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**Editorial**

# Resetting of Metabolic Hormones Can Weight Loss

**Mohsin Masud Jan**

Editor

Hormones influence energy expenditure or the number calories your body burns on daily basis. For this reason, fluctuations in hormone levels may lead to weight gain or loss, as well as body fat accumulation in specific areas. Fat storage and breakdown are strictly regulated by certain hormones in the body. There are actually six hormones that impact fat loss, which are Thyroid, Adrenaline, Glucagon, Adiponectin, Androgenic Hormone, Testosterone and Growth Hormone. They directly stimulate the metabolism. You need the reset these Hormones like Prolactin, Insulin and Thyroid antibodies for optimal fat loss. Insulin, a hormone produce by pancreas is important for regulation of carbohydrates and metabolism of fat.

The Hormone Reset Diet was developed by a World Well Known gynaecologist, with the goal of resetting metabolic hormones to promote weight loss. In order to address hormonal imbalances, the 21-day programme is essentially an elimination diet that calls for avoiding meat, alcohol, fruit, grains, and dairy.

The Hormone Reset Diet promises that you'll lose 15 pounds in 21 days. This should be an immediate red flag that this is a fad diet, and any weight that is lost will likely be regained. Although the focus is on eating healthy foods, such as vegetables and protein, this diet plan is too low in calories for most people and will probably leave you feeling hungry. In addition, there is no clinical evidence to suggest that eliminating foods in a specific order can revamp your metabolism and help you lose weight.

The main foods to eat on the Hormone Reset Diet include primarily whole foods with the exception of the food groups that are eliminated during each specific phase. The foods the diet includes (and excludes) and the phases of the diet are determined by the results of a quiz that claims to determine which hormonal imbalances you may have.

Aim to eat a pound or more of vegetables per day, sticking to less starchy, high fiber choices to stay under the required 99 grams of carbohydrates.

- Asparagus
- Leafy greens
- Zucchini
- Mushrooms
- Bell peppers
- Organic, Free-Range Eggs and Poultry

The Hormone Diet claims that non-organic, factory-produced eggs and poultry contain "toxins" that contribute to hormonal imbalance. Plant-based sweeteners are thought to be more natural than artificial sweeteners. Sugar alcohols are low-calorie and sugar-free. They do not increase blood sugar and are approved for use on the Hormone Reset Diet.

Certain foods are eliminated at specific times or for specific individuals, depending on their supposed effects on hormones as determined by a quiz. Eliminating meat, according to the Hormone Reset Diet, resets your estrogen levels. According to the diet, being "estrogen dominant" will prevent you from losing weight. The diet refers to all red meat as "meat." According to known researcher, sugar is addictive and leads to insulin resistance, causing weight gain, so it is eliminated. Dairy is thought to cause an imbalance and add unwanted growth hormone, so it is eliminated. The Hormone Reset Diet also claims that dairy is addictive.

Although the Hormone Reset Diet focuses on whole, nutritious foods, it also excludes many foods of high nutritional value. For example, the Hormone Reset Diet excludes grains. Choosing healthy, whole foods for the majority of your diet is a good idea for general health and weight loss. However, excluding food groups like dairy, fruit, and grains is unnecessary for weight loss and could be detrimental to your health and long-term weight loss success.

The Hormone Reset Diet may result in weight loss, but the highly restrictive and unsustainable nature of the diet makes it unnecessarily difficult to follow. If you believe you might have a hormonal health issue, speak to your doctor about the best way to promote hormone balance. Remember, following a long-term or short-term diet may not be necessary for you and many diets out there simply don't work, especially long-term. While we do not endorse fad diet trends or unsustainable weight loss methods, we present the facts so you can make an informed decision that works best for your nutritional needs, genetic blueprint, budget, and goals. If your goal is weight loss, remember that losing weight isn't necessarily the same as being your healthiest self, and there are many other ways to pursue health.

Exercise, sleep, and other lifestyle factors also play a major role in your overall health. The best diet is always the one that is balanced and fits your lifestyle.

