate the accuracy of urinary neutrophil gelatinase associated lipocalin (NGAL) in the diagnosis of HRS in Egyptian patients with hepatitis C virus (HCV) - related liver cirrhosis with serum creatinine as a gold standard test for kidney injury.

**Method:** The study was conducted in the period from January 2015 and November 2015 on a group of patients with HCV-associated liver cirrhosis complicated with HRS

**Results:** NGAL level was compared in group III versus group I we found that group III had higher level of NGAL (Mean  $\pm$  SD of  $732.9 \pm 304.78$  pg/ml vs.  $40.07 \pm 14.61$  pg/ml,  $p < 0.001$ ) and when it was compared between group III and group II we found that group III had higher level (Mean  $\pm$  SD of  $732.9 \pm 304.78$  pg/ml vs.  $62.6 \pm 29.65$  pg/ml,  $p < 0.001$ )

## Conclusions:

- Urinary NGAL is valid biomarker for detection of AKI in hospitalized cirrhotic patients with AKI.
- The studied urinary biomarker were positively correlated with liver specific scores indicating severity of liver disease and with ICU specific scores indicating multi-organ failure

## Keywords:

## Introduction

Cirrhosis is a global health problem<sup>(1)</sup>. This may be attributed to the increasing rate of hepatitis C virus

(HCV) infection to >185 million infection worldwide<sup>(2)</sup>. In Egypt the prevalence of HCV is estimated to range from 14.7-22%<sup>(3)</sup>.

Acute kidney injury (AKI) is a frequent complication of cirrhosis that occurs in approximately 20% of hospitalized patients with advanced disease<sup>(4)</sup>. Serum creatinine (sCr) is the most established tool for the diagnosis of AKI in patients with and without cirrhosis<sup>(5)</sup>. A sCr concentration  $\geq 1.5$  mg/dl (133  $\mu$ mol/l) has been selected in several conferences as a cut-off to define AKI in cirrhosis<sup>(6)</sup>. However the use of this fixed value

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is problematic due to numerous renal and non-renal factors<sup>(7)</sup>, which result in erroneous estimated glomerular filtration rate (eGFR)<sup>(7)</sup>.

Hepatorenal syndrome (HRS) is a functional and potentially reversible form of AKI that occurs almost exclusively in cirrhosis patients with ascites<sup>(8)</sup>. Pathogenesis of HRS is unclear; however, it is postulated that splanchnic vasodilatation reduces effective circulating volume, which in turn leads to cardiovascular dysfunction and renal hypo-perfusion; all these hemodynamic changes are triggered by portal hypertension<sup>(9)</sup>.

The clinical characteristics of HRS are similar to pre-renal azotemia, but the condition does not respond to volume expansion<sup>(8)</sup>. Based on the course of the disease and the presence of trigger(s), HRS is divided into two types. Type 1 HRS is defined as a rapid decline in kidney function with sCr increasing to >2.5 mg/dl within a two week period. It usually follows a precipitating factor and has a worsen survival. Whereas, type 2 HRS is defined as slowly progressive rise in sCr to >1.5mg/dl that almost associated with refractory ascites, Till now the diagnosis of HRS is one of exclusion due to the lack of the standard test, as kidney biopsy is uncommonly performed in cirrhosis patients due to increased risk of internal bleeding caused by coagulopathy and thrombocytopenia<sup>(10)</sup>.

Thus, it is obvious that new objective biomarkers which accurately differentiate the structural from functional AKI in cirrhosis patients are urgently needed. In this regard, novel serum/or urinary biomarkers of tubular damage, such as neutrophil gelatinase-associated lipocalin (NGAL), interleukin-18, kidney injury molecule-1 and liver fatty acid-binding protein have been discovered<sup>(11)</sup>.

NGAL is a small 25 KDa glycoprotein that released at the presence of inflammatory and ischemic insults from different cells including renal tubules<sup>(8)</sup>. Basically, it is undetectable in urine. Whereas, in renal dysfunction it presents and increases proportionally with the severity of the disease. Moreover, it appears in urine prior the rise of sCr levels; therefore, it could be helpful in early prediction of AKI in cirrhosis<sup>(12)</sup>. The preliminary studies showed that uNGAL level either alone<sup>(13,14)</sup> or in a panel of a aforementioned biomarkers<sup>(11)</sup> could differentiate functional and structural causes of renal dysfunction in patients with advanced cirrhosis, however, there remains

a need to clarify its potential role for the identification of patients at increased risk for HRS.

## Patients and Method

The current prospective, hospital-based, case-controlled study; with the participants recruited from the patients admitted to the Internal Medicine Department, Minia University Hospital for the treatment of cirrhosis-related complications. The study was conducted in the period from January 2015 and November 2015 on a group of patients with HCV-associated liver cirrhosis complicated with HRS . This group of patients was compared with two other cirrhosis groups: a group without as cites and a group with as cites but without impairment of kidney function. These groups were used to represent the different stages of natural history of cirrhosis (Moore and Van Thiel, 2013)

Diagnosis of chronic HCV was considered by presence of anti -HCV and detectable serum HCV-RNA for six months or more. Established diagnosis of liver cirrhosis was based on a combination of clinical, biochemical, ultrasonographic and endoscopic findings.

### The study groups included:

**Group I:** It included 20 cirrhotic patients without as cites their age ranged from 40-60 years. They were 14 (70%) males and 6 (30%) females.

**Group II:** It included 30 cirrhotic patients with as cites but without renal impairment, their ages ranged from 38-63years . They were 21 (70%) males and 9(30%) females.

**Group III:** It included 30 cirrhotic patients with as cites and with renal impairment diagnosed as having hepatorenal syndrome, their ages ranged from 48-68 years they were 22 (73.3%) males and 8 (26.7%) females

### HRS was diagnosed according to criteria reported by Salerno et al. (2007); including:

- Presence of cirrhosis with ascites.
- Serum creatinine > 1.5 mg/dL.
- No improvement in serum creatinine level (decrease to 1.5 mg/dL) after at least 2 days with diuretic withdrawal and volume expansion with albumin. The recommended dose of albumin is a single infusion of 1 g/kg of body weight (maximum, 100 g).

- d. Absence of shock.
- e. No current or recent treatment with nephrotoxic drugs.
- f. Absence of parenchymal kidney disease as indicated by proteinuria > 500 mg/d, microhematuria (>50 red blood cells/high-power field), and/or abnormal renal ultrasonography.
- 8. Urinary tract infection.
- 9. Anuria for 12 hours or more.
- 10. Need for renal replacement therapy.
- 11. Any solid organ transplantation.
- 12. Diabetic patients.

**Exclusion Criteria Include:**

1. Class IV heart failure, O2 dependent chronic obstructive pulmonary disease (COPD).
2. Chronic kidney disease with serum creatinine persistently > 4 mg/dL and/or eGFR<60 ml/min/1.73m<sup>2</sup> for > 3 months, using MDRD.
3. Other causes of liver cirrhosis.
4. Shock as defined by American College of Chest Physicians .
5. Established parenchymal kidney disease.
6. Obstructive uropathy based on ultrasound examination.
7. Use of nephrotoxic drugs in the previous 30 days.

**Results**

In the current when NGAL level was compared in group III versus group I we found that group III had higher level of NGAL (Mean ± SD of 732.9 ± 304.78 pg/ml vs. 40.07 ± 14.61 pg/ml, p < 0.001) and when it was compared between group III and group II we found that group III had higher level(Mean ± SD of 732.9 ± 304.78 pg/ml vs. 62.6 ± 29.65 pg/ml, p < 0.001) but when it was compared between group I and group II there was no significant difference . When levels of IL-18 were compared in group III versus group II we found that group III had higher level of IL- 18 (mean ± SD of 41.67 ± 20.66 pg/ml vs. 30.32 ± 9.52pg/ml, p = 0.012) and when it was compared between group I versus group II or between group III versus group II there was no significant difference., as shown in Table

**Table (1): Urinary markers of Neutrophil Gelatinase-Associated Lipocalin, Interleukin-18 And Kidney Injury Molocule-1 in the different study groups**

	Group I (n=20)	Group II (n=30)	Group III (n=30)	P value			
<sup>(1)</sup> NGAL (pg/ml)	Range	(20-66.8)	(24-125)	< 0.001*			
	Mean ± SD	40.07 ± 14.61	62.6 ± 29.65	732.9 ± 304.78	I vs II	I vs III	II vs III
				1	< 0.001*	< 0.001*	
<sup>(1)</sup> IL-18 (pg/ml)	Range	(10.2-49)	(12.6-56.4)	(19.2-98)	0.011*		
	Mean ± SD	32.87 ± 9.84	30.32 ± 9.52	41.67 ± 20.66	I vs II	I vs III	II vs III
				1	0.129	0.012*	
<sup>(2)</sup> KIM 1 (pg/ml)	Median(IQR)	1.4 (0.3-5.02)	2.35 (2.2-4.55)	4.55(3.97-5.72)	< 0.001*		
					I vs II	I vs III	II vs III
					1	<0.001*	0.002*

- Group I:non ascetic cirrhotic patients with normal renal function, Group II: cirrhotic ascetic patients with normal renal function, Group III: patients with hepatorenal syndrome.
- SD: Standard deviation , IQR: Interquartile range; ANOVA: Analysis Of Variance, NGAL: Neutrophil Gelatinase-Associated Lipocalin , IL-18:Interleukin-18 And KIM 1:Kidney Injury Molocule-1
- (1)Data are expressed as mean ± SD and compared by one way ANOVA test between the three groups followed by post Hoc Bonferroni correction between each two groups
- (2) Data are expressed as median(IQR) and compared by Kruskal Wallis test between the three groups followed by Mann Whitney test to compare variables of each two groups .
- \*: significant difference at p value < 0.05

## Discussion

Acute kidney injury (AKI) is frequent in cirrhosis and recurrent episodes of AKI may occur in end-stage cirrhosis. Serum creatinine (sCr), creatinine clearance as well as sCr-derived equations tend to overestimate GFR in cirrhosis which affect their utility in the early diagnosis of AKI. Moreover, early identification of the phenotype may facilitate recovery. One of the most challenging issues is the ability to differentiate HRS from ATN<sup>(5)</sup>.

Several novel biomarkers recently emerged to help in the early diagnosis of AKI and to phenotype AKI. The most promising tubular biomarkers of tubular injury in AKI are (i) neutrophil gelatinase-associated lipocalin (NGAL), (ii) interleukin 18 (IL-18), (iii) kidney injury molecule 1 (KIM 1).

In the current study, patients with HRS had significantly higher urinary NGAL, compared to cirrhotic patients with normal renal function with or without ascites. Similar results have been reported in both animal models and human studies. In animal models, NGAL expression is markedly increased in the kidneys and released in urine following ischemic or nephrotoxic insults. Urinary concentration increases very rapidly (within 2 h) following ischemia<sup>(14,15)</sup>. Human studies have shown that NGAL measurement in either urine or serum might be useful to detect AKI at an early stage in numerous clinical situations such as, sepsis and septic shock, contrast-enhanced imaging, cardiac surgery, polytrauma and hypothermia<sup>(16)</sup>. In addition, NGAL may be useful in monitoring some kidney diseases such as delayed kidney graft function<sup>(17)</sup>, kidney allograft rejection<sup>(18)</sup>, lupus nephritis<sup>(12)</sup> and IgA nephropathy<sup>(19)</sup>. Recently, it has been suggested that NGAL may help to identify the cause of AKI in patients with liver disease, especially in differentiating ATN from HRS<sup>(20)</sup>. On average, urinary NGAL is higher in patients with cirrhosis and AKI compared to patients without AKI<sup>(20)</sup> and is significantly higher in patients with persistent AKI as compared to patients with transient AKI<sup>(21)</sup>.

On the basis of receiver-operating characteristic analysis, uNGAL could predict HRS [area under receiver operating characteristic curve (95% confidence interval) (AU ROC curve (95%CI) 1.0 (0.96-1.0),  $P < 0.001$ ]. A cutoff point of  $>125$  ng/ml for uNGAL had a sensitivity of 100%, specificity of 100%, positive predictive value of 100%, negative predictive value of 100%, and accuracy of 100% in diagnosing HRS. This finding is similar to

that reported by Verna and colleagues,<sup>(13)</sup>

Our study demonstrated that the values urinary biomarker were progressively increased with advancement of liver disease as indicated by Child-Pugh, MELD and MELD-Na scoring systems reflecting severity of liver disease. They should be used for prediction of short and intermediate-term mortality in HRS patients.

In the current study the finding of high levels of urinary biomarkers in HRS is potentially consistent with the speculation that HRS may in fact contain some degree of structural injury. There is likely to be an overlap between HRS and mild ATN<sup>(16)</sup>.

**Disclosure:** The authors report no conflicts of interest in this work.

**Source of Funding:** By self.

**Ethical Clearance:** Taken from faculty of medicine, Minia University committee.

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# Serum Visfatin, Blood Glucose, Lipid Metabolism and Nonalcoholic Fatty liver Disease in Simple Obese Children

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## Abstract

**Background:** Non-alcoholic fatty liver disease (NAFLD) it is one of the most common causes of liver disease worldwide. Visfatin is an adipocytokine hormone, which exerts an insulin-like effect by binding to the insulin receptor-1, we aim to investigate the correlation between serum Visfatin and NAFLD in Simple obese children.

**Method:** This prospective study included 62 children clinically evaluated as obese and 35 apparently healthy children, age and sex matched as controls. Patients were recruited from the pediatric department of EL-Mina University, children's hospital. While controls were collected from healthy school children between September, 2016 and October, 2017.

Fasting Visfatin, glucose, hemoglobin A<sub>1c</sub> and lipid levels were assayed and abdominal ultrasonography was done for detection of NAFLD.

**Results:** There was a statistically significant correlation between serum Visfatin level and BMI ( $p < 0.01$ ), cholesterol levels ( $p < 0.01$ ), triglycerides levels ( $p < 0.01$ ), LDL levels ( $p < 0.01$ ), HDL levels ( $p < 0.01$ ) in both overweight and obese groups.

**Conclusions:** Visfatin plays an important role in pathogenesis of NAFLD.

**Keywords:** *Non-alcoholic fatty liver disease; metabolic syndrome; Visfatin.*

## Introduction

Obesity is defined as either a body mass index (BMI) at or above the 95<sup>th</sup> percentile for children of the same age and sex specific BMI percentiles and overweight as a BMI at or above the 85<sup>th</sup> percentile but lower than

the 95<sup>th</sup> percentile for children of the same age and sex. [1-3] Among primary school children, 6% were obese and 10.5% were overweight with higher percentage in girls [4].

NAFLD is considered as the hepatic presentation of metabolic syndrome. Patient is considered to have metabolic syndrome when having central obesity plus any 2 of the following factors; triglyceride  $> 150$  mg/dL, HDL  $< 40$  mg/dL in men and  $< 50$  mg/dL in women, systolic BP  $> 130$  or diastolic BP  $> 85$  mmHg., fasting blood glucose (FBG) level  $> 100$  mg/dL. [5-7] Visfatin binds and activates the insulin receptor, but not competing with insulin for its binding receptor. [8-12]

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## Method

97 children were enrolled in this study, 62 were enrolled as patient while the other 35 children were enrolled as controls (age and sex matched) (group I). The enrolled patients were 2-17years old fulfilled the following inclusion criteria: children with a BMI at or above the 85<sup>th</sup> percentile but lower than the 95<sup>th</sup> percentile were considered overweight and planned as group II, while children with a BMI exceeding the 95<sup>th</sup> were considered obese and planned as group III according to the Egyptian Growth Charts, [13]

**Sample Collection:** 10 ml of venous blood samples were taken for, FBG, ALT, AST, urea, creatinine levels total cholesterol, LDL, HDL and triglycerides levels.

Ultrasound of liver right lobe for the evaluation of fatty liver was performed.

**Statistical Analysis:** The numerical data were presented as means – standard deviations while non-numerical data were presented as percentage. Two tailed t-tests were used to analyze differences between the control and patients groups.

## Results

Significant difference between obese, overweight children and healthy ones regarding bodyweight Z-score centile (mean±SD 0.5 ± 1.1, 0.05 ± 0.9, -0.35 ± 0.5 respectively) and ( $p < 0.01$ ) and BMI Z-score centile (mean±SD 0.9 ± 0.7, 0.1 ± 0.6, -0.97 ± 0.4 respectively) and ( $p < 0.05$ ) while no significant difference between the three groups of children regarding height Z-score centile. (mean±SD 0.2 ± 1, 0.04 ± 1.1, -0.2 ± 0.9 respectively). (Table.1)

Mean diastolic blood pressure (DBP) values significantly higher in obese children compared to healthy ones ( $p < 0.01$ ). (Table.1)

Significant higher incidence of NAFLD in obese and overweight children compared to healthy ones ( $p < 0.01$ ) for both. 73% of obese children 26.3% of overweight ones were having NAFLD. (Table.1)

ALT, AST were higher in obese and overweight compared to healthy ones (mean±SD for ALT 71.3 ± 21.4, 41.3 ± 19.1, 30.3 ± 4.4 respectively and (mean±SD for AST 69.8 ± 24.5, 36.8 ± 5.5, 30.0 ± 4.4 respectively) ( $p < 0.01$  and 0.05 respectively). (Table.2)

Regarding lipid profile in obese and overweight compared to healthy ones, mean total cholesterol (mean±SD 238.1 ± 49.1, 160.7 ± 56.6, 147.1 ± 44.9, respectively),

LDL (mean±SD 137.9 ± 18.8, 123.4 ± 14.2, 102.6 ± 17.4, respectively), HDL (mean±SD 33.2 ± 13.4, 48.4 ± 19.2, 62.2 ± 16.3, respectively) and TG values (mean±SD 143.1 ± 23.9, 35.2 ± 16.0, 88.4 ± 21.4, respectively) all were significantly higher in obese, overweight children compared to healthy children ( $p < 0.01$  for all) except for HDL level which was higher in healthy children ( $p < 0.01$ ). (Table.2)

Higher mean FBG and Hb<sub>A1C</sub> were found in overweight (mean±SD for FBS 99.5 ± 22.5 and Hb<sub>A1C</sub> 6.19 ± 1.91) and obese (mean±SD for FBS 148.5 ± 39.7 and Hb<sub>A1C</sub> 7.49 ± 2.18) compared to healthy ones (mean±SD 86.7 ± 14.9 and Hb<sub>A1C</sub> 5.13 ± 0.64 respectively) ( $p < 0.01$  for both). (Table.2)

Visfatin level was higher in obese children (mean ±SD 301.3 ± 64.5) overweight children (mean±SD 136.4 ± 24.1) compared to healthy children (mean±SD 114.8 ± 23.7) ( $p < 0.01$  for all). (Figure.2)

There were significant positive correlation between BMI, weight, cholesterol, TG and ALT and serum Visfatin levels. ( $p < 0.01$  for all). (Table.3)

Significant ultrasonographic differences between obese, overweight and healthy children regarding the degree of hepatic steatosis ( $p < 0.01$ ). (Figure.1)

ROC analysis of serum visfatin level showed an area under the curve (AUC) of 0.82 at cut off value for serum Visfatin of > 126.5 ng/ml. showing the sensitivity (78.1%) and specificity (61.4%) of serum Visfatin as a predictor of fatty liver disease in obese children. (Figure.3)

**Table 1. Some important clinical data of the patients and controls**

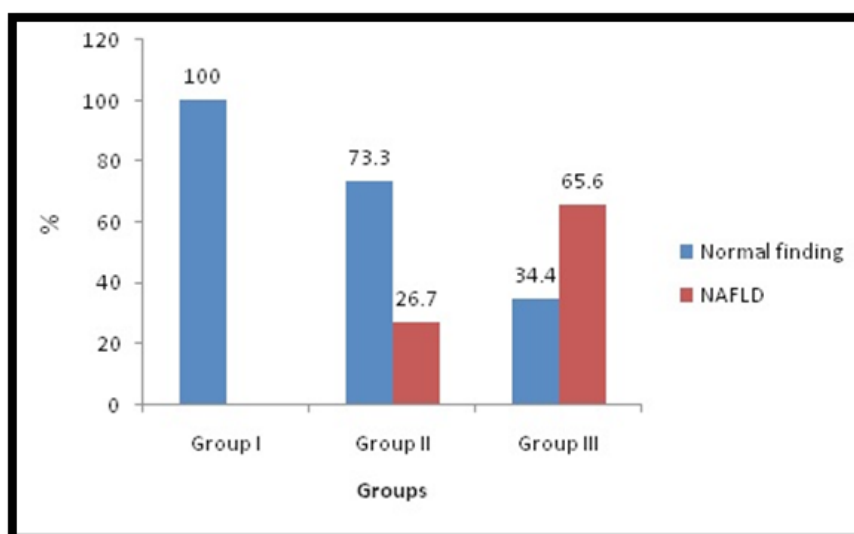
Variable	Groups			P. value
	Group (I)(n=35)	Group (II)(n=30)	Group (III)(n=32)	
Weight (kg) (Z score)	-0.35 ± 0.5	0.05 ± 0.9	0.5 ± 1.1	0.01**
Height (cm) (Z score)	-0.2 ± 0.9	0.04 ± 1.1	0.2 ± 1	0.31 <sup>NS</sup>
Body mass index(Z score)	-0.97 ± 0.4	0.1 ± 0.6	0.9 ± 0.7	0.01**
Age (year)	8.3 ± 4.6	8.6 ± 5.1	9.1 ± 4.7	0.77 <sup>NS</sup>
Sex	Male	16 (45.7%)	15 (50.0%)	0.88 <sup>NS</sup>
	Female	19 (54.3%)	15 (50.0%)	
Diastolic blood pressure	Normal	35 (100.0%)	22 (73.3%)	0.01**
	High	-----	8 (26.7%)	
Hepatomegaly	No	35 (100.0%)	22 (73.3%)	0.01**
	Yes	-----	8 (26.7%)	

**Table 2. Some important laboratory findings among studied groups**

	Groups			p. value
	Group (I) (n=35)	Group (II) (n=30)	Group (III) (n=32)	
ALT (U/L)	30.3 ± 4.4	41.3 ± 19.1	71.3 ± 21.4	0.01*
AST (U/L)	30.0 ± 4.4	36.8 ± 5.5	69.8 ± 24.5	0.01*
Cholesterol (mg/dl)	147.1 ± 44.9	160.7 ± 56.6	238.1 ± 49.1	0.01*
Triglycerides (mg/dl)	88.4 ± 21.4	135.2 ± 16.0	143.1 ± 23.9	0.01*
LDL (mg/dl)	102.6 ± 17.4	123.4 ± 14.2	137.9 ± 18.8	0.01*
HDL (mg/dl)	62.2 ± 16.3	48.4 ± 19.2	33.2 ± 13.4	0.01*
FBS (mg/dl)	86.7 ± 14.9	99.5 ± 22.5	148.5 ± 39.7	0.01*
Hb <sub>A1C</sub>	5.13 ± 0.64	6.19 ± 1.91	7.49 ± 2.18	0.01*
Serum visfatin (ng/ml)	114.8 ± 23.7	136.4 ± 24.1	301.3 ± 64.5	0.01*

**Table 3. Correlations between serum Visfatin and other Laboratory variables**

Serum Visfatin	Age	Weight	BMI	FBS	Hb <sub>A1C</sub>	Cholesterol	TGA	LDL	HDL	AST	ALT
r	-0.6	0.84	0.53	0.74	0.69	0.7	0.64	0.66	0.64	0.80	0.83
p-value	0.59	0.01*	0.01*	0.01*	0.01*	0.01*	0.01*	0.01*	0.01*	0.01*	0.01*

**Figure 1: Abdominal sonar findings among studied groups**

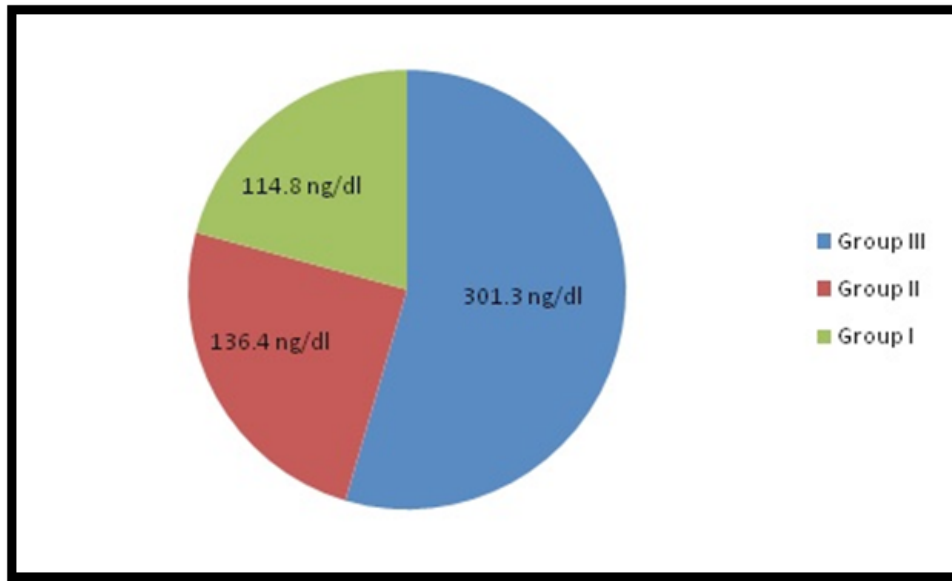


Figure 2: Serum visfatin among studied groups

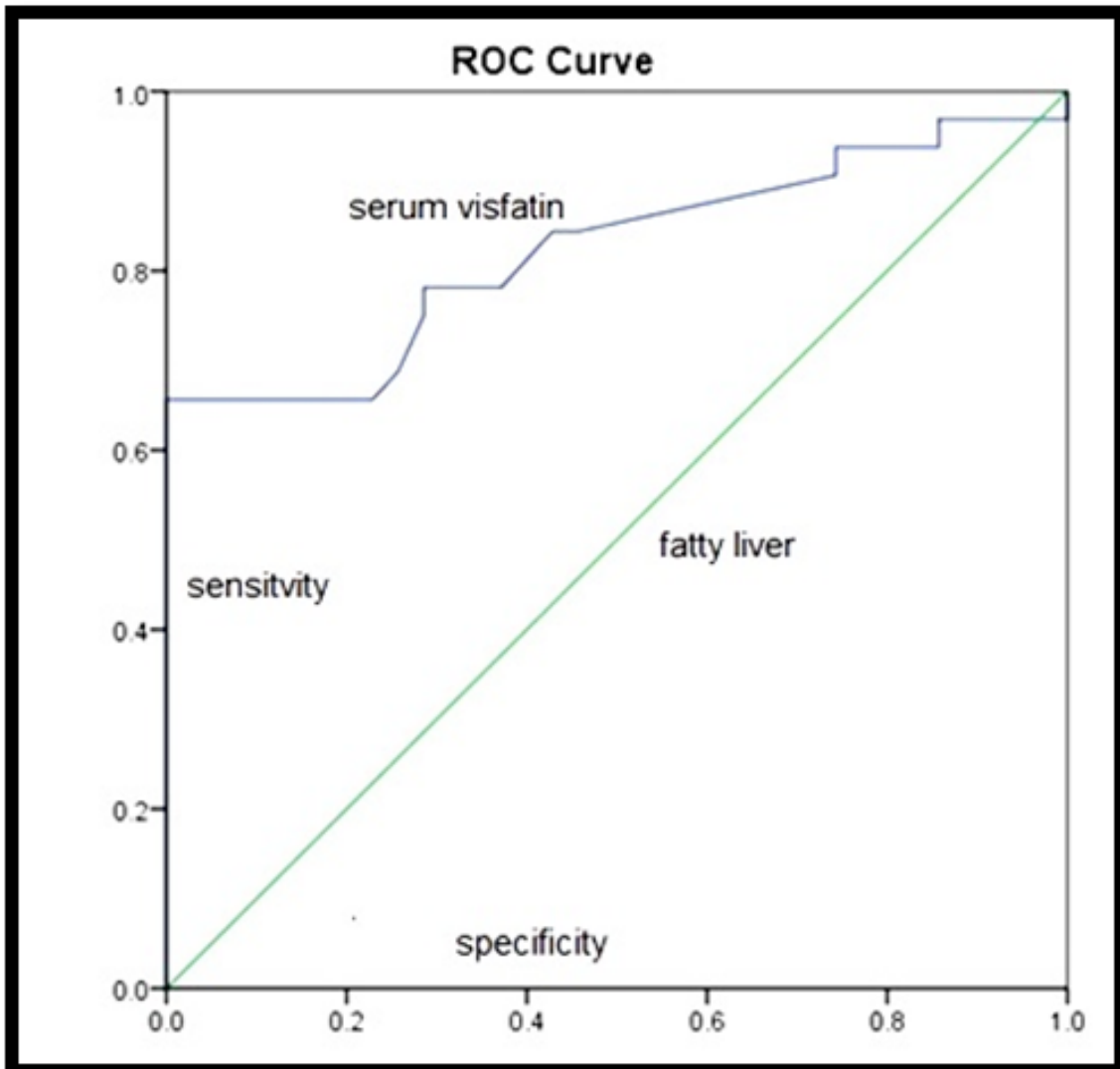


Figure 3: Serum visfatin among studied groups

## Discussion

The synthesis and secretion of Visfatin is regulated by Interleukin-6 (IL-6), growth factors, glucocorticoids, and TNF- $\alpha$ <sup>[15,16]</sup> and down regulated by insulin, somatostatin and statins.<sup>[14,16]</sup>

In the present study the BMI correlates closely with total body fat (TBF), which is in previous studies estimated using dual-energy x-ray absorptiometry (DEXA) scanning.<sup>[17]</sup>

DBP it was significantly higher in obese children, obesity likely contribute to the increase levels of insulin-like growth factor I which may increase blood pressure.<sup>[18,19]</sup>

Nageswari et al.,<sup>[19]</sup> found higher DBP values in the obese group children. However, Divković. et al.,<sup>[20]</sup> proved that overweight/obese children had significantly higher systolic blood pressure compared to eutrophic children.

In the present study, NAFLD was significant higher in the obese children compared with overweight & healthy children, Ludwig et al.,<sup>[20-23]</sup> proved that, rarely, physical examination reveals hepatomegaly.

Our results showed mild to moderate elevations in transaminases two to five times the upper limits of normal in overweight and obese agreeing with the results of<sup>[24, 25]</sup>

High total cholesterol, LDL and TG were detected in obese and overweight children compared with control groups and also in the obese children was higher than overweight ones. While HDL was higher in healthy children who show normal levels of HDL which has a cardiovascular protective function, this is in agreement with Holst-Schumacher et al.<sup>[26,27]</sup>

Higher mean fasting blood glucose level (FBG) and Hb<sub>A1C</sub> were found in overweight and obese compared to healthy ones, this is similar to that described by Elghaffar et al.,<sup>[28,29]</sup>

Serum Visfatin was higher in obese & overweight patients compared with controls. Also it was higher in patients who develop metabolic syndrome. The presence of NAFLD itself is a significant predictor of serum Visfatin levels as reported by Dahl et al.,<sup>[30-34]</sup>

However, they found no difference of serum Visfatin levels between the healthy and overweight children.<sup>[35,25]</sup>

In our study there was a significant difference between the obese children and healthy ones in the ultrasonographic findings of NAFLD and between the obese children and overweight ones with the frequency of 65.6% and 26.7%, respectively. Lipid accumulation in the liver leads to hepatic inflammation and cytokine production.<sup>[36-40]</sup>

Our results showed the ROC for serum Visfatin as a predictor of fatty liver in obesity, with sensitivity of 78.1% and specificity of 61.4% .

**Limitation of the study:** The smaller sample size which due to refusal of many patients to share in this study.

**List of Abbreviations:** BMI: Body mass index, LDL: Low density lipoprotein, HDL: High density lipoprotein, Bp: Blood pressure, FBG: Fasting blood glucose, TNF- $\alpha$ : Tumor necrosis factor- $\alpha$ , ALT: Alanin aminotransferase, AST: Aspartate aminotransferase, DBP: Diastolic blood pressure, CHD: Coronary heart disease, IL-7: Interleukin-7, IL-6: Interleukin-6, TBF: Total body fat, DEXA: Dual-energy x-ray absorptiometry, IR: Insulin resistance, VLDL: Very-low density lipoprotein, FFA: Free fatty acid.

Patients known diabetes, under treatment for chronic diseases and under steroids therapy all were excluded. The study conducted according to the principles of Helsinki and agreed by the faculty of medicine, Minia university, Ethical committee (No: 116-5-2016). Informed written and verbal consents from the patient's caregiver were obtained

### Declarations

**Funding:** Personally funded by the authors.

**Authors' Information:** Available

**Competing Interests:** The authors declare that they have no competing interests.

**Conflict of Interest:** None.

**Financial Disclosure:** The authors have no financial relationships relevant to this article to disclose.

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# Validation of Radiological Imaging in Evaluating Cases with Pleural Effusion

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## Abstract

**Background:** Pleural effusion disease became widely distributed nowadays with multiple pathogenic mechanisms.

**Aim of the Work:** To assess the concordance between chest X-ray, chest ultrasound (US) and chest computed tomography (CT) in cases of pleural effusion.

**Method:** Seventy patients with pleural effusion subjected to full history taking, examination and Radiological investigations including chest X ray, CT and US.

**Results:** Strong agreement between X-ray, CT and US in evaluation of amount of pleural effusion, moderate agreement between CT and US in evaluating the pattern of effusion even free or loculated with superiority of US, superiority of US and ability to diagnose pleural thickening and pleural mass.

**Conclusions:** ultrasound is standard tool for diagnosing and evaluating the pleural effusion.

**Keywords:** pleural effusion, TUS, chest CT.

## Introduction

A pleural effusion is an accumulation of fluid in the pleural space, due to imbalance between the formation and reabsorption of such fluid. A multiple causes of a pleural effusion, with different pathogenic mechanisms as elevated hydrostatic pressure gradient (transudation); increased extravasation of the pleural vessels (exudation); due to local inflammatory process; decrease in lymphatic drainage<sup>(1)</sup>.

Diagnostic evaluation of cases with pleural effusion

begins by obtaining a perfect clinical history and physical examination, followed by chest radiography, and analysis of pleural fluid in specific situations. In addition to the chest radiography, TUS (transthoracic ultrasound) and CT have an important role in some cases<sup>(2)</sup>.

**Chest Radiograph:** It is the first imaging approach regarding a pleural effusion. The chest postero-anterior (PA) view shows blunting of lateral costophrenic angle when pleural fluid is over 200 mL. In the anteroposterior (AP) view, blunting occurs over 300 mL where's the lateral view may shows earlier signs, with blunting of the sharp posterior costophrenic angle when fluid exceeds 50 mL<sup>(3)</sup>.

**Ultrasound:** The use of ultrasonography (US) has become a standard technique worldwide in evaluating the pleural space<sup>(4)</sup>. In addition to its value in diagnosing the pleural effusion, it can also evaluate the echogenicity of the fluid and the presence and degree

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ofseption, which are key parameters in stratifying pleural infections and choosing the optimum treatment pathway<sup>(5)</sup>. Given its real-time potential, US has the advantage of safely guiding pleural procedures, leading to lower complication rates and reduced healthcare costs which has been translated in recent guidelines for pleural procedures<sup>(6)</sup>.

**Chest Computer Tomography:** Chest CT is often considered the gold standard which frequently used to investigate thoracic pathologies because of its cross-sectional perspective and superior contrast resolution and as it is helping to differentiate pleural from parenchymal disease<sup>(7)</sup>. However the non-contrast chest CT in the presence of pleural effusion often confirms pleural effusion and shows the underlying collapsed lung and rarely provides additional information over chest X-ray<sup>(8)</sup>.

### Patients and Method

The study was done on seventy patients with pleural

effusion who attendant to chest department, Minia university hospital. The study protocol was approved by the hospital's research ethics board. All patients were enrolled in the study after written informed consent.

**All Patients were subjected to full history taking, examination and Radiological investigations including:**

- (1) Chest X-ray (postero-anterior).
- (2) Recent Computed Tomography (CT) of the chest with contrast.
- (3) Ultrasound with color Doppler: All cases were examined by curvilinear transducer (3.5 MHz) and linear array transducer (7.5 MHz). Screening of the patient's chest using the low frequency probe.

Kappa test was done to show the degree of concordance between plain chest X-ray (P-A view), chest ultrasound and C.T chest in pleural diseases.

### Results

**Table (1): Degree of concordance between plain chest X-ray (P-A view), chest ultrasound and C.T chest in detection amount of pleural effusion:**

N= 70		X- ray	CT	US	Fleiss Kappa test	
					Kappa	P value
Amount of effusion	Mild	8(11.4%)	7(10%)	6(8.6%)	0.868	<0.001*
	Moderate	36(51.4%)	34(48.6%)	37(52.9%)		
	Massive	26(37.1%)	29(41.4%)	27(38.6%)		

US=ultrasound, CT=computerized tomography.

Table (1) shows perfect and strong agreement between X-ray, CT and US in evaluation of amount of pleural effusion with statistical significance (P value < 0.001).

**Table (2): Degree of concordance between chest ultrasound and C.T chest in differentiation between free or loculated pleural fluid:**

N=70		CT	US	Kappa test	
				Kappa	P value
Pleural fluid	Free	51(72.9%)	42(60%)	0.591	<0.001*
	Loculated	19(27.1%)	28(40%)		

US=ultrasound, CT=computerized tomography.

Table (2) shows moderate agreement between CT and US in evaluating the pattern of effusion even free or loculated with statistical significance (P value < 0.001).

**Table (3): Degree of concordance between chest ultrasound and C.T chest in detection pleural thickness:**

N=70		CT	US	Kappa test	
				Kappa	P value
Pleural thickening	No	12(17.1%)	3(4.3%)	0.356	<0.001*
	Yes	58(82.9%)	67(95.7%)		

US=ultrasound, CT=computerized tomography.

Table (3) shows fair agreement between CT and US on judgment on pleural thickening with statistical significance (P value < 0.001).

**Table (4): Degree of concordance between chest ultrasound and C.T chest in detection pleural masses:**

N=70		CT	US	Kappa test	
				Kappa	P value
Pleural mass	No	42(60%)	28(40%)	0.505	<0.001*
	Yes	28(40%)	42(60%)		

Table (4) shows moderate degree of agreement between CT and US in clarifying the pleural mass with statistical significance (P value < 0.001).

### Discussion

Imaging studies play a pivotal role in the diagnosis and management of pleural disease, this study shows perfect and strong agreement between X-ray, CT and US in evaluation of amount of pleural effusion with moderate agreement between CT and US in evaluating the pattern of effusion even free or loculated with superiority of US which diagnose 40% of the cases in comparison with CT which diagnose 27% so the Chest US can represent the gold-standard technique<sup>(9)</sup>. This in agreement with Smargiassi et al.<sup>(10)</sup> Who report US inter-rater agreement with Chest X-ray of a fair magnitude, Sobhyet al<sup>(11)</sup> study the ability to detect pattern of pleural effusion (free or loculated) and revealed that both CT and US were close to each other but with no significant difference.

Bediwy et al,<sup>(12)</sup> stated that in TUS diagnosed 83.3% of free pleural effusion lesions, 60% of encysted pleural effusion lesions with diagnosing all empyema lesions, but less sensitive in detecting pleural thickening and pleural nodules or masses.

Sikora et al.,<sup>(13)</sup> also reported that transthoracic US serves as a more accurate imaging tool than chest radiography in the diagnosis of pleural effusions and allows discrimination of pleural effusions from other lung pathology which may appear similar on a chest

X-ray. Also US can allow diagnosis of complicated pleural effusions, such as empyema.

Regarding the ability of TUS to detect pleural thickening, there is fair agreement between CT and US on judgment on pleural thickening with superiority of US and ability to diagnose more than 97% of the cases with pleural thickening at the time where CT diagnose 83% of the cases, also the results show moderate degree of agreement between CT and US in clarifying the pleural mass with 60% diagnosed by US and 40% by CT this in agreement with Sobhyet al<sup>(11)</sup> revealed that TUS was superior over MDCT in diagnosis of pleural thickening and pleural nodules detected by TUS in 66.2% of cases.

Also Qureshi et al.,<sup>(14)</sup> identify 73% of malignant effusions on US appearance alone, they found that pleural thickening >10 mm, pleural nodularity and diaphragmatic thickening >7 mm were highly suggestive of malignant disease. Bugalho et al.,<sup>(15)</sup> stated that TUS could detect pleural or diaphragmatic thickening.

On the other hand, Bediwy et al,<sup>(12)</sup> stated that in TUS was less sensitive than CT chest in detecting pleural thickening and pleural nodules or masses. Also Raj et al.,<sup>(16)</sup> who stated that CT chest allows detailed evaluation of the pleura and differentiation of benign from malignant pleural disease and also adequate enhancement of the pleura enables differentiation of the thickened pleura from adjacent effusion or aerated or collapsed lung.

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# The Effect of Repetition of Oral Health Education by Dokterkecil on knowledge, attitudes, OHIS and PHP Score Changes of 8-12 Years Old Children in Tangerang Selatan Indonesia in 2019

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## Abstract

Most Indonesian children still don't brush their teeth before going to bed and after breakfast. Peer group model education has been proven to be able to improve oral hygiene in children. This study aimed to estimate the effect of educational repetition by dokterkecil on knowledge, attitude and oral hygiene score changes in children aged 8-12 years. This was a quasi-experimental study design. Involved 69 child school respondents from 3<sup>rd</sup>, 4<sup>th</sup> and 5<sup>th</sup> grade and 15 children were selected as dokterkecil and assigned to provide education to the respondent for 3 times. Knowledge and attitudes data were collected using a questionnaire that was filled out by the respondents while OHIS and PHP data were collected through an intraoral examination. It was carried out at 5<sup>th</sup>, 10<sup>th</sup> and 14<sup>th</sup> weeks. Data analyzed with Longitudinal Data Multilevel Analysis. Results: There were positive changes in knowledge, attitudes, OHIS and PHP scores after 1<sup>st</sup>, 2<sup>nd</sup>, 3<sup>rd</sup> education ( $p < 0.005$ .) The most drastic changes occurred in 1<sup>st</sup> and continue to slope after 3<sup>rd</sup> education. Suggestions Oral health education by dokterkecil needs to be given repeatedly to reinforce the positive changes the other hand the repetition can lead to boredom. Education by dokterkecil should be given in various forms to keep interesting and maintain the child's motivation

**Keyword:** Oral health education, oral hygiene, plaque scores, peer group.

## Introduction

Most of Indonesian children still don't have proper dental health behavior. National data in 2018 recorded that 98% of Indonesian children brush their teeth every day, 95.2% of them do not do it twice a day, after breakfast and before going to bed. This bad behavior can affect 60% Indonesian children suffer from caries<sup>1</sup>. Brushing teeth before bed extends the time plaque forms and reduces the potential for caries and periodontal disease<sup>2</sup>.