# Frequency of Hyperkalaemia in Non-Dialysis Dependent Chronic Kidney Disease (CKD) Patients

Hyperkalaemia  
in Non-Dialysis  
of CKD

Abdul Qadir<sup>1</sup>, Zareen Ullah<sup>1</sup>, Muhammad Daud Khalil<sup>2</sup>, Muhammad Najumu Saqib<sup>1</sup>,  
Aimal Khan<sup>3</sup> and Adam Khan<sup>1</sup>

## ABSTRACT

**Objective:** To examine the prevalence of hyperkalaemia and its relationship with various demographic and clinical variables among non-dialysis dependent chronic kidney disease (CKD) patients.

**Study Design:** A cross-sectional study.

**Place and Duration of Study:** This study was conducted at the Nephrology Unit of Khyber Teaching Hospital, Peshawar, from September 6, 2020, to March 5, 2021.

**Materials and Methods:** The study evaluated 150 diagnosed non-dialysis dependent CKD patients aged between 20 to 60 years. Demographic information, duration of CKD, and other relevant clinical data were recorded. Serum potassium levels were obtained, and renal function was quantified using the MDRD-4 equation. Serum K level  $>5$  mmol/L was considered hyperkalaemia. Statistical analyses, Mean  $\pm$  SD, univariate and multivariate logistic regression were produced using latest version 21 SPSS.

**Results:** Patients mean age was  $39 \pm 11.2$  years, with 53.3% being male 46.7% female. The mean duration of CKD was  $10.2 \pm 7.2$  months, and 60% of patients had been diagnosed with CKD for less than 1 year. Hyperkalaemia was observed in 45.3% of the patients. Significant associations were found between hyperkalaemia and factors such as CKD duration ( $p < 0.05$ ), CKD staging ( $p < 0.05$ ), and BMI  $>25$  kg/m<sup>2</sup> ( $p < 0.05$ ). Log odds of hyperkalemia increased by 1.9598 as patients were moving from Stage 1-2 to Stage 3-4.

**Conclusion:** This study features the high prevalence of hyperkalaemia in non-dialysis dependent CKD patients and its associations with CKD Stages, duration, and demographic characteristics. These findings emphasize the seriousness of surveying and managing serum potassium levels in these patient population to prevent potential life-threatening complications.

**Key Words:** Hyperkalaemia, Chronic kidney disease, Nephrology, Prevalence

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## INTRODUCTION

Potassium is predominant ion found in body fluid, with about 98% of its levels located inside cell at a concentration of 140-150 mmol/L, and only 2% outside the cell, that is 3.5-5.0 mmol/L<sup>1,2</sup>.

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The proportion of potassium inside to outside the cell is a major factor of the resting membrane potential and plays vital role in regulation of cellular excitability, and to generates a transmembrane potential, cardiac conduction, neuromuscular function, cellular metabolism, and maintaining acid-base equilibrium. If the serum level of K is more than 5.0 mmol/Lit will be stated as hyperkalaemia<sup>3</sup>. Constant level of extracellular potassium is maintained by certain homeostatic mechanisms<sup>4</sup> among those, kidney maintains optimal level of potassium in body by secreting it through the proximal collecting duct and distal convoluted tubule<sup>5</sup>. Hyperkalemia stands as a significant metabolic complication due to its potential to induce electrophysiological abnormalities that can have severe



clinical consequences, even leading to death<sup>6</sup>. Among all population hyperkalemia is infrequent that is, 4 cases per 100 person-years, although it is a quiet common complication in individuals having chronic kidney disease (CKD), with (eGFR) is <60 ml/min/1.73m<sup>2</sup><sup>3</sup>. Patients with chronic kidney disease who are non-haemodialysis-dependent are at the risk of developing life-threatening cardiovascular complications, including arrhythmias, sudden cardiac arrest<sup>7</sup>. The presence of hyperkalaemia varies in CKD patients, ranging from 2% to 35%, depending on the glomerular filtration rate (eGFR)<sup>8</sup>. There is a relationship between decreased eGFR in CKD and risk of hyperkalaemia<sup>9</sup>. As eGFR gets down from 60 to 20 ml/min/1.73m<sup>2</sup>, prevalence of hyperkalaemia abruptly increased from 7% to 42% with an overall frequency of 17%<sup>11</sup>. In individual with eGFR less than 59 ml/min/1.73m<sup>2</sup>, for every 5 ml/min/1.73m<sup>2</sup> drop in eGFR, risk of hyperkalaemia raised by 26%<sup>9</sup>. CKD stage wise prevalence of hyperkalaemia is 20.7% in Stage III, 42.1% in Stage IV and 56.6% in Stage V.<sup>3</sup> The occurrence of hyperkalaemia exhibits a gradual rise, starting at 13% in Stage II CKD and progressively increasing to 34% in Stage IV CKD, which is almost a three-time increase.<sup>12</sup>.

Renal failure and certain medications usage are recognized considerable risk factors for the prevalence of hyperkalaemia in hospital setup.<sup>6</sup> In patients with reduced renal function, pathophysiology of hyperkalaemia is, metabolic acidosis-induced movement of intracellular potassium across the cells membrane to ECF, resulting in elevated levels of potassium in the bloodstream. Diabetes, heart failure (HF), and the utilization of renin-angiotensin-aldosterone system antagonists (RAAS i) are additional significant risk factors for hyperkalaemia<sup>6</sup>. While renin-angiotensin-aldosterone system antagonists (RAAS i) have demonstrated effectiveness to slowdown the progress of chronic kidney disease, but risk of hyperkalaemia is associated with its use.<sup>13,14</sup> At serum K level >6.0 mmol/L risk of mortality within one day, increase to 30-fold<sup>14</sup> mostly due to ventricular arrhythmia and sudden death.<sup>15</sup> Non-dialysis CKD patients who experienced an episode of hyperkalaemia had an elevated risk of complications related to cardiac arrest and arrhythmia.<sup>16</sup>

The need of this study was to find the frequency of hyperkalaemia in CKD patients who were not on dialysis, evaluate the factors influencing hyperkalaemia, and compare the clinical and demographic characteristics among hyperkalaemic and normokalaemic groups.

## MATERIALS AND METHODS

Cross-sectional observational study on Non-Dialysis dependent CKD Patients at Nephrology Unit, Khyber Teaching Hospital, Peshawar was conducted from

September 6, 2020, to March 5, 2021. By using Sample size calculation formula, 150 patients were included in the study with diagnosed non-dialysis dependent CKD for > 3 months, both male and female patients aged between 20 to 60 years. Demographic information along with detailed history assessment, including the duration of CKD, were recorded using a pre-designed Proforma. Serum K levels and pertinent laboratory results were achieved from laboratory archives. All laboratory investigations were performed by a single experienced biochemist following standardized protocols. Renal function was evaluated by MDRD-4 equation.<sup>(19)</sup> CKD stages were defined as follows KDIGO guidelines<sup>(20)</sup> CKD stage I is eGFR more or equal to 90 ml/min/1.73 m<sup>2</sup> with findings of kidney injury lasting >3 months; CKD stage II is eGFR between 60 and 89 ml/min/1.73 m<sup>2</sup> with findings of kidney injury; CKD Stage (IIIa) is eGFR in between 45 and 59 ml/min/1.73 m<sup>2</sup>; CKD Stage (IIIb) is eGFR between 30 and 44 ml/min/1.73 m<sup>2</sup>; CKD stage IV is eGFR in between 15 and 29 ml/min/1.73 m<sup>2</sup>; and CKD stage V is eGFR that is less than 15 ml/min/1.73 m<sup>2</sup>. Serum K more than 5 mmol/L was considered Hyperkalaemia. To ensure data accuracy confounders and biases were controlled by strictly adhering to the exclusion criteria, through which we excluded who had a history of potassium supplementation in the past three weeks, those undergoing chemotherapy and Hemodialysis in past.

Statistical analysis was done for continuous variables in the form of mean  $\pm$  1 standard deviation (SD), and Student's t-test was used for any associations. For categorical variables frequencies (n) and percentages (%) were used. Furthermore, logistic regression both univariate and multivariate analyses were carried out to evaluate the correlation of Hyperkalaemia with various clinical and demographic findings such as age, CKD stages, duration of CKD, gender and BMI groups. P<0.05 was our statistically significant limit. For statistical analysis version 21 of the Statistical Package for Social Sciences (SPSS Inc., Chicago, Ill., USA) was used.