The Indonesian government has run a school-based health education program to increase health awareness in children, called *dokter kecil*/kiddie doctor. *Dokter kecil* is a school-based health education program similar to the peer education model. In this program, some children are trained to share personal health information for their

peers. Unfortunately due to lack of health personnel, this program cannot be held regularly every year and the program less focused on oral health<sup>3</sup>.

The opportunities to establish a *dokterkecil* program specifically for dental health, need to be trial. Vangipuram dan Sexena has proved that oral health education peer group model has succeeded increasing knowledge and improving oral health behavior better than ever before<sup>4,5</sup>. The outcome of education by peer group was found to be better than those by the teacher and even almost as good as by health officer<sup>4,6</sup>.

Like other education model, oral health education by *dokterkecil* is not enough to be done once although several studies have shown that providing education in the first 30 days can significantly reduce plaque scores<sup>7,8</sup> but that condition does not last forever. A

constant repetition of education<sup>8-12</sup> is still needed as reinforcement of established good behavior<sup>11</sup>. It is also needed to keep the behavior from returning to its initial state.

Dokter kecil program has been going on for a long time<sup>13</sup> but has not accelerated to achieve the target to the Indonesia Caries-Free Program in 2030 yet, especially in changing the child oral health behavior. So that *dokterkecil* program for oral health that is done repeatedly needs to be trial. The unknown repetition effect on knowledge, attitudes and oral hygiene status changes, attracted researchers to create a regression model to estimate of knowledge, attitudes and oral hygiene scores after every education.

## Method

This research is quasi experimental, repeated time measure design. The subjects of this study were school children aged 8-12 years. Involving 69 students from grade 3<sup>rd</sup>, 4<sup>th</sup> and 5<sup>th</sup> as respondents and 15 students from the same grade as *dokterkecil* from a Public Elementary School in South Tangerang.

**Sample:** The selection of schools was carried out randomly from all schools in South Tangerang City that had at least two class in each grades. The class conducted research was chosen randomly. Respondents were selected according to criteria, did not having dental malposition, dental deformity, not using orthodontics appliance, did not suffering from periodontal disease and mental disabilities. Performed for 4 months from January to April 2019. The number of samples is calculated through mean different test formula based on Vangipuram study<sup>4</sup>. The minimum number of samples needed is 59 and added 20% to anticipate potential losses and obtained a sample of 66 respondent taken from all grades with the same proportions at each.

**Education Material:** Both doctor kecil and respondent are given the same oral health information in module form containing the knowledge of dental disease, etiology of dental disease, prevention of dental diseases including Bass techniques. The researcher developed the module by himself based on material from the Oral Health Education Guidelines MOH Republic Indonesia to adapt the children cognitive abilities. The module has been tested on 18 children equivalent to respondents with good results.

**Dokter Kecil Training:** Fifteen children were

selected to be dokter kecil based on teacher considerations. Dentist trained dokter kecil candidates using modules for 3 times, 60 minutes in each visit. The purpose of this training is to improve presentation ability and to build a positive attitude towards maintaining dental hygiene.

**Education Intervention:** Each *dokterkecil* is asked to teach 6-7 friends in a group. The educational activities consisted of two sessions, material session and a practical session. Material session was held discussion and information sharing for 60 minutes and the practical session was held a demonstration of brushing teeth by *dokterkecil* and practicing it together for 40 minutes. It carried out 3 times, at 2<sup>nd</sup>, 7<sup>th</sup> and 11<sup>th</sup> week with the same group composition. Every *dokterkecil* activity was monitored by the observer to ensure that all material was delivered completely.

**Data Collected and Outcome measurements:** Knowledge data were obtained from 10 questions and attitude data obtained from 13 statements that were filled out by respondents. The questionnaire was developed by the researcher has been tested in 35 children with good reliability and validity.

Oral hygiene Status data were obtained from intra-oral examination by two calibrated and validated examiners through the Oral Hygiene Index Simplified Vermillion 1964 and the Patient Hygiene Performance Index Poshadley 1968 instruments. Data collection was taken every 3 weeks after education at 5<sup>th</sup>, 10<sup>th</sup> and 14<sup>th</sup> weeks. Baseline data were taken at 1 week before 1<sup>st</sup> education. Data were analyzed using STATA 14.

Prior to data collection all students and their parents had written informed consent and get permission from the principal.

## Result

At the beginning of the study there were 99 respondents who participated in the study, but 30 respondents loss to follow due to illness or other reasons. At the end of research, there were 69 respondents took part completely. Longitudinal data multilevel analysis was performed to estimate the effect of repetition on variables scores changes. Researchers designed multilevel data, i.e, level 1 is measurement at t time and level 2 is respondent.

The results of multilevel longitudinal data analysis could determine the estimated magnitude of the effect of

repetition of education on oral hygiene status as seen in Table 1.

**Table 1:** It can be seen estimation score change if the respondent is given education for first time the knowledge score could rise to 0.956 points, second education could grow to 1.797 and increase by 2.289 points if given the 3<sup>rd</sup> education. The same thing happened with attitude. Estimate attitude scores could increase 0.246 point in the 1<sup>st</sup> education provision. an increase by 3.405 points in the 2<sup>nd</sup> education and could rise 3.797 point in 3<sup>rd</sup> education.

First education can be estimated reduce OHIS score as much 0.766 points. Second education could reduce 0.891 points and three times reduce by 0.817 points. While the first education could be estimated reduce PHP scores by 0.434 points. The 2<sup>nd</sup> education reduce -0.668 point and the 3<sup>rd</sup> education decreases the score by 0.610 points (table 1).

Knowledge, attitudes and status of dental hygiene score changes in visual form can be seen by simulating the regression formula as shown in graph 1,

**Graph 1:** Shows the change knowledge score mean. The baseline respondent's mean knowledge score was 5.13. increased to 6.93 after the 3<sup>rd</sup> education. In measuring the attitude. the baseline respondent's attitude mean score was 6.94 increased to 10.33 after 3<sup>rd</sup> education. These graph can show that knowledge and attitudes score rises slightly from 1<sup>st</sup> to 3<sup>rd</sup> education.

#### Graph 2:

In the OHIS baseline measurement. respondents' OHIS mean scores was 1.52. decreased until 2<sup>nd</sup> education (0.63) and in the 3<sup>rd</sup> education score tended to increase to 0.70. in other hand PHP baseline mean score of the respondent was 1.7. decreased to 1.01 after 2<sup>nd</sup> education and tended to increase to 1.09 after 3<sup>rd</sup> education. On both OHIS and PHP the mean score drops extremely in the 1<sup>st</sup> and 2<sup>nd</sup> education and tends to be worse in the 3<sup>rd</sup> education.

### Discussion

*Dokter kecil* is a method of education by using children as model and as providers of health information is an effective method. In this study, *dokter kecil* is proven increase knowledge. attitudes and reduce respondents' OHIS and PHP scores significantly. This finding is the same as Haleem and Saxena study [6.16]. Although

*dokter kecil* is not a professional informan, they provide information through unique ways such as speaking in child's language that make information can be more accepted by respondents easily<sup>15</sup>.

Trihapsari study found that school-based education can reduce plaque deposits starting on the 7<sup>th</sup> day after first education<sup>7</sup>. Reddy and Rodriguez<sup>8</sup> found that the first education was enough to reduce the plaque index score from day 15 to day 30 [9.12]. Similar to the two researchers. the results of this study showed that there was a positive change in knowledge. OHIS and PHP score attitudes within 3 weeks after first education.

The influence of repetition was found by Rodriguez's study<sup>11</sup>. Educational group plaque scores without repetition decreased in the first 30 days but tended to return to their original condition in the following 90 days. whereas the group with repetition. score decreased on the 30th day and remained stable until the 90th day. The same finding was also found in this study. PHP score dropped dramatically after the first 30 day of education and remained stable until 3<sup>rd</sup> education. Repetition is useful for maintaining and preventing returning to the original behavior<sup>11</sup>

Emier<sup>12</sup> emphasized that PHP scores in groups with repetition would significantly different from those without repetition. Reddy study<sup>8</sup> proved there was a reduction in plaque scores by 61% in twice education group and 32% in one times education group. while this research was carried out three times giving a plaque reduction by 75%. The better results are not only due to the higher number of frequencies but also interval time. Three-week intervals education in this research was more effective than six-week intervals to increase knowledge and oral health practice<sup>16</sup>.

In this study the best positive changes were found in the three weeks after 1<sup>st</sup> education. decreasing slight in the 2<sup>nd</sup> and 3<sup>rd</sup> education. Deceleration changes in knowledge and attitudes after 3<sup>rd</sup> education can occur due to boredom caused by repeated use of information media [19.20]. Repetition using the same visual media led to decrease of child's attention even though in initially subjects spend more time paying attention to media then attention begins to decrease at the second exposure and more<sup>19</sup>.

The role of *dokter kecil* in increasing knowledge attitude and oral hygiene cannot be denied. Although he is able to perform tasks and achieve the desired

results he is not a professional teacher. In conducting health promotion, *dokterkecil* most rely on the material and training. *Dokterkecil* has no ability to develop or innovate education content other than what he has gained from training.

Educational material must have many ideas. Poor idea material would be able to affect the all participant's motivation. Group activities carried out with the same material and activities could rise to a monotonous situation causing boredom to all group members [22,23]. Decreased attention to activities does not only occur in respondents but also in *dokterkecil* who act as motivators<sup>10</sup>. The no longer enthusiastic group makes *dokter kecil*s lose their enthusiasm to motivate their group.

To overcome boredom, a good program designer is needed to design *dokterkecil* plan activity that can remain attractive even the activity done repeatedly. Information sharing method that already exist should not only be presented in the form of discussions but also need to be combined with other method such as video<sup>22</sup>, play roles, work sheets<sup>23</sup>, the enrichment of the *dokterkecil* method must be carried out to keep all participant motivation.

## Conclusion

Repetition of education in *dokter kecil* method has two opposite sides. The more often the education is given the greater the positive changes can be achieved but on the other hand the more often the education is carried out can lead to boredom which can initiate motivation reduction. Peer group educational program designers must enrich education material by combining with other method solely so that the motivation of both respondents and peer led can be maintained.

**Conflict of Interest:** All researcher stated that there was no conflict of interest in the implementation of this research

**Acknowledgement:** Researcher would like to thank you to MOH Republic of Indonesia for supporting this research.

**Funding:** This research was funded by education and research assistance funds MOH Republic of Indonesia.

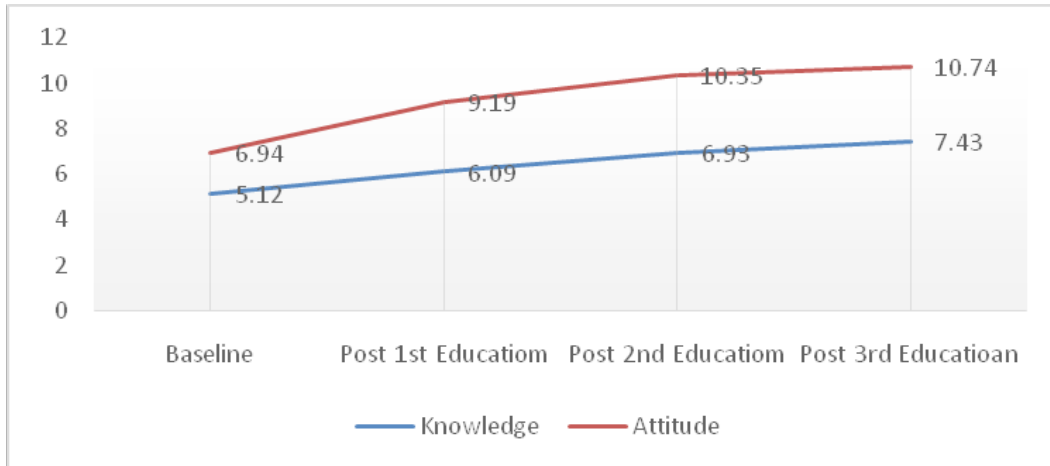
**Ethical Clearance:** This research has received ethical approval from the Research and Community Service Ethics Commission. Faculty of Public Health. University of Indonesia with certificate No. 682/UN2.F10/PPM.00.02/2018.

**Table 1: Estimated hanges in the score of knowledge, attitudes, OHIS and PHP in each post-education**

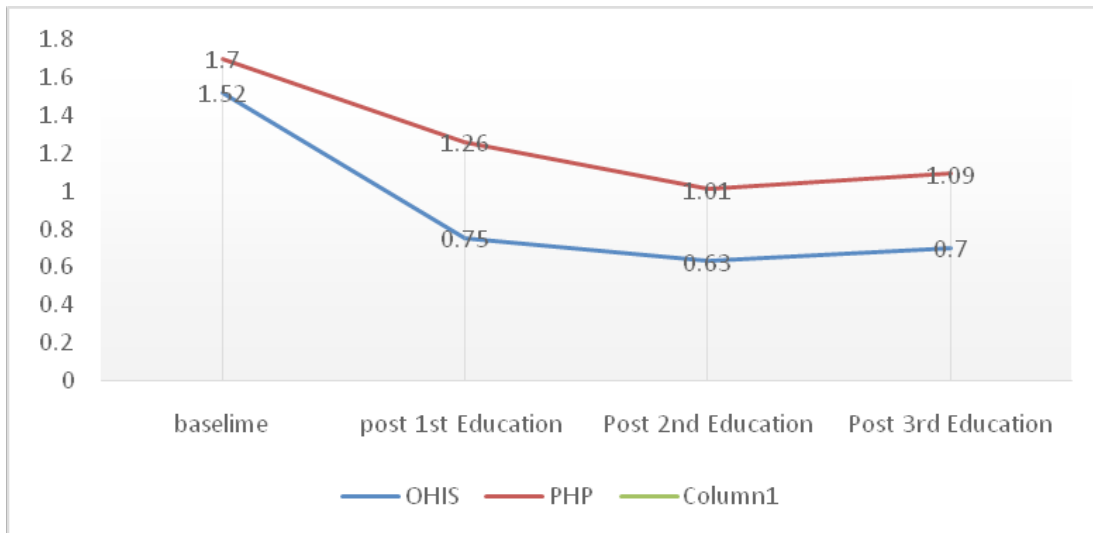
Fixed Effect	Coef	Std. Err.	P>z	[95% C		Interval]
<b>Knowledge</b>						
Post 1 <sup>st</sup> Education	0.956	0.1882	0.001	0.5876	-	1.325
Post 2 <sup>nd</sup> Education	1.797	0.1882	0.001	1.4282	-	2.166
Post 3 <sup>th</sup> Education	2.289	0.1882	0.001	1.9209	-	2.658
Constant	5.134	0.2128	0.001	4.7178	-	5.552
<b>Attitude</b>						
Post 1 <sup>st</sup> Education	2.246	0.2615	0.001	1.7339	-	2.758
Post 2 <sup>nd</sup> Education	3.405	0.2615	0.001	2.8933	-	3.918
Post 3 <sup>th</sup> Education	3.797	0.2615	0.001	3.2846	-	4.309
Constant	6.942	0.2480	0.001	6.4560	-	7.428
<b>OHIS Index</b>						
Post 1 <sup>st</sup> Education	-0.766	0.0552	0.001	0.875	-	-0.659
Post 2 <sup>nd</sup> Education	-0.891	0.0553	0.001	-1.000	-	-0.782
Post 3 <sup>th</sup> Education	-0.817	0.0552	0.001	-0.926	-	-0.708
Constant	1.519	0.0453	0.001	1.429	-	1.608



Fixed Effect	Coef	Std. Err.	P>z	[95% C		Interval]
<b>PHP Index</b>						
Post 1 <sup>st</sup> Education	-0.434	0.0852	0.001	-0.601	-	-0.2677
Post 2 <sup>nd</sup> Education	-0.686	0.0852	0.001	-0.854	-	-0.519
Post3 <sup>th</sup> Education	-0.610	0.0852	0.001	-0.777	-	-0.443
Constant	1.698	0.0743	0.001	1.552	-	1.844



**Graph 1. Knowledge, attitudes mean score changes in 1<sup>st</sup>, 2<sup>nd</sup> and 3<sup>rd</sup> education**



**Graph 2. OHIS and PHP mean score changes after 1<sup>st</sup>, 2<sup>nd</sup> and 3<sup>rd</sup> education**

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# Analysis of Factors Associated with the Incidence of Diarrhea in Toddlers in the Working Area of Puuwatu Health Center, Kendari in 2019

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## Abstract

**Background:** Diarrhea is a condition in which a person defecating with the consistency of a soft or liquid, even can be either water alone and is more frequent (usually three times or more) in one day, diarrheal disease remains a global problem with degrees pain and death are high in many countries especially in the developing countries, and also as one of the main causes of the high number of pain and death of children in the world.

**Objectives:** This research aimed to know the factors associated with the incidence of diarrhea in toddlers in the region Puuwatu, Puuwatu health centers Kendari in 2019.

**Method:** Type of research was quantitative with a cross sectional study approach. Toddlers selected as samples in the Research as many as 287 toddlers from 1,115 populations.

**Results:** The results showed that there was no significant relationship between sources of clean water, household toilet facilities, sewerage management, maternal behavior, knowledge of mother with the incidence of diarrhea in toddler. Meanwhile, there was a significant relationship between household waste management and the incidence of diarrhea in infants.

**Conclusions:** The community must further improve clean and healthy lifestyle patterns and maintain good environmental sanitation the community must further improve the pattern of clean and healthy behavior and maintain good environmental sanitation so as to avoid environmental-based diseases such as diarrhea and always get used to washing hands with soap every time will eat, after defecate and before carrying out activities related to food.

**Keywords:** *source of clean water, household toilet facilities, household waste management, sewerage, maternal behavior, knowledge of mother.*

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## Introduction

In 2015, diarrhea caused approximately 688 million morbidity and 499,000 mortality of children under five worldwide and in 2017, there were almost 1.7 billion diarrhea cases in children with mortality of about 525,000 in toddler every year worldwide<sup>1</sup>.

Diarrhea can be transmitted among humans and exacerbated by poor hygiene. Food is among the major causes of diarrhea when it is not stored or processed hygienically and water can contaminate during food processing. Contaminated food and beverages can be transmitted by vector or dirty hands<sup>2</sup>.

Globally, there are about two billion cases of diarrhea each year. 1.9 million sufferer are children under five which and susceptible to mortality without any immediate treatment, especially in the developing countries. Of this number, 18% mortality was children under five years of age. In Indonesia, national data showed that 100,000 children under five died because of diarrhea each year. It means that every day, 273 toddlers died, or 11 deaths per hour and 1 death per 5.5 minutes because of diarrhea<sup>3</sup>.

In Indonesia, there were 4,017,861 cases of treated diarrhea in 2015, in 2016 treated diarrhea cases decreased to 2,544,084 cases and in 2017 the treated cases increased dramatically to 4,274,790 diarrhea cases<sup>4</sup>.

Diarrhea is more susceptible for children under five years of age as their immune system is still weak. When diarrhea is followed by persistent vomit, it may cause dehydration. This condition should be watched as it requires immediate treatment to avoid death<sup>5</sup>.

Diarrhea is an endemic disease in Indonesia and an outbreak potential which is very often accompanied by death. In 2015, there were 18 diarrhea outbreaks across 11 provinces, 18 regencies, and left 1,213 sufferers and 30 mortalities (CFR 2.47). In 2016, there were 3 diarrhea outbreaks in 3 provinces, 3 regencies with 198 sufferers (CFR 3.04%). Subsequently, 21 outbreaks in 12 provinces, 17 regencies happened in 2017 with 1,725 sufferers and 34 deaths (CFR 1.97)<sup>6</sup>.

In 2015, Southeast Sulawesi became the 11<sup>th</sup> biggest contributor of diarrhea cases with a prevalence period of

> 2 weeks – 1 month and the percentage was 7.3%. In the meantime, Papua was the biggest contributor with a percentage of 14.7% diarrhea cases. There were about 41,071 diarrhea cases (77.74% of predicted cases) in Southeast Sulawesi in 2015, and approximately 35,864 cases (46.77 of predicted cases) in 2016<sup>7</sup>.

Several risk factors of diarrhea in toddler are environmental factors including solid waste management, waste canal and water sources. Furthermore the habit of hand washing before cooking and after toilet will enable direct contamination<sup>8</sup>.

Based on the data from the Health department of Kendari the highest incidence of diarrhea was in the area of public health center of Puuwatu. In 2016, there were 513 cases of diarrhea in children under five, decreased to 216 cases in 2017 and in 2018 (January – October) the cases increased as many as 394 cases of diarrhea incidence<sup>9</sup>.

## Method

This is a quantitative study with a cross sectional approach. The study was conducted in February 2019 in the work area of the Puuwatu health center. A total of 1,115 toddlers were identified and we took a sample of 287 toddlers. Variables are the incidence of diarrhea, clean water facilities, domestic toilets, management of household waste, and waste water management. The chi square test is used to examine the relationship between variables.

## Results

Table 1 shows univariate analysis according to clean water source, household toilet facility, waste management, sewerage management, mother's behavior and knowledge in the working area of public health centre of Puuwatu in 2019.

**Table 1. Distribution of respondents based on clean water source, household toilet facility, waste management, sewerage management, mother's behavior and knowledge**

Variable	Objective Criteria	Number (n)	Percentage (%)
Clean water source	Met requirements	139	48,4
	Did not meet requirements	148	51,6
Household toilet facility	Met requirements	276	96,2
	Did not meet requirements	11	38

Variable	Objective Criteria	Number (n)	Percentage (%)
Domestic waste management	Met requirements	150	52,3
	Did not meet requirements	137	47,7
Sewerage management	Met requirements	213	74,2
	Did not meet requirements	74	25,8
Maternal behavior	Good	251	87,5
	Poor	36	12,5
Knowledge of mother	Sufficient	167	58,2
	Less	120	41,8
Diarrhea incidence	Sufficient	167	58,2
	Less	120	41,8

Bivariate analysis can be seen through the following tables.

**Table 2. Association between source of clean water and the incidence of diarrhea in toddler**

Factors Associated	Diarrhea				Total		p Value
	Suffering		Not suffering		n	%	
	n	%	n	%			
<b>Source of clean water</b>							
- Met requirements	60	43,2	79	56,8	139	100	0,810
- Did not meet requirements	67	45,3	81	54,7	148	100	
<b>Domestic toilet</b>							
- Met requirements	121	43,8	155	56,5	276	100	0,545
- Did not meet requirements	6	54,5	5	45,5	11	100	
<b>Household waste management</b>							
- Met requirements	78	52,0	72	48,8	158	100	0,000
- Did not meet requirements	49	35,8	88	64,2	137	100	
<b>Sewerage management</b>							
- Met requirements	78	52,0	72	48,8	158	100	0,000
- Did not meet requirements	49	35,8	88	64,2	137	100	
<b>Maternal behavior</b>							
- Good	111	44,2	140	55,8	251	100	1,000
- Poor	16	44,4	20	55,6	36	100	
<b>Knowledge of mothers</b>							
- Sufficient	73	43,7	94	56,3	167	100	1,000
- Less	54	45,0	66	55,0	120	100	

### Discussion

Clean water comes well, underground water, mountain water, rain and used in a daily basis. The clean water has no colour, odour, and taste.

The results showed that there was no relationship between sources of clean water and the incidence of diarrhea in infants in the work area of the Puuwatu health center. The majority of clean water in Puuwatu comes from tap water (PDAM). The tap water provided

by this local government has several advantages. One of them is clean and suitable for daily consumption. Most of the water comes from water reservoirs, and is distributed to household areas through pipes. To reduce or prevent diarrhea morbidity, it is necessary to improve the quality of water used by the community. Nadra's (2012) study looked at the relationship between environmental sanitation and the incidence of diarrhea in infants in Bireuen District, in 68 samples and showed that there was no significant relationship between clean water supply and the incidence of diarrhea in infants<sup>10</sup>.

Toilets are human waste disposal facilities equipped with shelter and water for cleaning. Good disposal of feces is an important part of environmental health. Settlement density makes the location of the septic tank coincide with the location of the well, so that well water will be contaminated by feces and consequently can cause disease including diarrhea<sup>11</sup>.

The results showed that 155 toddlers did not suffer from diarrhea. Likewise, 11 respondents who had family toilet facilities did not meet the requirements, 6 children suffered from diarrhea. The chi square test showed no relationship between household toilets and the incidence of diarrhea in infants.

Respondents generally use healthy toilets that do not pollute sources of drinking water, odorless and feces can be covered by insects or mice.

The spread of diseases originating from feces can be through various ways. Diarrhea is caused by germs found in human feces. Germs that enter water or food, hands, cooking utensils or equipment, can be swallowed causing disease. The most important way to prevent the spread of germs is to remove human waste into the toilet. The toilet must be cleaned frequently the hole must always be closed<sup>12</sup>.

These results are not in line with Nadra's study (2012) there is a relationship between using the toilet at home and the incidence of diarrhea in the region. This research is also in line with the results of research conducted by Umiati (2010), regarding the relationship between environmental sanitation and the incidence of diarrhea in infants which shows that there is no relationship between toilet use and the incidence of diarrhea in infants<sup>13</sup>.

Waste is all types of solid materials, including liquids in containers which are disposed of as waste materials

and are useless, or disposed of because of excess. According to Minister of Home Affairs Regulation No. 33 of 2010, Household waste is garbage originating from daily activities in households which mostly consist of organic waste, excluding waste and specific waste. The influence of waste in environmental health can be seen from three aspects, namely physical, chemical and biological aspects.

The analysis shows that there is a significant relationship between the management of household waste and the incidence of diarrhea in infants. It was found that in the management of household waste, there were still many people who had not separated organic and inorganic waste, and they still kept garbage in their homes for a long time without closing it. This can make it easier for vectors to perch and multiply and pollute the surrounding environment such as food.

Garbage is closely related to public health, because garbage can spread vector-borne diseases. even though they already have trash bins at home, most of the respondents have non-closed trash bins and do not sort waste before being disposed, so food contamination by flies or mice can occur because the processing of respondent's waste is not good.

Waste water originating from households includes originating from feces that have the potential to contain pathogenic microbes, urine which may not contain microorganisms, and kitchen washing water, washing machines or bathrooms. Waste water can contain germs, contain dangerous toxic substances, and can become a nest of disease vectors (eg mosquitoes, flies, cockroaches, etc.). For this reason, it is necessary to increase public knowledge about the procedures for disposal of good household wastewater.

The results of the Bivariate analysis showed that as many as 118 toddlers did not suffer from diarrhea. Likewise, of the 74 respondents who had sewerage that did not meet the requirements, 42 children did not suffer from diarrhea.

This shows that there is no significant relationship between sewerage management and the incidence of diarrhea in infants in the work area of the Puuwatu health center.

Based on observations made, it was found that Wastewater Drainage (SPAL) in the working area of the Puuwatu Health Center did not have a pool of water

around the house, so it did not become a breeding ground for insects or could pollute the environment and water sources.

Meri Lidiawati (2016) in Banda Aceh that the availability of clean water is related to the incidence of diarrhea. Healthy waste water disposal facilities can drain waste water without polluting the environment and are inaccessible to insects and mice. Mothers as caregivers and those who care for toddlers are one of the factors that can cause diarrhea, this is due to poor maternal behavior, maternal behavior influenced by the level of education, usually the higher the mother's education the higher the level of mother's knowledge and understanding<sup>14</sup>.

The results showed that there was no significant relationship between maternal behavior and the incidence of diarrhea in infants in the work area of the Puuwatu health center.

Based on observations made, regarding to the behavior of mothers in the work area of Puuwatu Health Center, most of the respondents already had good behavior and had commenced household PHBS.

Majid's research (2016), which has not been able to prove the relationship between maternal behavior and the incidence of diarrhea in infants the researchers stated that there was no significant relationship between poor maternal behavior and the incidence of diarrhea in infants<sup>15</sup>.

Mother's knowledge of the course of the disease, signs of disease, consequences of disease, and prevention method must be prioritized to reduce the morbidity and mortality caused by diarrhea. Actions taken by mothers at home are a factor in the success of managing patients to avoid more fatal consequences<sup>16</sup>.

The results showed that there was no significant relationship between maternal knowledge and the incidence of diarrhea in infants in the work area of the Puuwatu health center.

Most mothers have sufficient knowledge about diarrhea in their environment. This is because most mothers with high school graduates are 163 (56.8%), and this makes mothers have sufficient knowledge about prevention of diarrhea.

## Conclusion

There is no significant relationship between sources of clean water, household toilet facilities, sewerage management, maternal behavior, knowledge of mothers with the incidence of diarrhea in toddler. Meanwhile, there is a significant relationship between household waste management and the incidence of diarrhea in infants. It is hoped that the community can further improve the pattern of clean and healthy behavior and maintain good environmental sanitation to avoid environmental-based diseases such as diarrhea and always get used to washing hands with soap every time they eat, after defecation and before doing food-related activities.

**Suggestion:** It is expected that Puskesmas and related institutions can increase health promotion efforts, especially diarrhea problems and the factors that influence them. Giving health promotion is not enough. Clinics together with other relevant agencies made efforts to find cases of diarrhea, because many people do not know the cause and treatment.

For further research is expected to continue this research with another design, to know with more certainty how the relationship between Factors Associated with the Incidence of Diarrhea in Toddlers.

**Ethical Clearance:** The ethical clearance was taken from The Ethical Research Committee Of The Ministry Of Research Technology and Higher Education, University of Halu Oleo

**Source of Funding:** The funding of this researches comes from all authors' contribution.

**Conflict of Interest:** Authors declares that there is no any conflict of interest within this research.

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# Determinant of The Use of Long-Term Contraceptive Method: An Analysis of 2017 Indonesian Demographic Health Survey

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## Abstract

**Background:** Family Planning Program is one way to prevent maternal deaths. In Indonesia long-term contraceptive method users tend to be low compared to non long-term contraceptive method.

**Objective :** This study aimed to determine the factors of use of long-term contraceptive method.

**Method:** The design of this study uses cross sectional, analyzed secondary data of the IDHS 2017. The sample criteria were: women, aged 15-49, who are using long contraceptive method (IUD, implants, sterilization) and not long contraceptive method (injections, pills, condoms, etc)

**Results:** This study shows that the most widely used contraceptive method by women of childbearing age in Indonesia in 2017 is non LTCM, which is 78%. While LTCM users are 22%. The average Long term contraceptive method user at aged >35 years with a higher education background and having a number of parities >2 and in the highest wealth quintile.

**Conclusion:** Variables that are proven to be related to the use of LTCM are age, education, parity, information from electronic media and information from print media.

**Keywords:** Long-term contraceptive method; LTCM determinant; contraception.

## Introduction

Family Planning Program is one way to prevent maternal deaths. The maternal mortality rate in Indonesia is still high at 305 per 100,000 live births. This figure is far from the SDGs target, which is to reduce maternal mortality to 70 per 100,000 live births <sup>(1)</sup>.

The strategy and implementation of the family planning program are as stated in the Medium Term Development Plan (MTDP) for 2015-2019 regarding the control of the number and rate of population growth. One of the MTDP policies is to increase the use of tools and long-term contraceptive method. The national family planning movement has been successful in encouraging an increase in the participation of the community in developing smaller and more independent families. This success must be considered even increased because

the achievement has not been evenly distributed, while family planning activities are still lacking in the use of LTCM <sup>(2)</sup>.

In Indonesia LTCM users tend to be low compared to non LTCM. In 2017 among married women who use KB there were only 13% who used LTCM (IUD, implant, MOW). The LTCM failure rate is relatively low compared to non LTCM. The number of LTCM failures is reported to be 0-2 per 1000 users, while the non LTCM is reported to be more than 10 per 1000 users. Based on these results it can be seen that the LTCM is more effective in preventing or delaying pregnancy <sup>(3)</sup>.

According to Bertand, one of the factors that influence contraceptive use is socio-demographic factors (education, family income, work status, type of house, nutritional status, age, ethnicity, religion), and

factors related to health services including knowledge about contraceptive sources, distance to service centers and involvement with mass media<sup>(4)</sup>.

### Method

This study was designed to carry out descriptive and analytical studies in accordance with the objectives of the analysis using data from the IDHS 2017. While the designs used in this study were cross sectional studies in order to study and analyze factors that constitute women's backgrounds using LTCM and study the relationship of each factor. This research was conducted in 34 Indonesian provinces involving 21,024 women LTCM and Non LTCM users. As the dependent variable is the participation of long-term contraceptive use, while the independent variable is grouped based on socio-demographic factors and health service factors (access

to information through electronic media and print media, as well as visits by field officers).

### Results

Based on the selection of contraceptive method, most of the WUS uses non LTCM, which are 16,464 WUS (78%), while LTCM users are 4,560 WUS (22%). Table 1 shows a descriptive description of the characteristics of respondents. Most of the respondents were women in the age group  $\geq 35$  years, secondary education, lower wealth quintile, and had given birth to 2 children. The number of respondents in the city and in the village is almost the same as the majority getting information about family planning programs, which gets more information from electronic media than print media. And most of the WUS did not get visits from field officers.

**Table 1: Overview of the characteristics of respondents**

Variable	Amount	%
<b>Age</b>		
• $\geq 35$ years old	11.512	54,8
• $< 35$ years old	9.912	45,2
<b>Education</b>		
• High	2.776	13,2
• Intermediate high	11.245	53,5
• First Level	6.729	32
• No school	247	1,3
<b>Wealth Quintile</b>		
• Quintile 1 (top)	3.935	18,7
• Quintile 2 (upper middle)	4.102	19,5
• Quintile 3 (intermediate)	4.205	20,0
• Quintile 4 (lower middle)	4.229	20,1
• Quintile 5 (bottom)	4.553	21,7
<b>Residence</b>		
• City	10.595	50,4
• Village	10.429	49,6
<b>Parity</b>		
• $>2$	8.911	42,4
• 0-2	12.113	57,6
<b>Contraceptive information from electronic media</b>		
• Yes	11.703	55,7
• No	9.321	44,3
<b>Contraceptive information from print media</b>		
• Yes	2.471	11,8
• No	18.553	88,2
<b>Visited Field Officer</b>		
• Yes	978	4,7
• No	20.046	95,3

**Bivariate Analysis.** Table 2 shows that the proportion of LTCM users in respondents aged  $\geq 35$  years is 25.8%, while for respondents  $<35$  years old is 16.7%. The results of statistical tests show that there is a relationship between the use of LTCM and the age of the mother (p-value 0,0001). Respondents with age  $\geq 35$  years had a tendency to use LTCM 1.72 times greater than respondents aged  $<35$  years. This is indicated by the confidence interval OR (95% CI) which is between 1.61 to 1.84.

The proportion of LTCM users in highly educated respondents was 30.4%, intermediate level was 21%, first level was 19.2%, and non-school was 22.6%. The results of statistical tests show that there is a relationship between the use of LTCM and the level of education of the mother. Respondents with higher education had a tendency of 1.49 times using LTCM compared to respondents who did not go to school. Respondents with secondary education had a tendency of 0.98 times using LTCM compared to respondents who did not go to school, and respondents with first-degree education had a tendency of 0.81 times using LTCM compared to respondents who did not go to school.

The results of the analysis of the relationship between economic status that can be seen from the wealth quintile with the use of LTCM indicate that the proportion of LTCM users in respondents in the 1 (top) quintile category is 29.2%, quintile 2 (upper middle) is 20.8%, quintile 3 (medium) of 19.8%, quintile 4 (lower middle) 18.4%, and quintile 5 (bottom) of 20.7%. The statistical test results show there is a relationship between the quintile of power and the use of LTCM. OR values indicate respondents in quintile 1 had a tendency to use LTCM 1.58 times compared to respondents in quintile 5. Respondents in quintile 2 had a tendency 1 time compared to respondents in quintile 5, respondents in quintile 3 had a tendency of 0.94 times compared to respondents in quintile 5, and respondents in quintile 4 have a tendency of 0.86 times compared to respondents in quintile 5.

The proportion of LTCM users in respondents who live in cities is 23.3%, while those living in villages are 20.1%. The results of statistical tests show that there is a

relationship between the residence of the respondent and the use of LTCM (p-value 0,0001). Respondents who are located in urban areas have a tendency of 0.82 times using LTCM compared to respondents who live in rural areas.

The results of the analysis of the relationship between the number of parity of respondents and the use of LTCM shows that the proportion of LTCM users in respondents with more than 2 parity amounts is 28.1%, while those with a parity of 0 to 2 are 17%. The results of statistical tests show that there is a relationship between the number of maternal parity and the use of LTCM (p-value 0,0001).

The proportion of LTCM users in respondents who received KB information from electronic media was 22.5% while those of respondents who did not get KB information from electronic media were 20.6%. The results of the statistical test show that there is a relationship between family planning information from electronic media and the use of LTCM (p-value 0.001). Respondents who received KB information from electronic media had a tendency of 1.1 times using LTCM compared to respondents who did not obtain KB information from electronic media.

The results of the analysis of the relationship between KB information from print media and the use of LTCM indicate that the proportion of LTCM users in respondents who obtained information from print media was 27.1%, while those who did not obtain information were 21%. The results of statistical tests show that there is a relationship between family planning information from print media and the use of LTCM (p-value 0,0001). Respondents who obtained information from print media had a tendency to 1.39 times use LTCM compared to those who did not obtain information from print media.

The proportion of LTCM users in respondents who had been visited by field officers was 22.6%, while those never visited were 21.6%. The results of the statistical test show that there is no relationship between the variable visited by field officers and the use of LTCM (p-value 0.478).

**Table 2: Distribution of Respondents to the use of LTCM**

Variable	Types of Contraception Method				Total	p-value	OR	95% CI	
	LTCM		Non LTCM					Min	Max
	N	%	N	%					
<b>Age</b>									
• ≥ 35 years old	2.967	25,8	8.545	74,2	11.512	0,0001	1,726	1,612	1,847
• < 35 years old	1.593	16,7	7.919	83,3	9.512	-	1		
<b>Education</b>									
• High	844	30,4	1.932	69,6	2.776	0,0001	1,494	1,113	2005
• Intermediate high	2.360	21	8.885	79	11.245	0,008	0,908	0,682	1,210
• First Level	1.294	19,2	5.435	80,8	6.729	0,0001	0,814	0,610	1,087
• No school	62	22,6	212	77,4	274	-	1		
<b>Wealth Quintile</b>									
• Quintile 1 (top)	1.151	29,2	2.784	70,8	3.935	0,0001	1,583	1,434	1,749
• Quintile 2 (upper middle)	852	20,8	3.250	79,2	4.102	0,111	1,005	0,906	1,115
• Quintile 3 (intermediate)	835	19,8	3.370	80,2	4.205	0,001	0,949	0,855	1,053
• Quintile 4 (lower middle)	780	18,4	3.449	81,6	4.229	0,0001	0,866	0,779	0,962
• Quintile 5 (bottom)	942	20,7	3.611	79,3	4.553	-	1		
<b>Residence</b>									
• City	2.466	23,3	8.129	76,7	10.595	0,0001	0,828	0,775	0,884
• Village	2.094	20,1	8.335	79,9	10.429	-	1		
<b>Parity</b>									
• >2	2.503	28,1	10.056	71,9	8.911	0,0001	1,909	1,786	2,039
• 0-2	2.057	17	6.408	83	12.113	-	1		
<b>Contraceptive information from electronic media</b>									
• Yes	2.637	22,5	9.066	77,5	11.703	0,001	1,118	1,046	1,195
• No	1.923	20,6	7.398	79,4	9.321	-	1		
<b>Contraceptive information from print media</b>									
• Yes	670	27,1	1.801	72,9	2.471	0,0001	1,398	1,271	1,538
• No	3.890	21	14.661	79	18.553	-	1		
<b>Visited Field Officer</b>									
• Yes	221	22,6	757	77,4	978	0,478	1,057	0,907	1,233
• No	4.339	21,6	15.707	78,4	20.046	-	1		

**Table 3: Multivariate Final Modeling**

Variable	p-value	OR	95% CI
<b>Age</b>			
• ≥ 35 years old	0,0001	1,440	1,336-1,553
• < 35 years old	-	1	-
<b>Education</b>			
• High	0,0001	1,886	1,395-2,549
• Intermediate high	0,438	1,122	0,838-1,552
• First Level	0,442	0,891	0,665-1,195
• No school	-	1	-
<b>Parity</b>			
• >2	0,0001	1,793	1,666-1,930
• 0-2	-	1	-

Variable	p-value	OR	95% CI
<b>Contraceptive information from electronic media</b>			
• Yes	0,023	1,085	1,011-1,165
• No	-	1	-
<b>Contraceptive information from print media</b>			
• Yes	0,009	1,150	1,036-1,276
• No	-	1	-

From the multivariate results above, it is known that the variables related to the use of long-term contraceptive method (LTCM) are variables of age, education, parity, KB information from electronic media, and KB information from print media.

In this data the dominant variable related to the use of LTCM is the education variable. The results of the analysis found OR respondents with higher education amounting to 1,886 means that respondents with higher education had a tendency to use LTCM 1.88 times compared to respondents who did not go to school after controlling for the variables of age, education, KB information from electronic and print media.

### Discussion

The level of LTCM contraceptive use in Indonesia is still very low compared to non LTCM contraceptive use such as injections and pills. Most WUS in Indonesia use Non LTCM contraception (87%). This is in line with WHO data in 2011 showing that LTCM users, especially IUDs in developing countries, are less desirable<sup>(5)</sup>.

The results of the analysis showed that there was a significant relationship between the age of the respondents and the use of LTCM. respondents aged  $\geq 35$  years had a tendency 1.4 times higher to use LTCM than respondents aged  $< 35$  years. This is in line with the Harzif study (2018) that age determines the choice of contraception type, at the age of  $> 30$  years the user considers the long-term effects of contraceptive use<sup>(6)</sup>.