## RESULTS

Total 150 patients were assessed. In terms of gender distribution, male were 53.3% while female were 46.7%. Mean age was 39  $\pm$  11.2 years among the participants, 56% fell into 20-40 years age group, while 44% were between 40-60 years age group. The mean body mass index (BMI) was 23  $\pm$  3.1. Additionally, 67.3% of the individuals had a BMI <25 kg/m<sup>2</sup>, while 32.6% had a BMI greater than 25 kg/m<sup>2</sup>.

The mean duration of CKD was found to be 10.2  $\pm$  7.2 months with 60% of patients had been diagnosed with CKD for less than 1 year, whereas 40% for more than 1 year. In terms of CKD staging, 40% of the patients

were classified as being in stage 1 or 2, while 60% were in stage 3 or 4.

The mean serum potassium level was  $4.7 \pm 5.2$  mg/dl. 45.3% of the patients were hyperkalaemic.

There was a considerable association between hyperkalaemia and certain variables. Patients with CKD for more than 1 year showed a higher prevalence of hyperkalaemia (p value < 0.05). Similarly, stage 3 and 4 CKD was more associated with hyperkalaemia (p value < 0.05). In term of binary univariate logistic

model, the estimated coefficient ( $\beta_1$ ) associated with Stage 3-4 (X2) was approximately 1.9598. This indicates that moving from Stage 1-2 to Stage 3-4 increases the log odds of hyperkalaemia by 1.9598. There was also a considerable association between hyperkalaemia and body mass index greater than  $25\text{kg/m}^2$  (p value < 0.05).

Results for these stratifications can be found in Tables No. 1.

**Table No. 1: Clinical and demographic attributes of Hyperkalaemic and Normokalaemic CKD patients**

Parameter	Hyperkalaemic group (N = 68)	Normokalaemic group (N= 82)	P value
Age group years n (%)			
20-40 years	40 (47.6%)	44 (52.4%)	0.52
40 – 60 years	28 (39.3%)	38 (60.7%)	
Gender n (%)			
Male	39 (48.7%)	41 (51.3%)	0.10
Female	29 (41.4%)	41 (58.6%)	
BMI group n (%)			
<25 kg/m <sup>2</sup>	40 (39.6%)	61 (60.4%)	< 0.043
>25 kg/m <sup>2</sup>	28 (57.1%)	21 (42.9%)	
CKD stages n (%)			
Stage 1-2	23 (27%)	62 (73%)	<0.001
Stage 2-4	45 (69.2%)	20 (30.8%)	
Duration of CKD n (%)			
< 12 months	22 (24.4%)	68 (75.6%)	< 0.001
> 12 months	46 (76.6%)	14 (23.4%)	

N.BBold values are considered significant.

## DISCUSSION

In our study, we observed that around 45.3% of patients exhibited hyperkalaemia. This finding aligns closely with the results of a Denmark cohort study, where hyperkalaemia (K more than 5.0 mmol/L) was detected in approximately 43% of individuals with CKD.<sup>16</sup>

This study revealed a significant correlation between chronic kidney disease (CKD) stages and the occurrence of hyperkalaemia. Particularly, hyperkalaemia found to be more prevalent in stages 3-4 of CKD (p < 0.001), it went up from 10% in stage 1-2 to a staggering 85% in stage 2-4. For instance, a large cohort study comprising nearly 70,000 individuals, CKD stage wise prevalence of hyperkalaemia was around 20% in stage III, 42% in stage IV and 56% in stage V, in other words, 11 time increase in CKD stage 5 as compared to normal individuals.<sup>3</sup> Another study demonstrated a considerable link of declining glomerular filtration rate (GFR) in CKD with risk of hyperkalaemia<sup>9</sup>. One study shows, if estimated GFR (eGFR) reduce by 5 ml/min/1.73 m<sup>2</sup>, risk of hyperkalaemia went up by 26%.<sup>9,10</sup> In another study there was 10 time increase in prevalence of hyperkalaemia when eGFR fell from 60-90 ml/min/1.73 m<sup>2</sup> to 20-30 ml/min/1.73 m<sup>2</sup> range.<sup>11</sup>

In this study, patients with BMI >25kg/m<sup>2</sup> the risk of hyperkalaemia was high (p value < 0.05). A study conducted in England examine the link between body mass index (BMI) and stages of CKD, the study found

that patient shaving BMIs of 25-30 kg/m<sup>2</sup> and 30-35 kg/m<sup>2</sup> had a 34% and 94% higher risk respectively of CKD stages 4-5.<sup>19</sup>

The development of hyperkalaemia is frequently associated with demographic factors such as age and gender. Among these, gender act as independent risk factor, as mentioned in several studies, with males being more prone to developing hyperkalaemia<sup>20,21</sup>.