Another factor is the number of respondents' parity. The results of the analysis show that there is a significant relationship between the amount of parity and the use of LTCM. Respondents with parity  $> 2$  had a 1.79 times higher chance to use LTCM than respondents with a parity of 0-2. The amount of parity is related to the number of children owned. The greater the number of living children a person has the more likely it is to limit

births. By looking at the number of children born alive also found positive relationships, meaning that older age reflects the process of changing families and can also show the process of changing fertility between times<sup>(7)</sup>. This is in line with Lindh's research that parity affects the choice of contraception<sup>(8)</sup>.

The results of the analysis of respondents' educational factors indicate that LTCM contraceptive use has an opportunity of 1.88 times in mothers with higher education compared to respondents who have never received an education/no school. Respondents with secondary education had a tendency of 1.12 times to use LTCM compared to respondents who did not go to school. While respondents with first level education had a tendency of 0.89 times using LTCM compared to respondents who did not go to school. The higher the level of education will affect the mother's insight and knowledge the more information related to health, especially contraception the better in determining the type of contraception that will be used. This is in line with Larsson's research in sub-Saharan Africa that the level of education is influential in choosing the type of contraceptive method<sup>(9)</sup>.

Exposure to information media both electronically and print has a role in the selection of community contraception, this is evidenced by the results of analysis which shows that there is a significant relationship between electronic information media and print media (magazines, lifleat, posters, etc.) with the use of LTCM. Mothers who are exposed to information through electronic media and print media have an opportunity that is 1.1 times greater for using LTCM compared to mothers who are not exposed to information on electronic media and print media. This is in line with research in the arumer district in Arusha showing that mass media have a major influence on the use of female contraception with promotions that are broadcast on television and radio<sup>(10)</sup>.

Factors visited by family planning staff proved to have no relationship with the use of LTCM. This is in line with the research of Laksmi (2017) which shows that there is no significant relationship between visits by family planning officers and the use of LTCM. Because officers who make visits to people's homes will certainly increase public knowledge about the types of contraceptives and their side effects so that people can choose the method according to their conditions<sup>(11)</sup>.

The results of the statistical analysis show that there is no relationship between the area of residence and the use of LTCM. This is in agreement with Albalushi research (2015) which shows that contraceptive enthusiasts are more in urban areas compared to rural areas<sup>(12)</sup>.

The wealth proof proved that there was no relationship with the use of LTCM. This is contrary to the results of Rourke's (2015) study which explains that wealth conditions are associated with contraceptive use especially at the richest level<sup>(13)</sup>.

### Conclusion

Based on the analysis that has been done For the dependent and independent variables, we can conclude, among others: the most widely used contraceptive method by WUS in Indonesia in 2017 is Non LTCM, which is 78%. The average LTCM user at WUS aged > 35 with a higher education background and having a parity > 2 and in the highest wealth quintile. Factors proven to be related to the use of LTCM are age, education, parity, information from electronic media, and information from print media. The dominant factor is the respondent's education factor. Whereas factors not related to the use of LTCM were factors in field staff visits, factors in wealth quintiles and factors of residence.

**Acknowledgment:** In the name of the authors, we would like to thank BKKBN for providing research data and willing to allow Indonesia Demographic Health Survey 2017 data to be analyzed.

**Ethical Clearance:** Demographic health survey

**Source of Funding:** No funding required

**Conflict of Interest:** there were no conflicts of interest in this study

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# A Research Instrument for Vaccine Information Seeking and Vaccine Hesitancy

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## Abstract

Vaccine hesitancy has been a complex, dynamic yet interesting topic of discussion. Vaccine information seeking has been on to observe because it doesn't just give us an insight as to why people sought vaccine information, it also helps to provide clarity as to what they may be looking for. Therefore, it will be interesting to conceptualize the phenomenon so that a measuring instrument can be created for researchers in this field. The study made use of (n=100) respondents in the pilot testing of this instrument. The instrument was tested for reliability and validity using the Statistical Package for the Social Sciences (SPSS) version 25 for the Cronbach alpha and exploratory factor analysis (EFA).

**Keywords:** Vaccine hesitancy, Health Information seeking, source of information, Vaccine confidence demography and Parents Exploratory analysis.

## Introduction

**A research instrument for information seeking and vaccine hesitancy:** One of the human communication issues pushed and researched about by scholars in human communication over the last decade has been the link between health information seeking and vaccine hesitancy. The question of the "What" "Where", "when" "Why" and "How" parents seek vaccine information has been one of the major challenges of the World Health Organization (WHO)<sup>[1]</sup> This challenge has led to the development of instruments by various scholars like<sup>[2];[3];[4][5]</sup>. These scholars have laid a blueprint for studies in information seeking and vaccine hesitancy. For example, a study is to be carried out in Malaysia to examine the relationship between

information seeking and vaccine hesitancy. In this study the researcher would use<sup>[6]</sup> Information seeking model to explain the issue of vaccine hesitation in Malaysia.

The objective to this study basically is to create a valid and reliable survey instrument for researchers that seek to examine information seeking on vaccine hesitancy. Furthermore, this study would also serve as a guild for scholars who wish to develop their own research instrument.

**Information Seeking Model:** Wilson<sup>[6]</sup> defined information-seeking behaviour as an activity an individual may engage in when the need for information occurs, this would result to searching for the information in any way, used or transfer the information to fulfil the need.<sup>[7]</sup> Information seeking model has two propositions;

**Information is a secondary need that arises out of a basic need to satisfy an information thirst:** This means that if there is no quest or need for a particular knowledge a person might and won't probably seek out information. Basically the content of information determines or drives the quest for information sought.

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The context of vaccine information search as explained by<sup>[8]</sup> are vaccine efficacy (vaccine effectiveness over time and rate), vaccine availability (if vaccines can be obtained in a variety of locations, and the minimum time to wait in line for it. Vaccine affordability (if vaccines are affordable for and are worth the money been paid for). Vaccine trust (zero tolerance is given to vaccine ineffectiveness, so parents are on the lookout for vaccines without side effects). Vaccine dosage (the amount of vaccine to be collected, if such dosage is too much for the immune system).<sup>[9]</sup>

In order to discover this information need he/she might encounter some personal, role-related or environmental barriers. In the quest to get the information sought the enquirer or seeker is likely to meet barriers of different kinds<sup>[10]</sup>. These barriers such as (e.g. demographics, psychological, cognitive, affective, and environments might affect the results or shape seekers mind and understanding of the information. This explains the use of demography as barriers in the model and instrument. For example, a study by Moran et al. explained that the choice of source for vaccine information may vary by ethnicity, as African Americans use or trust newspapers for health-related information, while non-Hispanic Whites trust health providers and also seek them out for health-related information. Mexican Americans talk to friends about health information but trust more in what their mothers have to say and build strong vaccine beliefs on them. Although the internet is the most popular source for health-related information<sup>[11]</sup>

**Vaccine Hesitancy:** Vaccine hesitancy (VH) as defined by World Health Organization (WHO) in conjunction with Report of the SAGE (Strategic Advisory Group of Experts) is the refusal or delay of vaccination by a parent or an individual. Vaccine hesitancy is a context-specific, complex, varying across time, influenced by factors such as “confidence”, “complacency” and “convenience”<sup>[19]</sup>. Confidence is defined as trust in the safety and effectiveness of vaccines and vaccinations. This is evaluated by the competence, reliability, and durability of healthcare providers. This is seen as the very first step towards vaccinations. If this trust is broken, then prevention of vaccine hesitation is almost impossible<sup>[18]</sup>. Complacency is defined as when a parent or an individual’s perceived risks of Vaccine-preventable diseases (VPD) is low, leading such individual to erroneously conclude that vaccination is not necessary. This attitude could be towards a certain vaccine or vaccines. The ability of an individual or

parents to make a call on whether to vaccinate or not depending on the risk, gives a degree to which complacency can cause hesitancy<sup>[16]</sup>. Convenience is defined or measured by the affordability (the ability to pay for vaccination), availability (access to vaccination or healthcare providers), Affordability is a key factor evaluating vaccine hesitancy especially in the rural area. Some parents might want or seek vaccination but lack the funds for it. Ability to understand health language or vaccine contents, these factors can make a parent hesitant towards vaccination<sup>[17]</sup>.

**The Instrument:** The Survey method of quantitative research makes use of a questionnaire as an instrument for data collection. The questionnaire is a self-administrated instrument for data collection<sup>[12]</sup>. The close-ended questions provides a consistency of response, quantifying answer and facilitates a process for data analysis. According to<sup>[13]</sup> the Likert-scale is the most commonly used scale in survey research because after the respondents are assessed from their answers it makes it possible for the get a level of agreement with the subjects.<sup>[14]</sup> The instrument was designed using the proposed measuring instrument developed by examining a) Information seeking, this section will measure variables under the concept of information seeking; it will look at items such as the source of information b) Vaccine hesitancy, this section will look to observe the variables, i.e. consistency, complacency, convenience, and confidence, that identifies vaccine hesitancy and see which of them is more active.

**The Test Results:** The test was. Conducted in Malacca/Kedah. A total of 100 respondents were used in conducting the test. A response rate of a 100% was achieved in the self- administrated questionnaire.

**Profile of respondents in the pilot study:** The demographic data shows that the highest respondents were female (74), and male (26). The age distribution was 30-35 (34), 36-41 (25), 24-29 (20), 42-47 (13), 18-23 (5), and 48-53 (3). There were 39 Masters/PhD candidates, 30-degree students, 22 PhD holders, 5 STPM/Diploma and 4 STP holders. A good number of the respondents (46) lived within RM 1,000- RM 3,000, (39) RM 3, 001- RM 5,000, (6) RM 7,001- RM 9,000, (4) 5, 001 – RM 7,000, (3) Less than RM 1,000 (2) RM 9,000 and above. A total number of (68) represented the Malay ethnic group, (17) the Chinese ethnic group, (15) Indian ethnic group. Subsequently, (74) per cent of the respondents are Islam, (12) are Christians, (7)

Buddhist (6) Hindus, and (1) no religion respectively in the demographic data shown in table 3

**Reliability of the Instrument:** The Cronbach's alpha is a popular statistics tool used to measure coefficient based reliability consistency. This coefficient ranges from 0.00 to 1.00. Literature suggested that a coefficient of 0.70 is of a high value and such questions or constructs are reliable [23]. The table below shows that the constructs have a high coefficient. The items under "VH Complacency" seems to have the lowest value of 0.754, which according to literature that's high enough and reliable. Thus, we can say this instrument is good enough and reliable for the intended study [15].

**The Exploratory Factor Analysis (EFA):** Gaskin [20] defined the EFA as a statistical package on SPSS that enables the researcher with the information of many indicators which are needed within a model to provide the best data. First, an Exploratory factor analysis will be used to reduce data to a smaller set of summary variables and explore the underlying structure (theoretical) of the phenomena. This technique is employed in order to determine the number of variables underlying one general variable or construct [21]. This technique will enable the researcher to identify a set of latent constructs underlying by measured variables. Hair, Black, Babin, and Anderson, (2014) categorized these EFA loadings using another rule of thumb as (0.30 minimal), (0.40, important), and (0.50, practically significant). For example, if no correlations go beyond 0.30 the researcher might have to reconsider whether factor analysis is the appropriate statistical method. A factorability of 0.3 accounts for approximately 30% relationship within the data. However, it could also be a case of multicollinearity.

**The EFA Test:** The data was analysed using SPSS 25, for this test, some certain factors were put into consideration, factors like Rotation type, extraction, factor structure, Discriminant validity, convergent validity and of course new reliability.

**Rotation Type:** The Orthogonal rotation types of

rotations (varimax, Quartimax, Equimax) are used to minimise the numbers of variables in extreme loadings. These rotations make it easy for the researcher to identify indicators without a factor in the model [22]. It is used in a model where factors are not correlated nor have any relationship with one another. While the Oblique rotation types of rotation (Direct oblimin, Promax) are used in a model where factors are allowed to correlated [20]. For this study the researcher will be using the promax rotation because it is best for a larger dataset of indicators and it computes faster than the direct oblimin rotation.

**Extraction Type:** Extraction can be done using three main method,

(I) Principal Component analysis (PAC) which uses results from an orthogonal rotation, mostly when factors are uncorrelated. (ii) Principal axis factoring (PAF) seeks variability of common factors, taking out the unexplained variability and uniqueness from the model. It is also best for co-variation data. (iii) Maximum likelihood (ML) this model provides model fit estimates and maximizes the difference between factors in the model [20]. This extraction type is similar to the type used in AMOS for CFA. The ML would be used to extract the data because AMOS is the package that would be used for the CFA.

**Convergent and Discriminant Validity:** Hair et al., (2014) explained that convergent validity is archived when the variables within a single factor in the model are highly correlated. These loadings are from 0.20 -0.75 and are determined by the sample size of the dataset. However, it is best to have loadings averaging, or out to greater than 0.700, and minimum loading greater than 0.500. Discriminant validity is the degree to which two or more similar concepts are distinct [20]. The KMO statistics showed 0.713 which means we have a middling result according to [22] which is acceptable. Bartlett's test is also significant.

According to [14] a cumulative variance of 50% is acceptable. The cumulative variance is at 63.8% which is good and acceptable for the model.

**Table 1: Total variance explained**

Factor	Total	Initial Eigen values % of Variance	Cumulative %	Total	Extraction Sums of Squared Loadings % of Variance	Cumulative %	Rotation Sums of Squared Loadings Total
1	4.310	22.682	22.682	3.772	19.854	19.854	3.164
2	3.267	17.195	39.877	3.063	16.119	35.973	2.851
3	2.531	13.319	53.196	2.168	11.408	47.381	3.020
4	2.005	10.551	63.747	1.598	8.413	55.794	2.581
5	1.778	9.357	73.104	1.525	8.026	63.820	2.112
6	.829	4.362	77.466				
7	.724	3.810	81.276				
8	.605	3.185	84.462				
9	.447	2.354	86.816				
10	.434	2.282	89.098				
11	.328	1.727	90.825				
12	.325	1.709	92.534				
13	.304	1.600	94.134				
14	.242	1.276	95.410				
15	.235	1.238	96.647				
16	.192	1.009	97.656				
17	.164	.862	98.519				
18	.147	.775	99.293				
19	.134	.707	100.000				

**Table 2: Factor Pattern Matrix**

		1	2	3	4	5
VHCONFIDENCE14	I think vaccines are reliable	.886				
VHCONFIDENCE15	I trust that vaccinations help increase my child’s immune system	.824				
VHCONFIDENCE13	I don’t think a past event would stop me from getting a child vaccinated.	.768				
VHCONFIDENCE12	I believe vaccines are safe for my children	.738				
SOVI10	I seek vaccine information from the/a Television station		.881			
SOVI9	I seek vaccine information from Magazines		.863			
SOVI8	I seek vaccine information from newspapers		.776			
SOVI11	I seek vaccine information from a radio station		.728			
COV3	I search for vaccine cost.			.815		
COV4	I search for vaccine contents.			.752		
COV6	I search for oral vaccines.			.686		
COV5	I search for vaccine frequency.			.643		
COV7	I search for vaccine injections.			.597		
VHCONVENIENCE6	The relationship between my healthcare provider and I might affect my vaccination choices.				.899	

		1	2	3	4	5
VHCONVENIENCE5	The manufacturer of the vaccine might prevent me from vaccinating my child.				.840	
VHCONVENIENCE7	I think the vaccine dosage is enough.				.814	
VHCOMPLANCENCY3	I think it is better for my child to develop immunity by getting sick than to get a shot.					.796
VHCOMPLANCENCY4	I have delayed having my child vaccinated for reasons other than illness or allergy.					.787
VHCOMPLANCENCY2	I don't think vaccines are needed since the diseases are rare.					.707

**Extraction Method:** Maximum Likelihood.

**Rotation Method:** Promax with Kaiser Normalization.

**a. Rotation converged in 5 iterations:** Table 6 above showed the account of extracted factors from the model. In the extraction, as stated above the method of extraction was Maximum likelihood, rotation Promax, and factors lesser than ( $<$ ) 0.05 were not shown. Factors with cross-loadings and missing loadings were also taken out of the model. This process was done with caution not to allow the statistics to drive the theory, in steady the theory drove the statistics. Although after identifying the factors that fit within the theoretical factor structure, some constructs were left with 3 indicators which according to<sup>[22]</sup> Hair<sup>[21]</sup> is sufficient or acceptable given that the reliability test is higher than 0.06.

### Conclusion

This methodological and statistical contribution to knowledge by the use of a second generation statistical package has helped to create a valid and reliable instrument that can serve as a footprint for future researchers who wish to examine this phenomenon. This study can also serve as a guild to scholars who wish to develop their own instrument for any study in any field of discipline. As a conclusion, a good EFA model fit, shows evidence of good construct validity. A poorly performing item or loading may be retained to satisfy statistical identification requirements. However, a referrer to theory should always serve as a guild in testing and model fit.

**Ethical Clearance:** Taken from Universiti Putra Malaysia Ethics Committee (JKEUPM).

Ref no- JKEUPM-2019-248.

**Source of Funding:** Self.

**Conflict of Interest:** Nil.

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# The Relationship between Vaccine Information Seeking and Vaccine Confidence

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## Abstract

Vaccine hesitancy has been a complex, dynamic yet interesting topic of discussion. Vaccine information seeking has been on to observe because it doesn't just give us an insight as to why people sought vaccine information, it also helps provide clarity as to what they may be looking for. Therefore, it will be interesting to examine the relationship between vaccine information seeking, and vaccine confidence. This paper will employ the use of quantitative research using the survey method. Using a sample size of n =100. The findings showed that there was significant relationship between the content of vaccine information and vaccine confidence and that the source of vaccine information does not really affect vaccine confidence.

**Keywords:** Vaccine hesitancy, Health Information seeking, source of information, Vaccine confidence demography and Parents.

## Introduction

Vaccine confidence can be defined as the belief or faith in the safety of the healthcare system and effectiveness in vaccines. Public vaccine confidence can also be explained as the total acceptance and trust that vaccination is in the best interest of the public/parents<sup>1</sup>. Jody<sup>7</sup> explained that childhood vaccination have brought about significant benefits in terms of socio-economical, communal and to the individual. However, there has been lots of failed vaccination agendas due to one reason or the other. The choice or acceptance of vaccination can be measured by the level of confidence parents have in vaccination. Jody et al continued that, some parents tend to see vaccination as some pharmaceutical/government

propaganda<sup>7</sup>. Politi<sup>2</sup>, reported that an unvaccinated French boy caused the first measles case in Costa-Rica in five years. The report stated that the parents of the boy admitted to have never vaccinated the boy. Stories like this could explain why the WHO enlisted "Vaccine hesitancy" as one of the top 10 global health issues of 2019<sup>2</sup>.

A study by Larson HJ,<sup>5</sup> showed that, parents in the United Kingdom (UK) showed more confidence in vaccination when compared to parents in countries like Nigeria, Pakistan and India. Glanz et al.,<sup>9</sup> reported that parents who have a lower level of confidence or trust in their pediatrician's advice (70%) will mostly refuse or delay vaccination. These parents also believe pediatricians also report or advise them on only the benefits of vaccines and not the risk or side effects if any, so this makes them question the of the information received<sup>9</sup>. While for some parents, it was the Adverse events following immunization (AEFI). According to<sup>10</sup> AEFI such as mild fever and a sore arm, these effects can settle without treatment and don't have a long-term consequence<sup>10</sup>. On a very rare occasion would a

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serious adverse reaction occur. In countries around all the globe from Europe, to a few Asian and African countries AEFI is one of the perceived causes for loss of public trust in vaccination process the resurgence of vaccine-preventable diseases (VPD) and change in health policies<sup>10</sup>.

Chaudhuri et al.<sup>11</sup> in their study, stated that people or parents reaction to vaccination maybe from the kind and source of health information they consume. Chaudhuri et al continued that the health seeking behavior of older adults, made used of sociodemographic as a barrier to understand information seeking and how it controls information retrievals. These items were included to get a better understanding as to what prevents adults from retrieving information and understanding it. Wilson defines 'information behavior' or 'information seeking behavior' as a need that arises in order to fill a knowledge quest or to satisfy an information need. This information sought begins with an ideology of the content of information the seeker has in mind<sup>13</sup>. Wilson<sup>13</sup> information seeking model, has two propositions (a) information is a secondary need that arises out of a basic need to satisfy an information thirst,

This means that if there is no quest or need for a particular knowledge a person might and won't probably seek out information. Basically the content of information determines or drives the quest for information sought. The context of vaccine information search as explained by<sup>12</sup> were vaccine efficacy (vaccine effectiveness over time and rate), vaccine availability (if vaccines can be obtained in a variety of locations, and the minimum time to wait in line for it. Vaccine affordability (if vaccines were affordable for and were worth the money been paid for). Vaccine trust (zero tolerance is given to vaccine ineffectiveness, so parents were on the lookout for vaccines without side effects). Vaccine dosage (the amount of vaccine to be collected, if such dosage is too much for the immune system)<sup>12</sup>. Similarly,<sup>14</sup> examined parental vaccine information sources, results show internet (41%) is the most used source of information by parents, followed by Doctors (26%), nurses (23%), family (21%), friends (18%). Among parents who used the internet (49%) of them check for information on health sites and vaccine-related pages, while others (29%) search Google. Irene et al, also stated that vaccine information choices might influence vaccine beliefs, some parents likely said that they would like to receive and be informed about vaccination either during pregnancy or childbirth. This brings us to the main purpose or objectives of the study,

- A. To examine the relationship between of source of information and vaccine confidence
- B. To examine the relationship between content of information need and vaccine confidence.

### Hypotheses:

H1- There is a relationship between source of information and vaccine confidence.

H2- There is a relationship between content of information and vaccine confidence.

### Method

A purposive sampling method was used in the Survey method of the quantitative research, with the use of a questionnaire as an instrument for data collection. The research instrument for this study was developed on a Likert-scale of five. The Likert-scale consist of a measuring scale of 1-5 namely 'strongly agree, agree, neutral, disagree and strongly disagree. According to<sup>3</sup> the Likert-scale is the most commonly used scale in survey research because after the respondents were assessed from their answers it makes it possible for the get a level of agreement with the subjects<sup>3</sup>. The instrument was designed using the proposed measuring instrument developed by the World Health Organization in conjunction with the Strategic Advisory Group of experts on vaccine hesitancy<sup>4</sup>. However the researcher also adopts and adapt from previous studies on vaccine hesitancy studies such as<sup>9, 12, 13, 15</sup>. The survey instrument will consist of 3 sections; a) Demographics, this section will contain questions such as age, gender, level of income, level of education, religion and ethnicity.

- b. Information seeking, this section will measure variables under the concept of information seeking, it will look at items such as the source of information.
- c. Vaccine confidence, that identifies vaccine confidence identifiers. Data collection in Malacca and Kedah consisted of 100 respondents. The data was analysed using both descriptive (demography and mean representation) and inferential (Pearson correlation) statistics.

### Results

The test was conducted in Malacca/Kedah. A total of 100 respondents were used in conducting the test. A response rate of a 100% was achieved in the self-administrated questionnaire.

In order to measure the reliability of the instrument the Cronbach's alpha was used. Hair et al.<sup>18</sup> explained that the consistency and stability of the instrument help to assess the "goodness" of a measure. The Cronbach's alpha is a popular statistics tool used to measure coefficient based reliability consistency. This coefficient ranges from 0.00 to 1.00. literature suggested that a coefficient of 0.70 is of a high value and such questions or constructs were reliable<sup>18</sup>. The table below shows the constructs have a high coefficient Thus, we can say this instrument is good enough and reliable for the intended study.

**Table 1: Cronbach Alpha**

Variables	No. of Items	Cronbach's Alpha
Source of vaccine information	11	.825
Content of Vaccine information	7	.867
VH Confidence	16	.900

The table below showed that the highest respondents were female (74), and male (26). The age distribution was 30-35 (34), 36-41 (25), 24-29 (20), 42-47 (13), 18-23 (5), 48-53 (3). There were 39 Masters/PhD candidates, 30-degree students, 22 PhD holders, 5 STPM/Diploma and 4 STP holders. A good number of the respondents (46) lived within RM 1,000- RM 3,000, (39) RM 3,001- RM 5,000, (6) RM 7,001- RM 9,000, (4) 5,001 – RM 7,000, (3) Less than RM 1,000 (2) RM 9,000 and above. A total number of (68) represented the Malay ethnic group, (17) the Chinese ethnic group, (15) Indian ethnic group. Subsequently, (74) per cent of the respondents are Islamic, (12) are Christians, (7) Buddhist (6) Hinduism, and (1) no religion respectively in the demographic data shown in table 2.

**Table 2: Demography of respondents**

Profile	Item	Frequency	Percentage
Age	30-35	34	34
	36-41	25	25
	24-29	20	20
	42-47	13	13
	18-23	5	5
	48-53	3	3
	<b>Total</b>	<b>100</b>	<b>100</b>
Gender	Female	74	74
	Male	26	26
	<b>Total</b>	<b>100</b>	<b>100</b>
Income	RM 1,000 - RM 3,000	46	46
	RM 3,001 - RM 5,000	39	39
	RM 7001 - RM 9000	6	6
	RM 5,001 - RM 7,000	4	4
	Less than RM 1,000	3	3
	RM 9,000 AND ABOVE	2	2
	<b>Total</b>	<b>100</b>	<b>100</b>
Education	Master/PhD	39	39
	Degree	30	30
	PhD	22	22
	STPM/Diploma	5	5
	STD	4	4
	<b>Total</b>	<b>100</b>	<b>100</b>



Profile	Item	Frequency	Percentage
Religion	Islam	74	74
	Christian	12	12
	Buddhism	7	7
	Hinduism	6	6
	No Religion	1	1
	<b>Total</b>	<b>100</b>	<b>100</b>
Ethnicity	Malay	68	68
	Chinese	17	17
	Indian	15	15
	<b>Total</b>	<b>100</b>	<b>100</b>

The regression table below shows that there source of information does not correlates with vaccine confident level of parents with a Sig value of 0.630. Therefore the first hypothesis of the study is rejected.

H1- There is a relationship between source of information and vaccine confidence.

However, there seems to be a correlated relationship between the content of information sough and vaccine confidence. The Sig value is at .000 therefore the second hypothesis of the study is accepted.

H2- There is a relationship between content of information and vaccine confidence.

**Table 3: Pearson correlation**

	B	Std. Error	Beta	t	Sig.	Lower Bound	Upper Bound
(Constant)	30.536	5.654		5.401	.000	19.314	41.758
ADDSOVI	.062	.127	.043	.484	.630	-.191	.314
ADDCOV	.952	.175	.487	5.431	.000	.604	1.300

**Discussion**

The first objective of this study was to examine the relationship between source of information and vaccine confidence. In order to examine this relationship, respondents were asked what was there preferred source of vaccine information. The respondents majorly agreed to seeking vaccine information on from a television station (M=3.15, n=100). When compared to other sources like family, friends, internet, magazines, doctors, newspapers and a radio station. However, results from the correlation showed that there were no relationship between source of vaccine information and vaccine confidence. The source of vaccine information does not affect how the (respondents) parents feel about vaccination. They parents don't really believe that what

they see on television were convincing enough to make them think vaccines are reliable or if vaccinating will help increase the immune system of their children. These results are similar with studies by <sup>5</sup>, why they illustrated that vaccines confidence level are dependent on a lot of factors like dosage, effect and timing and method of administration. However, studies by Moran et al.,<sup>14</sup> found a relationship between source of vaccine information and vaccine complacency. Vaccine complacency as defined by World Health Organization (WHO) in conjunction with Report of the SAGE (Strategic Advisory Group of Experts) as when a parent or an individual's perceived risks of Vaccine-preventable diseases (VPD) is low, leading such individual to erroneously conclude that vaccination was not necessary. This attitude could be

towards a certain vaccine or vaccines. The ability of an individual or parents to make a call on whether to vaccinate or not depending on the risk gives a degree to which complacency can cause hesitancy<sup>4</sup>.

The second objective of the study was to examine the relationship between content of information need and vaccine confidence. Respondents (parents) agreed to sought out information about vaccine content (M3.44, n=100), when compared to vaccine frequency, cost and method of administration. However, there was a significant relationship between the content of information and vaccine confidence. The content of a particular vaccine thus affect the confidence parents have towards such vaccines. For example, <sup>6</sup> explained that some parents skip vaccination in Malaysia because it contains Pigdeoxyribonucleic acid(DNA).

### Conclusion

The content of vaccines have proven to be one of the key parametric of vaccine hesitancy. Parents pay a lot of attention to things like dosage, cost, ingredients, effects and method administration. Moreover, because vaccination is such a sensitive topic, it is always difficult to pin point what triggers refusal. We can only continue to build assumptions on results of studies like this. It is really not surprising that the source of vaccine information does not affect vaccine confidence because, parents actually use that as a means to satisfy their urge for vaccine information. However as stated above, some studies have found the relationship between source of information and vaccine complacency. Future studies might want to try to further examine that effect to great lengths.

**Ethical Clearance:** Taken from Universiti Putra Malaysia Ethics Committee (JKEUPM).

Ref no- JKEUPM-2019-248.

**Source of Funding:** Self.

**Conflict of Interest:** Nil.

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# Characteristics of Down Syndrome Children with Delayed Speech and Hearing Loss in Audiology Clinic, Dr. Soetomo Surabaya Hospital

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## Abstract

**Background:** Down syndrome is a pathology related to trisomy 21 chromosome. The incidence of Down syndrome is approximately 1/1000 births in some countries. The syndrome is commonly associated with the risks of developmental delays, difficulties in speech and hearing loss.

**Objectives:** To determine the prevalence and characteristics of children with Down syndrome suffered from delayed speech and hearing loss in Audiology Clinic, Dr. Soetomo Hospital, Surabaya from January 2013-December 2017. **Method:** This study is an observational analysis with cross-sectional retrospective design on the patient's medical record.

**Results:** Thirty patients were diagnosed with delayed speech amongst the Down syndrome children; 19 (63.3%) were males; 11 (36.7%) were females. The most frequent was in the age group of >1-2 years [8 patients (26.7%)]; the least was in the age group of 4-6 months [1 patient (3.3%)]. Hearing loss was found in 21 patients (70%) and the rest had normal hearing [9 patients, (30%)]. Amongst the first group, 1 patient (3.3%) had profound hearing loss, 8 patients (26.7%) had severe hearing loss, 11 patients (36.7%) had moderate hearing loss and 1 patient (3.3%) had mild hearing loss. Two patients (6.7%) had prenatal problem, 2 patients (6.7%) had natal problem, 7 patients (23.3%) had post-natal problem. Amongst these, 1 patient (3.3%) had prenatal and natal problems, 5 patients (16.7%) had natal and post-natal problems, 1 patient (3.3%) had prenatal and post-natal problems, 3 patients (10%) had prenatal, natal and post-natal problems, and the rests had no recorded problems.

**Conclusion:** Hearing loss was prevalent in Down Syndrome children with delayed speech. This might be correlated to the prenatal, natal, post-natal health risk problems. The hearing loss should be considered during treatment of speech delay in Down Syndrome children.

**Keywords:** *Delayed speech, hearing loss, Down syndrome.*

## Introduction

Down syndrome is correlated to trisomy 21 chromosomes and accepted to be the major cause of Down syndrome, accounting for about 95% of cases.<sup>1,2,3</sup> The cause of the extra full or partial chromosome is still unknown. This syndrome associated with some phenotypes i.e. disability of learning, cardiac abnormalities, brain development, physical and mental disorder the risk of early Alzheimer's disease,

and leukemia in childhood.<sup>4</sup> The incidence of Down syndrome has been predicted around 1/1000 live births in some countries. This syndrome is also associated with delayed development, hearing loss, and delayed speech.<sup>4</sup>

Worldwide the number of Down syndrome patients was predicted around 8 million people. This syndrome is the most frequently occurring chromosomal abnormality in humans and affecting between 1 in 400 until 1500 babies born in different populations, depending on

maternal age, and prenatal screening schedules.<sup>1,5,6</sup> The incidence of Down syndrome is approximately 1 in 1000 births. In USA, 3000 until 5000 births of children in a year is suffered from this condition. Based on the data from Indonesia Center for Biodiversity and Biotechnology (ICBB), there was more than 300,000 of Down syndrome children in Indonesia.<sup>7</sup>

Down syndrome children need specific care from their parents. One of the common health problems are hearing disorder and delayed speech. Children must be able to mumble in the age of 2 until 4 months. However, in Down syndrome children with hearing loss, they could be suffering from delayed speech at the age of 2-5 years. When not detected and treated properly, these may develop into a socioeconomic problem for these children and their parents. Thus controlling children ear hygiene and parental awareness of hearing loss potential play a vital role.<sup>8</sup> Identification of hearing loss and awareness of its implications in children with Down syndrome is very important because it will adversely affect cognitive abilities, sentence imitation, language comprehension, speed of word processing, and sensitivity to short acoustics.<sup>9</sup> However, not every child with Down syndrome has the same problems or associated conditions. Parents of children with Down syndrome should be aware of these possible conditions so they can be diagnosed and treated quickly and appropriately.

To increase public awareness, we conducted a study of the prevalence and characteristics in Down syndrome children with delayed speech and hearing loss in the Audiology clinic at Dr Soetomo General Hospital, Surabaya from January 2013 – December 2017.

**Material and Method**

This was an observational analysis with cross-sectional retrospective design on the patient’s medical record in the Audiology clinic at Dr Soetomo General Hospital, Surabaya from January 2013 until December 2017 which had been ethically legalize before. The assessment was speech development based on the Milestone.<sup>10</sup> All data were analyzed using SPSS 17.

**Findings:** This study selected 30 data of patient’s medical record which had complete data in the Audiology clinic at Dr Soetomo General Hospital, Surabaya from January 2013 until December 2017.

**Table 1. The distribution of gender subject**

Gender	n
Male	19 (63.3%)
Female	11 (36.7%)
Total	30

Based on the data table 1, delayed speech in Down syndrome children occur more in male patient 19 patients than female.

**Table 2. The distribution age of subject**

Age	n
4 – 6 months	1 (3.3%)
>6 – 12 months	3 (10%)
>1 – 2 years	8 (26.7%)
>2 – 3 years	5 (16.7%)
>3 – 4 years	5 (16.7%)
>4 – 5 years	3 (10%)
>5 – 8 years	5 (16.7%)

Based on the data table 2, delayed speech in Down syndrome children occur more in the age group of more than 1 until 2 years, and the least was in the age group of 4 until 6 months.

**Table 3. The distribution health risk factor in prenatal and peri-natal period of mother’s subject**

Prenatal Period	n
Hypertension	2 (6.7%)
Heart disease	1 (3.3%)
Accident	1 (3.3%)
Pulmonary TB	1 (3.3%)
Drugs user	2 (6.7%)
Normal	23 (76.7%)
Perinatal Period	n
Sectio caesaria	8 (26.7%)
Normal	22 (73.3%)

Based on the data table 3 the most frequent health risk factor in prenatal period was hypertension and drugs user. In peri-natal period the most frequent health risk factor was normal labor.

**Table 4. The distribution health risk factor in natal period of mother's subject.**

Natal Period	n
Premature	3 (10%)
Low birth weight	2 (6.7%)
Placenta calcification	1 (3.3%)
Rupture of membranes	2 (6.7%)
Birth without crying	3 (10%)
Normal	19 (63.3%)

Based on the data table 4 the most frequent health risk factor in natal period was premature and birth without crying.

**Table 5. The distribution health risk factor in post-natal period of mother's subject**

Post-natal Period	n
Jaundice	3 (10%)
Seizure	4 (13.3%)
Pulmonary infection	4 (13.3%)
High fever	2 (6.7%)
Surgery	1 (3.3%)
Cardiac abnormalities	2 (6.7%)
Normal	14 (46.7%)

Based on the data table 5 the most frequent health risk factor in post-natal period was seizure and pulmonary infection.

**Table 6. The distribution hearing threshold level of Down syndrome patients with delayed speech.**

Hearing threshold	n
Normal	9 (30%)
Mild hearing loss	1 (3.3%)
Moderate hearing loss	11 (36.7%)
Severe hearing loss	8 (26.7%)
Profound hearing loss	1 (3.3%)
<b>Total</b>	<b>30</b>

Based on the data table 6 the most frequent level of hearing threshold in Down syndrome children with delayed speech was moderate hearing loss.

## Discussions

From 34 cases, 4 cases were excluded due to incomplete data. Thirty patients were diagnosed with delayed speech amongst the Down syndrome children; 19 (63.3%) were males; 11(36.7%) were females. In previous study conducted in RSUP Dr. Moh. Hoesin

Hospital, Palembang, Indonesia, delayed speech amongst non-Down syndrome children were found more in males than females (66.9% to 33.1%).<sup>11</sup> This is similar with what had been found in the current study: to certain extent this may be associated to the higher prevalence of Down syndrome in males compared to in females (55.8% : 44.2%).<sup>12</sup>

We found the most frequent number of Down syndrome with delayed speech and hearing syndrome was in the age group of >1-2 years[8 patients (26.7%)]; the least was in the age group of 4-6 months [1 patient (3.3%)]. In other study the most frequent delayed speech of Down syndrome children with hearing loss was in the age group of >1-2 years 26.8% whilst the least in age group of 6 months-1 year 6.6%.<sup>11</sup> At 4-6 months they cannot babble and do pronunciation speech with many different sounds including p, b, and m, chuckling and giggling, vocalizing vocabulary and displeasure, making a noise when alone and when playing with others. These children could babble at the age of more than 1 year but without meaning and do not understand when ordered; whereas in control group they are able to say more words every month, using several questions with one or two words ("Where is the cat?", "bye-bye", "What is that?"), placing two words together ("More cakes", "No juice", "Mother's book"), using many different consonant sounds from the beginning of the word.<sup>10</sup>

In this study, 2 patients (6.7%) had prenatal problem, 2 patients (6.7%) had natal problem, 7 patients (23.3%) had post-natal problem. Amongst these, 1 patient (3.3%) had prenatal and natal problems, 5 patients (16.7%) had natal and post-natal problems, 1 patient (3.3%) had prenatal and post-natal problems, 3 patients (10%) had prenatal, natal and post-natal problems, and the rests had no recorded problems. Patient with premature birth was 17% of total sample, however the etiology was not determined. Previous research reported that hearing loss was found in 53.3% of preterm births (with birth body weight <2500 grams).<sup>13</sup> The highest risk factors for post-natal period were seizures [4 patients, (13.3%)] and pulmonary infections [4 patients, (13.3%)]. Whereas previous study at Dr Moh. RSUP. Hoesin, Palembang showed that the most frequent risk factors in post-natal period were 20.8% infection and 12.8% head trauma.<sup>11</sup> Infections that can cause hearing disorders such as bacterial meningitis, intrauterine infections (CMV, rubella, herpes, syphilis, and toxoplasmosis).<sup>14</sup> The least health risk factors during the prenatal period were hypertension [2 patients (6.7%)] and medications

used [2 patients (6.7%)] in natal period was premature [3 patients, (10%)] and baby born without crying [3 patients, (10%)]. History of the use of herbs or medicines was also reported in Palembang although the type of herbs or medicines taken by patients are not cleared.<sup>11</sup>

We also found hearing loss based on the hearing threshold level which examined by using BOA (Behavioural Observational Audiometry). In this study, hearing loss was found in 21 patients (70%) and the rest had normal hearing [9 patients, (30%)]. Amongst the first group, 1 patient (3.3%) had profound hearing loss, 8 patients (26.7%) had severe hearing loss, 11 patients (36.7%) had moderate hearing loss, 1 patient (3.3%) had mild hearing loss. In other study, hearing loss was found in patient with delayed speech 6.3%. Lieu *et al*, described that bilateral disorders are more at risk of causing delayed speech in children than unilateral disorder, because in unilateral disorder, growth and development are still running.<sup>15</sup> The previous study reported that Down syndrome children with delayed speech has hearing loss due to the external ear canal being smaller than normal size and has stenosis, chronic ear diseases such as chronic rhinitis which can cause conductive, sensorineural and mixed hearing loss. Subglottic stenosis, vocal cord paralysis, and laryngomalacia are also common in Down Syndrome patients and can cause delayed speech.<sup>16</sup> In another study conducted by Tedeschi *et al.*, in the United States, hearing loss in children with Down syndrome with delayed speech is caused by long-term use of mechanical ventilation.<sup>17</sup>

### Conclusion

From the current study, hearing loss was prevalent in Down Syndrome children with delayed speech. This might be correlated to the prenatal, natal, post-natal health risk problems. The hearing loss should be considered during treatment of speech delay in Down Syndrome children.

**Conflict of Interest:** There was no conflict of interest in this study.

**Ethical Clearance:** The ethical clearance is granted from KEPK, Dr Soetomo General Hospital, Surabaya no. 0925/KEPK/II/2019.

**Source of Funding:** This study was supported by the authors.

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# The Pattern of Iron-source Food Consumption and its Relation with Adult Anemia (Data Analysis of Indonesian Family Life Survey 2014)

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## Abstract

**Introduction:** Anemia is a public health concern that impacts reduced present and future economic productivity of a nation. Therefore, it is important to determine the factors associated with anemia, especially in adults. **Objective:** The aim of this study was to determine the pattern of consumption (frequencies of consuming meat, egg, green vegetables and fruits), individual characteristics (sex, body mass index (BMI)), social economic status (working status, living area, spending on food), and physical activity the relationship between the previous stated factors with anemia, and to determine the dominant factors of anemia among adults on Java Island.

**Materials and Method:** Data of 1,178 adults on Java Island, Indonesia was obtained from the 2014 Indonesian Family Life Survey which was collected by the RAND Corporation. The study applied cross-sectional designed and data was analysed using *chi-square* statistical analysis.

**Results:** The average hemoglobin level among adults on Java Island was  $13.5 \pm 1.96$  g/dL; 22% of adults were anemic. While the proportion of anemia was significantly higher in adults who were female, unemployed, performed inadequate physical activity and consumed egg less frequently ( $p < 0.05$ ), there was no significant relationship between the consumption of iron-source food, except for egg, and anemia. After controlling for BMI and consumption frequency of meat and egg in multivariate analysis the dominant factor for anemia was sex.

**Conclusion:** On Java Island – Indonesia the risk of anemia is 1.8 times higher among adults who consume egg less frequently.

**Keywords:** Anemia, Adult, Iron-Source Food Consumption.

## Introduction

Anemia is a public health problem that requires attention due to its impact on human health and the

socioeconomic development of countries<sup>[1,2]</sup>. Anemia in adults decreases concentration and mental health, and leads to poor pregnancy outcome<sup>[3]</sup>. These three factors can reduce economic productivity at present and in the future<sup>[4]</sup>.