In a study involving large number patients examined the prevalence of hyperkalemia CKD, 14.0% males and 7.3% females were hyperkalaemic.<sup>3</sup> In our study, we found that, among all hyperkalaemic patients, the proportion of male and female were 48% and 41% respectively. However, in terms of gender our findings did not demonstrate statistical significance.

Age has been identified as another demographic factor related with the occurrence of hyperkalaemia. In a study it was noted that the prevalence of hyperkalaemia was nearly doubled in patients aged 65 and above, compared to those under of 65 years, even when controlling for similar comorbidities.<sup>22</sup>

However, in our study, we could not find considerable difference between age groups and hyperkalaemia. Nevertheless, we did note that the proportion of patients with hyperkalaemia in the younger age group (20-40 years) was 47.6% compared to 39.3% in the 40-60 years age group. These findings align with another study that also found an opposite association between age and hyperkalaemia. Specifically, they reported an odds ratio of 0.969 (95% CI: 0.951-0.987, p = 0.001),

indicating a decrease in the likelihood of hyperkalaemia with increasing age.

## CONCLUSION

This study features the high prevalence of hyperkalaemia in non-dialysis dependent CKD patients and its associations with CKD Stages, duration, and demographic characteristics. These findings emphasize the seriousness of surveying and managing serum potassium levels in these patient population to prevent potential life-threatening complications.

### Author's Contribution:

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**Conflict of Interest:** The study has no conflict of interest to declare by any author.

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Compared to Patients without these Comorbidities. Value in Health 2015;18(3):A135.

# Evaluation of Defects in Surface Detail of 2 Phase One Step Versus 2 Phase Two Step Impression Techniques: An In Vitro Study

Defects in Surface Detail of 2 Phase One Step VS 2 Phase Two Step

Khalid Yaqub, Abdul Mueed Zaigham, Hamza Talat, Hamza Ahmed Sahaf, Daniyal Naeem Dar and Muhammad Afzal

## ABSTRACT

**Objective:** To compare frequency of defects in surface detail of 2 phase one step versus 2 phase two step impression techniques.

**Study Design:** Randomized control trial study

**Place and Duration of Study:** This study was conducted at the Department of Prosthodontics, Institute of Dentistry, CMH Lahore Medical College from 14-5-2018 to 14-11-2018.

**Materials and Methods:** A total of 618 impressions were taken on a stainless steel abutment which were prepared and fabricated according to American Standards Institute- American Dental Association specifications. This model was incorporated in auto polymerizing resin and fixed onto a base. The auto polymerizing resin was then modeled to allow reproducible positioning of impression trays on the model. All impressions were made in stock perforated trays. The Impressions were divided into two equal groups i.e. Group A (Two phase one step) and Group B (Two phase two step). The impressions were then removed from master model. The Number of defects produced in both groups were evaluated and counted by an examiner trained in standardized technique for recognition and classification of surface defects. They were further confirmed by taking pictures of individual impressions.

**Results:** The defects in surface were noted in 54.5% impressions. Out of these 337 impressions Type I (group A) classification was found in 273(81%) impressions and type II (group B) classification was noted 19% in impressions. In group-A the defect in surface noted in 59.9% impressions and in group B the defect in surface noted in 49.2% impressions (p-value=0.008).

**Conclusion:** This present study showed that 2 phase two step impression techniques showed significantly lower defect rate than to 2 phase one step technique in evaluation of defects in surface.