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According to the research of World Health Organization (WHO) in 2011, the global prevalence of anemia in non-pregnant women aged 15 – 49 years was 29%, while in South-East Asia was 45%<sup>[5]</sup>. In Indonesia the result of the National Basic Health Research in 2013 indicated that the prevalence of anemia in female adults

was 22.7% and in male adults was 16.6%<sup>[6]</sup>. Indonesia's anemia prevalence is similar to the neighboring countries, including Malaysia (20%), Singapore (22%), and Thailand (24%)<sup>[5]</sup>.

Anemia in adults is associated with both modifiable and un-modifiable factors. Unmodifiable factors associated with anemia are race and years of menstruating<sup>[7]</sup>, while modifiable factors are nutritional status, daily diet and physical activity. However the literature on the relation of iron-source food consumption frequency with anemia in adults, specifically on Java Island, is limited. Therefore, this study aimed at determining the pattern of iron-source food consumption and its relation with the anemia incidence in adults on Java Island.

## Method

This study applied a cross-sectional design based on the Indonesian Family Life Survey (IFLS) data from RAND Corporation, conducted in 2014 specifically for Java Island. This study has acquired approval from RAND Corporation. The target population of this study was female and male adults aged 21-26 years living on Java Island, a total of 1,641 adults. Of this population the samples for this study were 1,178 adults who met the inclusion criteria; which were having hemoglobin (Hb) and anthropometry data.

Independent variables consisted of sex, living area, body mass index (BMI), physical activity, parents' demographics (both parents' occupation status and education level), spending on food (meat, tofu, egg, vegetables and fruits) and frequency of consumption (meat, egg, fish, milk, green vegetables, fruits, rice, and fast-food). Data of BMI was measured in accordance with standardized procedure; data of socio-demographic characteristic and food consumption was obtained through interview using IFLS questionnaire. Anemia was determined based on the Hb level; respondents were stated to have anemia if their Hb level <12 g/dL (WHO, 2011). Data of anemia was measured by trained personnel using Hemocue. The physical activity variable was categorized into 'adequate' (< 600 METs/week) or 'inadequate' ( $\geq$  600 METs/week), living area as 'urban' or 'rural', working status as 'unemployed' and 'employed', spending on food as 'low' (< median) or 'high' ( $\geq$  median). Household spending was defined by the cost incurred by the family for the purchasing of meat or vegetables and fruits during the previous week.

Variables of consumption frequency were categorized as 'not frequent' (< 3 times/day) or 'frequent' ( $\geq$  3 times/day).

Statistical analyses consisted of univariate, bivariate and multivariate statistical analyses. Bivariate analysis in the form of chi-square tests determined the relationship between independent variables and our main dependent variable of anemia. Multivariate analysis in the form of multiple logistic regression tests was performed to determine the most dominant independent variable associated with anemia. A p-value of <0.05 was considered statistically significant. Multivariate analysis was performed using multiple logistic regression tests. Variables that could be included in the early model were sex, BMI, working status, physical activity, expenditure for rice consumption and consumption frequency of meat, fruit, rice, egg and fast-food. Then, one by one, variables with a p-value > 0.05 were excluded from the modeling. If there was a change in OR > 10% after the variable was excluded the variable was then put back in the modeling. However, if the change in OR was < 10% the variable could still be excluded. After the modeling was performed seven times the final modeling of multivariate analysis was obtained.

## Results

The respondents' average Hb level was 13.5 $\pm$ 1.96 g/dL, with a range of 7.10–19.5 g/dL. Across the sample, 22% of respondents had anemia. The average of respondents BMI was 22.59 $\pm$ 4.47 kg/m<sup>2</sup>, whereas the average of age was 23.92 $\pm$ 1.92 (Min – max = 21-26) years. Anemia occurred more frequently in adults who were female (38.5%), overweight (23.7%), unemployed (29.6%), perform an inadequate physical activity (26%) and live in rural area (22.5%). A significant relationship was found between anemia and sex (p<0.001), working status (p=0.001) and physical activity (p<0.001).

This study did not find a significant relationship between anemia and spending on various studied group of foods. Anemia occurred more frequently in adults with 'low' spending on meat (22.1%), tofu (23.4%), egg (23.5%), fruits (23.3%) and rice (24.1%). Meanwhile, we found a significant relationship between egg consumption frequency with anemia (p=0.002; OR = 1.85 [1.27-2.70]). The incidence of anemia was higher in adults with 'not frequent' consumption of egg (27.9%), meat (23.9%), fish (22.8%), fruits (24.2%) and rice (42.9%) and 'frequent' consumption of milk, green

vegetables and fast-food (23.1%, 21.6% and 25.9%, respectively).

The Results of the interaction test showed no interaction between sex and BMI, sex and meat consumption frequency, sex and egg consumption

frequency towards the incidence of anemia in adults. Female sex was the dominant factor contributing towards the incidence of anemia in adults aged in Java Island after controlling for variables of the BMI, meat consumption frequency and egg consumption frequency, as shown in table 1.

**Table 1. Early and final modeling of multivariate analysis factors associated with anaemia among adults on java island year 2014**

Variable	p-value	OR	CI 95%
<b>Early Modeling</b>			
Sex	0.998	0.000	0.000
Body Mass Index	0.597	1.089	0.794–1.492
Working Status	0.639	1.378	0.361–5.260
Physical Activity	0.567	1.529	0.357–6.554
Expenditure for Rice Consumption	0.331	3.370	0.290–39.088
Meat Consumption Frequency	0.583	1.883	0.197–18.021
Fruit Consumption Frequency	0.600	0.558	0.063–4.935
Rice Consumption Frequency	0.999	0.000	0.000
Egg Consumption Frequency	0.874	0.837	0.093–7.572
Fast-food Consumption Frequency	0.618	0.546	0.050–5.903
<b>Final Modeling</b>			
Sex	0.000	34.818	13.586–89.230
Body Mass Index	0.074	1.052	0.995–1.113
Meat Consumption Frequency	0.028	1.835	1.068–3.154
Egg Consumption Frequency	0.048	1.207	0.715–2.038

**Discussion**

The average Hb level in adults in Java Island in 2014 was 13.50 ± 1.96 g/dL, classified into the normal category. The prevalence of anemia in adults on Java Island in 2014 was 22%(males: 9%; females: 38.5%). Referring to the WHO classification the prevalence of anemia in adults is considered to be a mild public health issue<sup>[5]</sup>, particularly in males. However the prevalence of anemia in female adults is considered a moderate-level public health issue<sup>[5]</sup>. The prevalence of anemia in adults in Java Island was similar to the results of the 2013 National Basic Health Research, at both the national and Java Island levels<sup>[6]</sup>.

The present study found that sex was the

significantly dominant factor in anemia in adults on Java Island in 2014 after controlling for the variables of BMI, meat consumption frequency and egg consumption frequency. The logistic regression analysis indicates that female adults were 34 times more likely to have anemia than males. This is because females menstruate and subsequently reduce their plasma iron levels<sup>[2]</sup>.

We found that a higher BMI was associated with anemia in our cohort, more so than those with ‘normal’ and ‘underweight’, although this was not significant. This trend is in line with a prior study stating that female adults with a higher nutritional status have increased inflammatory activity of adipose tissue, resulting in decreased iron utilization in the body, despite sufficient

iron intake<sup>[8]</sup>. Consequently, adults with a higher nutritional status have a greater risk of anemia, which explains our current findings.

Anemia was found to be significantly associated with respondents' working status. We concluded that anemia was more prevalent among unemployed adults. Respondents' unemployment indicates that they have low educational background and poor socioeconomic status (SES). The low SES is associated with poorer access to iron-source food, including meat, as meat is considered to be expensive in Indonesia<sup>[9]</sup>. Low education increases the risk of anemia due to lack of health-related knowledge. On the other hand the prevalence of anemia is higher in unemployed adult probably due to the decreased of cognitive function and physical productivity<sup>[10]</sup>. Therefore, it is harder for adults with anemia to have a job.

Living area was not significantly related to anemia in adults in Java Island, which is in line with a study by Dhokar and Ray (2016)<sup>[11]</sup>. This may be due to the idea that the relationship between living area and anemia is affected by several other factors, such as food availability the income gap between urban and rural areas, limited access to iron-rich foods and unequal food distribution.

Consistent with the majority of previous studies, we found a significant relationship between anemia and physical activity. Adults with inadequate physical had higher risk of anemia. The relationship between physical activity and iron-deficiency anemia is known to be reciprocal. Vigorous physical activity among female athletes increases the risk of anemia due to the increased iron requirement and exercise-induced hemolysis resulting from oxidative stress<sup>[12, 13]</sup>. Meanwhile, adults with anemia have significantly lower physical activity due to a low Hb level, which leads to decreased aerobic capacity, thus they tend to suffer from fatigue and subsequently spend more sedentary time compared to adults with normal Hb<sup>[14]</sup>. Performing adequate aerobic physical activity increases Hb level when accompanied by iron supplementation<sup>[15]</sup>.

Household spending on meat, egg, tofu, rice, vegetables and fruits were not significantly related to anemia. This result supports the previous study in Indonesia<sup>[16]</sup>. Despite the higher food purchasing ability the nutritional knowledge of families with "high" spending and "low" spending is similar<sup>[17]</sup>. Consequently the types of meat, vegetables and fruits selected may

not be iron-rich. Although the type of vegetables the purchased were iron-rich the uneven distribution of the food within families may also cause the absence of a relation between anemia and household expenditure for iron-rich food purchasing.

Our study attempted to determine the relation between anemia and iron-rich food consumption frequency. Although the relationships were not statistically significant, we found that the proportion of anemia was higher in adults who consume meat and fish less frequently. Meat and fish are known to be the source of protein, iron, and vitamin B<sub>12</sub>. The effect of lack consumption of those three nutrients on anemia has long been established. On the contrary the present study showed a significant relationship of egg consumption frequency with adult anemia. This result disagrees with previous studies which concluded that the consumption of egg was inversely related with serum ferritin<sup>[18]</sup>. The yolk is known to be an iron-rich food which contains both heme and non-heme iron. The white egg protein contains ovoalbumin which supports the recovery of people with iron-deficiency anemia<sup>[19]</sup>. The result of the present study mentions the importance of egg consumption as a substitute of meat for preventing anemia in low-income families.

## Conclusion

Anemia in female adults on Java Island in 2014 was categorized as a moderate-level public health problem, whereas that in male adult was categorized as a mild level. The results of our study reinforce the hypothesis that sex is the most dominant factor of anemia in adults, after controlling for variables of BMI and consumption frequency of meat and egg. The risk of anemia is higher in adults who are female, unemployed, physically inactive, consume egg not-frequently. We suggest to conduct further research on the possible use of egg as a substitute of meat for preventing anemia in low-income adults.

**Acknowledgement:** The authors would like to thank RAND Corporation for authorizing the authors to conduct research using Indonesian Family Life Survey (IFLS) Data 2014.

**Conflict of Interest:** Nil

**Source of Funding:** Self

**Ethical Clearance:** This study is a secondary data

analysis. The authors have obtained permission from RAND Corporation as the owner of the data.

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# Profile of Detection and Intervention in Children with Congenital Deafness in Audiology Clinic Dr. Soetomo Hospital

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## Abstract

**Background:** The evidence on congenital deafness ranges from 1-3/1000 births in some countries. Data collected from the Department of the Ministry of Health in Indonesia (2017), there were 9 provinces in Indonesia with a prevalence of hearing the loss in the age of more than 5 years old children exceeded from the national level (2.6%). It was found in Yogyakarta, West Sulawesi, East Java, North Sumatra, South Sulawesi, Central Java, Lampung and Nusa Tenggara Timur province.

**Objective:** To determine the detection and intervention profile in children with congenital deafness in Audiology Clinic Department of Otorhinolaryngology-Head and Neck Surgery Dr. Soetomo Hospital in 2015-2017.

**Method:** This study is a descriptive method with a cross-sectional design to determine the pattern of detection and intervention in children with congenital deafness. Data were collected from medical records.

**Result:** There were 44 patients detected with congenital deafness. The most frequent were 12 patients (27.3%) with the age of  $\geq 60$  months (5 years). The least frequent were 2 patients (4.5%) with  $\leq 12$  months (1 year). The type of intervention were 22 patients (50%) with speech therapy only, 20 patient (45.5%) with hearing aid and 2 patient (4.5%) with a cochlear implant. Related with the timely intervention of speech therapy was found 16 patients (36.4%) with age  $\geq 60$  months (5 years). The lowest group were 4 patients (9.1%) with the age of 12-24 months (1-2 years) and 48-60 months (4-5 years).

**Conclusion:** There was a delay of hearing assessment and intervention in congenital deafness. The delay of referral to hospital might be related to the lack of awareness on early detection and intervention program. There was challenge on intervention with hearing aids or cochlear implants related to the high cost and insurance system.

**Keyword:** *Detection, intervention, hearing loss, congenital deafness.*

## Introduction

The evidence on congenital deafness ranges from 1-3/1000 births in some countries. Data collected from the Department of the Ministry of Health in Indonesia

(2017), there were 9 provinces in Indonesia with the prevalence of hearing loss in the age of more than 5 years old children exceeded from the national level (2.6%). It was found in Yogyakarta, West Sulawesi, East Java, North Sumatra, South Sulawesi, Central Java, Lampung and Nusa Tenggara Timur province.<sup>1,6</sup>

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Hearing is one of the senses in humans is closely linked to the ability to speak so with no abnormalities of hearing in infants or children who are present at birth will lead to an impaired ability to speak and speak and,

more broadly will have an impact on cognitive, social and academic.<sup>2</sup>

The diagnosis for congenital hearing loss is often too late. Delay in diagnosis of moderate to severe deafness can occur up to the age of 2.5 years, as the infants and the child can react to loud noises, laughter, and Babble. The Joint Committee on Infant Hearing recommends detection of hearing loss should be done before the age of 3 months and intervention before age 6 months.<sup>8</sup>

Newborn hearing screening is an attempt to detect the occurrence of congenital deafness early detection of congenital deafness. Early detection convincing diagnosis of congenital deafness, so that interventions can be done.<sup>3</sup> Screening should be done as soon as possible to reduce the problems of health, education, and quality of life of children.<sup>4</sup>

Early detection and intervention are required for congenitally deaf children. Early intervention is done partly by the use of hearing aids and cochlear implants. Interventions will help provide auditory stimulation to the child so that the effect on the ability of speech. Hearing aids are relatively cheaper and affordable than cochlear implants. Most children congenital deafness are still many who do not want and/or are not able to use because of constrained problem hearing aids cost.<sup>3</sup> When hearing aids do not help then it is advisable to use a cochlear implant. Besides, children are also given audio verbal speech therapy or therapy that can detect sound and be able to communicate.<sup>2</sup> This study aimed to improve the knowledge and understanding of congenital deafness interventions, researchers will describe the percentage and pattern of intervention based on the number of cases occurring children with congenital deafness in Audiology Clinic Department of Otorhinolaryngology-Head and Neck Surgery Dr. Soetomo Hospital in 2015-2017.

### Material and Method

This study is a descriptive method with a cross-sectional design to determine the pattern of detection and intervention in children with congenital deafness. Data were collected from medical records.

**Findings:** There were 44 patients detected with congenital deafness. The most frequent were 12 patients (27.3%) with the age of  $\geq 60$  months (5 years). The least frequent were 2 patients (4.5%) with  $\leq 12$  months (1 year) can be concluded that the screening of congenital

deafness is still low, because there are many patients with newly detected in over 60 months, and it can greatly affect the interventions and the ability to communicate that is not optimal.

The type of intervention were 22 patients (50%) with speech therapy only, 20 patient (45.5%) with hearing aid and 2 patient (4.5%) with a cochlear implant. From the data obtained, namely the largest group of patients who underwent speech therapy alone amounted to 50%, and the lowest is the use of speech therapy with cochlear implants by 4.5%.

Related with the timely intervention of speech therapy was found 16 patients (36.4%) with age  $\geq 60$  months (5 years). The lowest group were 4 patients (9.1%) with the age of 12-24 months (1-2 years) and 48-60 months (4-5 years).

### Discussion

Yoshinaga Itano declares patient hearing loss is detected early then obtain intervention by the age of fewer than 6 months apart will have better speech capability was also demonstrated a better view during education at school and productivity in the workplace than that detectable hearing loss is slow and gained intervention at the age of 6 months.<sup>5</sup>

Study before included 48 patients who underwent cochlear implants before the age of six years showed that increasing age at implantation inversely proportional to the categories of auditory performance (CAP) was achieved. Patients who receive cochlear implants before the age of 2 years to reach normal levels of CAP in a shorter period than patients implantation at a greater age, even 90% of these patients had the opportunity to enter the path of kindergarten education normal.<sup>7</sup>

Currently, cochlear implantation can be performed in Indonesia, although there are some problems, such as price and expensive equipment and postoperative treatment that requires persistence and seriousness of the patient or the family. The use of hearing aids is high because the price of hearing aids is quite affordable than cochlear implants, while still many patients only in speech therapy because of economic limitations it is caused by the absence of the health budget for the installation of hearing aids from the government.

Many congenital deaf patients experienced delays in intervention, it may result in disruption of the ability

to communicate optimally on the child. In the case of family support is needed in the early detection of the disorder so did not experience the delay in intervention.

### Conclusion

There was a delay in hearing assessment and intervention in congenital deafness. The delay of referral to a hospital might be related to the lack of awareness on early detection and intervention program. There was a challenge on intervention with hearing aids or cochlear implants related to the high cost and insurance system.

**Conflict of Interest:** There was no conflict of interest in this study.

**Ethical Clearance:** The ethical clearance is granted from KEPK, Dr Soetomo General Hospital, Surabaya no. 748/Panke.KKE/XII/2017.

**Source of Funding:** This study was supported by the authors.

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# Comparative Analysis of Financial Performance before and After Cooperation with Health BPJS as a Provider of Health Services in 2011-2018 (Study at RSI Muhammadiyah Sumberrejo, Bojonegoro)

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## **Abstract**

This study aims to determine the differences in financial performance of Muhammadiyah Hospital Sumberrejo, Bojonegoro before becoming a health service provider in collaboration with Health BPJS in 2011-2013 and after becoming a health service provider in collaboration with BPJS Health in 2014-2018 using financial ratios. Using a horizontal (dynamic) analysis method that is comparing financial statements for a certain number of periods, this type of research is a descriptive study with a quantitative approach. The technique used is ratio analysis, an analysis used to determine the relationship of items that exist in one balance sheet and income statement. A nalysis financial statements. This uses financial ratios such as Liquidity Ratios to determine the company's ability to meet its current liabilities, Solvency Ratios to determine the company's assets financed by total debt, Profitability Ratios to determine the company's ability to generate profits, Activity Ratios to determine the company's ability to manage its assets.

**Keywords:** *Financial Statements, Liquidity Ratios, Solvency Ratios, Profitability Ratios, Activity Ratios.*

## **Introduction**

The National Health Insurance Program (JKN) has been established by the Government to be implemented on January 1, 2014<sup>1</sup> while the implementing body is the Health BPJS which is an Implementing Body and is a public legal entity formed to organize a health insurance program for all Indonesians<sup>2</sup>.

RSI Muhammadiyah Sumberrejo, Bojonegoro is owned Persyarikatan Muhammadiyah located at Highway No . 1193 in Sumberrejo district is a provider of health services at an advanced level referral health facility in collaboration with BPJS Health<sup>3</sup>. Therefore, RSI Muhammadiyah Sumberrejo, Bojonegoro must keep the quality of service that is oriented to the safety and satisfaction of patients and controlling the cost of services oriented to the effective and efficient as well as the impact on the financial performance of hospitals.

The performance of finance is the relationship between income and loads of entities as presented in the

income statement. Profit or loss is often used as a measure of performance or as a basis for other measurements such as return on investment or earnings per share<sup>4</sup>.

The research is aimed at analyzing the differences in the financial performance of Muhammadiyah Hospital, Sumberrejo, Bojonegoro before cooperating with BPJS in 2011-2013 and after collaboration with BPJS the years 2014-2018 using financial ratios. Furthermore the results of the ratio analysis need to be given recommendations that must be done by the management of the results of the financial ratio analysis. Financial ratio analysis is a process of analysis and assessment that helps in answering questions that are naturally raised, so it is a tool to achieve goal<sup>5</sup>. Ratio analysis is one of the most widely used financial analysis tools, wherein this ratio calculation uses simple arithmetic calculations that can be interpreted, where each ratio calculation will be more useful when compared with the results of the previous ratio calculation.

The main objectives of financial ratio analysis are (1) as a barometer for forecasting or projecting financial position in the future; (2) reviewing the company's current condition regarding problems in management, operations, and finance; (3) measuring devices for efficiency in all departments of the company. Also the results of the financial ratio analysis can be used by the hospital management to assess its performance in a period, whether the management has reached the set target or vice versa. Besides the results of the financial ratio analysis can be used as an assessment of the ability of management to empower all resources in the hospital more effectively<sup>6</sup>.

The finance ratio consists of (1) liquidity ratio is a ratio that illustrates the company's ability to meet short-term obligations. The type of liquid ratio consists of the current ratio, quick ratio, cash ratio, cash turnover ratio and inventory to networking capital. (2) leverage ratio is the ratio used to measure the extent to which a company's assets are financed with debt. The type of leverage ratio consists of debt to asset ratio, debt to equity ratio, long term debt to equity ratio, tangible debt coverage, current liabilities to network, time interest earned and fixed charge coverage. (3) activity ratio is the ratio used to measure the level of efficiency in the utilization of company resources. The type of activity ratio consists of receivable turnover, days of receivable, inventory turnover, days of inventory, working capital over, fixed assets turn over and assets turnover last (4) profitability ratio is a ratio to assess the company's ability to search profit or profit in a certain period. The type of profitability ratio consists of net profit margin, return on investment (ROI), return on equity (ROE) and earnings per share of common stock<sup>7</sup>.

### Materials and Method

The object of this study is the Muhammadiyah Hospital Sumberrejo, Bojonegoro located on Jl. Raya, No. 1193, Sumberrejo Bojonegoro This type of research is a descriptive study with a quantitative approach<sup>8</sup> because this study is analyzing the financial statements of the Muhammadiyah Hospital of Sumberrejo, Bojonegoro in 2011 to 2018. The material used for analysis is the financial statements with data sources from the balance sheet and income statement.

Financial analysis of Muhammadiyah Sumberrejo Hospital in 2011-2018 uses a horizontal (dynamic) analysis method, which is to compare financial statements

for certain periods. The technique used is ratio analysis, an analysis used to determine the relationship of items that exist in one balance sheet and income statement.

#### The ratio analysis used is as follows:

1. **Liquidity Ratio:** Is a ratio that illustrates a company's ability to meet short-term obligations<sup>9</sup>. The types of liquidity ratios are as follows :
  - a. **Current Ratio:** Namely the ratio used to measure the company's ability to pay short-term obligations or debt that is due immediately when billed as a whole. This current ratio compares current assets and current debt.
  - b. **Cash Ratio:** That is a tool used to measure how much cash is available to pay the short-term debt . This cash ratio compares to cash and cash equivalents (banks) with current liabilities.
2. **Leverage Ratio:** Is ratios that measure the ability of companies financed with debt. The types of leverage ratios are as follows:
  - a. **Debt to Asset Ratio:** That debt ratio is used to measure the ratio between total debt premises n total assets. The debt to asset ratio compares between total debt and total assets.
  - b. **Debt to Equity Ratio:** That ratio used to measure the ratio between a company's debt to total equity.
3. **Activity Ratio:** The ratio that illustrates the extent to which a company uses its resources to support the activities of the company's activities, where the use of these activities is carried out very maximally to obtain maximum results.<sup>10</sup> The types of activity ratios are as follows:
  - a. **Receivable Turnover:** That ratio used to measure how long the collection of receivables during a period or the number of times the funds invested in these receivables revolve in one period. Receivable Turnover compares sales with receivable.
  - b. **Inventory Turnover:** That is the ratio used to measure the number of times the funds invested in these inventories revolve in one period. This inventory turnover compares sales with the inventory.
  - c. **Fixed Asset Turnover:** That is the ratio used to measure the number of times the funds invested

in fixed assets revolve in one period. This fixed asset turn over compares sales with total fixed assets.

**d. Total Assets Turnover:** The ratio used to measure the turnover of all assets owned by the company and measure how many sales are obtained from each asset rupiah. This total asset turnover compares sales with total assets.

**4. Profitability Ratio:** Namely the ratio that measures the overall effectiveness of management aimed at the size of the level of profits obtained in relation to sales and investment. The types of profitability ratios are as follows:

**a. Net Profit Margin:** Is a measure of profit by comparing the profit after interest and tax

compared to sales. This net profit margin compares profit after interest and tax with sales.

**b. Return on Investment (ROI):** Is a ratio that shows the return (return) on the amount of assets used in the company. ROI is also a measure of the effectiveness of management in managing its investments. This return on investment compares the profit after interest and tax with the total assets.

**c. Return on Equity (ROE):** Is the ratio for measuring net income after tax with own capital. This ratio shows the efficiency of using their own capital. Return on equity compares the profit after interest and tax with equity.

### Result and Discussion

**Table 1: Liquidity ratio (cash ratio and current ratio) RSI Muhammadiyah Sumberrejo, Bojonegoro in 2011-2018**

Ratio	Year							
	2011	2012	2013	2014	2015	2016	2017	2018
<b>Liquidity Ratio</b>								
Cash Ratio (%)	123%	131%	161%	120%	92%	160%	74%	109%
Current Ratio (%)	180%	181%	215%	179%	176%	254%	224%	231%

**Source:** Data processed from RSI Muhammadiyah Sumberrejo Financial Report, Bojonegoro Year 2011-2018

Based on table 1 cash ratio RSI Muhammadiyah Sumberrejo, Bojonegoro before working with the Health BPJS (in 2011-2013) the highest was in 2013 by 161%, whereas after working with the Health BPJS (in 2014-2018) the highest in 2016 was 160% and which needs to be watched out or become a record of the management is in 2015 by 92% and in 2017 by 74%. This means that the ability of Muhammadiyah Hospital of Sumberrejo, Bojonegoro to pay short-term liabilities (liquidity ratio) using cash and cash equivalents is still very good.

Based on table 1 the current ratio of RSI Muhammadiyah Sumberrejo, Bojonegoro before cooperating with BPJS Health (in 2011-2013) the highest was in 2013 by 215%, whereas after cooperating with BPJS Health (in 2014-2018) the highest was in 2016 at 254 % This means that the ability of Muhammadiyah Hospital of Sumberrejo, Bojonegoro to pay short-term liabilities (liquidity ratio) using current assets is still very good.

**Table 2: Solvency ratios (debt to assets ratio and debt to equity ratio) RSI Muhammadiyah Sumberrejo, Bojonegoro in 2011-2018**

Ratio	Year							
	2011	2012	2013	2014	2015	2016	2017	2018
<b>Leverage Ratio</b>								
Debt to Asset Ratio (%)	11%	17%	18%	21%	20%	12%	13%	18%
Debt to Equity Ratio (%)	12%	21%	21%	27%	25%	13%	15%	22%

**Source:** Data processed from RSI Muhammadiyah Sumberrejo Financial Report, Bojonegoro Year 2011-2018

Based on table 2 the debt to asset ratio of RSI Muhammadiyah Sumberrejo, Bojonegoro before working with the Health BPJS (in 2011-2013) the highest was in 2013 by 18%, while after working with the Health BPJS (in 2014-2018) the highest in 2014 was 27% This means that the funding of RSI Muhammadiyah Sumberrejo, Bojonegoro from debt is still very small.

Based on table 2 the debt to equity ratio of RSI Muhammadiyah Sumberrejo, Bojonegoro before working with the Health BPJS (in 2011-2013) in 2012 and 2013 was the same at 215% and the lowest was in 2011 at 180%, whereas after working with the Health BPJS (in 2014 -2018) the highest was in 2014 at 27% while the lowest was in 2015 at 13%. This means that the funding of RSI Muhammadiyah Sumberrejo, Bojonegoro from debt is still very small.

**Table 3: Activity ratio (daysofreceivable,inventory turn over, fix asset turn over, total asset turn over) RSI Muhammadiyah Sumberrejo, Bojonegoro in 2011-2018**

Ratio	Year							
	2011	2012	2013	2014	2015	2016	2017	2018
<b>Activity Ratio</b>								
Days of receivable (days)	1	1	1	20	26	23	47	44
Days of Inventory (days)	23	22	26	20	17	15	9	11
Fix Asset Turn Over (kali)	1	1	2	2	2	1	2	2
Total Asset Turn Over (kali)	1	1	1	1	1	1	1	1

**Sumber:** Data diolah dari Laporan Keuangan RSI Muhammadiyah Sumberrejo, Bojonegoro Tahun 2011-2018

Based on the 3 days of receivable table RSI Muhammadiyah Sumberrejo, Bojonegoro before working with the Health BPJS (in 2011-2013) was the same 1 day, whereas after working with the Health BPJS (in 2014-2018) the highest in 2017 was 47 days. This means that the average collection of receivables (days of receivable) RSI Muhammadiyah Sumberrejo before and after collaboration with BPJS Health has increased and this is a record for the management.

Based on the 3 days table of inventory of RSI Muhammadiyah Sumberrejo, Bojonegoro before

working with the Health BPJS (in 2011-2013) the highest in 2013 was 26 days, whereas after working with the Health BPJS (in 2014-2018) the highest in 2014 was 20 days. This means that the smaller the inventory turnover at the RSI Muhammadiyah Sumberrejo, Bojonegoro there will be a build-up of goods in the warehouse, conversely, if the higher the inventory turnover the number of goods stored in the warehouse will be small.

Based on table 3 fixover assets turnover of RSI Muhammadiyah Sumberrejo, Bojonegoro before working with Health BPJS (in 2011-2013) was highest

in 2013 by 2 times, whereas after working with Health BPJS (in 2014-2018) the lowest was in 2016 at 1 time. This means that the rotation of fixed assets at the RSI Muhammadiyah Sumberrejo, Bojonegoro both before and after working with the Health BPJS is quite effective and has an impact on finances at the RSI Muhammadiyah Sumberrejo, Bojonegoro.

Based on table 3 the total assets turnover of RSI

Muhammadiyah Sumberrejo, Bojonegoro before cooperating with BPJS Health (in 2011-2013) was the same once, while after working with BPJS Health (in 2014-2018) it was also equal at 1 time. This means that the total assets turnover at RSI Muhammadiyah Sumberrejo, Bojonegoro both before and after collaboration with BPJS Health has not been effective and has not given the maximum impact on finances at the RSI Muhammadiyah Sumberrejo, Bojonegoro.

**Table 4: Profitability ratio (net profit margin, return of investment, return on equity) RSI Muhammadiyah Sumberrejo, Bojonegoro year 2011-2018**

Ratio	Year							
	2011	2012	2013	2014	2015	2016	2017	2018
<b>Profitability Ratio</b>								
Net Profit Margin (%)	15%	12%	11%	11%	10%	6%	9%	9%
Return on Investment (ROI) (%)	52%	50%	51%	54%	50%	36%	56%	54%
Return on Equity (ROE) (%)	14%	12%	13%	14%	16%	6%	9%	11%

**Source:** Data processed from RSI Muhammadiyah Sumberrejo Financial Report, Bojonegoro Year 2011-2018

Based on table 4, net profit margin of RSI Muhammadiyah Sumberrejo, Bojonegoro before cooperating with BPJS Health (in 2011-2013) was highest in 2011 at 15%, whereas after cooperating with BPJS Health (in 2014-2018) the highest in 2014 was 11% and the lowest was in 2016 of 6%. This means that before working with BPJS Health, Muhammadiyah Sumberrejo Hospital is still able to maximize net profit (net profit margin) and after working with BPJS Health, net profit margin gradually decreases.

Based on table 4 return on investment (ROI) of RSI Muhammadiyah Sumberrejo, Bojonegorobefore working with the Health BPJS (in 2011-2013) the lowest in 2012 was 50%, whereas after cooperating with the Health BPJS (in 2014-2018) the lowest was in 2016 by 36%.

Based on table 4 return on equity (ROE) of RSI Muhammadiyah Sumberrejo, Bojonegoro before working with the Health BPJS (in 2011-2013) the highest in 2011 at 14% the lowest in 2012 at 12%, whereas after working with the Health BPJS (2014 -2018) the highest was in 2015 at 16% and the lowest was in 2016 at 6%.

**Ethical Clearance:** Not applicable

**Source of Funding:** Not applicable

**Conflict of Interest:** Nil

**Conclusion**

1. The liquidity ratio of RSI Muhammadiyah Sumberrejo for the current ratio before and after collaboration with BPJS Health is very good/satisfying while for cash ratio after working with BPJS Health decreased in 2015 and 2017.
2. The leverage ratio of RSI Muhammadiyah Sumberrejo both debt to asset ratio and debt to equity ratio before and after working with BPJS Health is still very small (good).
3. Activity ratio RSI Muhammadiyah Sumberrejo for days of receivable after cooperating with BPJS poorly because trend increased, for days of inventory better after cooperating with BPJS than before in cooperation with BPJS, while for fixed asset turnover and total asset turn over good (no problem).
4. Profitability ratio RSI Muhammadiyah Sumberrejo for net profit margins has decreased, if before working with Health BPJS above 10% after

working with Health BPJS below 10%, for return on investment since before and after working with BPJS Health has increased, for return on equity both before or after collaboration with BPJS Health is quite good.

### **Recommendation:**

1. Elements of the management of RSI Muhammadiyah Sumberrejo, Bojonegoro must make improvements to the management of receivables to maintain cash ratios at the RSI Muhammadiyah Sumberrejo, Bojonegoro and result in short-term debt settlement, such as debt for drug purchases, debt for purchasing medical equipment, debt for medical services, doctors and employee salary costs.
2. Payment of receivables from the Health BPJS for a long time, then internally the RSI Muhammadiyah Sumberrejo, Bojonegoro needs to improve claims management to the Health BPJS, need intensive communication with the BPJS Health and SCF (supply chain financing) from the bank is needed the rate/interest does not exceed the fine from the Health BPJS.
3. The Element of the management of RSI Muhammadiyah Sumberrejo, Bojonegoro needs to carry out activities that can reduce operational costs so that it has an impact on increasing profit margins. For example, implementing lean management that can speed up business processes, eliminate useless processes and have an impact on costs.

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# Effect of Mobile Phone Radiofrequency on Shared Cognitive Abilities of Adolescent Users

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## Abstract

Mobile phone use is increased worldwide, most of mobile phone users are from the young age, our study is carried out to explore negative effects of mobile phone radio frequency (MPRF) on shared cognitive abilities of the children. The study is a (case-control) study on 30 children as users (cases) 12-18 years old, and 30 age matched nonusers (controls). We used Stanford Binet intelligence scale for assessment of shared cognitive abilities. The users were found to be negatively affected in comparison to nonusers in items of shared cognitive abilities; Visual motor ability, abstract Conceptualization, understanding long question, high performance under time pressure, acquired knowledge. The shared cognitive abilities predict learning disabilities and ADHD in the teens who are frequently using mobile phones for calling.

**Keywords:** Shared cognitive abilities, adolescents, MPRF, Stanford Binet intelligence scale.

## Introduction

There are 5.11 billion unique mobile users in the world today, up 100 million (2 percent) in the past year<sup>(1)</sup> and youth represent a large sector of this quantity<sup>(2)</sup>. This worldwide use of radiofrequency (RF) generating devices raised the concerns about possible hazardous health effects from exposure to RF radiation. Given the fact that children and adolescents are still in the developmental process, there is concern over the question of whether children are more sensitive to electromagnetic fields (EMF) than adults.<sup>(3)</sup> Neurological functions are of special concern given that the brain is heavily exposed while calling with a mobile or cordless phone<sup>(4)</sup>. Present-day adolescents will likely have higher cumulative life time exposure to RF-EMF, and the developing brain might be particularly susceptible to RF-EMF-induced

alterations up to 15y of age<sup>(3)</sup>. Scientists from around the world agree that the head and brain of a child absorb significantly more radiation than those of an adult<sup>(5)</sup>. As noted by the International Agency for Research on Cancer the average RF energy deposition is twice as high in certain regions of children's brains and up to 10 times higher in the bone marrow of children's skulls, compared to energy deposition in adult brains and skulls (IARC 2012).<sup>(6)</sup> In the present study we aimed to explore whether the exposure to mobile phone radiofrequency is associated with changes in shared cognitive abilities in adolescents which would predict learning disabilities and ADHD with MP use if present.

## Subjects and Method

**Study design and setting:** This pilot (case-control) study was conducted on relatives of the patients attending pediatrics outpatient clinic at the Minia university hospital, Egypt during the period from June 2016 to July 2017 on 60 children of different socioeconomic status, 30 users (cases) and 30 nonusers (controls). Written informed consent was taken from parents of all enrolled children after clarifying the aim and all steps of the study to them. Children with previous central nervous system pathology or Children with psychiatric disorders

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or receiving any medicine known to affect cognitive function were excluded from the study. All children were subjected to detailed history taking, with fulfillment of the questionnaire that includes; Chronological age, Residence, Level of education. RF-EMF exposure measures according to the characteristics of mobile phone use by a questionnaire which was answered by the children and their parents.

**Cognitive Function Assessment:** The participating children were subjected to the Stanford Binet Intelligence Scales – Fifth Edition (SB5). The overall administration time is ranging from 45 to 75 min. Scoring was done by Windows-based software SB5 Scoring Program (7).

**Statistical Analysis:** The data were coded, tabulated and analyzed using statistical package for social sciences (SPSS), software version 19. Chi-square test was applied to test the relationship between variables. Binary logistic regression analysis was used to confirm whether the significant statistical differences between cases and controls are related to the MPRF exposure or not.

## Results

Concerning the demographic data between mobile phone nonusers and users, there is no significant difference regarding age, gender, urbanity and type of education between them. Prevalence of children using MP in urban

areas (93.3%) is higher than nonusers (83.3%). Regarding type of education it was noticed more prevalence of MP users in private schools (20%) rather than nonusers (10%). Regarding to the exposure to radiofrequency we noticed that the teens used their mobile phone for about 5 calls per day with duration about 5.3 min per call, 31 calls per week and with 3 years duration of ownership and use. Regarding laterality the results showed that 100% of the children in this age group were using the same side of the head during active call operation. In comparing users and non-users, significant differences were observed in the items of shared cognitive abilities with lower values in the users including; Visual motor ability  $p=0.005$ , Abstract Conceptualization  $p=0.012$ , Understanding Long Question  $p=0.015$ , Performance Under Time Pressure  $p=0.040$ , High Performance Under Time Pressure  $p=0.039$ , Cultural Knowledge  $p=0.019$ , Acquired Knowledge  $p=0.011$ .

On applying binary logistic regression analysis to detect which effect is related to the exposure, we found; Visual motor ability  $OR=1.06$ ,  $95\% CI=1.01-1.1$ ,  $p=0.01$ , Abstract Conceptualization  $OR=1.05$ ,  $95\% CI=1.01-1.09$ ,  $p=0.02$ , Understanding Long Question  $OR=1.05$ ,  $95\% CI=1.01-1.1$ ,  $p=0.02$ , High Performance Under Time Pressure  $OR=1.05$ ,  $95\% CI=1.01-1.1$ ,  $p=0.04$ , Acquired Knowledge  $OR=1.04$ ,  $95\% CI=1.004-1.08$ ,  $p=0.03$  were significantly affected by the MP use.

**Table (1) Demographic and clinical data of the studied children:**

Age group (12-18 years)		Control	Cases	P value
		N=30	N=30	
Age	Mean $\pm$ SD Range	13.9 $\pm$ 1.3 (12-17.9)	14.7 $\pm$ 2 (12-17.9)	0.09
Sex	Male	15(50%)	14(46.7%)	0.796
	Female	15(50%)	16(53.3%)	
Residence	Urban	25(83.3%)	28(93.3%)	0.424
	Rural	5(16.7%)	2(6.7%)	
School	Governmental	27(90%)	24(80%)	0.472
	Private	3(10%)	6(20%)	

Mann Whitney test for non-parametric quantitative data between the two groups

- Chi square test (if expected values within cell  $> 5$ ) and Fisher's exact test (if expected values within cell  $< 5$ ) for qualitative data between the two groups

- \*: Significant difference at P value  $< 0.05$



**Table (2) Prevalance of use of mobile phone among cases:**

Age group (12-18 years)		Cases
		N=30
Number of call/day	Mean ±SD (Range)	±2.7 (5-15) 5.067
Number of call/week	Mean ±SD (Range)	31±17.4 (10-100)
Duration of call by minutes/day	Mean ±SD (Range)	5.3±4.3 (1-15)
Duration of use/years	Mean ±SD (Range)	3±1.2 (1.5-5)
Laterality	RT	97%
	LT	3%
	Both	0%

**Table (3) comparison between cases and controls as regard shared cognitive abilities:**

Age group (12-18 years)	Control	Cases	P value
	N=30	N=30	
Planning ability	107.4/(97.7-120.6)	98.7/(90.9-112.8)	0.053
problem solving	102.9/(94.4-111.5)	98.7/(88.7-105.8)	0.168
Visual motor ability	104.1/(98.1-110.1)	97.1/(88-104.6)	0.005*
Abstract Conceptualization	110.2/(98.2-121)	99.9/(91-110.6)	0.012*
Understanding Long Question	102.4/(94.9-113.1)	94.9/(85.6-104.2)	0.015*
Attention Concentration	106.4/(99.8-116.2)	100.2/(95.5-111.1)	0.116
Performance Under Time Pressure	105.4/(100.3-113.1)	102.4/(93.6-110.6)	0.040*
High Performance Under Time Pressure	106.3/(100.5-113.1)	100/(92.8-110)	0.039*
Cultural Knowledge	101.2/(92.9-110.7)	91/(84.7-107.4)	0.019*
Acquired Knowledge	104.5/(94.5-114.9)	91.2/(84.2-106)	0.011*

Data expressed by median/IQR

- Mann Whitney test for non-parametric quantitative data between the two groups
- \*: Significant difference at P value < 0.05

**Table 4: Logistic regression analysis for prediction of other knowledge Scales between mobile user and nonusers with age group 12-18 years**

Variable	OR	95% CI	P value
Planning ability	1.03	0.9-1.07	0.07
problem solving	1.3	0.9-1.08	0.1
Visual motor ability	1.06	1.01-1.1	0.01*
Abstract Conceptualization	1.05	1.01-1.09	0.02*
Understanding Long Question	1.05	1.01-1.1	0.02*
Attention Concentration	1.03	0.9-1.08	0.1
Performance Under Time Pressure	1.05	1-1.1	0.05
High Performance Under Time Pressure	1.05	1.01-1.1	0.04*
Cultural Knowledge	1.02	0.9-1.06	0.1
Acquired Knowledge	1.04	1.004-1.08	0.03*

OR: Odds Ratio, - CI: Confidence Interval, - \*: Significant level at P value < 0.05

## Discussion

This is a pilot case-control study to demonstrate effects of MPRF on shared cognitive abilities of adolescent users. Shared cognitive abilities obtained from Stanford Binet scale 5<sup>th</sup> edition mostly used as a predictor for learning disabilities and ADHD. Our study found that, MPRF exposure has negative effects on Visual motor ability, abstract conceptualization, understanding long question, high performance under time pressure, acquired knowledge.

Mobile phone, Wi-Fi and other radiofrequency signals have been found to alter electrical brain activity<sup>(8)</sup>. Yan and Hardell, (2017) concluded- that the key factor in disrupted memory and learning may be due to disruption of neural synchrony by RF exposure<sup>(9)</sup>.

A study by Leung (2011) provided support for an effect of acute 2G and 3G exposure on human cognitive function, especially in adolescents<sup>(10)</sup>. Thomas (2010) in their study found 7% of children and 5% of adolescents using mobile phones showed behavioral problems. The higher the exposure the higher the risk of problems<sup>(11)</sup>.

A Spanish study of 9-11 year old boys found a significant association between higher background radiofrequency exposures in the home ( $\geq$  median values) and anxious/depressed behaviours, social problems, rule breaking, aggressive behaviour, internalizing, total behavioural problems, anxiety and conduct problems, obsessive compulsive disorder and ADHD<sup>(12)</sup>. Lai (2004)<sup>(13)</sup> also found an intriguing effect with other environmental EMFs, in that exposure to a specific form of magnetic fields blocked the learning and memory deficits. Abramson et al., (2009) found that in children reporting more mobile phone voice calls the accuracy of working memory was poorer, reaction time for a simple learning task shorter, associative learning response time shorter and accuracy poorer<sup>(14)</sup>.

Compromised learning behaviour was also determined in the EMF group rats studied by Ikinci (2013) their results show that the application of a 900 MHz EMF in the prenatal period adversely affected female pups' learning behavior and also resulted in histopathological changes appearing in the hippocampus. Pyramidal neuron loss and histopathological changes in the cornuammonis of 8-week-old male rats may be due to the 900-MHz EMF exposure<sup>(15)</sup>. A proposed mechanism by which EMF may affect the brain is by increasing the permeability of the blood-brain barrier

(BBB). The BBB protects the brain from exposure to substances in circulating blood that could be toxic or disrupt the homeostasis of the brain microenvironment. Exposure to an electromagnetic pulse may increase the permeability of the BBB and perturb proteins that form the tight junctions that maintain its integrity.<sup>(16)</sup>

## Conclusion

This study found negative effects of MPRF on shared cognitive abilities which predict presence of learning disabilities and ADHD in teens with frequent mobile phone use.

**Disclosure:** The authors report no conflicts of interest in this work.

**Source of Funding:** By self.

**Ethical Clearance:** Taken from faculty of medicine–Minia University Committee.

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# Effect of Mobile Phone Radiofrequency on Cognitive Abilities between Adolescent Users and Nonusers

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## Abstract

Mobile phone use is increased worldwide, most of mobile phone users are from the young age, our study is carried out to explore negative effects of mobile phone radiofrequency (MPRF) on cognitive abilities of the children. The study is a (case-control) study on 30 children as users (cases) 12-18 years old, and 30 age matched nonusers (controls). We used Stanford Binet intelligence scale for assessment of cognitive abilities. The users were found to be negatively affected in comparison to nonusers in items of shared cognitive abilities; Visual motor ability, abstract Conceptualization, understanding long question, high performance under time pressure, acquired knowledge. The shared cognitive abilities predict learning disabilities and ADHD in teens that are frequently using mobile phones for calling.

**Keywords:** Shared cognitive abilities, adolescents, MPRF, Stanford Binet intelligence scale.

## Introduction

There are 5.11 billion unique mobile users in the world today, up 100 million (2 percent) in the past year<sup>(1)</sup> and youth represent a large sector of this quantity<sup>(2)</sup>. This worldwide use of radiofrequency (RF) generating devices raised the concerns about possible hazardous health effects from exposure to RF radiation. Given the fact that children and adolescents are still in the developmental process, there is concern over the question of whether children are more sensitive to electromagnetic fields (EMF) than adults<sup>(3)</sup>. Neurological functions are of special concern as the brain is heavily exposed while calling with a mobile or cordless phone<sup>(4)</sup>. Present-day adolescents will likely have higher cumulative life time exposure to RF-EMF, and the developing brain

might be particularly susceptible to RF-EMF-induced alterations upto 15y of age<sup>(5)</sup>. Scientists from around the world agree that the head and brain of a child absorb significantly more radiation than those of an adult<sup>(6)</sup>. In the present study we aimed to explore whether the exposure to mobile phone radiofrequency is associated with changes in shared cognitive abilities in adolescents which would predict learning disabilities and ADHD with mobile phone (MP) use if present.

## Subjects and Method

This pilot (case-control) study was conducted in pediatrics outpatient clinic at Minia university hospital, Egypt, during the period from June 2016 to July 2017 on 60 children of different socioeconomic status, 30 users (cases) aged from 12–18 years and 30 age matched nonusers (controls). Written informed consent was taken from parents of all enrolled children after clarifying the aim and all steps of the study to them. Children with psychiatric disorders or suffering from any chronic illness or receiving any medicine known to affect cognitive function were excluded from the study. Detailed history taking, with fulfillment of the questionnaire about RF-EMF exposure and pattern of

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mobile phone use were taken. The participating children were subjected to the Stanford Binet 5<sup>th</sup> edition (SB5) intelligence scale.<sup>(7)</sup>

**Results**

**Concerning the demographic data** between mobile phone nonusers and users, there is no significant difference regarding age, gender, urbanity and type of education between them. Prevalence of children using MP in urban areas (93.3%) is higher than nonusers (83.3%). Regarding type of education it was noticed more prevalence of MP users in private schools (20%) rather than nonusers (10%).

**Regarding to the exposure to radiofrequency and effects on cognitive function:** we noticed that the teens used their mobile phone for about 5 calls per day with mean duration about 5.3 min per call, 31 calls per week and with 3 years duration of ownership and use. Regarding laterality the results showed that

100% of the children in this age group were using the same side of the head during active call operation. In comparing users and non-users, significant differences were observed in the items of shared cognitive abilities with lower values in the users including; Visual motor ability p=0.005, Abstract Conceptualization p=0.012, Understanding Long Question p=0.015, Performance Under Time Pressure p=0.040, High Performance Under Time Pressure p=0.039, Cultural Knowledge p=0.019, Acquired Knowledge p=0.011. On applying binary logistic regression analysis to detect which previous effect is related to the exposure, we found; Visual motor ability OR=1.06, 95% CI=1.01-1.1, p=0.01, Abstract Conceptualization OR=1.05, 95% CI=1.01-1.09, p=0.02, Understanding Long Question OR=1.05, 95% CI=1.01-1.1 p=0.02, High Performance Under Time Pressure OR=1.05, 95% CI=1.01-1.1 p=0.04, Acquired Knowledge OR=1.04, 95% CI=1.004-1.08, p=0.03 were significantly affected by the MP use.

**Table (1) Demographic and clinical data of the studied children:**

Variables		Controls	Cases	P value
		N=30	N=30	
Age	Mean ±SD Range	13.9±1.3 (12-17.9)	14.7±2 (12-17.9)	0.09
Sex	Male	15(50%)	14(46.7%)	0.796
	Female	15(50%)	16(53.3%)	
Residence	Urban	25(83.3%)	28(93.3%)	0.424
	Rural	5(16.7%)	2(6.7%)	
School	Governmental	27(90%)	24(80%)	0.472
	Private	3(10%)	6(20%)	

\*: Significant difference at P value < 0.05

**Table (2) Descriptive data of the pattern of mobile phone use among cases:**

Age Group (12-18 years)		Cases
		N=30
Number of call/day	Mean ±SD (Range)	±2.7 (5-15)5.067
Number of call/week	Mean ±SD (Range)	31±17.4 (10-100)
Duration of call by minutes/day	Mean ±SD (Range)	5.3±4.3 (1-15)
Duration of use/years	Mean ±SD (Range)	3±1.2 (1.5-5)
Laterality	RT	97%
	LT	3%
	Both	0%

**Table (3) Comparison between mobile phone nonusers (controls) and users (cases) adolescents as regard shared cognitive abilities:**

Variables	Controls	Cases	P value
	N=30	N=30	
Planning ability	107.4/(97.7-120.6)	98.7/(90.9-112.8)	0.053
Problem solving	102.9/(94.4-111.5)	98.7/(88.7-105.8)	0.168
Visual motor ability	104.1/(98.1-110.1)	97.1/(88-104.6)	0.005*
Abstract Conceptualization	110.2/(98.2-121)	99.9/(91-110.6)	0.012*
Understanding Long Question	102.4/(94.9-113.1)	94.9/(85.6-104.2)	0.015*
Attention Concentration	106.4/(99.8-116.2)	100.2/(95.5-111.1)	0.116
Performance Under Time Pressure	105.4/(100.3-113.1)	102.4/(93.6-110.6)	0.040*
High Performance Under Time Pressure	106.3/(100.5-113.1)	100/(92.8-110)	0.039*
Cultural Knowledge	101.2/(92.9-110.7)	91/(84.7-107.4)	0.019*
Acquired Knowledge	104.5/(94.5-114.9)	91.2/(84.2-106)	0.011*

Data expressed by median/IQR

- Mann Whitney test for non-parametric quantitative data between the two groups

\*: Significant difference at P value < 0.05

**Table (4) Binary logistic regression analysis for prediction of shared cognitive abilities between mobile user (cases) and nonusers (controls) adolescents:**

	OR	95% CI	P value
Planning ability	1.03	0.9-1.07	0.07
Problem solving	1.3	0.9-1.08	0.1
Visual motor ability	1.06	1.01-1.1	0.01*
Abstract Conceptualization	1.05	1.01-1.09	0.02*
Understanding Long Question	1.05	1.01-1.1	0.02*
Attention Concentration	1.03	0.9-1.08	0.1
Performance Under Time Pressure	1.05	1-1.1	0.05
High Performance Under Time Pressure	1.05	1.01-1.1	0.04*
Cultural Knowledge	1.02	0.9-1.06	0.1
Acquired Knowledge	1.04	1.004-1.08	0.03*

OR: Odds Ratio

- CI: Confidence Interval

- \*: Significant level at P value < 0.05

## Discussion

This is a pilot case-control study to demonstrate the effects of mobile phone radiofrequency (MPRF) on shared cognitive abilities of adolescent users. Shared cognitive abilities obtained from Stanford Binet scale 5<sup>th</sup> edition mostly used as a predictor for learning disabilities and ADHD. Our study found that, MPRF

exposure has negative effects on Visual motor ability, abstract conceptualization, understanding long question, high performance under time pressure, acquired knowledge. Leung et al., (2011) provided support for an effect of 2G and 3G exposure on human cognitive function, especially in adolescents<sup>(8)</sup>. Thomas (2010) in their study found 7% of children and 5% of adolescents using mobile phones showed behavioral problems the

higher the exposure the higher the risk of problems<sup>(9)</sup>. A Spanish study carried on adolescent boys found a significant association between higher background radiofrequency exposures in the home and anxious/depressed behaviors, social problems, rule breaking, aggressive behavior, internalizing, total behavioral problems, anxiety and conduct problems, obsessive compulsive disorder and ADHD<sup>(10)</sup>. Children living near a radio transmitter were found to have reduced memory and attention as well as slower reaction times<sup>(11)</sup>. On explaining how MPRF could affect cognition, researchers found that mobile phone, Wi-Fi and other radiofrequency signals alter electrical brain activity<sup>(12)</sup>. The radiofrequency microwave radiation thus has the potential to be far more disruptive to the biological processes going on in the child's growing and developing brain and nervous system. Motawi et al., (2014) found that mobile phone radiation affected the relative brain weight of young rats and histopathological examination reinforced the neuronal damage<sup>(13)</sup>. Dark neuron degenerative changes were found in the brains of rats exposed pre- and postnatally to 900 MHz radiation<sup>(14)</sup>. Compromised learning behavior was also determined in the EMF group rats studied by Şahin et al (2013), their results show that the application of a 900 MHz EMF in the prenatal period adversely affected female pups' learning behavior and also resulted in histopathological changes appearing in the hippocampus. Pyramidal neuron loss and histopathological changes in the cornu ammonis of 8-week-old male rats may be due to the 900-MHz EMF exposure<sup>(15)</sup>.

### Conclusion

This study found negative effects of MPRF on shared cognitive abilities which predict presence of learning disabilities and ADHD in teens with frequent mobile phone use.

**Disclosure:** The authors report no conflicts of interest in this work.

**Source of Funding:** By self.

**Ethical Clearance:** Taken from faculty of medicine–Minia University Committee.

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# The Influence of Educational Level, Working Period, and Job Satisfaction Toward The Achievement Motivation of Midwives in Banjarbaru

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## Abstract

Achievement motivation is an encouragement in a person to do an activity as well as possible in order to achieve the achievement. Factors that can influence achievement motivation include levels of education, working period, and job satisfaction. The purpose of this study was to analyze the effect of educational level, working period and job satisfaction on the achievement motivation of midwives in Banjarbaru City. The study used an analytic observational method with a cross sectional study design. The research sample was 106 midwives with proportional random sampling. The research instrument uses a questionnaire that has been tested for validity and reliability. Data analysis used chi-square test and multiple logistic regression. Respondents with a high level of education have high achievement motivation ( $p = 0.004$ ). Respondents with long tenure have high achievement motivation ( $p = 0,000$ ). Respondents with high job satisfaction have high achievement motivation ( $p = 0,000$ ). Multiple logistic regression analysis showed that the level of education ( $p = 0.034$ ; Exp (B) = 6.366), years of service ( $p = 0.007$ ; Exp (B) = 9,138) and job satisfaction ( $p = 0.006$ ; Exp (B) = 3.696) with a 95% confidence level. There is a significant influence on the level of education, working period and job satisfaction on the achievement motivation of midwives in Banjarbaru. The working period variable has the most dominant influence on achievement motivation.

**Keywords:** *Level of education, working period, job satisfaction, achievement motivation.*

## Introduction

Based on data from the The Human Resource Development and Management, Ministry of Health, Republic of Indonesia in 2017 the number of midwives in Indonesia reached 280,175 people where there were 17,224 people with achievements. Kalimantan Selatan region has a distribution of 2,226 people with 571

achieving midwives.<sup>1</sup> There are three factors influencing achievement motivation, namely education level, years of service and job satisfaction. Someone practices or actions caused by the knowledge and attitudes they have. Knowledge or cognitive are very important domains for the formation of one's practice or actions.<sup>2</sup>

Midwives who have high achievement motivation can be seen from their high self-confidence in the midwifery activities that they do are always done with maximum effort and overcoming existing obstacles and oriented towards success or failure goals. Midwives who are not motivated to excel will have low quality work, resulting in low satisfaction with work and if required to do midwifery work will likely fail.<sup>3</sup>

Public health center in the city of Banjarbaru has a workforce of more than 10 midwives. From 9 existing

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health centers, for each midwife evaluation model, there were only 6 out of 9 midwives who participated in the competition with a percentage of 66.67%. This causes the achievement motivation is still not optimal.<sup>4</sup> Based on data from the Banjarbaru City Health Office, there are midwives who work in public health center in the working area of the city of Banjarbaru that are not in accordance with their expertise, some midwives who become treasurers in public health center. The number of midwives who work at the public health center is 110 people, there are 5 people who work not according to their expertise.<sup>5</sup>

Based on the above background, midwife education greatly influences the achievement motivation of midwives the length of service of a midwife greatly influences work motivation. Midwives who are not in accordance with their profession greatly affect the motivation to work. Midwives in public health center should work according to their profession. Based on the above background the researcher is interested in analyzing the influence of education level, tenure and job satisfaction in the midwife achievement motivation in the city of Banjarbaru.

**Materials and Method**

This type of research is an analytic observational study using a cross-sectional approach. The population

in this study was all midwives at the health center in the city of Banjarbaru. The sample in this study was taken using the proportional random sampling method. The sample size calculation in this study uses the Lameshow formula with a total sample of 96 people. Research instruments using a questionnaire. Statistical analysis using logistic regression test.

**Findings:**

**Table 1. The Characteristic of Respondent**

Variable	Frequency (People)	Percentage (%)
<b>Level of education</b>		
Diploma III	88	83
Bachelor/Applied	18	17
<b>Working period</b>		
Long	88	83
New	18	17
<b>Job satisfaction</b>		
High	57	53.8
Low	49	46.2
<b>Achievement motivation</b>		
High	47	44.3
Low	59	55.7

**Table 2. Bivariate Analysis Effect of Education Level, Working Period, and Job Satisfaction on Achievement Motivation**

Variable	Achievement motivation				Total		P-value	PR	95% CI
	High		Low		N	%			
	n	%	n	%					
<b>Level of education</b>									
Diploma III	43	48.9	45	51.1	88	100	0.004	4.602	1.226-17.272
Bachelor/Applied	16	88.9	2	11.1	18	100			
<b>Working Period</b>									
Long	57	64.8	31	35.2	88	100	0,000	2.523	1.819-3.499
New	2	11.1	16	88.9	18	100			
<b>Job Satisfaction</b>									
High	36	63.2	21	36.8	57	100	0,000	2.813	1.612-4.910
Low	11	22.4	38	77.6	49	100			

**Table 3. Multivariate Analysis The Effect of Educational Level, Working Period, and Job Satisfaction on Achievement Motivation**

Variable	Sig.	Wald	B	Exp (B)	95% CI	
					Lower	Upper
Level of education	0.034	4,492	1,851	6,366	1,149	35,257
Working period	0.007	7,294	2,212	9,138	1,835	45,515
Job satisfaction	0.006	7.507	1,307	3,696	1,451	9,415

**Discussion**

**Effect of Educational Level on Achievement**

**Motivation:** Based on the results of the study it can be seen that the midwife who has the last level of education Diploma III (D3) has a pretty good achievement motivation, as many as 48.9% have high achievement motivation. Midwives with the most recent education level D3 are mostly senior midwives, namely midwives with long working periods, where for decades they have worked at the public health center and have even opened their own clinics/practices at home. Midwives with a long work period, certainly are experienced midwives who have excellent knowledge or midwifery skills. Therefore, supported by years of work, experience and skills, it can be ensured that the midwife will always be motivated to excel and be better than other midwives in doing their work.

Furthermore, it can be seen that midwives with a Bachelor/Applied education level (S1/D4) tend to have high achievement motivation (88.9%). Midwives with S1/D4 education levels are mostly midwives who previously had a D3 education level who had gone on to S1/D4. Where they also have a long period of work or senior midwives who have knowledge and skills of midwifery very well. Midwives that level of education S1/D4 has the same tendency with most midwives D3 which has a high achievement motivation.

From the opinions above it can be seen that one form of desire to be able to surpass others is in the form of education level. Education has an important role in increasing labor productivity, because the increase in labor productivity that relies on education basically aims to improve the ability of human labor and to improve the standard of living of its people.<sup>6</sup> Achievement motivation is an encouragement related to achievement, namely mastering, manipulating, managing the environment and physically to overcome obstacles and maintain high

quality of learning, competing through efforts to surpass past actions and surpass those of others.<sup>7</sup>

**Effect of Working Period on Achievement**

**Motivation:** Based on the results of the study it can be seen that midwives with long tenure tend to have high achievement motivation. Then for midwives with new tenure, it is known that their achievement motivation tends to be low. This is possible because of their minimal experience so that the desire to compete with other more senior midwives is also low. Therefore, their achievement motivation also tends to be low.

The working period is the period that has been done by people since they work. The period of work can describe a person’s experience in mastering his field of work. Officers with a lot of work experience do not need guidance compared to officers with little work experience.<sup>8</sup> Working period can be attributed to the experience gained in the workplace.<sup>9</sup> The longer a worker has more experience and the higher his knowledge and skills. In addition the length of a person’s work can be related to the experience gained at work. The longer a worker has more experience and the higher his knowledge and skills. Longer tenure shows more experience of a person compared to other co-workers, so often work tenure or work experience is considered by a company in finding workers.<sup>7</sup>

**Effect of Job Satisfaction on Achievement**

**Motivation:** Based on the results of the study it can be seen that midwives with high job satisfaction tendencies also have high achievement motivation. Midwives who have high job satisfaction mean that the midwife is a midwife who enjoys her work as a midwife, is responsible for her duties, works sincerely and without coercion. Midwives with good job satisfaction will have a tendency to motivate better achievement. Job satisfaction is the level of pleasure a person feels for his role or work in the organization. The level of satisfaction of individuals that

they receive compensation in kind from various aspects of the work situation of the organization where they work. So job satisfaction concerns the psychological individual in the organization, which is caused by the condition he feels from his environment.<sup>10</sup>

Job satisfaction is a general attitude of an individual towards his job, a high level of job satisfaction is indicated by a positive attitude while dissatisfaction is indicated by a negative attitude towards his job, so from that opinion, satisfaction the work obtained raises a positive attitude, can be used as a tool to control organizational functions that are expected to produce higher motivation.<sup>11</sup>

**Multivariate Analysis:** Based on the results of statistical data analysis using multiple logistic regression it is known that the significance value of educational level variables is equal to  $0.034 < 0.05$ , so  $H_0$  is rejected and it can be concluded that education level has a significant partial effect on achievement motivation. The results of the multiple logistic regression analysis for the variable of working period are known to have a significance value of  $0.007 < 0.05$ , so  $H_0$  is rejected and it can be concluded that tenure has a significant partial effect on achievement motivation. Then the results of multiple logistic regression analysis also showed that the significant value of the variable job satisfaction was  $0.006 < 0.05$ , so  $H_0$  was rejected and it can be concluded that job satisfaction had a significant partial effect on achievement motivation.

The statistical test results using multiple logistic regression also revealed that the independent variable which gave the most dominant influence on the dependent variable (achievement motivation) was the working period variable with the largest Exp (B) value of 9,138 with a p-value of 0.007. Thus, it can be concluded that work tenure has the most dominant influence on the achievement motivation of midwives.

Midwives in the Banjarbaru Health Center are mostly senior midwives with a working period of more than 5 years. In addition, it is known that midwives who have an education level of S1/D4 are mostly midwives with long work periods who have continued their education from the D3 level. While in terms of job satisfaction, it can be seen that midwives with high job satisfaction also tend to have long working periods. It can be seen that the midwife employment variable is an inseparable part of the other variables. Thus, midwives with a long work period, supported by a good level of education and job

satisfaction will work professionally, not too concerned with material aspects, but are more motivated to excel by providing the best service to patients.

The length of a person's work can be related to the experience gained at work. The longer a person works the more experience the higher his knowledge and skills. Therefore, midwives who have a long working period and are supported with adequate skills and experience are not likely to be moved to just get money, status, or other benefits, they will look for them if they are a symbol of achievement, a measure of success. This is one of the characteristics of high achievement motivation.<sup>7</sup>

## Conclusion

There is a significant influence on the level of education, working period, and job satisfaction on the achievement motivation of midwives in Banjarbaru. The working period variable has the most dominant influence on achievement motivation.

**Ethical Clearance:** Before conducting the data retrieval the researchers conducted a decent test of ethics conducted at the Faculty of Medicine, Lambung Mangkurat University to determine that this study has met the feasibility. Information on an ethical test that the study is eligible to continue. The feasibility of the research was conducted in an effort to protect the human rights and security of research subjects.

**Source Funding:** This study was done by self-funding from the authors.

**Conflict of Interest:** The authors declare that they have no conflict interests.

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# Prevalence ESBL Producing *Escherichia Coli* among Children in Indonesia

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## Abstact

**Introduction:** Beta-lactam antimicrobials are the most often antibiotic used for the treatment of infections worldwide, including Indonesia. Continuous exposure of these antimicrobials will induce the increasing of antimicrobial resistance, such as extended spectrum  $\beta$ -lactamase (ESBL). The carrier of ESBL among people will be serve as a risk factor to get an infection, especially among low immune response hospitalized patients. The aims of this study was to explore the ESBL producing gut flora and carrier rate among children visiting Primary Health Center (PHC) in Surabaya. The cross sectional study was conducted in three PHCs since February 2019 until April 2019. The total 200 children were swabbed from rectal, 100 from neonatal age and 100 from post neonatal age, then sub-cultured in MacConkey medium supplemented with cefotaxime 2 micrograms per milliliter. The growth colonies were then confirmed by DDST (Double Disk Synergy test) for ESBL producer and biochemical test for bacterial diagnosis. Result: Among 100 neonatal age were identified 14 (14%) producing ESBL consist of 9 (64,3%) ESBL producing *Escherichia coli*, 5 (35,7%) ESBL producing non *Escherichia coli*. Whether among 100 post neonatal age were 37 (37%) producing ESBL consist of 25 (67,6%) ESBL producing *Escherichia coli* and 12 (32,4%) producing ESBL non *Escherichia coli*.

**Conclusion:** Prevalence ESBL producing *Escherichia coli* on post neonatal age was significantly different than neonatal age ( $p = 0,001$ ). Risk Factors of ESBL producing *Escherichia coli* on Post neonatal age and neonatal age are history of visiting hospital ( $p = 0,026$ ), history of antibiotics used by mother ( $p = 0,043$ ), mode of delivery ( $p = 0,032$ )

**Keywords:** Neonatal, ESBL, *Escherichia coli*.

## Introduction

Bacterial colonization in humans starts since the new born baby. The source of bacterial colonization are originating from environment, perineal, birth canal, stool and mother's skin to develop a microbiota of the newborn gut flora.<sup>(1)</sup> The perinatal age is important in

developing the microbiota, and the development of the immune system as well for the baby.<sup>(2)</sup> Aged 1 year to 18 months the digestive tract microbiota is fully formed. The use of antibiotic as therapeutic means in this period can disturb the development of microbiota.<sup>(3)</sup> The stage of child development consists of early neonatal period (0-7 days old), advanced neonatal period (8-28 days old), post neonatal period (29 days - 1 year old).<sup>(4)</sup>

The modern medicine today often uses antibiotics to treat the infections. Antimicrobial resistance is a serious problem in various countries, including Indonesia. Misuse of antibiotics in medicine, agriculture and livestock is a major factor in this phenomenon.<sup>(5)</sup>

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Beta-lactam antibiotics are the most often used for the treatment of infections. Continuous exposure of bacterial gut flora to several beta-lactam drugs will induce the mutation of the beta-lactamase enzyme encoding gene in these bacteria. These mutations cause new activation of bacteria in the fight against beta-lactam antibiotics. This enzyme is known as the Extended spectrum of  $\beta$ -lactamase (ESBL).<sup>(5)</sup>

Since the discovery of ESBL in 1983, gram-negative bacteria producing ESBL have become a major threat in the world. ESBL can hydrolyze beta-lactam antibiotics containing oxymino, such as 3<sup>rd</sup> generation cephalosporin and aztreonam. This enzyme can be inhibited by beta-lactamase inhibitors such as clavulanic acid, sulbactam, and tazobactam.<sup>(5)</sup>

Infections caused by ESBL-producing bacteria are commonly found in hospitals, particularly in intensive care units. For every patient with infection (especially caused by ESBL producers), there are two or more other patients with colonization on their skin, urinary duct, or respiratory tract that do not require specific antimicrobial therapy.<sup>(6)</sup>

Recently the infection caused by ESBL producing bacteria originating from hospitals has spread to wider community. Physical contacts between patients and hospital staffs with infected patients are one of the factor that transmits the infections caused by ESBL producing bacteria. The transmission of the infection is triggered by several conditions, such as a low income people, a poor immune system the lengthy hospital stay, and the hospital condition.<sup>(7)</sup>

ESBL-caused infections tend to happen in countries with the low income rate. The infection may affect the length of his or her hospital stay if the patient is an inpatient who requires an antibiotic treatment. Such patients with infections due to ESBL producers, who require antibiotic therapy will stay in the hospital longer than those without ESBL producer infections. This situation could increase the cost of staying longer in the hospital.<sup>(8)</sup>

Increased antibiotic resistance can cause problems in the community and also the Hospital. Pathogens that are resistant to antibiotics are identified worldwide, include *Escherichia coli*, *Klebsiella pneumoniae*, *Acinetobacter baumannii*, methicillin-resistant *Staphylococcus aureus*, penicillin-resistant *Streptococcus pneumoniae*, vancomycin-resistant *Enterococcus*, and *Mycobacterium*

*tuberculosis*.<sup>(5)</sup>

This study aims to explore the prevalence of ESBL producing gut flora among neonates and post-neonates baby in Surabaya.

## Materials and Method

This study was conducted by cross sectional approach, among 3 Primary Health Centers (PHCs) in Surabaya municipality, East Java, Indonesia. This study was approved by ethics committee of the Faculty of Medicine, Universitas Airlangga (No. 17/EC/KEPK/FKUA/2019).

The samples of this study consist of a rectal swab of neonatal ages (0-7 days old) and post-neonatal ages (1-2 months old) collected from three PHCs.

The samples were inoculated in MacConkey medium supplemented with cefotaxime (CTX) 2 mg/L. The growth colonies were continued for identification of bacterial species by biochemical testing, consisting of TSI (Triple Sugar Iron) test, indole test, MR (Methyl Red) test, VP (Voges Proskauer) test, citrate test, and motility test. ESBL-producing bacteria were confirmed using DDST (Double Disk Synergy Test) using antibiotic disc of ceftriaxon, cefotaxim, cefepim and aztreonam with amoxicillin-clavulanic acid at the center of the plate.<sup>(9)</sup> The identification was performed at Microbiology Laboratory, Dr. Soetomo General Hospital Surabaya. Data analysis was conducted using SPSS Statistical Software version 20.

## Result

The study was conducted in three PHCs since February 2019 until April 2019. The total 200 babies were included and rectal, 100 from neonatal age and 100 from post neonatal age, and male in neonatal age was 43 (43%) and post neonatal 59 (59%) respectively. The education of mothers in neonatal age were elementary school 3 (3%), junior high school 19 (19%), senior high school 77 (77%), higher education 1 (1%). The education of mothers in post neonatal age consist of elementary school 3 (3%), junior high school 14 (14%), senior high school 77 (77%), higher education 6 (1%).

Among 200 samples collected the ESBL producer among 100 neonatal age were 14 (14%) consist of 9 (9%) ESBL producing *Escherichia coli* and 5 (5%) producing ESBL non *Escherichia coli*. ESBL producer among 100 post neonatal age were 37 (37%) consist

of 25 (25%) ESBL producing *Escherichia coli* and 12 (12%) producing ESBL non *Escherichia coli* ( $p = 0,001$ ). The ESBL producers among Non-*Escherichia coli* bacteria were *Klebsiella pneumoniae*, *Enterobacter aerogenes*, *Acinetobacter spp*, *Pseudomonas spp*. Mean

while among 100 neonates babies and 100 post neonates babies, there were not identified ESBL producer 86 (86%) neonatal age group and 63 (63%) post neonatal age. The distribution of ESBL producers among the babies was presented in table 1.

**Table 1. The prevalence of bacteria producing ESBL from neonatal age and post neonatal age**

ESBL Producers in Gut Flora	Neonatal Age	Post Neonatal Age	Total	p Value	RR	C.I (95%)	
	n (%)	n (%)				Lower	Upper
Escherichia coli	9 (9)	25 (25)	34	0,001	4,3	2,2	8,5
Non Escherichia coli	5 (5)	12 (12)	17				
Non ESBL producer	86 (86)	63 (63)	149				
Total	100	100	200				

The Risk factors for carrier of ESBL producer in gut flora among neonatal age and post neonatal age were history of visiting hospital ( $p=0,026$ ), history of antibiotics used by the mother ( $p=0,043$ ) and mode of

delivery (0,032). The delivery handler, doctor or midwife and places (PHC or hospital) were not significantly different among babies age group. (Table 2).

**Table 2. Risk factor for ESBL colonization among neonatal age and post neonatal age babies in three Primary Health Center, Surabaya, Indonesia.**

Risk Factors		ESBL Positive	ESBL Negative	Total n = 200	p Value	RR	C.I (95%)	
		n (%)	n (%)				Lower	Upper
History of visiting Hospital	Yes	16 (39)	25 (61)	41	0,026	1,28	1,09	1,66
	No	35 (22,1)	124 (77,9)	159				
<b>Total</b>		<b>51</b>	<b>149</b>	<b>200</b>				
History of Antibiotics used by mother	Yes	3 (10,3)	26 (89,7)	29	0,043	0,80	0,69	0,94
	No	48 (28,1)	123 (71,9)	171				
<b>Total</b>		<b>51</b>	<b>149</b>	<b>200</b>				
Mode of Delivery	Vaginal	38 (22,6)	130 (77,4)	168	0,032	1,30	0,97	1,76
	Sectio	13 (40,6)	19 (59,4)	32				
<b>Total</b>		<b>51</b>	<b>149</b>	<b>200</b>				
Delivery Handler	Midwife	38 (23,2)	126 (76,8)	164	2,602	1,88	0,87	4,05
	Doctor	23 (63,9)	13 (36,1)	36				
<b>Total</b>		<b>51</b>	<b>149</b>	<b>200</b>				
Birth Places	PHC	32 (22,2)	112 (77,8)	144	2,91	1,8	0,91	3,5
	Hospital	19 (33,9)	37 (66,1)	56				
<b>Total</b>		<b>51</b>	<b>149</b>	<b>200</b>				

Note: ESBL = Extended Spectrum beta Lactamase producer; PHC = Primary Health Center



## Discussion

The largest ESBL-producing bacteria found in this study is *Escherichia coli*. Other ESBL-producing bacteria includes *Klebsiella pneumoniae*, *Enterobacter aerogenes*, *Acinetobacter spp*, *Pseudomonas spp.*, and *Pseudomonas aeruginosa*. *Escherichia coli* is the most common ESBL-producing bacteria, found in 9 (9%) of neonatal sample and 25 (25%) of post-neonatal samples. A similar study conducted in Bangladesh found that 90% of feces samples collected from 100 healthy infants contained *Escherichia coli*.<sup>(10)</sup> The results of a study conducted in Lebanon found that 42 out of 53 ESBL-producing bacteria in 1-12 months old infants were *Escherichia coli*. The ESBL-producing *Escherichia coli* is the cause of infection in community and nosocomial infections.<sup>(11)</sup>

The ESBL producers in neonatal age is inherited from the mother during the childbirth process. ESBL can also be transmitted from a health worker to a neonate and another sources.<sup>(12)</sup> The infection of ESBL-producing bacteria may be caused by healthy individuals without risk factors. The colonization of ESBL producers in a pregnant woman can be transmitted to her baby during its childbirth.<sup>(13)</sup>

ESBL can be transmitted from mothers to their babies during their childbirth as proven from 14 of 225 newly-born babies who are ESBL producers positive were transmitted from 13 ESBL producer positive mothers.<sup>(12)</sup> The colonization of resistance traits can occur within early months of their life. A study reported that 14 antibiotic-resistance genes from 18 types of antibiotics and 8 drug classes were found from 22 healthy infants and children who have never been exposed to antibiotics.<sup>(14)</sup>

Unlike adults, a newly-born baby is exposed to various sources of drug resistance producing organisms during their childbirth and within their first week of life. A study states that the bacteria were obtained when the fetus is in uterus. The bacteria develop after the childbirth to the first week of life. When a baby was born, their gastrointestinal tract may have contained bacteria that potentially develop to be a pathogenic bacteria. In addition to an internal pathogenic source, other sources can be obtained from the environment after the childbirth, such as the mothers, health care workers, and visitors.<sup>(15)</sup>

Nutrition intake during post-neonatal periode

also affects ESBL producer colonization. Breast milk affects bacterial colonization and reduces the risk of gastrointestinal tract inflammation. It also plays an important role in preventing pathogenic bacteria colonization.<sup>(15)</sup>

The transmission can also occur from the history of the health care facility use. ESBL-producing *Escherichia coli* can be found in health care facilities, administration office areas, and community health care centers. Contacts between health care workers and patients and contacts among patients enable the transmission of ESBL producing bacteria, such as *Klebsiella pneumoniae*.<sup>(16)</sup>

This study showed that the carrier rate of ESBL producer incidence in neonatal and post-neonatal age was correlated with the history of antibiotics used by mother ( $p = 0,043$ ). ESBL is common in developing countries where the policies concerning the use of antibiotics are less strict compared to developed countries. Japan and Switzerland are exemplary countries that apply strict policies concerning the use of antibiotics. The citizens detected as ESBL carriers from these two countries are 5,8% and 6,4% from the total healthy population.<sup>(17)</sup>

The use of antibiotics during pregnancy for various reasons may affect the growth of floras in newly born babies. Several types of antibiotics can penetrate placenta and be transmitted to the fetus. This is one of the reasons why a baby born from a mother who consumes antibiotics has the risk of ESBL.<sup>(18)</sup>

Contacts with health care workers and surroundings also affect ESBL colonization in newly born babies. Direct contacts between baby and vaginal flora of the mother during the childbirth process may cause infection without harming the mother. Bacteria from mother's vagina may spread to vaginal opening, amnion membrane, even amnion fluids.<sup>(19)</sup>

The childbirth process is one of transmission factors from mothers to their children. The results of a study indicate that 17,9% neonates born in spontaneous manners 34% of them is infected by *Escherichia coli* transmitted from their mother.<sup>(20)</sup> It shows the close relationship of bacterial colonization and spread between the baby and the mother.

## Conclusion

The colonization rate of ESBL producing bacteria among babies are prevalent. The carrier rate of ESBL

producing bacteria in post neonatal age was significantly different than neonatal age ( $p = 0,001$ ). Risk Factors of ESBL producing *Escherichia coli* on Post neonatal age and neonatal age are history of visiting hospital ( $p = 0,026$ ), history of antibiotics used by mother ( $p = 0,043$ ) and mode of delivery ( $p = 0,032$ ).

**Source of Funding:** This study was supported by grant of Tahir Professorship program at Universitas Airlangga No. 1149/UN3/2018

**Conflict of Interest:** None declare.

**Ethical Clearance:** This study was approved by ethics committee of the Faculty of Medicine, Universitas Airlangga No. 17/EC/KEPK/FKUA/2019

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# Correlation between Lymphocyte Level and Disease Activity in Systemic Lupus Erythematosus Patients

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## Abstract

**Introduction:** Systemic lupus erythematosus (SLE) is a multisystem autoimmune disease with a wide spectrum of clinical manifestations characterized by remissions and exacerbations. Serological tests are commonly used to assess the disease activity and predict lupus flare including complement (C3 and C4) test. During active disease, usually there is a fall in complement levels. However, these tools are limited and require high cost. Some studies have shown lymphopenia to be associated with disease activity and organ damage. The aim of the present study was to investigate the correlation between lymphopenia and disease activity (C3 and C4) in SLE patients.

**Method:** A cross-sectional analytic study included 27 patients who fulfilled the American College of Rheumatology (ACR) 1997 classification criteria for SLE was conducted. The patients were consecutively recruited from the inpatient and outpatient of Dr. Wahidin Sudirohusodo Hospital and Private Rheumatology Clinic, Makassar. We collected lymphocyte count and complement C3 and C4 data from the patients.

**Results:** The study included 27 SLE patients. This study shows the percentage of lymphopenia in low C3-C4 is higher than in normal C3-C4, which is 58.3% compared to 33.3%, but there is no statistically significant correlation between lymphopenia with low C3-C4 ( $p > 0.05$ ). The percentage of lymphopenia in low C3-normal C4 is higher than in normal C3-C4, which is 77.8% compared to 33.3%, but the results are also statistically insignificant ( $p > 0.05$ ).

**Conclusions:** Lymphopenia was not significantly correlated with disease activity (C3 and C4) in SLE patients.

**Keywords:** Lymphocyte, complement, C3, C4, disease activity, systemic lupus erythematosus.

## Introduction

Systemic lupus erythematosus (SLE) is a

multisystem autoimmune disease with a wide spectrum of clinical manifestations characterized by remissions and exacerbations.<sup>1,2</sup> Tissue damage in SLE is caused by autoantibodies and complement fixing immune complex deposition.<sup>2,3</sup> Therapeutic decisions are based on the estimation of the degree of damage that may result from untreated disease activity.<sup>2</sup> There are various methods to quantify disease activity, identify flares and to predict flares.<sup>2,4</sup>

Serological tests are commonly used to assess the disease activity and predict lupus flare including

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complement (C3 and C4) test.<sup>2,4,5</sup> During active disease, usually there is a fall in complement levels.<sup>2,5</sup> However this tools are limited and require high cost.

Lymphopenia is a common clinical manifestation in lupus and the mechanism of its occurrence is still unknown.<sup>6</sup> The clinical usefulness of lymphopenia has been limited mainly to aid in lupus diagnosis because lymphopenia is one of the hematologic criteria according to the American College of Rheumatology (ACR).<sup>7</sup> Lymphopenia was detected in about two thirds of lupus patients on initial diagnosis and in more than 90% of patients during their disease course.<sup>8</sup> Lymphopenia has been shown to be associated with disease activity in adult SLE patients.<sup>9,10</sup> However, it may be caused by factors other than SLE.<sup>11</sup> Medications including corticosteroids, cytotoxic agents, infections and hospital setting can also contribute to reduction in lymphocyte count, which may not be a direct reflection of disease activity.<sup>11</sup> Some studies have shown lymphopenia to be associated with disease activity and organ damage.<sup>9,12</sup>

Based on these findings, it is tempting to conduct the study especially in Makassar, Indonesia. The aim of the present study was to investigate the correlation between lymphopenia and disease activity (C3 and C4) in SLE patients.

**Method**

A cross sectional analytic study included 27 patients who fulfilled the American College of Rheumatology (ACR) 1997 classification criteria for SLE was conducted, The patients were consecutively recruited from the Inpatient and outpatient of Dr. Wahidin Sudirohusodo Hospital and Private Rheumatology Clinic, Makassar. All patients have been subjected to full history taking, thorough clinical examination and laboratory investigations. Disease activity was assessed using complement C3 and C4, which low complement level (C3 < 85mg/dl and C4 <12mg/dl) showed active disease. Subjects were excluded if there was a history of corticosteroid or immunosuppressant consumption and patients that comorbid with infection. An informed consent was obtained from the subjects. We collected lymphocyte count and complement C3 and C4 data from the patients. Data were processed and analyzed using the computer program SPSS (Statistical Package for the Social Science Program) version 22. Fisher Exact Test were used for the statistical analysis of the data and was considered significant if p <0.05.