**Key Words:** Impression Techniques, Two Step, One Step, Defect, Surface

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## INTRODUCTION

An impression is a negative replica of a surface; a dental impression is an imprint of the teeth and surrounding tissues. A complete record of the patient's hard and soft tissues is generated via the use of impressions. The final shape, fit, and function of both removable and permanent restorations are determined mostly by this stage.<sup>1,2</sup>

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The accuracy and surface details are primary focus in fixed prosthodontics. The goal is to achieve a defect free negative representation of a prepared tooth which will produce an accurate cast. Various impression materials e.g. alginate, polyether and silicones are used to achieve this objective. Among these materials addition silicones are among the most recommended impression material in fixed prosthodontics and have become the material of choice.<sup>3,4</sup> Addition silicones are among the most dimensionally stable and accurate impression materials available<sup>5</sup>. These are available in four consistencies i.e. Type 1- Heavy body putty, Type 2- Medium body putty, Type 3- light body material and Type 4- extra light body material Impression techniques using addition silicones have been categorized according to 2 phase one step and 2 phase two step

impression techniques.<sup>6,7</sup> Two phase one step or two phase two step procedures are performed using putty and light body. Two phase one step technique is one in which both materials polymerize simultaneously. Its advantages include reduced chair side time and saving of impression material. A disadvantage is that occasional ledges are formed at junction of putty and wash material<sup>8</sup>. For the first stage of the two-step imprint process, a high-viscosity substance (putty) is employed, and for the second step, a lower-viscosity material is utilized. The lightweight material used in the second phase of this process leaves a detailed imprint. Distortion, more time in the operating room, and more supplies are just a few of the drawbacks. Materials for the wash should ideally extend throughout the whole of the pretreatment for both methods.<sup>9,10</sup> However, in the therapeutic setting, this goal is not always attainable. In a recent clinical trial from 2015, researchers found that more than 89% of impressions they examined had at least one obvious inaccuracy, highlighting the need for a more careful review on the side of dentists. Technique, impression material, volume of material, and other variables may all affect the quality of imprints<sup>1</sup>. A high viscosity substance should be used for the bulk of the mixture, while a low viscosity material should be used to capture the fine details of the margins.<sup>11</sup>

## MATERIALS AND METHODS

This was a Randomized control trial conducted at Department of Prosthodontics, Institute of Dentistry, CMH Lahore Medical College during six months' time period. i.e. 14-5-2018 to 14-11-2018.

**Sample Size:** A total of 618 impressions were taken. They were divided equally in two groups i.e. 309 impressions in each group. The sample size was calculated using expected percentage of defects 55% in Two phase 1-step and 45% in Two phase 2-step. We used 80% power of test and 95% confidence of level and 5% margin of error. Sample selection was done with the help of non-probability consecutive sampling. Following inclusion and exclusion criteria was adopted for sample selection.

**Inclusion criteria:** Impressions that are seated in impression tray after taking impressions with both techniques

**Exclusion Criteria:** Impressions that dislodge from tray and impressions taken from condensation silicones.

**Data collection procedure:** The dimensions of the cast (8.015 mm in height, 6.330 mm and 8.450 mm at the base, and 28 mm as the distance between the centre of the two abutments) adhere to the American Standards Institute-American Dental Association specifications no 19. Figure V shows the putty and light body silicon imprints made from the stainless steel abutments used as a reference. Two-phase one-step and two-phase two-step imprint methods were used. In this research, we

looked at how many problems each method had in comparison. Included in self-polymerizing resin and securely fastened to a foundation is this model.

The auto polymerizing resin was then modelled such that imprint trays could be placed on the model in a consistent fashion. Stock perforated trays were used for all impressions. Added 3M Express vinyl polysiloxane (PVS) silicone was used to make the impressions. Due to the imprints being taken at ambient temperature rather than in the mouth, the polymerization periods were twice from what was indicated by the manufacturer. Group A consists of people who are taught the one-step, two-phase impression technique, while Group B consists of people who are taught the two-step, two-phase impression technique. Both groups' outputs were analyzed for their fault rates. Two types of impressions were taken: one-step impressions with putty and light body, and two-step impressions with 2mm thick acrylic resin copings inserted on each abutment to produce a homogeneous area for light body impression material.

The proportions were standardised using electronic callipers (Mitytoyo, Japan) and the coping was created from acrylic by eliminating material with a carbide bur until a consistent thickness was reached. After the first putty imprint was formed, the coping was taken off and a light body impression was made. Light body was reinserted until it made solid contact with the tray's edge, and then left to polymerize. Master model impressions were discarded.