**Findings:** The present study included 27 SLE patients. Their age ranged from 18 to 51 years with a mean age of 30.5 ± 9.4 years. The mean lymphocyte level was 1291.0 ± 845/ml, which is low (lymphopenia). The mean C3 level was 67.1 ± 32.5 mg/dl and C4 level was 16.2 ± 11.3 mg/dl (Table 1).

**Table 1. Statistic Variables (n=27)**

Variable	Minimum	Maximum	Mean	Std. Deviation
Age	18	51	30,5	9,4
C3	27,3	160,0	67,1	32,5
C4	2,9	46,3	16,2	11,3
Lymphocyte	82,1	2904,0	1291,0	845,4

All subject were female (100%). Among all patients, 16 subjects (59.3%) had lymphopenia, and 11 subjects (40.7%) had normal lymphocyte levels. Low C3 level was found in 21 subjects (77.8%), and only 6 subjects

(22.2%) with normal C3 levels. Low C4 level was found in 12 subjects (44.4%), and 15 subjects (55.6%) with normal C4 level (Table 2).

**Table 2. Distribution of Category Variables (n=27)**

Variable		n	%
Gender	Male	0	0
	Female	27	100
C3	Low	21	77,8
	Normal	6	22,2
C4	Low	12	44,4
	Normal	15	55,6
Lymphocyte	Lymphopenia	16	59,3
	Normal	11	40,7

The percentage of lymphopenia in low C3-C4 is higher than in normal C3-C4, which is 58.3% compared to 33.3%, but there is no statistically significant correlation between lymphopenia and low C3-C4 ( $p > 0.05$ ) (Table 3).

**Table 3. Correlation between Lymphocyte and Low C3-C4**

Lymphocyte		C3 & C4		Total	p
		Low C3 Low C4	Normal C3 Normal C4		
Lymphopenia	n	7	2	9	0,620
	%	58,3%	33,3%	50,0%	
Normal	n	5	4	9	
	%	41,7%	66,7%	50,0%	
Total	n	12	6	18	
	%	100,0%	100,0%	100,0%	

We also analyze the correlation between lymphocyte levels and low C3-normal C4. We found the percentage of lymphopenia in low C3 low-normal C4 also higher than in normal C3-C4, which is 77.8% compared to 33.3%, but the correlation are also statistically insignificant ( $p > 0.05$ ) (Table 4).

**Table 4. Correlation between Lymphocyte and Low C3-Normal C4**

Lymphocyte		C3 & C4		Total	p
		Low C3 Normal C4	Normal C3 Normal C4		
Lymphopenia	n	7	2	9	0,136
	%	77,8%	33,3%	60,0%	
Normal	n	2	4	6	
	%	22,2%	66,7%	40,0%	
Total	n	9	6	15	
	%	100,0%	100,0%	100,0%	

**Discussion**

This study included 27 patients with ages between 18-51 years with a mean age of  $30.5 \pm 9.4$  years. This study in line with the European League Against Rheumatism (EULAR) data where about 65% of patients

with SLE have an onset of disease between the ages of 16 and 55 years.<sup>1</sup> All research subjects are female, this is also in line with EULAR data where female are more often affected SLE nine times than men.<sup>1</sup> This is related to hormonal factors where estrogen facilitated

the humoral response, which leads to an increase in B cell proliferation and antibody production.<sup>13</sup>

In this study, SLE patients had mean lymphocyte level of  $1291.0 \pm 845/\text{mm}^3$ , with the lowest level is  $82.1/\text{mm}^3$  and the highest level is  $2904.0/\text{mm}^3$ . Among the subject, 16 (59.3%) had lymphopenia, and 11 (40.7%) had normal lymphocyte levels. Oehadian et al at Hasan Sadikin Hospital Bandung (2013) found the mean lymphocyte level in SLE patients was  $1721 \pm 600/\text{mm}^3$ .<sup>14</sup> Whereas Faddah et al in Cairo (2014) found lower mean lymphocyte level  $721.6 \pm 296.65/\text{mm}^3$  in 29 SLE patients.<sup>3</sup> Low lymphocyte counts commonly occur in SLE with a prevalence ranging from 20% to 93% and are observed frequently in patients with active or severe disease.<sup>15</sup> The degree of lymphopenia can be quite striking with values  $<0.5 \times 10^9/\text{L}$  observed in 10% of patients.<sup>15</sup>

The role of complement in SLE is to assess disease activity and predict recurrence. Andrejevic et al (2013) found low level of C3 and C4 in SLE patients (58.6% and 54.5%)<sup>16</sup>, Sobhi et al (2019) found SLE patients with a decrease in C3 by 67.7% and C4 by 35.5%<sup>17</sup>, while in this study we found 77.8% patients with low C3 levels and 44.4% patients with low C4 levels.

The level of C3 and C4 in serum are used as indicators of complement consumption in SLE because activation of the complement occurs during the course of active disease, so lower levels of complement indicate a higher level of disease activity in SLE.<sup>4</sup>

Lymphopenia is a common clinical manifestation in systemic lupus erythematosus (SLE) and is one of the diagnostic criteria.<sup>9</sup> Lymphopenia was observed in 62% of adult patients at the diagnosis of SLE.<sup>10</sup> Lymphopenia in SLE is correlated with the formation of antilymphocytic antibodies (ALA).<sup>18,19</sup> ALA was present in more than half of the SLE patients with lymphopenia and of the patients with ALA, 90.9% had lymphopenia.<sup>18</sup> In a multivariate analysis, ALA was independently associated with lymphopenia.<sup>18</sup> The results suggest that ALA might be one of the reasons for lymphopenia.<sup>18</sup> Possible mechanisms include the depletion of circulating T cells and ALA may have the capacity for direct actions on target cells.<sup>18</sup> In addition, Martin et al. found decreased absolute numbers of Treg in SLE patients with lymphopenia compared to those without lymphopenia that correlated with disease activity, suggesting that lower Treg numbers contribute to the maintenance of

systemic autoimmunity.<sup>20</sup> Treg inhibit spontaneous proliferation of naive T cells from lymphopenic hosts via their suppressive functions or by enhancing apoptosis and impairing differentiation of naive T cells.<sup>10</sup>

This study shown that there was no significant correlation between lymphocyte levels with C3 and C4 ( $p < 0.01$ ), although it was found that the percentage of lymphopenia was higher in patients with low C3-C4 levels, as well as low C3-normal C4 level, where decreases in complement level indicated disease activity in SLE patients. Sobhi et al (2019) in his study shown a significant relationship between lymphopenia and a decrease in C3 levels ( $p < 0.03$ ).<sup>17</sup> But in the study of Faddah et al (2014) shown no correlation between lymphopenia with C3 and C4 levels.<sup>3</sup> This might be related to etiology of lymphopenia in SLE is associated with the formation of ALA, which not all SLE patients develop ALA that causes lymphopenia. Li et al (2014) shown that out of 130 SLE patients only 55 (42.3%) were positive for ALA.<sup>18</sup> So even though patients with low level of complement, that indicates high amount complement consumption due to activation of complement, during the course of active disease are not all accompanied by lymphopenia, although this study found a tendency for lymphopenia to occur in active SLE.

Based on this finding, we concluded that lymphopenia was not significantly correlated with disease activity (C3 and C4), therefore we assumed that lymphocyte levels could not be used to predict the disease activity in SLE patients. We still need to examine the C3 and C4 as biomarkers to evaluate the disease activity in SLE patients.

## Conclusion

Lymphopenia was not significantly correlated with disease activity (C3 and C4) in SLE patients.

**Conflict of Interest:** No Potential conflict of interest relevant to be declared.

**Source of Funding:** This study was conducted with self funding, no external funding sources for this study

**Ethical Clearance:** The study has been permitted and acknowledged by Hasanuddin University Ethic Medical Committee. Before each interview, each participant was given written information on the study. Each participant was also informed that his or her participant was

voluntary. Before each interview, we emphasized the importance of maintaining confidentiality in relation to patient cases. All participants provided written consent to participate in this study.

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# The Effect of Chest Physiotherapy During Immediate Postoperative Period among Patients Underwent Abdominal Surgery

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## Abstract

**Objective:** To evaluate the effect of chest physiotherapy on pain and oxygen saturation during the immediate postoperative period among patients underwent abdominal surgery.

**Method:** A quantitative approach, by using single group pre-test and post-test quasi experimental research design without equivalent control group was undertaken. Thirty subjects who fulfilled both inclusion and exclusion criteria were included by using convenient sampling method. Pulse oximetry measurement was performed preoperatively and on the second postoperative day. A visual analog pain scale (VAS) was applied on the second postoperative day, before and after chest physiotherapy. The subjects received treatment at the post-anesthesia care unit. Length of hospitalization, surgery duration and postoperative pulmonary complications were gathered from patient's medical record.

**Results:** The subjects showed improved in oxygen-hemoglobin saturation reading after chest physiotherapy during the immediate postoperative period ( $p < 0.04$ ).

**Conclusion:** Chest physiotherapy was effective for improving oxygen-hemoglobin saturation reading during the immediate postoperative period among patient underwent upper abdominal surgery without increased abdominal pain.

**Keywords:** Chest physiotherapy, Oxygen saturation, abdominal surgery.

## Introduction

Abdominal surgery and general anesthesia have adverse impact on the respiratory system that leads to post-operative pulmonary complications (PPCs)<sup>(3)</sup>. Respiratory system changed immediately after induction of general anesthesia such as altered respiratory muscle function and respiratory drive, reduced lung volume including tidal volume, total lung capacity and vital capacity<sup>(16)</sup>. It also causes impairment in mucociliary clearance and decreases the efficiency of efforts to cough. There are also drops in oxygen-hemoglobin saturation (SPO<sub>2</sub>) and oxygen arterial pressure (PaO<sub>2</sub>)<sup>(15)</sup>.

After anesthesia and surgery, respiratory control may be unusual for few weeks including reduced ventilator responses to hypoxia and hypercapnia. This has serious

suggestions for controlling airway obstruction upon asleep and most likely explains the specific problems faced by patients with obstructive sleep apnoea (OSA) in the post-operative period<sup>(11)</sup>. The combination of decreased FRC impaired respiratory control, reduced coughing effort, and residual atelectasis forms a perfect condition for PPCs to occur<sup>(9)</sup>.

More than 230 million major surgeries happen every year in worldwide<sup>(17)</sup>. The occurrence of PPCs in major surgery ranges from less than 1% to 23%<sup>(6)</sup>. Some researchers have shown that pulmonary complications occur more often than cardiac complications and post-operative respiratory failure is the most often PPC<sup>(10)</sup>. As age increases the risk of PPC also increases. Frailty in older patients has shown in increased incidence of PPCs<sup>(14)</sup>. Other than that, patients who underwent

upper abdominal surgery also are at high risk of PPCs. Laparotomy with an upper abdominal incision may have up to 15 times the risk of a PPC compared with a lower abdominal incision <sup>(12)</sup>. Patients with pre-operative anaemia (haemoglobin < 100g/litre) undergoing any type of surgery have a three-fold increase in the risk of a PPC <sup>(5)</sup>.

Chest physiotherapy treatment has been recommended as a crucial component in the prevention and improving of PPCs after abdominal surgery. It has been regularly applied in both pre and post-operative care settings <sup>(13)</sup>. In this context, chest physiotherapy assistance to abdominal surgery aims to optimize pulmonary function and reverse physiological and/or functional changes that may occur in the post-operative period due to these complications <sup>(8)</sup>. Deep breathing exercises such as percussion, vibration, clapping or shaking were applied to improve bronchial drainage. Currently, mechanical breathing devices like incentive spirometry (IS), continuous positive airway pressure (CPAP), intermittent positive pressure breathing (IPPB), and blow bottle were introduced into clinical practice <sup>(7)</sup>. Objective of the study is to evaluate the effect of chest physiotherapy on VAS and SPO<sub>2</sub> during the immediate postoperative period among patients who underwent abdominal surgery.

## Method

Quasi-experimental study design.

**Sampling Design:** Convenience sampling method

### Inclusion Criteria:

- Patients composed of independent gender and age
- Patients were at the preoperative stage preceding abdominal surgery. The procedures that they were about to undergo included large bowel removal, hernia repair, exploratory laparotomy, gall bladder removal, or other interventions in the abdominal cavity performed by conventional laparotomy.
- All the patients underwent general anaesthesia.
- The patients should have the following characteristics
- age above 18 years
- without heart, pulmonary and/or neuromuscular disease

- who had not been on mechanical ventilation and/or in intensive care for more than 48 hours

### Exclusion Criteria:

- Patients with an indication for liver transplantation, or who presented aneurysm of any arterial segment, were excluded since these patients stay in the intensive care unit for a longer time during the postoperative period.
- Patients undergoing laparoscopy surgery were also excluded, since this induces smaller changes in the postoperative breathing mechanics than laparotomy does.

**Procedure:** During implementation phase the patients undergoing abdominal surgery were recruited from the surgical ward of UKMMC. Then, all subjects will be screened based on the inclusion and exclusion criteria. Thirty subjects were selected from the schedule for abdominal surgery, independent of age and gender. Subjects of both groups were assessed on the day before surgery and on the second postoperative day. The pulse oximetry test was performed pre-operatively and on the second post-operative day. Then the patients were asked to subjectively describe their pain using a visual analog pain scale (VAS). While patients were still in the post-anaesthesia care unit (PACU) after surgery the patients who achieved a score of 10 were assessed and subjected to one session of chest physiotherapy intervention <sup>(1)</sup>. The session consisted of breathing exercises for a total of 30 minutes and included; deep breathing exercise, chest expansion exercise, passive and localized exercises. The same protocol regarding VAS as described above for the control group was applied to the chest physiotherapy group.

The clinical signs of PPCs (dyspnea, cough, sputum and chest sound) were assessed daily by the attending surgical staff. Both groups received the routine physical therapy (early ambulation) while the patients in the study group received breathing exercises after surgery, while still in the PACU in addition to the routine therapy. During data collection phase the oxygen-hemoglobin saturation and visual analog pain scale will be recorded and collected pre-operatively, day two postoperative for both groups by the same researcher.

**Results**

**Subject demographic characteristics:**

**Table 1: Patients’ demographic characteristics (n=30)**

Characteristics	Control Group (n=15)	Chest Physio Group (n=15)
Age (years)	46.4 ± 10.92	50.87 ± 12.97
Respiratory rate (bpm)	20.87 ± 1.85	20.93 ± 2.71
Heart rate (bpm)	97.53 ± 11.95	95.53 ± 8.31
Length of hospitalization (day)	7.6 ± 1.45	7.33 ± 1.4
Surgery duration (in minutes)	207.07 ± 17.23	209.4 ± 11.79

**Gender Distribution:**

**Table 2: Gender distribution (n=30)**

Gender	Control Group (n=15)	Chest Physio Group (n=15)
Male	8 (53%)	7 (47%)
Female	7 (47%)	8 (53%)

**Pre and Post-Test of Visual Analog Pain Scale (VAS)**

**Table 3: Pre and Post-Test of Visual Analog Scale (VAS)**

	Control Group		Chest Physiotherapy Group	
	Median	p-value	Median	p-value
Pre-operative	1 (3-1)	0.88	2 (2-1)	0.06
Post-operative	1 (2-1)		1 (2-1)	

**Pre and Post-Test of Oxygen Hemoglobin Saturation (SPO2)**

**Table 4: Pre and Post-Test of SPO2**

	Pre-test; Mean ± SD	Post-test; Mean ± SD	Mean Difference	t-value	p-value
Control	98.6 ± 1.8	99.2 ± 1.01	0.6	0.14	0.14
Chest Physiotherapy	98.87 ± 1.19	99.53 ± 0.52	0.66	0.03	0.05

Statistically significant positive relationship between chest physiotherapy and SPO2 without increase in pain was supported by the collected data. Thus the null hypothesis was rejected while alternative hypothesis was accepted in this study.

**Discussion**

The purpose of this study was to investigate the effect of chest physiotherapy during immediate post-operative abdominal surgery patient. This study was carried out smoothly without any adverse effects

or subject withdrawal. The study shows that chest physiotherapy during immediate post-operative periods among patient underwent abdominal surgery resulted in a significant improvement (p<0.05) for oxygen-hemoglobin saturation without increased pain. The mean ± SD for SPO2 improved for chest physiotherapy group from 98.87 ± 1.19 to 99.53 ± 0.52. Since the result had showed significant effects between chest physiotherapy and oxygen hemoglobin saturation with p value 0.04. Therefore the effect of chest physiotherapy after immediate post-operative periods was proven.

Breathing exercises upon immediate post-operative periods after abdominal surgery could prevent mild atelectasis extending to severe atelectasis, at which point breathing exercises are less effective in re-expanding non-compliant collapsed lung tissue<sup>(2)</sup>. Earlier interventions may also increase the total dose of breathing exercises. Pain, anxiety, analgesia, nausea and persisting sedation can also compromise a patient's ability to follow instructions upon first contact with physiotherapy is only in the postoperative phase. Breathing exercise with or without different mechanical devices such as positive expiratory pressure (PEP) are used in the post-operative care, with the aim of improving lung volumes and ease the mobilization of secretions. In attempt to optimize the function of the diaphragm after operation, inspiratory resistance positive expiratory pressure (IR-PEP) has been used. Thoracic expansion exercises and diaphragmatic breathing exercise help to improve oxygenation without caused increase in pain or other complications after abdominal surgery. Thus, patients would benefit from additional chest physiotherapy exercises during and after their PACU stay.

There was no difference in visual analog pain scale reading during pre-operative and post-operative periods for the subjects. Some patients experienced reduced in pain after the exercises. From the study, mobilization will increase intensity of pain following abdominal operation<sup>(4)</sup>. Pain is both subjective and multi-dimensional and so the VAS cannot capture the complete pain experience after surgery. So, it is crucial to know how much depletion in a visual analog pain scale to be beneficial from the patient's perspective.

Despite that, analgesic treatment and physiotherapy for abdominal and thoracic surgery can decrease the length of hospitalization and optimize recovery. From the point of view, short duration of hospitalization in the current study may be an indication of reduction of the incidence of the severity of post-operative pulmonary complications in these patients. In this study the oxygen-hemoglobin saturation improved following physiotherapy sessions. The patients would gain advantages from chest physiotherapy upon and after their post-anesthesia care unit stay. With extra exercise the oxygen-hemoglobin saturation will last longer. Although this could have increased the statistical comparison, it reflected the practice applied these days. The patients who received chest physiotherapy experienced low levels of pain because the protocol did not have the aim to study whether physiotherapy during

post-anesthesia recovery could influence the pain.

## Conclusion

Pulmonary impairments occurring after abdominal surgery persist as a major problem as a result of anesthesia and immobilization. The effects of different chest physiotherapy programs have been assessed among these patients and none of them could be evaluated highly satisfactory about preventing PPCs. Variable techniques, poor quality trials and varying meanings of post-operative pulmonary complications resulted in limited evidence on prophylactic lung expansion. Breathing exercises routinely used in clinical practice. These exercises aim to optimize respiratory muscle strength and breathing pattern, improve functional residual capacity, lung expansion and inspiratory reserve volume. Recently the increasing prominence on cost effective provision of healthcare and the focus on evidence-based practice has challenged health care provider to re-assess and justify their traditional practices. For that reason the new approach showed here for early post-anesthetic care aimed to analyse the effects of early post-anaesthetic chest physiotherapy intervention on patients undergoing abdominal surgery could be verifying the benefit of this treatment modalities and establishment of proper treatment protocol for patients submitted to abdominal surgery.

The rationale for applying breathing exercises or devices that encourage deep breathing after surgery is that normal or optimized respiratory patterns will be promoted, thus increasing the distribution of ventilation. If these aims are achieved, it should be possible to document enhanced ventilatory function and pulmonary gas exchange, and to demonstrate that the development of pulmonary complications is reduced the rate of postoperative recovery increased and the clinical course of PPCs improved. Therefore the aim of the present study was to evaluate the effects of early post anaesthetic chest physiotherapy intervention on ventilatory functions, pulmonary complications and length of postoperative hospitalization in patients undergoing abdominal surgery.

As a conclusion, PPCs are common and although many scoring systems exist to quantify PPC risk, there is no consensus on the best one to use and they remain too complex to use clinically. Preoperative smoking cessation interventions before surgery decrease the incidence of PPC and more intensive cessation support

increase their success. Correction of severe preoperative anaemia also improves PPC risk. Postoperative non-invasive ventilation may be useful in a small group of high-risk patients, but otherwise avoidance of PPCs after major surgery requires good analgesia and a care bundle of physiotherapy, mobilization and good oral hygiene. As these strategies become more widely adopted the incidence of PPCs and their associated morbidity and mortality will reduce.

**Based on the findings of the current study the following recommendations can be suggested:**

1. Together with postoperative care, breathing exercises should be adopted at post-anesthesia care units for patients submitted to abdominal surgery.
2. Additional studies to address the numbers, techniques and intervals of physiotherapy regimes that could be applied to benefit these patients is recommended but must be assessed within the context of the study's limitations, including a small sample size, and a relatively short study period.
3. Well-designed trials are needed to clarify the magnitude of advantage and the comparative effectiveness of different modalities of chest physiotherapy for these patients.

**Source of Funding:** Self

**Conflict of Interest:** Nil

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# Implementation of Interprofessional Collaboration in Public Health Center

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## Abstract

**Background:** The more complex the need for services and the higher demand for quality services, the more health workers are pushed to act professionally. Besides, in providing care, each has succeeded in influencing the collaboration system between health workers for the better and increasing patient satisfaction and the services of each profession are still acting according to their needs and interests. The results of a survey of 42 countries conducted by WHO in 2010, the implementation of Interprofessional Education (IPE) in their health education curriculum. To carry out care more effectively and be able to synergize among professionals, the Interprofessional Collaboration (IPC) is very important to be implemented.

**Method:** This type of research is by research and development or Research and Development (R&D) with 10 stages of research, the analysis of which is qualitative.

**Results:** This research resulted in a product in the form of an IPC Model Care Book that was carried out until the last revision based on expert consultation / input that produced the IPC Model Care Guidelines.

**Conclusion:** The research suggest Interprofessional Collaboration to improve service quality.

**Keywords:** *Implementation, Model, IPC, Public health center.*

## Introduction

Health care is needed to provide professionals to give qualified services to the patients as they need for comfort when they receive the service. The collaboration between health workers either in community and clinical are important<sup>(1)</sup>. The development of the health care model is still inclined towards the development of understanding of health workers rather than the patient, as<sup>(2)</sup>. Interpreted in the understanding of health services, especially development that leads to the needs of health services, it has less attention to customer demand.

Previously, the method of Interprofessional Education (IPE) was used. It is form of collaboration in

which the students can practice the delivery of health care services. The materials in IPE itself are health discipline collaborate to provide health services to patients in achieving its goal to increase the quality of care<sup>(1)</sup>.

To synergize and streamline health services to patients, it is implemented Interprofessional Collaboration (IPC). IPC is provision of comprehensive health services to patients by multiple health caregivers who collaboratively work to perform quality care<sup>(3-7)</sup>. The things to take into account regarding IPC is that there must be intangible integration between the education system to prepare the workforce and health care system. The study of IPC has also conducted to produce a patient-safety-based model in order to improve the competence of the specialist-1 doctors of Child Health and in fact, it can increase the competence of the doctors 45.61% and 20.68% in students nursing of the nursing profession program<sup>(8)</sup>. IPE may provide subjects with valuable collaborative learning as well

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as enhance respect for other professional and insight into the value of IPC in healthcare<sup>(9)</sup>. It is stated that medical graduates are prone to have less attitude towards interprofessional communication and IPC<sup>(10)</sup>. Thus, IPC must be conducted simultaneously. Even IPC can be one method to reduce health care costs<sup>(11)</sup>.

The implementation of IPC is very much influenced by understanding the concept of Interprofessional Education (IPE) because IPE as a concept to prepare health students or prospective health workers to better understand the role of each profession and increase their readiness to collaborate in providing health services<sup>(12)</sup>. The objectives in this study is to identify the policy and implementation of the patient service model of IPC as a service reference to the patient.

## Methodology

This type of research is by research and development or Research and Development (R&D), as a research method that produces a particular product, and examines the effectiveness of the product<sup>(13)</sup>.

1. **Primary Data Collection:** This data collection phase is carried out by means of field studies and literature studies.
  1. **Field Study:** To find out the implementation of care provided to patients and analyse it for service needs with the Interprofessional Collaborative (IPC) model in the study area.
  2. **Literature Review:** Literature study obtained the concept of implementation of the IPC model which is conceptually through the theory of the implementation of IPC.
2. **Planning:** The activity began by forming an Interprofessional Collaborative Team (IPC). The team consists of personnel who have or have been exposed to training, consisting of a Research Team:
  - a. **Team Formation**
  - b. **Research Sites and Respondents:** The origin of the respondents came from 3 health centers, namely Public Health Care of Toroh I, Godong I and Gubug I.
3. **Data Collection:** The data collection technique was done by Focus Group Discussion (FGD). The design used concurrent mixed method will be used by the IPC model theory which is implemented in the service of patients in the Public Health Center.

4. **Initial Product Development Stage:** The initial product development stage is the making of a guidebook design for the implementation of the IPC model.
5. **Validation Stage:** There are two stages, which are carried out in consultation with expert experts and experts in practice.
  - a. **Stage I Validation:** The first stage is validation by the material expert or expert in mastering the IPC model concept.
  - b. **Phase II Validation:** The draft guideline for the implementation of the IPC model is then validated in Phase II by the designated practitioners.
6. **Revision Phase of Validation Results:** Improvements in accordance with the results of validation phase I followed by validation phase II by practitioners of the IPC Model provide input on the obstacles found in its implementation.
7. **Field Trials:** As a result of the revision, the guidebook for implementing the IPC model is then used to implement the patient's trial.
8. **Completion of Field Trial Results:** Input from the field team is that adequate human resources are needed in terms of quantity, so that the implementation of the IPC model can be carried out without disrupting other work.
9. **Enhancing Book Products:** In enhancing book product, it is started by carrying out revisions which are adjusted input field test results.

## Results

The data order was done immediately after the Data is obtained, from each Public Health Center and organized into one data group. The information needed that underlies IPC uses the IPC Model concept guidelines, namely:

1. **Platform/Regulation:** To show whether there any regulations used as the basis for implementing patient services or not is done by entering the respondents' answers into the unit typology format. The results of each Typology Unit are arranged in the form of the respondents' original statements as follows.
  - a. Basis/foundation or regulation used as the basis for the implementation of patient services



1. In the form of special regulations governing how to provide services to patients there is none.
2. Forms of services that exist in the form of standard operating procedures (SOP), which are indeed made for the basis of providing patient services.
3. Following the Minister of Health Regulation: No: 75 of 2017, which regulates the minimum service standards that must be available at the Public Health Center, the minimum resources that must be available, quality control through accreditation and financing.
4. There are no regulations either from the the Public Health Center, level or the District Health Office that regulate certain technical aspects.

**b. Researcher's Response:** The regulatory aspect intended as in the concept of Interprofessional Collaborative (IPC) is not solely directed at regulations issued by institutions authorized for this, but may be regulations that provide the basis for certain technical implementation, in a small or narrow scope.

**2. Service Model:** The service model includes information service models implemented at the research site/with the Inter-professional Collaboration approach, the multidisciplinary approach or using another service model. Firstly, in the context of the approach the model used cannot be specifically answered using what approach, but in the care given to patients is as soon as possible to get patients received and served either through the ER or the Polyclinic. Secondly, services that prioritize patients, need to stay or outpatient. Third, never use consideration of the form or model used. If the model as explained, many obstacles were found, such as limited medical personnel who had to serve in the emergency room as well as in the inpatient room. Calculation of strengths and weaknesses or positive and negative is more an effort to improve the quality of management, so that patients as objects are more of an impact of the model used. The IPC model is not new in the world of patient care, but in the implementation of foster care there are obstacles, especially in terms of the responsibilities that so far have been with doctors.

**3. Services at the Public Health Center:** Always respect patient dignity and privacy, pay attention to differences in cultural values, work closely with patients and create a relationship of trust. Not to mention, demonstrate high ethical and service quality attitudes and manage the ethical dilemmas that occur as well as possible. Lastly, master competencies and use as a basis for practice.

As a subject the patient participates in the delivery of service. As an object the patient becomes the target of services that must follow the programs that must be passed. In addition, it must be controlled by their respective professions that are manifested in action. Regarding relationships or interactions and communication between professions are mostly carried out through integrated medical records and it has not been yet through sitting together in discussions, with a variety of reasons.

The respond of ours are noted in several points: ethical values which guide behavior for professionals become an inseparable part of the competencies that must be mastered. For example when going to perform dressing, ethically we must notify the patient, ask for patient permission and carried out smoothly. The communication between professions still requires more study. In-depth, including the study of the underlying policies, the study of the similarity of degrees and levels in handling patient problems, the ability of each profession towards its components.

**4. Data categorization:** The data categorization was divided into three main points. First, the regulations are used as a basis for the implementation of patient services, with some sub-points of following the Minister of Health Regulation, No: 75 of 2017, regarding minimum service standards. Besides, there is a standard operating procedure (SOP) and there are no specific regulations/technical services with certain models. Secondly, the service model implemented at the research site is the Interprofessional Collaboration, Multidisciplinary Approach, etc. In this categorization, it is not allowed to use certain models. By using IPC model, there probably many obstacles and it includes multidisciplinary care models as well as interaction of communication through medical records.

Thirdly, domain competency of collaboration between professions. It is divided into three points.

First, domain of ethical value collaboration between professions which includes care with sincerity, patients as subjects and objects of care, polite behaviour, and soft words, competent manifested forms of action. In addition, interaction and communication through integrated medical records and having a discussion by sitting together. Second, role and responsibility in which care is carried out individually, understanding the competencies of other professions is still a problem, involvement of all professions. The doctor is the main responsibility for the patient being treated and one should be responsible as permanent team leader of the doctor. Forth, communication between professions is done by using language and terms that are understood, material of communication is according to patient needs.

5. **Interpretation of Data:** The interpretation of data are categorized in five points. They are regulation or basis for the implementation of patient service, service implemented at the study site with Interprofessional Collaboration approach and multi-disciplinary approach, competence domains of collaboration between professions: domain of collaborative ethical value, domain of role and responsibility, domain of inter-profession communication and competence of working in teams
6. **Debriefing or discussion on the Implementation of the IPC Model:** Debriefing on the implementation of IPC model includes participants in the discussion or briefing as well as the place and time for debriefing/discussion.

## **Discussion**

### **1. Data collection stage**

- a. **Regulation as the basis for service delivery:** Professional work is an autonomous work that is independent, meaning a job that can only be and can be done by the profession itself. This shows that the authority for professional work lies on his own profession.
- b. **Service model:** Determining the model provides certainty of action, with the formation of teams that have to carry out or have been determined through regulation of patient problems which must be implemented using the IPC model.

### **c. Domain competency of collaboration between professions**

1. **Domain of ethical value collaboration between professions:** Ethical values in the implementation of care are carried out according to Indonesian cultural values by working sincerely with the delivery using polite speech.
  2. **Role and responsibility domain:** In the domain of responsibility, the role of the doctor is still the center of the management of patients treated, despite the concept of “using knowledge about the role of the profession itself and the role of other professions in the team to assess and provide appropriate services to clients and population”
  3. **Domain of communication between professions:** Communication in the IPC concept as conveyed in “interprofessional communication, is a very influential factor in improving patient safety, effectively avoids health care teams from misunderstandings that can cause a medical error, so this communication needs to be mastered “.
  4. **Competence of Working in Teams:** A statement in accordance with the competencies that must be possessed by professional members of an interprofessional collaboration team.
2. **Initial Product Development Stage:** In the preparation of this initial product development did not experience significant obstacles, because many resources were available and the research team was very supportive. So that it can be realized in the form of a draft of the initial product book.
  3. **Validation Stage:** Two stages of validation have been carried out, validation I, more into Systematics and typing and substance content, as explained, namely about the definition or term “care” also about the IPC domain that needs to be revisited, to be distinguished from the IPE domain.
  4. **Revision of Validation Results:** The product draft was improved according to suggestions and input, then duplicated as needed, namely a number

of respondents in this study to be studied and understood in the context of field implementation.

5. **Field Trials:** Trials have the same validation to still around the limitations of resources, both human and facilities and infrastructure.
6. **Completion of Field Trials:** The drafting of the IPC Model at the Public Health Center, a more understanding of the concept of the IPC Model for all professions, in the form of training, so that all professions can understand the roles, functions and tasks of each profession in collaboration.

### Conclusion

Regarding the implementation of the IPC Model, conceptually/theoretically a competency is the responsibility of each profession while authority is regulated and established through regulations so that the competence and authority of professional members become an important part of the profession. In additional, guide to the IPC Model at the Public Health Center, regarding the preparation of the Guidebook is the ultimate goal of research with the Research and Development Method. The results in the form of a Draft IPC Model Handbook have been made and until now still processes ISBN registration.

**Conflict of Interest:** The author has no conflict of interests related to the conduct and reporting of this research.

**Source of Funding:** Source of the fund for this research was by Indonesia Ministry of Health.

**Ethical Clearance:** Before conduct of the study, written permission was obtained from Poltekkes Kemenkes Semarang, Indonesia. The consent and willingness were established from all the subjects who meet the criteria for this research.

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# Pressure Ulcers in a Sample of Iraqi Patients with Spinal Cord Injury

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## Abstract

**Background:** Pressure injury is the most common preventable secondary complication of spinal cord injury and may lead to serious.

**Aims of the study:** To determine the prevalence, grade, number and most common sites of pressure ulcer in people with spinal cord injury.

**Patients and Method:** This study carried out at Ibn Alkuff Spinal Cord Injury Rehabilitation Hospital, Baghdad, Iraq, during the period from 1st of November 2017 to the 1st of July 2018. A total sample of 100 patients was included in this descriptive cross-sectional study. Pressure ulcer was diagnosed by physical examination and graded according to the classification system for pressure ulcer by the European Pressure Ulcer Advisory Panel (EPUAP). Special scale was included in this study to assess spinal cord injury impairment (American spinal injury association scale (ASIA)).

**Results:** Forty patients were having a pressure ulcer. This study showed these pressure ulcers more frequent in ASIA score (A) followed by (B) and (C). The results showed no statistically significant association between age, gender, duration of spinal cord injury and causes of spinal cord injury in determining the presence of pressure ulcer ( $p=0.089$ ,  $p=0.57$ ,  $p=0.214$  and  $p=0.57$  respectively).

**Conclusions:** Pressure ulcers are one of common secondary complication that occurs in 40% of Iraqi patients with spinal cord injury with more frequency in ASIA scale A and B spinal cord injury especially in sacral area and most of the patients presented with one ulcer only.

**Keywords:** Pressure ulcer, causes of spinal cord injury, impairment after spinal cord injury, ASIA scale.

## Introduction

Spinal cord injury (SCI) is a devastating condition which occurs with an annual incidence of 12.1-57.8

cases per million, worldwide<sup>[1]</sup>. Younger males remain at greater risk.<sup>[2]</sup> The male-to-female ratio in developing countries is higher compared to developed ones.<sup>[3]</sup>

Pressure Injury: (PU) is a localized area of cellular necrosis and vascular destruction owing to prolonged exposure to pressure, shearing or friction.

There are no precise figures about the prevalence of pressure ulcers, only estimates that vary from one place to another and depending on the manner of estimation, Prevalence rates range from 4.7% to 32.1% for hospital populations, 4.4% to 33.0% for community-

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care populations, and 4.6% to 20.7% for nursing-home populations.<sup>[4]</sup>

A common classification system for pressure ulcers has been developed by the National Pressure Ulcer Advisory Panel (NPUAP) and European Pressure Ulcer Advisory Panel (EPUAP). They have agreed on four levels of injury which range in severity from category/ stage I (intact skin with no-blanchable erythema) to category/ stage IV (full-thickness tissue loss), recognizing that the terms unclassified/unstageable and deep tissue injury are generally graded as “IV” in Europe, NPUAP has agreed to put them separately.<sup>[5]</sup>

### Patients and Method

This is a cross-sectional descriptive study carried out at Ibn Alkuff spinal cord injury Hospital (in Baghdad) during the period from 1st of November 2017 to the 1st of July 2018.

**Inclusion Criteria:** Patients with spinal cord injury.

**Exclusion Criteria:** Patients with cerebral pathology, congenital paralysis, and psychiatric issue.

Data were collected using a data collection sheet containing questionnaires for the patients.

#### The questionnaire includes:

1. Patients demographics; name, age, gender, body mass index (measured according to equation  $BMI = \text{Weight}/(\text{Height by } m^2)$ ), residence (rural, urban), job (employed, unemployed), marital status, education level (ignorance, primary school, secondary school, college, high education level), medical history (chronic illness; DM, HTN, renal, pulmonary, or cardiac disease), smoking, and alcohol intake.
2. Cause of injury (Motor vehicle collision, Violence, fall, other), site of injury, and duration by months.
3. Classification criteria for level of injury, its type, and impairment degree were assessed according to the American Spinal Injury Association impairment scale (ASIA scale).<sup>[6]</sup> Also, we have an ASIA impairment score for Functional assessment of SCI patients calculated according to a standardized formula.<sup>[7]</sup>
4. Presence of pressure ulcer was examined for all patients and their grade assessed according to the grading scale by the European Pressure Ulcer Advisory Panel (EPUAP).<sup>[5]</sup> Number and sites are

recorded also.

#### Ethical Approval:

1. The study protocol was approved by the council of Faculty of Medicine/Baghdad University and the Department of Rheumatology.
2. Official agreements were obtained
3. Verbal patients’ consents were obtained

**Statistical Analysis:** Data were analyzed using the statistical package for social sciences (SPSS) version 25 for windows. Descriptive statistics presented as frequencies, proportions, means, standard deviation (SD), median and interquartile ranges. Statistical tests and analysis were performed according to the type of variables, chi-square test used to assess the significance of association in cross-tabulation model, (categorical variables), Fisher’s exact test was used as an alternative when Chi-square was inapplicable (more than 20% of the table cells had expected values < 5). Student’s t-test (two independent groups) used to compare two means; for instance, mean BMI and mean duration of injury in patients with pressure ulcer vs. those without. Spearman’s rho correlation test used to assess the correlation between pressure ulcers and other variables.

### Results

A total of 100 patients were enrolled in this study with a mean age of  $31.7 \pm 14.6$  (range: 5 – 81) years. Men were the dominant, represented (85%) of the studied group with men to women ratio of 5.7: 1.

**The causes of the injury are represented in table 1:**

**Table 1. Distribution of cause and duration of injuries among the studied group**

Variable		No.	%
Cause of Injury	Violence	48	48.0
	Fall	20	20.0
	RTA	17	17.0
	Other	15	15.0
Duration of injury (month)	Median	8	-
	IQR	4 - 24	

IQR: Interquartile range

Our results show that 72% were paraplegic, and the remaining 28% were tetraplegic.

Table 2 shows the distribution of levels of the injuries.

**Table 2. Distribution of level of injury among the studied group**

Level	No.	%
C2,3	2	2.0
C4,5	17	17.0
C6,7,8	9	9.0
D1, D2	8	8.0
D3, D4	11	11.0
D5, D6	6	6.0
D7, D8	8	8.0
D9, D10	13	13.0
D11, D12	5	5.0
L1, L2	9	9.0
L3, L4	12	12.0

Among the 100 patients with spinal cord injuries, unfortunately, pressure ulcers were found in 40 patients giving a prevalence rate of 40%.

Table 3 shows the total number of ulcers.

**Table 3. Characteristics of the present pressure ulcers**

Characteristic	No.	%	
Number of Ulcers/patient	1	32	80.0
	2	6	15.0
	3, 4	2	5.0
	<b>Total</b>	<b>40</b>	<b>100.0</b>
Stage of Ulcer	Stage 1	8	16.3
	Stage 2	23	46.9
	Stage 3	14	28.6
	Stage 4	4	8.2
	<b>Total</b>	<b>49</b>	<b>100.0</b>
Site of Ulcer	Sacral	23	46.9
	Gluteal	14	28.6
	Thigh	4	8.2
	Heel	3	6.1
	Other sites	5	10.2
	<b>Total</b>	<b>49</b>	<b>100.0</b>

Table 4 shows pressure ulcers were relatively more frequent in women than men, and also relatively more frequent in advancing age, however, the differences were statistically insignificant.

**Table 4. Cross-tabulation between pressure ulcers and each of age and gender of the patients**

Variable		Pressure Ulcer		No Pressure Ulcer		P. value
		No.	%	No.	%	
Age (Year)	≤ 20	5	12.5	15	25.0	0.089
	21 - 30	18	45.0	22	36.7	
	31 - 40	5	12.5	14	23.3	
	41 - 50	6	15.0	2	3.3	
	> 50	6	15.0	7	11.7	
Gender	Man	33	82.5	52	86.7	0.57
	Woman	7	17.5	8	13.3	

Table 5 shows distribution of pressure ulcers across different ASIA.

**Table 5: Stages of pressure ulcers according ASIA impairment scales**

ASIA score	Pressure ulcer		No Pressure ulcer	
	No.		No.	
A	34	49.3	35	50.7
B	5	45.5	6	54.5
C	1	5.9	16	94.1
D	0	0.0	3	100.0

Table 6 shows the significance of the relationship between the presence of pressure ulcer and other variables of the studied group was assessed by conducting bivariate analysis and cross-tabulation.

**Table 6: Results of correlation analysis for the relationship between presence of pressure ulcers and other variables**

Variable	P. value
Job	0.17
Residence	0.74
Marital status	0.93
Education	0.34
BMI	0.56
Smoking status	0.10
Alcohol	0.08
History of chronic diseases	0.29
Cause of injury	0.57
Patient's status	0.72
Duration of injury	0.214

## Discussion

Pressure ulcers were found in 40% of patients, which is higher than another study that was done in other countries like 32.3% in Pakistan [8] 17% on Dutch [9] and 14.7% in Iran. [10] That difference may be related to the sample size, and differences in risk factors that may be attributed to the ulcer formation such as level of injury, educational level and mode of injury since most of our patients (48%) were victims of violence. Sixty-one Iraqi patients with SCI were studied in the period of 2003\_2005 by Haider k. Radhee et al. They found that the major cause was RTA which represent 54.4% [11] Taghipour et al. and Fakharian et al, Otom, A. S., et al. all they found that road traffic accident was also the most common cause [12-14]. While RTA accounted for only 17% of the causes in our study. Most of the patients in

this study were men 85% that support the fact explained by Dukes, Ellen M., et al. [15]. Men: women ratio was 5.33:1 which is closer to studies done in Jordan by Otom, A. S., et al. [14] Eslami et al. said that pressure ulcers were more common in women for patients aging less than 10 years while, in patients above 11 years, PU was more common in men. [16] Ning et al. did a review in Asia and they found that men were subject to a higher risk of traumatic spinal cord injury (TSCI) than women. [17]

This could be explained by the nature of the job of most of our patients as breadwinner 38%, or military 31%, that make them exposed to injurious causes. This was also noticed by Kuhn et al [18] when he concluded that the men: women ratio affected strongly by the socioeconomic and cultural status of the society. Regarding the affected age, Abdul Samad with his local study had shown the same range of age as we found [19]. Most of our patients aged 20-30, a mean age of 31.7 ± 14.6 (range: 5 – 81) years, the wide range in age may be related to special circumstances that occur in Iraq including recent war against terrorism and emigration that made all age groups be victims of violence and SCI. Asian studies reported an average age between 26.8 to 56.6 years. [17] Regarding educational levels in this study, most of our patients (45%) graduated from primary school, while 31% have graduated from secondary school. These results were compatible with those of Ali, Diaa, Ku; Lee and Mittelstaedt and LoBello et. al., in which their findings indicated that the majority of the studied subjects were secondary school graduated or less. [20-23] Comparable to another local study [19] 72% of our studied patients were paraplegic. Complete spinal cord injury A in ASIA was the most common type (69%); followed by incomplete type B (11%); C (17%) and D (3%) which is also agreed with studies of Jordan, Iran, and Pakistan. Eighty percent of patients had only one ulcer and 46% of all ulcers were stage 2. Shah, Syed Hussain; showed that only 25% of patients had stage 2 ulcer and another 25% had stage 3 ulcer [11] This reflects earlier detection of ulcer in our group sample. Patients with complete SCI lose protective pain and temperature sensation and increase the risk of developing PU as compared to other patients with incomplete. A complete injury is also associated with maceration from incontinence, which increases the risk of pressure PU. We found that the pressure ulcers in complete SCI were 49.3%, and in incomplete SCI were 19.3% which is closer to the studies carried on, Pakistanis patients by Shah, Syed Hussain [8], Nigeria by Idowu et al. [24] That means



patients with complete SCI required more attention and frequent risk assessment for PU and may require more counseling and awareness session about prevention of PU. Patients with an incomplete injury can usually be educated and motivated to use the upper limb for support in turning the body regularly. Such a maneuver has been reported to reduce the risk of pressure sores [25]. Regarding the sites of these ulcers, more frequent ulcers were found in the sacral region (46.9%), followed by (28.6%) in the gluteal region, (8.2%) in the thigh (lateral aspect), (6.1%) in the heel and (10.2%) ulcers in other sites. These findings were quite different from those on other studies. [8,26] This may be related to patient's education regarding turning from side to side and not let him on supine position for long period. There was no statistical significant association between development of PU (regarding severity or numbers) and different variants including: age, gender, residency, marital status, and education, duration of spinal cord injury, smoking, alcohol or presence of chronic illnesses. In conclusion pressure ulcers is one of common secondary complication that occurs in 40% of Iraqi patients with spinal cord injury with more frequency in ASIA scale A and B spinal cord injury especially in sacral area and most of them with one ulcer only.

**Funding:** This research received no grant from any funding agency in the public, commercial or not-for-profit sectors.

**Disclosure:** The Authors declare that there is no conflict of interest.

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# The Influence of Parents and Other Factors on Adolescents' Fish Consumption in Selected Senior High School Students, Jakarta

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## Abstract

Fish is an important source of animal food for adolescents because it contains various nutrients. Indonesia has high fish availability, but the level of domestic fish consumption in adolescents is still low. Lower fish consumption during adolescence will affect health status in the future. It is thus important to understand the various factors that influence fish consumption in adolescents. This study aimed to obtain information on fish consumption frequency; to investigate the associations between individual, socio-physical and environmental factors of adolescents and their fish consumption; and to examine the influence of parental eating behavior and support on adolescents' fish consumption. Samples were chosen from adolescents aged 15-17 years. This study used a cross-sectional design. Data collection was obtained through filling out questionnaires, anthropometric data, and completing a semi-quantitative food frequency questionnaire (SFFQ). Bivariate analysis was conducted using the chi-square test and multivariate analysis was conducted using multiple logistic regression. The average fish consumption was found to be 34.1 grams/day. Fish consumption was significantly associated with attitude, preference, parental influence, and availability of fish at home ( $p < 0.05$ ). Further analysis showed that parental influence was the dominant factor related to fish consumption in students. This means that various parties, especially parents, can take a role in increasing fish consumption in students.

**Keywords:** *Fish consumption; senior high school student; parent influence.*

## Introduction

Fish is one of the most important animal food sources in a healthy diet because it is rich in protein, unsaturated fatty acids, various vitamins, selenium, and iodine<sup>(1)</sup>. Fish is also a major food source of long-chain omega-3 polyunsaturated fatty acids, including docosahexaenoic acid (DHA) and eicosapentaenoic acid (EPA), which are well-known for their anti-inflammatory

effects and protective role against non-communicable diseases, such as heart disease coronary, hypertension, stroke and Alzheimer's disease<sup>(1,2)</sup>. Bonaccio et al. showed that fish consumption 4 times per week was associated with a 40% reduction in the risk of coronary heart disease and stroke<sup>(3)</sup>. Fish consumption also has a good impact on cognitive development in adolescents. Handeland et al. in Norway stated that consumption of fish, especially fatty fish, can improve cognitive performance in adolescents, increasing their vocabulary skills and concentration on learning<sup>(4)</sup>. Morris et al. also showed that fish consumption  $\geq 4$  times per week was associated with lower memory loss rates<sup>(5)</sup> Although the benefits of fish consumption are numerous, there are still many adolescents who do not consume enough fish. The results of the National Diet and Nutrition Survey Rolling Program (NDNS) in Europe in 2008-2012 showed that only 5.3% of adolescents aged 12-18 years consumed

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fish in accordance with the recommendations<sup>(6)</sup>. St-Jules, Watters, and Novotny also showed that the average fish consumption in adolescent girls in Asia was only 24 g/day<sup>(7)</sup>. Fish consumption in Indonesia, especially in adolescents, is also still far below the national consumption target. The results of the Indonesian Individual Food Consumption Survey in 2014 showed that adolescents (13-18 years) who consumed fish in Indonesia had an average consumption of 58.3 g/day<sup>(8)</sup>. Adolescents (13-18 years) who consumed fish in Jakarta had an average consumption of 26.9 g/day<sup>(9)</sup>.

Low fish consumption in adolescents can be caused by several factors, such as individual factors (nutritional status, knowledge, attitude, and preference), social environmental factors (parents' education, parents' influence, peer influence, and mass media influence), and physical environmental factors (availability of fish at home)<sup>(1,10,11)</sup>. Individuals also may be averse to consuming fish because of a perceived difficulty in buying, preparing and cooking fish, the belief that it is expensive, or the unpleasant physical properties of some varieties of fish, such as bones, taste, smell, and texture<sup>(10,12)</sup>.

This research was conducted with adolescents, especially high school students, because in this period the consumption of nutrients is one of the critical things that must be achieved well to be able to improve the quality of individual health in the future. The researcher chose East Jakarta as the research location because the prevalence of non-communicable diseases in Jakarta is still high, while the average fish consumption in adolescents in Jakarta is still very low and the research on fish consumption on adolescents in East Jakarta remains limited.

## Method

**Design:** This research was conducted using a cross-sectional design. Independent variables in this study were individual factors (gender, nutritional status, pocket money, knowledge, attitude, and preference), social environmental factors (parents' education, parental influence, peer influence, and mass media influence), and a physical environmental factor (availability of fish at home), while the dependent variable used was fish consumption.

**Sample:** The study was conducted in April 2019 at SMAN 39 Jakarta. The sample used in this study comprised students of classes X and XI. Inclusion

criteria in this study were all students from five classes with active status in 2019. Exclusion criteria from this study were unwell students or those who had certain physical disabilities. Then, 150 students from five classes were selected by the school and all of them were taken as research samples.

**Data Collection:** Primary data collection was carried out through asking students to fill out questionnaires, SFFQ and measuring nutritional status based on anthropometric data. The time needed to complete the questionnaire and anthropometric data was 30 minutes. Data collection was carried out by the researchers and four enumerators who were students at the Nutrition Department in the Faculty of Public Health, Universitas Indonesia. Parental influence, peer influence and availability of fish at home were assessed using a four-point Likert scale, with responses ranging from 'strongly disagree' (1) to 'strongly agree' (4). Knowledge was obtained from the answers students scored by adding up all the questions that were answered correctly. Preferences were categorized as positive and negative. Anthropometric data was measured using weight scales and a microtoise and was calculated with BMI according to age based on classification by the Indonesian Ministry of Health (2010) to determine the classification of nutritional status.

A semi-quantitative FFQ was developed to assess dietary intake among senior high school students in Jakarta. The SFFQ included three sections: the food list, the portion size and the frequency response. The final SFFQ list included a total of 21 types of fish. The reference portion for each fish item was represented by how many pieces of fish and what parts were eaten (tail/body/head), or how many pieces of whole fish were eaten, and fish size (large/medium/small). The results were converted into grams. In order to assist in quantifying the reference portion size, the standard two-dimensional fish portion visual chart by the Indonesian Ministry of Health was also used. The frequency of adolescents' fish intake was indicated by how many times per day/week/month the adolescents consumed fish. For all fish items in the SFFQ, the frequency per day was multiplied by the portion size of the fish item in order to calculate the total amount of fish consumed in grams per day.

**Data Analysis:** Univariate analysis was conducted to provide an overview of the data. Bivariate analysis used chi-square to determine whether there is a relationship between the dependent variable and the

independent variable. Results are reported in terms of odds ratios (ORs), 95% confidence intervals (CIs) with the respective p-values with a significance level set to  $p < 0.05$ . Multivariate analysis used multiple logistic regression to determine the independent variables that have a dominant relationship to the dependent variable.

**Findings:** The average fish consumption among students is 34.1 grams/day. The results show that 57.3% of students are still low in fish consumption. All main results are displayed in Table 1.

**Table 1. Associations between Individual, Socio-physical Environmental Factors and Adolescents' Fish Consumption**

Variable	Fish Consumption				Total		OR (95% CI)	p-value
	Low		Good					
	n	%	n	%	n	%		
<b>Gender</b>								
Man	34	63	20	37	54	100	1,438	0,382
Women	52	54,2	44	45,8	96	100	0,73 – 2,85	
<b>Total</b>	<b>86</b>	<b>57,3</b>	<b>64</b>	<b>42,7</b>	<b>150</b>	<b>100</b>		
<b>Nutritional status</b>								
Not normal	22	48,9	23	51,1	45	100	0,603	0,235
Normal	64	61	41	39	105	100	0,3 – 1,24	
<b>Total</b>	<b>86</b>	<b>57,3</b>	<b>64</b>	<b>42,7</b>	<b>150</b>	<b>100</b>		
<b>Pocket money</b>								
Low	58	57,4	43	42,6	101	100	1,012	1
High	28	57,1	21	42,9	49	100	0,51 – 2,02	
<b>Total</b>	<b>86</b>	<b>57,3</b>	<b>64</b>	<b>42,7</b>	<b>150</b>	<b>100</b>		
<b>Knowledge</b>								
Less	69	57,5	51	42,5	120	100	1,035	1
Well	17	56,7	13	43,3	30	100	0,46 – 2,32	
<b>Total</b>	<b>86</b>	<b>57,3</b>	<b>64</b>	<b>42,7</b>	<b>150</b>	<b>100</b>		
<b>Attitude</b>								
Less	48	69,6	21	30,4	69	100	2,586	0,009
Well	38	46,9	43	53,1	81	100	1,32 – 5,07	
<b>Total</b>	<b>86</b>	<b>57,3</b>	<b>64</b>	<b>42,7</b>	<b>150</b>	<b>100</b>		
<b>Preference</b>								
Negative	24	77,4	7	22,6	31	100	3,152	0,02
Positive	62	52,1	57	47,9	119	100	1,26 – 7,87	
<b>Total</b>	<b>86</b>	<b>57,3</b>	<b>64</b>	<b>42,7</b>	<b>150</b>	<b>100</b>		
<b>Mother's Education Level</b>								
Low	39	61,9	24	38,1	63	100	1,383	0,426
High	47	54	40	46	87	100	0,71 – 2,68	
<b>Total</b>	<b>86</b>	<b>57,3</b>	<b>64</b>	<b>42,7</b>	<b>150</b>	<b>100</b>		

Variable	Fish Consumption				Total		OR	p-value
	Low		Good				(95% CI)	
	n	%	n	%	n	%		
<b>Father's Education Level</b>								
Low	38	59,4	26	40,6	64	100	1,157	0,788
High	48	55,8	38	44,2	86	100	0,6 – 2,23	
<b>Total</b>	<b>86</b>	<b>57,3</b>	<b>64</b>	<b>42,7</b>	<b>150</b>	<b>100</b>		
<b>Parental Influence</b>								
Less	52	76,5	16	23,5	68	100	4,588	0
Well	34	41,5	48	58,5	82	100	2,25 – 9,35	
<b>Total</b>	<b>86</b>	<b>57,3</b>	<b>64</b>	<b>42,7</b>	<b>150</b>	<b>100</b>		
<b>Peer Influence</b>								
Less	60	63,8	34	36,2	94	100	2,306	0,056
Well	26	46,4	30	53,6	56	100	1,04 – 3,99	
<b>Total</b>	<b>86</b>	<b>57,3</b>	<b>64</b>	<b>42,7</b>	<b>150</b>	<b>100</b>		
<b>Mass Media Influence</b>								
Never	15	65,2	8	34,8	23	100	1,479	0,547
Ever	71	55,9	56	44,1	127	100	0,59 – 3,74	
<b>Total</b>	<b>86</b>	<b>57,3</b>	<b>64</b>	<b>42,7</b>	<b>150</b>	<b>100</b>		
<b>Availability of Fish at Home</b>								
Less	58	67,4	28	32,6	86	100	2,663	0,006
Well	28	43,8	36	56,3	64	100	1,36 – 5,2	
<b>Total</b>	<b>86</b>	<b>57,3</b>	<b>64</b>	<b>42,7</b>	<b>150</b>	<b>100</b>		

The results of this study show that fish consumption is significantly related to attitude, preference, parent influence, and availability of fish at home. Thorsdottir et al.<sup>(13)</sup> and Tomić et al.<sup>(1)</sup> state that attitude has a significant relationship with fish consumption. Can et al.<sup>(10)</sup>, Thong & Olsen<sup>(14)</sup>, and Jimoh et al.<sup>(15)</sup> also state that preference has a significant relationship with fish consumption. Lai et al.<sup>(16)</sup> demonstrate that fish consumption in adolescents has a significant relationship with parental influence at home. Tamale et al. also show that the availability of fish at home is significantly associated with fish consumption in children<sup>(17)</sup>.

It was also found that most students did not like consuming fish because of bones (50%), unpleasant taste (18%) and unpleasant smell (18%). It was also found that catfish, carp, tuna fish and salmon are the most liked fish among students. The most preferred processing of fish by most students (57,3%) is frying, followed by roasting (30%).

Next, a multivariate analysis was carried out to obtain the dominant factor in adolescents' fish consumption. Following the final model of the multivariate stage, the independent variables that are most strongly related to the dependent variable are seen from the magnitude of the OR value. The greater the OR, the greater the effect.

**Table 2. The Dominant Factors in Adolescents' Fish Consumption**

Variable	p-value	OR (95% CI)
Nutritional status	0,280	0,647
Attitude	0,339	1,505
Preference	0,198	2,107
Parent Influence	0,001	3,407
Availability of Fish at Home	0,045	2,130

Table 2 is the result of the analysis of the final multivariate model, which shows that the most dominant

variable is parental influence, with an OR value of 3.407. This means that students who have less parental influence will have 3.407 times the risk of having less fish consumption compared to students who have good parental influence.

### Discussion

The results of this study showed that parents have the most important role in adolescents' fish consumption. Parents have an important role as role models in helping adolescents to adopt and learn to maintain a healthy lifestyle. This means that parental influence is an important factor in regulating nutrient intake in adolescents. Selection of the consumption of unhealthy foods in adolescents has been shown to be related to lack of supervision from parents<sup>(18)</sup>.

Parents tend to pay attention to their children's health and nutritional status, which influences a stronger desire for parents to provide fish at home as family food<sup>(19)</sup>. Parents who want to maintain the health and nutritional status of their children also tend to follow the recommended food consumption patterns, including those recommended for weekly fish consumption<sup>(20)</sup>. The influence of parental consumption on children's consumption can occur directly through the transmission of attitudes towards food. Parents' attitudes towards food consumption can influence certain behaviors, such as cooking seafood as a family dinner if parents have a good attitude towards fish consumption. This will certainly affect fish consumption in adolescents<sup>(1,14)</sup>.

Other factors that are also related to fish consumption in adolescents are attitudes, preferences, and the availability of fish at home. Adolescents who have a positive attitude towards healthy eating tend to consume fish more than other meat because it is high in protein and unsaturated fatty acids, as they believe that it brings many health benefits<sup>(21,22)</sup>. Preference is also an important factor related to fish consumption. Can et al.<sup>(10)</sup> and Thong and Olsen<sup>(14)</sup> stated that preferences are influenced by sensory factors (bones, taste, color, smell and texture) and non-sensory factors (habits, beliefs, individual characteristics and perceptions of risk). The availability of fresh fish that has been cooked for the family table is also important because family members will usually tend to eat food according to what is available at the dining table<sup>(1)</sup>. Tamale et al. also showed that children usually tend to consume food that is available at home<sup>(17)</sup>.

### Conclusion

This study shows that the average fish consumption among students is 34.1 grams/day with the majority of students still categorized as low in fish consumption. Attitude, preference, parental influence and availability of fish at home are significantly related to fish consumption. These factors can be influenced through cooperation between the ministries of maritime and fisheries, government health agencies and schools through the Gerakan Memasyarakatkan Makan Ikan (GEMARIKAN) program. Parents are also important, as they can serve as role models and support their children regarding fish consumption. Parents are also expected to be able to provide fish as an animal dish at home at least twice per week with enough portions to be consumed by all family members.

**Conflict of Interest:** There is no conflict of interest.

**Source of Funding:** This research was self-funded by the authors.

**Ethical Clearance:** This study was approved by The Research and Community Engagement Ethical Committee Faculty of Public Health Universitas Indonesia (number 126/UN2.F10/PPM.00.02/2019).

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# Effect of Benson's Relaxation Technique on Mental Health and Quality of Life in Hemodialysis Patients: A Literature Review

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## Abstract

**Background:** Patients undergoing hemodialysis have an increased risk of mental health problems and a poorer quality of life. Depression, stress, and anxiety are highly prevalent in this population. Benson's relaxation technique is a complementary therapy and one of the ways to reduce depression, stress, and anxiety and increase the quality of life at a low cost for patients undergoing hemodialysis.

**Aims:** In this literature review, we investigated the effectiveness of Benson's relaxation technique on depression, anxiety, stress, and quality of life in patients undergoing hemodialysis.

**Method:** This study was conducted using a literature review of several electronic research databases; we focused on studies that tested the effect of Benson's relaxation technique to reduce depression, anxiety, and stress and increase the quality of life of hemodialysis patients. The criteria of studies included in this review were that they (a) be randomized controlled trials (RCTs) with a control group, and (b) be published in English in 2010~2018.

**Results:** Seven RCTs which met the eligibility criteria were reviewed. Benson's relaxation technique was applied in all studies. There was a significant positive effect of Benson's relaxation technique in reducing depression, anxiety, and stress and increasing the quality of life in the intervention groups than in the control groups.

**Conclusions and Recommendations:** The review recommended that Benson's relaxation technique be routinely used as alternative therapy for reducing depression, anxiety, and stress and increasing the quality of life of patients undergoing hemodialysis. A more-comprehensive study with larger sample sizes should be conducted in the future.

**Keywords:** *Benson's relaxation, Depression, Anxiety, Stress, Hemodialysis.*

## Introduction

Chronic kidney disease (CKD) is an important epidemiological and major public health problem which

occurs in many countries with increasing prevalences<sup>(1-3)</sup>. According to the National Kidney Foundation (2015), 10% of the population worldwide is affected by CKD, and more than 2 million patients receive renal replacement therapies such as dialysis and renal transplantation (1). End-stage renal disease (ESRD) is a more-severe and disabling condition with a high mortality rate<sup>(3, 4)</sup>. ESRD can be treated by hemodialysis (HD), peritoneal dialysis, or kidney transplantation, and up to 90% of patients diagnosed with ESRD regularly receive HD as renal replacement therapy<sup>(5, 6)</sup>. Patients undergoing HD sometimes experience negative impacts both

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physically and mentally. Depression, anxiety, and stress are now realized as common psychological problems in patients with ESRD who undergo maintenance HD<sup>(7-9)</sup>. Patients undergoing HD who experience depression, stress, and anxiety have exhibited significant negative impacts on their quality of life<sup>(10-12)</sup>. However, mental health problems in HD patients are less recognized, and there are few interventions, which actually increase mortality<sup>(13,14)</sup>. In addition, mortality among first-year patients receiving HD with depression was more than twice that of patients without depression<sup>(15)</sup>. However, HD patients have little help in overcoming depression and other psychological disorders, and healthcare workers in therapeutic systems do not give specific attention to this issue<sup>(16)</sup>. Therefore, HD patients may require regular assessments and interventions.

In addition, in recent years, many ways were developed to overcome mental health problems in patients undergoing HD using both pharmacological and nonpharmacological approaches. Although the frequency of HD affects the physical and mental states of patients, in fact HD is not a treatment to overcome mental health problems or improve the QOL of HD patients<sup>(17)</sup>. One nursing intervention used to reduce depression, anxiety, and stress and increase the QOL is Benson's relaxation technique. Benson<sup>(18)</sup> showed that this relaxation technique can reduce autonomic nervous system activity, but no study has reviewed the effects of Benson's relaxation technique in reducing depression, anxiety, and stress and increasing the QOL of HD patients. The effects of Benson's relaxation technique on mental health and QOL in patients undergoing HD are still uncertain. Thus, the purpose of this review was to summarize what is currently known about the effectiveness of Benson's relaxation technique on depression, anxiety, stress, and QOL in patients undergoing HD.

## Method

**Inclusion and Exclusion Criteria:** Inclusion of articles in this review was based on the inclusion criteria: the full text was available; the study was in the English language; it was published in 2010~2018; it had an RCT design; it had a quasi-experimental pretest and posttest; it had a control group; it included human participants; it had the same outcome (measured scores of depression, anxiety, stress, and QOL); and it had the same intervention (Benson's relaxation technique). Abstracts only and case reports were not considered.

**Data Sources and Search Strategy:** The researcher conducted a literature through online search engines, including PubMed, Medline, Google Scholar, ProQuest, and a mainstream Google search, as well as reference lists in relevant articles. Furthermore, the search focused on articles using variations of multiple search terms through the PIO (P, population; I, intervention; and O, outcome) including Benson's relaxation, Benson's relaxation among HD patients, Benson's relaxation and depression, Benson's relaxation and stress, Benson's relaxation and anxiety, Benson's relaxation and QOL, as well as other similar combinations of these terms. The search terms were adapted and modified in another electronic database. Retrieved articles were examined for additional relevant references.

**Measurement Scales:** Various types of measurement scales were used in the studies included in this review. Tools to measure mental health problems (depression, stress, and anxiety) such as the Depression, Anxiety, Stress Scale (DASS-21), Beck Depression Inventory (BDI), and Spielberger State Anxiety Inventory (STAI-S) and to measure QOL included the Quality of Life Index-dialysis version (QLI) and Kidney Disease Quality of Life Short Form (KDQOLSf).

**Study Selection:** Studies were selected based on the following inclusion criteria: an RCT design with a control group included; studies with interventions designed as Benson's relaxation technique for more than 2 weeks, 1 or 2 times/day, with each session lasting 15~20 minutes during the HD day; patients with ESRD receiving HD for more than 3 months and aged over 18 years old; and both men and women were included. Studies with HD patients younger than 18 years, those receiving continuous ambulatory peritoneal dialysis, and pre-dialysis patients were not considered. Reviews, case reports, and studies for which the full text was unavailable were excluded. All studies were assessed and selected by the first and the second review author, and any dissent was discussed with the third review author.

**Data Extraction:** Data of each study were entered into a data collection form by the review authors. Data collected included the authors, year of publication, Benson's relaxation intervention (type, intensity, place, frequency, and total duration), study location, participants, and outcomes (mean and standard deviation (SD) of outcome measures after the intervention).

**Risk of Bias Assessment:** Researchers assessed the risk of bias using the CEBM critical appraisal worksheet for RCT Designs.

### Results of the Search

Articles included in this study specifically identified the focus of the intervention on HD patients using the search strategy. The initial search identified 1857 records from the database. After screening the titles/abstracts, 1811 articles were removed because of unrelated topics with the current study, and 46 articles were left with the full text available, and 17 articles remained for detailed review with the fulltext available. Consequently, seven articles from peer-reviewed journals that met our inclusion criteria were included in this study. The seven studies were RCTs involving a total of 538 hemodialysis patients.

### Results

The seven articles included in this review were published between 2010 and 2018. Sample sizes ranged from 65 to 102 enrolled patients, and a total of 538 participants ( $N=538$ ) were enrolled in the seven articles. The age range of participant in this study was 18~67 years (males and females) who had received HD therapy for at least 6 months. All Benson's relaxation interventions were conducted on HD days, and in six articles, they were applied twice a day and in one article, they were applied once a day.

Benson's relaxation technique is relatively safe compared to other nonpharmacological treatments, because this technique uses a rhythmic, relaxed breathing technique that consists of several phases, namely slow breathing, deep breathing, meditation on breathing, and abdominal breathing<sup>(19)</sup>. Furthermore, use of Benson's relaxation technique can train the body by properly and correctly regulating the breathing rhythm so that the mind can concentrate, which further speeds healing, eliminates anxiety, stress, and depression, and maintains and improves health<sup>(18,20,21)</sup>. In our review, we found that all of the articles revealed positive effects of Benson's relaxation technique for overcoming mental health problem and improving the QOL.

### Discussion

Depression, Anxiety, and Stress and Benson's Relaxation Technique

Depression, anxiety, and stress were observed in

patient undergoing maintenance HD<sup>(7, 11, 22)</sup>. In one study of 65 patients with ESRD on maintenance HD, Heshmatifar et al.<sup>(23)</sup> showed there was a statistically significant improvement in the BDI in the intervention group after Benson's relaxation technique was applied compared to patients in the control group. In another study among 80 ESRD patients who underwent HD, Mahdavi et al.<sup>(24)</sup> showed that at the end of 4 weeks of applying Benson's relaxation technique, there was a significant decrease in the total score of BDI depression in the intervention group. Kiani et al.<sup>(25)</sup> applied Benson's relaxation technique on 102 patients undergoing HD treatment, and reported that there were no differences in the Spielburger anxiety score between the intervention and control groups at the beginning of the study, but there was significant decrease after intervention in the group that received Benson's relaxation technique. In another study, Gorji et al.<sup>(26)</sup> evaluated 80 hemodialysis patients undergoing standard HD who had anxiety and stress, and they reported significant decreases in the Benson's relaxation group compared to the control group after a 4-week intervention period. Similar results were observed by Otaghi et al.<sup>(27)</sup> who conducted a study on 70 patients undergoing HD. They reported that after the intervention, there was a significant difference in the total score of DASS-21 between the intervention and control groups.

**QOL and Benson's Relaxation Technique:** Two articles reported the effect of Benson's relaxation on patients' QOL. In a study of 60 patients with ESRD on maintenance HD, Feyzi et al. (2015) reported that there was a statistically significant improvement in the total QOL in the intervention group after applying Benson's relaxation technique compared to patients in the control group. Results showed that Benson's relaxation technique once a day for 15~20 minutes for 8 weeks was effective in increasing the QOL of HD patients. Similar results were obtained in a study by Rambod et al. (2014) on 81 patients undergoing HD.

**Implications for Nursing Practice:** This review is expected to add to information for healthcare professional on the benefits of Benson's relaxation technique on depression, anxiety, stress, and QOL in patients undergoing HD and also used as a consideration in helping patients deal with mental and functional problems. Healthcare professionals as educators can encourage patients to apply this relaxation technique when they relax at home, but this study recommends that when applying Benson's relaxation technique, these

patients should be accompanied and monitored by a health professional or caregiver who properly knows about this technique. Further investigation of the factors influencing the effectiveness of Benson's relaxation technique in reducing depression, anxiety, and stress and improving the QOL of HD patients is needed. Systematic reviews on the effects of Benson's relaxation technique should be conducted.

**Study Limitations:** This study attempted to describe the effects of Benson's relaxation technique on depression, anxiety, stress, and QOL in HD patients. However, this study had several limitations. First, all outcomes were measured using self-reported questionnaires. Second, the search strategy by the first and second reviewer could have overlooked important articles. Third, variations in the duration and frequency of Benson's relaxation technique may make it difficult to understand the benefits of this technique, so it is important to conduct further research in this area specifically to explore the long-term feasibility, appropriate frequency, and effective duration for HD patients.

### Conclusions

Benson's relaxation technique is arguably a therapy that has very rarely been studied. Benson's relaxation technique was highly effective in treating depression, anxiety, and stress and improving the QOL of patient undergoing HD. This review showed that Benson's relaxation technique needs a long time, on average 1~2 months, to obtain a satisfactory effect in reducing the severity of depression, anxiety, and stress and increasing the QOL, but this treatment is safe and beneficial for patients undergoing HD. The patient's ability and condition to do the training are also two aspects that need to be considered. Finally, although it is very difficult to draw clear conclusions about the actual effect of Benson's relaxation technique in decreasing depression, anxiety, and stress and improving the QOL among HD patients. We found that all studies in this review reported significant differences between the intervention and control groups after applying Benson's relaxation technique.

**Acknowledgments:** The authors acknowledge Nursing Academy RS PGI CIKINI (Jakarta, Indonesia) for valuable support.

**Conflict of Interest:** The authors declare that there are no conflicts of interest associated with this study.

**Source of Funding:** The authors declare that this study received no funding.

**Ethical Clearance:** Ethical Clearance-not required.

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# The Association between Prevalence of Bacterial Diarrhea among Childrens and Some Factor's

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## Abstract

The study conducted through the period from August 2017 to June 2019 in Baquba city –Iraq, two hundred twenty five stool sample were collected from children for culture. Information about related epidemiologic Factor, were recorded in questionnaire in aim to focus the light on the association between and this factors and children diarrhea. Isolation and identification of bacteria spp performed by morphology, colony characteristics and biochemical test of the base of stand red methods. susceptibility test of Isolates to (10) antibiotics were performed. Result of identification showed three main species of bacteria were *Escherichia coli* 35(15.55%), *Shigella spp* 8(3.5%) and *Salmonella spp* 3(1.33%), The sensitivity Isolates for antibiotic revealed highly resistance of most bacteria species to Ampicillin, Trimethoprim –sulfamethaxazole, and chloramphenicol and low resistance to imipenem and Ciprofloxacin. The association study showed high prevalence for diarrhea in male were (7.77% 13), children Age group 4-6 years (31.55%), Bottle feeding (36%), low level of mother education (33-34%), Rural area (60%), Acute diarrhea (63.36%). low value hemoglobin (62.22%). and blood group O were (27.55%).

**Keywords:** Diarrhea, children, Bacteria, antibiotics, Ag, sex, blood groups.

## Introduction

Diarrhea defined by the loose of three times or more liquid, loose, watery or bloody stools during one day, considered worldwide problem specifying in development countries and most causes of morbidity and mortality between children and infants, it cause about approximating 12 millions of death<sup>(1,2)</sup>. Several enteric pathogens identified from children diarrhea include *Escherichia coli*, *salmonella spp*, *Shigella spp* other bacteria, viruses, parasites<sup>(3)</sup>. The most common symptoms of diarrhea disease are diarrhea, vomiting, abdominal pain, fever, diseases divided of stool nature watery, dysentery and Enteric

fever, and on the period of classify in to acute less than 14 day, and chronic diarrhea for more than three weeks<sup>(4)</sup>.

Several studies showed the presence of association between many factors and diarrhea occurrence. include type of drinking water, infant feeding method, economic condition of family, Age, sex education level of mother, habitat, seasons variants, and usage of un treatment waste product of animals and human in fertilization of soil in agriculture<sup>(5,6)</sup>.

Consumption of un sterilizer and insufficient sanitation water considered the major source of about (1.5) millions children death per year result from diarrhea<sup>(7)</sup>. Many studies conducted to detect the association between blood group of children infected with diarrhea and the levee of hemoglobin of patients.

Determination the incidence of diarrhea provided an assessment of social health level. The aim of current study were to isolation and identification of pathogenic bacteria from stool, and to detect the susceptibility of bacterial isolates to antibiotics, investigate association of

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bacterial children diarrhea and some factors in Baquba city due the little studies for this health problems.

### Material and Method

**Sample Collection:** The current study were performed during the period from the August 2017 to June 2019, two hundred stool specimens were collected from children s suffered from 8 years age diarrhea in Baquba city, the specimens were collected in sterilize and cleaning container . All information about patients were recorded in special questionnaire include gender, age, residence, type of feeding of infants (breast, bottle,mixed feeding), mother education level, state of diarrhea (acute or chronic), blood groups, and hemoglobin level .

**Isolation And Identification of Bacteria:** Two hundred stool specimens were cultured on selective media for isolation of *Escherichia coli*,*Salmonella spp*,*Shigella spp*,on the surface of sorbitol MacConkey agar (Germany) for the growth of *Escherichia coli* isolates (biolif),*Salmonella Shiglla* agar for the growth of *Shigella spp*. inoculated plates were incubated under aerobic condition at 37 C° for 24 hours,the stool sample

from each patient was placed in Selenite-F broth and then incubated at 37 C° for 24 hours in aerobic condition, than Selenite-Fbroth was culture again on xylose-lysine deoxycholate agar (Merck Germany)and incubate in the same conditions, isolates identify by colony characteristics,morphology of bacteria (gram stain) and biochemical test for *Escherichia coli* identification<sup>(8)</sup>. All isolates identification confirmed by Vitek 2 system .

**Antibiotic Susceptibility Test:** Kirby Baure method was used to investigate the inhibition effect of nine antibiotic against bacteria isolates include (Amoxicillin, Nalidixi acid, Apicillin, impenem, Meropenem,, Chloramphenicol, Ciprofloxacin, Amikacin,cefotaxim, Trimethoprim – sulfamrthazol), by spreading the 0.1 ml of bacterial suspension ( $1.5 \times 10^8$  cell/ ml) on the surface of Muller-Hinton agar <sup>(9)</sup>.

**Blood group and hemoglobin determination tests:** Hemoglobin analyzer were used in current study to determination hemoglobin value for children those infected with diarrhea<sup>(10)</sup>. and direct Slide method were used for determination of blood group<sup>(11)</sup>.

### Finding and discussion:

**Table (1): The bacterial species Isolated from children s diarrhea**

Sample size	Bacteria species						Total	
	Escherichia coli		Shigellaespp		Salmonella spp		No	%
	No	%	No	%	No	%		
225	35	15.55	8	3.5	3	1.33	46	20.44

The result of current study showed that *Escherichia coli* that isolated from stool samples were the higher percentage among Enteric pathogens with prevalence 35(15 .33%), followed by *Shigella spp* 8 (3.55) and *Salmonella spp* 3 (1.33%) Table 1,others study showed that children is mainly caused by *Escherichia coli* with identification percentage (22.5%) *Shigella spp*

caused (4.7%) of diarrhea cases,and *Salmonella spp* were non identified<sup>(12)</sup>. Enteropathogenic *Escherichia coli* considered one important pathogens in children diarrhea<sup>(13)</sup>, our result reveal that the diarrhea result from enter pathogenic were lower than those obtain by Albert *et al*<sup>(14)</sup> they recorded the prevalence of diarrheal due to bacteria infection (74.8%).

**Table (2): The resistance of bacterial isolates to antibiotic**

Antibiotics Mg/Dise	Escherichia coli (35)		Shigella spp (8)		Salmonella spp (3)	
	No	%	No	%	No	%
Nalidixic acid	12	34.28	2	25	2	66.67
Ampicillin	30	85.71	6	75	3	100

Antibiotics Mg/Dise	Escherichia coli (35)		Shigella spp (8)		Salmonella spp (3)	
	No	%	No	%	No	%
Imipenem	5	14.28	2	25	2	66.67
Meropenem	8	22.85	3	37.5	2	66.67
Chloramphenicol	29	82.85	7	87.5	1	33.33
Trimethprim-sulfamethaxizole	26	74.28	5	62.5	1	33.33
Ciprofloxacin	8	22.85	2	25	Zero	Zero
Amikacin	14	40	4	50	3	66.67
Cefotoixime	9	25.71	1	12.5	3	66.66
Cefuroxim	13	37.14	3	37.5	1	33.33

The bacterial isolates showed differences in the resistance to antibiotics, *Escherichia coli* show high resistance to Ampicillin, chloramphenicol, Trimethoprim- sulfamethaxizole were the resistant percentage (85.7%, 82.85%, 74.28%) respectively, the higher sensitive was to Imipenem, meropenem, ciprofloxacin were the percentage (14.28%, 22.8%,

22.8%) respectively, *Shigella spp* revealed highly resistance to the same antibiotics with percentage (75%, 87.5%, 62.5%) respectively. Ciprofloxacin show the higher inhibitory effect on the growth of *Salmonella spp*. Our finding in present study similar to the result obtained by<sup>(12)</sup>.

**Table(3): Association of childrens diarrhea and some related factors**

Factor		No	%
Gender	Male	130	57.77
	Female	95	42.23
Age / year	Less than 2	49	21.78
	2-4	54	24
	4-6	71	31.55
	More than 6	51	22.67
Feeding type (50 infants)	Breast	15	30
	Artificial: bottle	18	36
	Mixed	17	34
Education level of mother	Uneducated	75	33.34
	Primary	47	20.88
	Secondary	90	40
	Graduate	33	14.67
Household	Rural	135	60
	Urban	90	40
Diarrhea state	Acute	143	63.56
	Chronic	82	36.44



Prevalence of infection in male more than female (57.77%) the result consistent with some previous researches<sup>(12)</sup>, this finding because the male in Baquba community more work, attention, stay long hours out the houses than female this may by result may be due to consumption of contaminated water or food . El Samani *et al*<sup>(15)</sup> obtain contradicts result.

The result in table (3) indicate the lower infection between age group those less than 2 years (21.87%) the low prevalence may be due to the antibodies that receive by infant from mother during direct breast feeding and low percent among patient more than 6 years because the complete of natural immunity systems of children<sup>(16)</sup>.

Diarrhea among 50 infants (36%) with bottle feeding (artificial), and (30%) between breast feeding the result consistent with the (16),most prior studies confirmed the protective impact of and those type of feeding that has stronger protective effect in reduce the children diarrhea, so that the diarrhea distribution was lower between children depend early on mothers exclusive and predominate breast feeding. The prevalence of children diarrhea among 225 children show the presence of association between level of mother education and prevalence of disease the last elevated between children with lower education level mother and lower in higher education level with percent (33.34%)(14 .67%) respectively.

The result in table (3) reveal that distribution of diarrhea in rural and urban area was (60%), (40%) respectively the result may be due to level of personal hygiene in two area, rural children tine to be pores than urban, insufficient sterilize drinking water in rural area,

usage of un treatment animal waste product in soil Fertilizing considered one source of contamination, direct contact with animals in animal breeding houses this finding similar to the study form El-Gilany and Hanmad <sup>(17)</sup>

Current study showed that acute diarrhea was more than chronic diarrhea with prevalence (63.56% and 36.44%) respectively, this result consistent with <sup>(18)</sup>.

More than one half 140 (62.22%) children showed low level of hemoglobin less than 10 mg / dl and 85 (37.78%) showed more than 11 mg/dl the our finding consistent with the study abstained in across study conducted on Palestinian children revealed that the presence of fever or diarrhea related with an increased of anemia <sup>(19)</sup> . The anemia disease is associated with chronic infection <sup>(20)</sup>,because the presence of association between diarrhea infection and high level of TNT-8 and IL-6 they Play role in the causes of anemia in chronic disease <sup>(21)</sup>. Semba *et al*<sup>(22)</sup> reported no associated between anemia and diarrheal children in Urban Slum Indonesia.

**Table (4): Association Between children’s diarrhea and hemoglobin level**

Hemoglobin level gm/dl	Number	%
<8	30	13.33
8-10	110	48.89
11-12	68	30.23
>13	17	7.55
<b>Total</b>	<b>225</b>	<b>100</b>

**Table (5): Association of children s diarrhea cases and Blood groups**

Blood group	Rh	Number	%	Total	
				Number	%
A	A+	29	12.88	59	26.22
	A-	30	13.34		
B	B+	28	12.44	53	23.56
	B-	25	11.12		
AB	AB+	24	10.67	51	22.67
	AB-	27	12		
O	O+	33	14.67	62	27.55
	O-	29	12.88		

The result of current study showed that high prevalence of diarrhea among patients has blood group (O) and (A) were, (27.55%) and (26.22%) respectively Table(5), the result consistent with the conclusions of Black<sup>(23)</sup> he found the presence of relationship between patients with blood group (O) substances and the toxin produce by the *Escherichia coli*, and our finding similar to the results of kuhlmann and colleagues<sup>(24)</sup> they reported the association between diarrhea infection causes by *Escherichia coli* and blood group A and not in (O) and (B) they explained the result due to the production of specific protein by pathogenic *Escherichia coli* this protein linked to the sugar that cover Red blood cells of group (A) persons and not group (O) and (B) since, the protein linked to bacteria also allow to cause diarrhea and production of toxins to the cells of intestine. The current study contradicts to the Van loop et al<sup>(25)</sup> they showed no relationship between (O) Blood group and diarrhea in children cause by *E. coli*, and not consistent with Gabr<sup>(26)</sup> he found strong association between *E. coli* diarrhea and blood group with percentage about 11%.

### Conclusions

1. *Escherichia coli* and *Shighella spp* were high resistance to Ampicillin, chloramphenicol, Trimethoprim- sulfamethaxizole.
2. Prevalence of infection in male more than female and indicate the lower infection between age group those less than 2 years.
3. Diarrhea distribution was lower between children depend early on mothers exclusive and predominate breast feeding. And acute diarrhea was more than chronic diarrhea.
4. High prevalence of diarrhea among patients has blood group (O) and (A) and among infants with bottle feeding (artificial).

**Conflict of Interest:** None

**Source of Findings:** Self

**Ethical Clearance:** Nil

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# Evaluation of Serum B12, Folic Acid, Iron, Ferritin, Total Iron Binding Capacity and Unsaturated Iron Binding Capacity in Patients with Recurrent Aphthous Stomatitis in Sulaimani City

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## Abstract

**Background:** Many studies have demonstrated that iron, folate, Serum ferritin, Total iron binding capacity (TIBC), Unsaturated Iron Binding Capacity (UIBC), vitamin B1, B2, B6, B12 deficiencies occur in Recurrent aphthous stomatitis (RAS). The aim of this study was to evaluate serum level of vitamin B12, folate, ferritin, iron binding capacity, unsaturated iron binding capacity among patients with RAS.

## Materials and Method

A cross sectional study carried out in Al-Sulaimani teaching center of dermatology for period from 1st of March to the end of June, 2014 on 30 RAS patients and 30 healthy controls. Data were collected were demographic information and results of haematinic investigations for selected patients. Data were analyzed using software SPSS program version 17.

**Findings:** Mean age of RAS patients was 40±14 years. Male and female patients were equally distributed. A significant difference was observed between patients and controls in family history of RAS (p<0.001). Mean B12 level of RAS patients was

190.6±80.3Pgm/ml, there was a significant difference in means of B12 between patients and controls (p=0.009). Mean serum folate level of the patients was 10.2±4.6 ngm/ml, there was a significant difference in means of serum folate between patients and controls (p=0.01). Meanserum iron level was 55.5±18.8 µg/dl, a significant difference was observed between patients and controls in means of serum iron (p<0.001). No significant difference was observed between patients and controls in means of ferritin, TIBC and UIBC (p>0.05).

**Conclusions:** Family history, serum B12 level, and serum iron are associated with RAS patients. It is important to investigate vitamin B12, folate and iron deficiencies in patients with RAS.

**Keywords:** *Aphthous, stomatitis, vitamins, anemia.*

## Introduction

Recurrent aphthous stomatitis (RAS) is defined as the presence of recurring ulcers confined to the oral mucosa<sup>(1)</sup>. RAS is characterized by recurrent, small, round, or ovoid ulcers often multiple with circumscribed margins, erythematous haloes and yellow or grey floors that present first in childhood or adolescence<sup>(2)</sup>. RAS occurs worldwide and are reported on every populated

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continent. RAS affects 20% of the population, with the incidence rising to more than 50% in certain groups of students in professional schools. Children from high socioeconomic groups may be affected more than those from low socioeconomic groups<sup>(3)</sup>.

The etiology of recurrent aphthous stomatitis is still not understood, although many predisposing and precipitating factors have been described: trauma, stress, changes in the immune system, sensitivity to certain types of food, or ingested substances such as preservative agents or the substances like cinnamaldehyde or sodium lauryl sulfate present in some toothpastes and iron, zinc, folate, vitamin B1, B2, B6, B12 deficiencies<sup>(4)</sup>.

The main pathogenetic event is the inflammatory response with production of inflammatory cytokines, prostaglandin E2, and nitric oxide. The pathophysiology of aphthous ulcers is not clearly understood. Alteration of local cell mediated immunity is often encountered in patients with recurrent aphthous ulcer. Systemic T- and B-cell responses have also been reported as altered in patients with RAU<sup>(5)</sup>. Three clinical presentations within recurrent aphthous ulcer has been identified which are : Aphthous ulcer minor (synonym Mikulicz ulcers) (MiAU); Aphthous ulcer major; and Herpetiform recurrent aphthous ulcer<sup>(6)</sup>.

In regards to differential diagnosis, RAS and recurrent intraoral herpes are the two most commonly occurring lesion in the mouth. However, there are several diseases that should be included in the differential diagnosis of patient who presents with a history of recurring ulcers of the mouth such as Behçet's syndrome, recurrent herpes simplex virus infection and recurrent erythema multiforme<sup>(6, 7)</sup>.

## Materials and Method

**Study design:** A cross sectional study carried out in Al-Sulaimania teaching center of dermatology for a period from 1st of March to the end of June 2014. The target population was 30 cases all with the recurrent aphthous stomatitis attended the consultancy clinic of Al-Sulaimania teaching center of dermatology, with 30 controls without oral aphthous ulcer. Adult patients who consented to participate in this study were recruited. Exclusion criteria included 1) Systemic conditions, and other diseases having oral ulceration likes Reiter's syndrome, Behçet's syndrome, Crohn's disease and gastrointestinal problems, Sweet's syndrome (acute febrile neutrophilic dermatosis), recurrent herpes

simplex virus infection, recurrent erythema multiforme, PFAPA (periodic fever, Aphthae, pharyngitis and cervical adenitis) and HIV (aphthous like ulceration).<sup>2)</sup> No consumption of folic acid, vitamin B12 and iron in drug form and other supplements during the past 6 months.

**Data Collection:** The collection of data was done through direct interview in consultancy clinic of Dermatology center with each patient. Each patient was diagnosed previously by a dermatologist as RAS. The researcher interviewed the controls and filled a prepared questionnaire. The questionnaire included the followings: a) History: age, gender, family history, durations, times and number of recurrence, and number of ulcers. b) Symptoms: such as pain, difficulty in eating and drinking. Drugs history: topical, systemic, or mixed. c) Examination: oral cavity is examined using torch light, all the parts of oral cavity are examined, recording numbers and type of ulcers.

**Investigations:** The hematological tests were carried out in central laboratory of Al-Sulaimania teaching hospital, laboratory of SHAHID HADI outpatient's clinic, after taking blood samples (5ml of blood) for both patients and controls. a) Serum B12 tests result: was done Enzyme Immunoassay with AIA-Pack B12 Kits<sup>®</sup>. Normal value in pg/mL (173-700)<sup>(8)</sup>. b) Serum ferritin test result: was done by Immuno-Enzymometric Assay with ST AIA-Pack FER<sup>®</sup>. Normal values of serum ferritin in ng/ml are 30-350 for male and 20-250 for female<sup>(9)</sup>. c) Serum iron: was done by direct method using BIOLABO reagents (Ferene)<sup>®</sup>. Normal values of serum iron in µg/dl are (55-145)<sup>(10)</sup>. d) Serum folate: was done by Bio-Rad Laboratories' "Quantaphase II Folate/Vitamin B12" Radio assay Kit<sup>®</sup>. Normal values in ng/ml (3-17)<sup>(11)</sup>. e) TIBC and UIBC: was done by Treatment of Specimens for the Determination of Total Iron Binding Capacity and unsaturated iron binding capacity of Transferrin in human serum and plasma using BIOLABO Reagents<sup>®</sup>. Normal values of TIBC (250-400 µg/dl)<sup>(12)</sup>. Normal values of UIBC (180-280 µg/dl)<sup>(13)</sup>.

**Statistical analysis:** All patients' data entered using Statistical Package for Social Sciences (SPSS) version 17. Descriptive statistics presented as (mean ± standard deviation) and frequencies as percentages. Multiple contingency tables conducted and appropriate statistical tests performed, Chi-square used for categorical variables. In all statistical analysis, level of significance (p value) set at ≤0.05 and the result presented as tables

and/or graphs. Odds ratio (OR) was calculated using binary logistic regression to identify factors associated with RAS.

**Findings:** Mean age of RAS patients was 40±14 years, age group 30-39 years was the prevalent. Male and female gender was equally distributed, male: female ratio was 1. Positive family history represented 53.3% of RAS patients. Painful ulcer was present among 27 (90%) RAS patients. Seven (23.3%) patients had single ulcer and 23 (76.7%) had multiple ulcers. The most prevalent frequency of ulcer recurrences was 4 times/year, 19 (63.3%) patients had 4 times/year recurrences of ulcer. Mean aphthous duration was 8.2±3.5 years, 50% of the patients had aphthous duration > 9 years.

Mean age of controls was 36±11 years with prevalent age group 30-38 years. Males were 16 and females were 14. Controls with family history of RAS were only two. The means of B12, serum folate, serum ferritin, TIBC, UIBC and serum iron of the controls were 240±60.9 Pgm/ml, 13.1±4.7 ngm/ml, 55.1±54.6 ngm/ml, 333.9±78.8 µg/dl, 300.1±38.0 µg/dl and 78.8±42.2 µg/dl, respectively.

There was no significant difference between patients and controls regarding age groups and gender of them ( $p>0.05$ ). A significant difference was observed between patients and controls in family history of RAS ( $p<0.001$ ). The odds of having RAS among patients with positive family history were 16 times more than those with negative family history, table 1.

**Table 1: Distribution of patients and controls according to demographic variables (no=60).**

Variable	Patients		Control		$\chi^2$	P	OR
	No.	%	No.	%			
<b>Age</b>							
<20 years	2	6.7	1	3.3	3.6*	0.4	-
20-29 years	4	13.3	6	20.0			
30-39 years	9	30.0	10	33.3			
40-49 years	7	23.3	10	33.3			
≥ 50 years	8	26.7	3	10.0			
<b>Gender</b>							
Male	15	50.0	16	53.3	0.06	0.7	0.8 CI[0.3-2.4]
Female	15	50.0	14	46.7			
<b>Family history</b>							
Positive	16	53.3	2	6.7	15.5	<0.001	16 CI[3.2-79.5]
Negative	14	46.7	28	93.3			

\*Fishers Exact test.

Mean B12 level of RAS patients was 190.6±80.3 Pgm/ml, 12 (40%) patients had low vitamin B12 level. Mean serum folate level of the patients was 10.2±4.6 ngm/ml, two (6.7%) patients had low serum folate level. Mean ferritin level of the patients was 43.3±47.6 ngm/ml, 50% of the patients had low ferritin level. Mean TIBC of the patients was 338.9±58.0 µg/dl, 3 (10%) patients had low TIBC. Mean UIBC of the patients was 300.1±38.0 µg/dl, 3 (10%) patients had low UIBC. Mean serum iron level was 55.5±18.8 µg/dl, 12 (40%) patients had low serum

iron. All these findings were shown in table 4. Table 4: Hematological parameters of the patients (no=30).

There was a significant difference in means of B12 between patients and controls ( $p=0.009$ ). A significant low serum B12 level was observed among RAS patients. There was a significant difference in means of serum folate between patients and controls ( $p=0.01$ ). A significant low serum folate level of the patients was observed. A significant difference was observed between

patients and controls in means of serum iron ( $p < 0.001$ ). The mean of serum iron was significantly lower among patients. No significant difference was observed between

patients and controls in means of ferritin, TIBC and UIBC ( $p > 0.05$ ), table 7 and figure 4.

**Table 2: Distribution of patients and controls according to means of hematological parameters (no=60).**

Variable	Patients	Control	t	P
	Mean±SD	Mean±SD		
Serum B12	190.5±80.3	240±60.8	2.6	0.009
Serum folate	10.2±4.5	13.1±4.6	2.4	0.01
Serum ferritin	43.2±47.5	55.1±54.5	0.8	0.3
TIBC	338.8±57.9	333.9±78.7	0.2	0.7
UIBC	300±38	294±33.5	0.6	0.5
Serum Iron	55.4±18.8	87.7±42.2	3.8	<0.001

Binary logistic regression analysis revealed that family history of RAS ( $p = 0.002$ ), serum B12 ( $p = 0.003$ ) and serum iron ( $p = 0.008$ ) were significant predictors of recurrent aphthous stomatitis, table 8.

**Table 3: Results of binary logistic regression**

Variable	β	SE	Wald $\chi^2$	P	OR
Constant	6.7	2.5	7.05	0.008	0.001
Family history	4.9	1.5	9.6	0.002	0.007
Serum B12	0.02	0.009	9.05	0.003	1.02
Serum Folate	0.18	0.09	3.5	0.058	0.8
Serum Iron	0.07	0.02	7.07	0.008	1.07

### Discussion

RAs is a common presentation for both dermatology and general practice clinics. Considerable proportion of people are unaware of the method to reduce its prevalence. The demographic characteristics of our sample are consistent with results Fariba I, et al study in Iran (2005) that reported equal male to female ratio and mean age of patient was 30.5 years<sup>(14)</sup>. Our findings are also close to results of Tarakji B, et al study in Saudi Arabia (2012)<sup>(15)</sup> that reported prevalent age group of AS patients 30-39 years but males were more than females, on other hand, these findings are inconsistent with Abdullah MJ, et al study in Al-Sulimaniya (2013)<sup>(16)</sup> that reported main age group for RAS was 20-29 years and females more than females.

The prevalence of RAS among adults was significantly higher than that (17.9%) reported in US adult population aged over 17 years<sup>(17)</sup>. More than half of

the RAS patients had positive family history. Reports of family history were frequent in this population (53.3%), as observed in the previous literatures<sup>(18, 19)</sup> supporting a genetic involvement in the etiology of RAS.

The present study revealed a significant decrease in mean of serum B12 among RAS patients ( $p = 0.009$ ). Mean of serum B12 for patients was 190.5±80.3 Pgm/ml and that for controls was 240±60.8 Pgm/ml. Volkov I, et al study in USA (2009)<sup>(20)</sup> concluded that vitamin B12 treatment, which is simple, inexpensive, and low-risk, seems to be effective for patients suffering from RAS, regardless of the serum vitamin B12 level.

Burgan SZ, et al study in Jordan (2005)<sup>(21)</sup> reported that Patients with recurrent aphthous stomatitis have more hematonic deficiencies, particularly vitamin B12 deficiency, compared with controls. Correction of these hematonic deficiencies could help in the management of the disease. Liu HL, et al study in Southern Korea

(2013)<sup>(22)</sup> resulted vitamin B12 therapy to have a statistically significant benefit on pain relief among recurrent aphthous stomatitis sufferers.

Binary logistic regression analysis revealed that the main risk factors for RAS in this study were family history ( $p=0.002$ ), serum B12 ( $p=0.003$ ) and serum iron ( $p=0.008$ ). A genetic predisposition for the development of aphthous ulcer is strongly suggested as about 40% of patients have a family history and these individuals develop ulcers earlier and are of more severe nature. Various associations with HLA antigens and RAS have been reported. These associations vary with specific racial and ethnic origins<sup>(18)</sup>.

It has long been thought that iron, folate and vitamin B12 deficiencies play an important role in RAS, but some controversy does exist. Wray D, et al<sup>(23)</sup> reported that hematinic deficiencies affect up to 21% of adult patients with RAS, and when they replaced the deficient element, 59% of the patients showed resolution of RAS and 28% showed significant improvement. However, other studies have shown that patients with RAS and controls had comparable serum iron, folate or vitamin B12<sup>(24, 25)</sup>.

### Conclusion

In conclusion, family history, serum B12 level, and serum iron are associated with RAS patients. It is important to investigate vitamin B12, folate and iron deficiencies in patients with RAS.

**Conflict of Interest:** The authors have no conflict of interest

**Source of Funding:** Not available

**Ethical Clearance:** Ethical approval was obtained from Al- Sulaimania teaching hospital

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# Hepatorenal Function Markers Alteration in Aged and Aged Related Disease in Human

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## Abstract

Human puberty is indicated by a gradual decrease in organ function and related physical functions. The characteristics of aging affect and change all the dynamic biological, physiological, behavioral, psychological, and social processes. For this cause, this current experiment designed to investigate of some organ function markers in older adults in Kurdistan region-Iraq. The experiment design is the setting of a medium private laboratory with participants being common people (20–85 years=108) were classified into six age groups. Serum was obtained for liver and kidney function markers. The findings highlighted that the liver enzyme markers affected by aging and decreasing the levels with significant increasing direct-Bilirubin in both sex groups and Parkinson's disease have significant changes of all parameters. Also this result showed that all renal markers were rose significantly with advanced age groups, and high level of them associated with renal failure disease. In conclusion, various biomarkers have been studied and investigated, most of them affected by ageing in both gender, additionally the level of most organ markers were associated with health complication in elderly aged human.

**Keywords:** *Aging, renal and liver functions markers.*

## Introduction

Aging remains the constant phenomenon that every living being is experiencing. In any event, it is clear that the extent at which aging occurs varies between individual living people.<sup>1</sup> More specifically, the phenotype that can be seen during aging is the product of the interaction between inherited, epigenetic, probabilistic and natural factors that result in the loss of molecular integrity.<sup>2</sup> Human puberty is indicated by a gradual decrease in organ function and related physical functions. The developmental and social/behavioral factors, including pollution, circumstances, smoking, lifetime socioeconomic, food, and childhood cognitive

ability have been shown to influence aging. The characteristics of aging affect and change all the dynamic biological, physiological, behavioral, psychological, and social processes.<sup>3</sup> Also aging is the major risk factor for cardiovascular diseases, reactive oxygen species, and oxidative stress have long been associated with aging, and elderly diseases such as hypertension, cardiovascular disease, diabetes and Parkinson's disease.<sup>4-6</sup>

## Materials and Method

One hundred and eight older adults were participated in this study and allocated into three groups according to their ages; the first group (20-40 = 18), the second group (45-64 = 55), and third group (65-85= 35). Also according to health complication, men participants divided in to six groups: young group, healthy aged group, Diabetes mellitus group, cardiovascular disease group, Renal failure groups, Parkinson's disease group. All participants were obtained from Sulaimani Nursing House and Private New Medical Center. Blood was gathered in gel container tubes, centrifuged at 15000

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rpm, then serum separated for biochemical analysis including for liver function biomarkers with kidney function biomarker and fully automated chemical analyzer (Roche Cobas Integra 400 plus, Germany) has been used to estimate parameters concentration.

**Statistical Analysis:** Data were analyzed using the Statistical Package for Social Sciences (SPSS, version 22). One way analysis of variance (ANOVA) was used of the study. A p-value of  $\leq 0.05$  was considered statistically significant.

**Results**

The level of the ALP, ALT and AST was considerably decreased with aging, it showed height level in both males and females in (20–40) age group,

while it show the lowest level in both male and female (65–85) age groups (Table 1). With respect to Bilirubin, the highest level was showed in the males advanced age group (65-85), in contrast to the female group was noticed in the (45-64) aged group (Table ).

ALP and ALT levels was showed significantly decreasing in healthy aged group and followed by its levels in Parkinson’s disease and diabetes groups as compared to young age group with highly significant value. Regarding the AST level, the healthy aged groups showed highly decreasing of AST level in comparison to the young control group. In comparison to the control group a high level of bilirubin was found in Parkinson’s disease (Table 2).

**Table 1. Liver function markers in aged groups**

Parameters	Groups Sex	Control Young A 20-40	Aging Group		P- value		
			B 45-64	C 65-85	A vs B	A vs C	B vs C
ALP U/L	Male	81.52±9.07	70.45±6.69	59.85 ± 5.10	0.0001	0.0001	0.182
	Female	77.54±8.86	68.68±9.29	54.89 ± 6.11	0.235	0.006	0.102
ALT U/L	Male	25.18±5.83	22.09±3.04	22.26 ± 4.00	0.028	0.027	0.913
	Female	22.96±4.45	20.35±5.22	19.44 ± 4.43	0.037	0.036	0.099
AST U/L	Male	23.76±4.75	21.23±3.69	20.42 ± 3.93	0.015	0.007	0.482
	Female	21.31±5.82	20.82±3.13	18.62 ± 3.04	0.727	0.056	0.170
D. Bilirubin mg/dl	Male	0.170±0.01	0.175±0.03	0.211 ± 0.06	0.0001	0.0001	0.0001
	Female	0.164±0.02	0.234±0.02	0.134 ± 0.08	0.003	0.036	0.0001

**Table 2. Liver function markers in relation to health complications**

Parameters	Control young	Healthy Aged	Diabetes	CVD	Renal failure	Parkin-son’s disease	P-value				
							A vs B	A vs C	A vs D	A vs E	A vs F
ALP U/L	81.52±9.07	64.02±9.27	68.64±7.66	70.03±6.98	70.47±6.67	66.74±5.76	0.0001	0.0001	0.20	0.59	0.0001
ALT U/L	25.18±5.83	21.49±2.44	22.14±1.21	23.09±1.95	24.79±1.47	21.64±3.16	0.001	0.052	0.060	0.129	0.028
AST U/L	23.76±4.75	19.31±2.14	21.17±3.75	20.19±3.00	20.79±3.88	19.28±2.79	0.02	0.63	0.445	0.51	0.02
Bilirubinmg/dl	0.170±0.01	0.181±0.09	0.192±0.07	0.179±0.03	0.191±0.04	0.197±0.06	0.0001	0.0001	0.361	0.0001	0.0001

Table 3 showed that the highest blood creatinine, urea and uric acid value was found in the (65-85) age group in male and female groups as compared to the young age group (20-40) years in male and female groups.

The results showed significant ( $P=0.0001$ ) increasing in the level of creatinine, urea and uric acid in renal failure and Parkinson's disease groups as compared to its level in control young and healthy aged groups (Table 4).

**Table 3. Renal function markers in aged groups**

Parameters	Groups	Sex	Control young A 20-40	Aging group		P-value		
				B 45-64	C 65-85	A vs B	A vs C	B vs C
Creatinine mg/dl	Male		0.61±0.09	0.87±0.17	1.01±0.39	0.040	0.0001	0.0001
	Female		0.60±0.09	0.71±0.14	0.87±0.24	0.001	0.001	0.001
Urea mg/dl	Male		23.75±2.78	26.69±3.59	36.16±5.95	0.003	0.0001	0.0001
	Female		21.82±1.16	25.33±2.46	32.91±4.70	0.023	0.0001	0.004
Uric acid mg/dl	Male		4.10±0.81	5.01±0.93	5.55±1.19	0.004	0.0001	0.024
	Female		4.07±0.92	4.40±1.22	4.55±1.13	0.482	0.156	0.541

**Table 4. Renal function markers in relation to health complications**

Parameters	Groups	Control young 20-40	Healthy Aged	Diabetes	CVD	Renal failure	Parkin- son's disease	P-value				
								A vs B	A vs C	A vs D	A vs E	A vs F
Creatinine mg/dl		0.61±0.09	0.70±0.08	0.78±0.08	0.85±0.14	1.12±0.30	0.95±0.08	0.584	0.004	0.0001	0.0001	0.0001
Urea mg/dl		23.75±2.78	29.54±1.17	25.20±2.19	33.9±2.74	39.54±2.57	33.09±2.67	0.0001	0.005	0.0001	0.0001	0.0001
Uric acid mg/dl		4.10±0.81	5.11±1.03	5.31±1.23	5.30±1.22	5.66±1.08	5.63±1.11	0.071	0.031	0.021	0.0001	0.003

## Discussion

**Liver injury markers in aging:** The results revealed reducing the liver enzyme marker ALP, ALT and AST with aging. It showed lowest levels in the advanced age group (65-85) years and the highest levels were seen in the young age group (20-40) year. This pattern of the diminishing the activity of liver enzymes in the current study was in agreement with previous studies, reported diminishing levels of ALP, ALT and AST with expanding age (Ray, Singh et al. 2017).<sup>7</sup> Also the results showed, that the levels of enzymes are elevated in men as compared to women in accordance to the former study.<sup>8</sup> Furthermore, low ALT activity has been identified as a cause of fragility and long-term mortality in the elderly.<sup>7</sup>

Previously reported decreasing in the ALP level with aged complications in human<sup>9</sup> with abnormal

ALP level can serve as a pointer to a large group of illnesses, however, mild increase was seen in normal health adult between the ages of 40 and 65 years.<sup>10</sup> In chronic dialysis and chronic kidney disease patients with the most frequently reduced serum ALT concentrations, potential underlying reasons may be linked to pyridoxine deficiency or the presence of an enzyme in the uremic system.<sup>11</sup>

Moreover, the results showed that the level of the bilirubin was varied with aging in male and female in different pattern, its show higher level at age group (65-85) year in the elder males, while its level was high at age group (45-65) years in female. The current results is consistent with previous studies that showed bilirubin concentration increases gradually with age.<sup>12</sup> The rise in serum bilirubin has also been shown to be correlated

with aging and has shown that older livers have a slower and weaker regenerative limit, decreased homeostatic ability, and lower inflammatory response.<sup>13</sup> This in case may play a supportive role against incident CVD and possible biological mechanisms by which higher total bilirubin contributes to reduced risk of CVD include antioxidants, anti-inflammatory effects, anti-atherogenic properties. Also reported bilirubin protection property in vascular structure and reactivity pathways(14).<sup>14</sup>

**Kidney function markers in aging:** Present study showed rising in creatinine level with advancing in age particularly in a group (65-85 years), that showed high level of creatinine in both sexes, more specifically in the male groups that showed a highly significant difference. This result is agreement with former study.<sup>15</sup> This result revealed that in diabetic and CVD serum creatinine mildly increased. Low creatinine excretion could be indicative of low muscle mass which is connected to increased incidence of cardiovascular events.<sup>16</sup>

The physiological function of the kidney decreases with age and the elderly have less kidney function so that the level of creatinine increases with age and there is also a higher risk of having chronic kidney disease and acute kidney injury.<sup>17</sup>

The result revealed that the advanced age group showed had the highest blood urea level in both sexes, within more increasing in males than in females. The results are in consistent with the previous studies which found that urea increases with age.<sup>18</sup> This increase is due to decreased urinary excretion due to the reduced glomerular filtration rate (GFR) that is noticeable among the elderly population.<sup>19</sup> Although rising urea levels might still be caused by detrimental effects of increased oxidative stress on the glomerulus.<sup>20</sup> In addition, the tendency of elderly people to take a protein diet at a lower rate may lead to higher levels of urea, which may result from lower urea clearance.<sup>21</sup>

In this study the level of urea is higher in renal complicated patients than in other complicated patients. Increased blood urea levels may be indicative of mild kidney disease or acute kidney injury.<sup>22</sup> Nonetheless, cases with substantially reduced blood urea levels resulting in inadequate secretion of antidiuretic hormone syndrome in younger individuals are not unusual.<sup>23</sup>

The results showed increasing the level of the uric acid with aging, and this increasing level followed the same pattern in both men and women, with highly level

in males as compared with females of some age group. This study results in agreement to the previous study who explained that hyperuricemia is mutual in elderly population.<sup>24</sup> Also previous study has shown that the rise in uric acid level is capable of inflicting some oxidative changes that ultimately lead to the incidence of apoptotic cell death.<sup>25</sup>

Regarding the uric acid level increased in renal failure group as confirmed by past study, most associative diseases are typically seen when uric acid levels are increased. For example, acute kidney injury; a substantially raised uric acid level is usually reported along with decreased glomerular filtration, lower flow-mediated dilatation, high CRP and high systolic blood pressure and in the case of diabetes, an extremely high level of uric acid is caused by insulin resistance, which is associated with renal uric acid secretion.<sup>26</sup> From the above, there is a possibility that a relatively high level of uric acid would increase the occurrence of cardiovascular events in the older population.<sup>27</sup>

## Conclusion

This study might provide that the level of liver enzyme markers enzymes were changed with aging in males and females, and showed more increasing in Parkinson's disease complication in male group, also the level of renal function markers parameters were rose in advanced age in both sexes, and more associated with renal failure disease.

**Ethical Clearance:** This work was supported by a Sulaimany Polytechnic University (Iraq). Experimental protocols were approved by the Ethics Review Committee of Medicine, Sulaimani Nursing House, Iraq (approval no: 0529.1.75/3)

**Source of Funding:** Myself (Kaniaw Rafat Khafar)

**Conflict of Interest:** Nil

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# Effect of Using Warm Shower and Warm Water Footbath with and Without Adding Epsom Salt on Fatigue Level in Systemic Lupus Patients

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## Abstract

Systemic lupus erythematosus is a chronic inflammatory autoimmune disease characterized by fatigue, with meaningful effects on patients' life. The aim of this study was to examine the effect of using warm shower and warm water footbath with and without adding Epsom Salt on fatigue level in systemic lupus patients. The study was conducted at Kasr Al Ainy teaching hospital, Cairo University. Ninety consecutive patients (30 in each experimental group). Quasi- experimental design was used. Data was collected using demographic sheet, Fatigue severity scale and thermometer. The study results revealed that in the warm shower group, there was a significant reduction in fatigue level from baseline assessment to day 7 by 2.9 points ( $54.13 \pm 5.21$  and  $51.23 \pm 5.36$ ). Warm shower is effective in reducing fatigue level. Further investigation into using warm water footbath with adding Epsom salt and its effect on fatigue, may lead to an improvement in the complementary therapy and management modality of this chronic inflammatory disease.

**Keywords:** Fatigue, warm water footbath, Epsom salt and Systemic Lupus.

## Introduction

Systemic lupus erythematosus (SLE) is a worldwide complex health problem, afflicting young people at a crucial time in their lives<sup>1</sup>. Being a multisystem autoimmune disease with innumerable clinical and laboratory manifestations, SLE imposes negative effect on health and overall quality of life<sup>2</sup>. So precise assessment and proper intervention for SLE patients' subjective parameters such as fatigue is very important as it occurs in most patients.

In SLE patients, fatigue disrupts normal daily functioning and affects quality of life<sup>3</sup>. Despite its high

prevalence and impact on quality of life, fatigue has not been extensively studied in patients with SLE. At the same time, more than 80% of patients with SLE have reported that fatigue is not adequately addressed in their health care management plan<sup>4</sup>. One of the major responsibilities of nursing is to promote comfort among patients including SLE patients. Furthermore footbath therapy is a non-pharmacological, safe, side effect free, cost effective and easy technique to perform in all settings.

Epsom salt is also known as magnesium sulfate. It's a chemical compound made up of magnesium, sulfur, and oxygen. Epsom has an appearance similar to table salt, but its taste is distinctly different. As Epsom salt dissolves in warm water baths, it releases magnesium and sulfate ions<sup>5</sup>. Epsom salt plays various pharmaceutical effects in medical field. It plays an important role in relief of pain due to its effect on nerve and its characters' as anti-inflammatory and treatment of muscle cramps. Also, Epsom salt has beauty influence on body care due

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to its effect on skin and feet<sup>6</sup>. To our knowledge the effect of adding Epsom salt on warm water in relieving fatigue level was not yet investigated in previous studies. Therefore the aim of the current study is to examine the effect of using warm shower and warm water footbath with and without adding Epsom Salt on fatigue level in SLE patients.

**Hypotheses:**

All hypothesis are tested at 0.05 level of significance

**H1:** There will be significant differences in fatigue level between systemic lupus patients receiving warm water footbath with Epsom salt and those who receive warm shower.

**H2:** There will be significant differences in fatigue level between systemic lupus patients receiving warm water footbath and those who receive warm shower.

**H3:** There will be significant differences in fatigue level between systemic lupus patients receiving warm water footbath with Epsom salt and those who receive warm water footbath only.

**The conceptual framework** of the current study is based on general system’s theory given by Karl Ludwig von Bertalanffy in 1968. According to this theory, human beings are constantly changing due to their interaction with environment<sup>7</sup>.

**The main component of system theory includes**

**Input:** Fatigue level before the intervention

**Process:** Intervention

**Output:** Fatigue level after the intervention

**Material and Method**

**Research Design:** Quasi-experimental design will be used to demonstrate the causal impact of warm water foot bath with and without adding Epsom salt and warm shower on level of fatigue. This design uses some criterion other than random assignment<sup>8</sup>.

**Setting:** The study was conducted at inpatient ward of the Rheumatology and Rehabilitation Unit, Kasr Al Ainy teaching hospital, Cairo University in Egypt from February 2019 to January 2020.

**Sample:** The sample consisted of ninety consecutive patients (30 in each experimental group) admitted in

the inpatient ward. The study sample was calculated using of Power analysis of 95 ( $\beta = 1-.95 = .5$ ) at  $\alpha .05$  (one-sided) with large effect size (0.5) was used as the significance level<sup>9</sup>.

**The following inclusion criteria were considered:**

Patients with significant level of fatigue according to objective validated Fatigue scale (Arabic version)<sup>10</sup>. Patients with SLE diagnosed with a minimum duration of one year and their age from 18-60 years.

**Exclusion criteria:** Patients with disturbed conscious level, peripheral vascular disease, sensory deficit, any foot ulcer and concomitant Diabetes Mellitus were excluded.

**Tools:**

**Data was collected using the following tools:**

- (a) Structured Questionnaire: It includes patients’ characteristics such as age, gender, level of education, occupation,...etc
- (b) Fatigue severity scale (FSS): developed by Lauren B. Krupps and colleagues in<sup>10</sup> the late 1980s as a tool to assess fatigue symptoms. FSS is a questionnaire containing nine statements that explore the severity of fatigue symptoms. The subject is asked to read each statement and circle a number from 1 to 7, A score of 36 and above (out of a maximum of 63) indicates the presence of significant fatigue. Internal consistency of the FSS is excellent (Cronbach’s  $\alpha=0.89$ ).

**Procedure:** Once official permission was obtained to conduct with the proposed study, the potential patients were interviewed individually to explain the nature and purpose of current study. After obtaining verbal and written consent from patients, the investigators assessed patient’s fatigue level through the Fatigue severity scale (FSS). Patients who meet the inclusion criteria were consecutively assigned to three groups. Along with standardized treatment, the first group received warm shower. In the second group two medicine cups of Epsom salt were added to the 5 L warm water footbath whereas the third group received warm water footbath only. All interventions were administered for 30 minutes during hospitalization for seven consecutive days. A plastic basin is used for immersion of feet to a depth of 10 cm above the ankles. The temperature of water was measured by thermometer (40-42°C) for both groups. The post interventional assessment for fatigue was

conducted on 3rd, 5th, 7th day 30 minutes following the intervention for all groups using the same scale.

**Data Analysis:** Statistical package for the social science (SPSS) program, version 20 was used for data analysis. The demographic variables analyzed using (frequency and percentage). Level of fatigue was analyzed using (mean, standard deviation). Effectiveness of warm water foot bath was analyzed using (repeated measures ANOVA test). The independent *t*-test was used for the comparison of the difference between FSS overtime. For variance analysis for repeated measurements, the Pillai trace test was utilized to compare FSS over time after the

intervention of warm water.

**Pilot Study:** A pilot study will be conducted on 10% of the sample; to ensure objectivity and clarity, feasibility, and reliability of the study tool and determine the time required to fill the different data collection tools.

**Ethical Consideration:** Written approval from the head of the rheumatology and rehabilitation department .The purpose, nature and importance of the study were explained to patients who met the inclusion criteria. Anonymity and confidentiality were assured through coding the data.

## Results

**Table 1. Characteristics of patients**

Variables	Categories	Warm shower		Footbath using Epsom salt		Footbath using warm water only		Test	
		Mean ± SD		Mean ± SD		Mean ± SD		<i>F</i>	<i>P</i>
Age		37.36±14.34		35.23±11.21		34.96±10.12		.359	.69
		No.	%	No.	%	No.	%	$\chi^2$	<i>P</i>
Gender	Female	23	76.7	20	66.7	24	80	1.52	0.47
	Male	7	23.3	10	33.3	6	20		
Marital status	Married	12	40	16	53.3	10	33.3	4.48	0.61
	Widowed	6	20	3	10	4	13.3		
	Divorced	4	13.3	3	10	3	10		
	Single	8	26.7	8	26.7	13	43.3		
Education	Cannot read & write	7	23.3	5	16.7	9	30	5.83	0.67
	Can read & write	3	10	7	23.3	4	13.3		
	Basic education	3	10	2	6.7	3	10		
	Secondary education	13	43.3	9	30	11	36.7		
	University	4	13.3	7	23.3	3	10		
Job	Employee	4	13.3	9	30	2	6.7	11.64	0.07
	House wife	7	23.3	11	36.7	12	40		
	Unemployed	16	53.3	6	20	11	36.7		
	Retired	3	10	4	13.3	5	16.7		
Residence place	Urban	12	40	20	66.7	18	60	4.68	0.09
	Rural	18	60	10	33.3	12	40		
	No	11	36.7	3	10	9	30		

\* $P \leq 0.05$  ; *F* = Variance analysis of repeated measurements;  $\chi^2$  = Chi-square test

As demonstrated in table 1 no statistically significant difference between the groups as regards demographic characteristics ( $P > 0.05$ ).

**Table 2. Comparison of fatigue level over time, Mean ± SD of patients in the three experimental groups**

Follow up Time	Warm shower	Footbath using Epsom salt	Footbath using warm water only	One way ANOVA	
	Mean ± SD	Mean ± SD	Mean ± SD	F	P
FSS Baseline	54.13±5.21	56.97 ± 3.18	52.56 ± 4.71	7.53	.001
FSS day 3	52.23±5.49	56.30 ± 2.25	51.80 ± 4.68	9.72	.000
FSS day 5	51.79± 4.76	55.97 ± 2.36	52.46 ± 4.45	9.42	.000
FSS day 7	51.23±5.36	55.73 ± 3.91	51.13 ± 4.05	10.26	.000
Within the same group	F value 1.751	0.968	0.662		
	P 0.161	0.411	0.577		

Note: When patients complained about fatigue, baseline means immediately before receiving the intervention and again on day 3, day 5 and day 7 of starting the intervention.

FSS = Fatigue severity scale; \*P ≤ 0.05 ; F = Variance analysis of repeated measurements, Pillai trace test.

**Table 2** Revealed that there was a statistically significant difference in the baseline fatigue level and on days 3, 5, 7 between the 3 groups .In the warm shower group, there was a reduction in fatigue level from baseline assessment to day 7 by 2.9 (54.13± 5.21 and 51.23 ± 5.36 respectively).

**Table 3: Comparison of baseline assessment of fatigue level with day 3, 5, and 7 in the three experimental groups**

Fatigue	Pairs	Mean difference	Paired t-test	
			T	P
Warm shower	Baseline - day 3	1.90000	3.843	.001
	Baseline - day 5	2.34333	3.459	.002
	Baseline - day 7	2.90000	3.877	.001
Footbath using warm water only	Baseline - day 3	.76667	1.044	.305
	Baseline - day 5	.10000	.155	.878
	Baseline - day 7	1.43333	2.031	.052
Footbath using Epsom salt	Baseline - day 3	.66667	1.130	.268
	Baseline - day 5	1.00000	1.619	.116
	Baseline - day 7	1.24000	1.651	.110

Significant at \*P ≤ 0.05

**Table 3** illustrated statistically significant differences between baseline fatigue level and days 3,5 and 7 in the group using warm shower (P= 0.001, 0.002 and 0.001 respectively)

**Discussion**

Worldwide improvement in fatigue management among hospitalized patients is a high priority goal

especially in patients with SLE. The findings of this study showed that 30 minutes of warm shower and warm water footbath are significantly reduced fatigue levels within the fifth and seventh day of starting the intervention. Accordingly it is argued that the warm water intervention can be safely and effectively incorporated into standard nursing practice in the care of patients with SLE. In the current study the researchers’ added Epsom salt to warm water footbath and to the best of their knowledge, this

is the first study that has examined the effect of adding Epsom salt to warm water footbath on fatigue level in patients with SLE in Egypt.

In the current study the reduction of fatigue level after the intervention was similar to a study conducted in India to evaluate the effectiveness of warm water footbath on level of fatigue among elderly patients and highlighted that fatigue level was reduced in the experimental group when compared with control group. In addition the findings of this current study are congruent with the findings of the study carried out by<sup>11</sup> to investigate the effect of footbath therapy on fatigue among chronic renal failure patients highlighted a significant difference between fatigue level in the experimental group before and after administering warm water footbath. Another study conducted in Egypt by<sup>12</sup> also supported the effectiveness of using warm water footbath to reduce level of fatigue among hemodialysis patients.

Regarding the effect of warm shower of the body, the researchers of the present study found a significant reduction in FSS after the intervention. This finding is consistent with study conducted in Japan by<sup>13</sup> evaluating physical and mental effects of bathing and reported better self-assessment results for fatigue level among the group taking warm shower of the body. This could be due to the effect of warm shower of the body exerts sufficient hyperthermic action to induce vasodilatation and increase blood flow, supplying more oxygen and nutrients to the periphery. Also showering is the most common form of bathing worldwide and provide feelings of warmth, relaxation, relief from fatigue, and refreshment. Another study conducted in Germany by<sup>14</sup> to evaluate the changes in the haemostatic system after hyperthermic water immersion and highlighted that warm water bathing leads to management of fatigue through haemoconcentration and minimal activation of coagulation.

Epsom salt is hypothesized to have an important role in relieve pain due to its effect on nerve and its characters' as anti-inflammatory and treatment of muscle cramps<sup>15</sup>. Our study failed to demonstrate a positive effect of adding Epsom salt to warm water footbath. The current study is the first study that has examined the effect of warm water footbath adding Epsom salt on fatigue level in SLE patients in Egypt. So the findings of this study could potentially be useful if repeated in different settings to confirm the effect of the intervention.

Furthermore the American Society of Health-System Pharmacists<sup>16</sup> highlighted that, in warm water Epsom salt dissociated into magnesium ions, and sulfate ions which easy absorbed through the skin, this improve the benefit of Epsom salt .Another study carried out in USA by<sup>17</sup> reported that magnesium plays bio vital roles in the body including reduction of inflammation, relaxation of muscle and helps to prevent artery hardening. In addition, sulfates helps in removing toxins from the body and promoting the production of serotonin, which is responsible for feeling of calm and relaxation, and reduces the effect of adrenaline which may be triggers from increasing level of fatigue<sup>6</sup>.

The authors of the current study **concluded** that using different methods of bathing indicated that warm shower of the body is more effective in reducing level of fatigue than warm water footbath with and without adding Epsom salt. The study cannot be generalized to the whole population as small sample size was recruited.

**Ethical Clearance:** All procedures were performed in accordance with the ethical standards of the institution

Source of funding This study was funded by the authors

**Conflict of Interest:** The authors declare that they have no conflicts of interest

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Published, Printed and Owned : Dr. R.K. Sharma

Printed : Printpack Electrostat G-2, Eros Apartment, 56, Nehru Place, New Delhi-110019

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