An expert in standardised methods for detecting and categorizing surface flaws then analysed the removed impressions. To do this, we looked at all of the abutment's surfaces from a distance of about 150 mm and counted the amount of open voids (about 2-4 mm) and bubble-like contained voids (2 mm) we could see. To provide further evidence, we took digital photographs of each impression using a Nikon D 7100 and a Nikko macro lens of 105mm. We just tallied the number of flaws in the abutment's prepped surface. Type 1 faults (bubble-like enclosed voids) and Type 2 defects (open voids) were used to categorize the total number of flaws on each sample. The variation in defect rates was studied. You'll find a complete breakdown of the findings in the accompanying Performa.

**Data Analysis:** All data was entered and analyzed using SPSS version 20. Frequency and percentage applied for categorical data like defects (as per operational definition). Chi square tests applied to compare defects in both groups. P-value  $\leq 0.05$  was considered as significant. Data was stratified for type of voids (open/close). Post stratification chi square test was used taking p value  $\leq 0.05$  as significant.

## RESULTS

In this study a total of 618 impressions were taken. Out of which 309 impressions were taken by Two phase one step (Group A) and 309 impressions were taken by Two phase two step impression techniques (Group B). According to this study the defect in surface was noted in 337(54.5%) impressions. In these 337 impressions the defects classified as closed voids (type I classification) were found in 273(81%) impressions and defects classified as open voids (type II classification) were found in 64(19%) impressions. The frequency of surface defects was found in 337(54.3%) impressions. In this study in Two phase one step impression technique (group A) 309 impressions were taken. The defects in surface were noted in 185(59.9%) impressions. In Two phase two step impression technique (group B) 309 impressions were taken and the defects in surface were noted in 152(49.2%) impressions. This difference was statistically significant. i.e. p-value=0.008. Out of 337 impressions, in group A the type I defect noted in 138(74.6%) subjects and in group B the type I defect in surface noted in 135(88.8%) subjects. Similarly, in group A the type II defect noted in 47(25.4%) subjects and in group B the type II defect in surface noted in 17(11.2%) subjects. This difference was statistically significant. i. e p-value=0.001.

## DISCUSSION

This study compared the defect rates of two-phase one-step impressions to those of two-phase two-step impressions, and the research was conducted by the Department of Prosthodontics at the Institute of Dentistry at CMH Lahore Medical College. Improvements in imprint accuracy have been made possible by both technological and material advancements. Many various impression methods have been proposed, however when polyether and vinyl polysiloxane materials are utilized, the double-mix techniques have shown to be the most successful. Putty and light body, putty and medium body, or heavy body and light body may be used for either a one-step or two-step method.<sup>6, 12, 13</sup>

In our study the defect in surface was noted in 337(54.5%) subjects, type I classification was found in 273(81%) subjects and type II classification was noted 64(19%) subjects. In Two phase, 1 step group the defect in surface noted in 185(59.9%) subjects and in Two phase, 2 step group the defect in surface noted in 152(49.2%) subjects. Two phase, 2 step Group showed significantly lower defects than to two phase, 1 step group. i. e p-value=0.008. The number of close void defects were less in number in Two Phase two step impression technique. Also the number of open voids were less in Two phase two step impression compared with two phase one step impression technique.

Some of the studies are discussed below showing their results as. It has been shown in a research by EB Franco et al. that when the first impression is not relieved, the 2-step hydraulic and hydrophobic impression procedure produces stone dies with large disparities. Compared to the two-step hydraulic and hydrophobic imprint without relief, the single-step method yielded more accurate stone dies from the impression materials studied here.<sup>(14)</sup> Levartovsky S et al. found findings that were consistent with ours in their investigation. Short distances had more disparities than long distances did across all materials and all periods, as indicated by the author's research. There were fewer mistakes and more precision using the two-step imprint method compared to the one-step method. A deviation of less than 0.5% between the two sets of parallel lines was considered satisfactory across all materials and testing conditions. Variations in the President's substance were more pronounced than in the others'<sup>15</sup>. However, research by Justin L. Boulton and colleagues shows that polysulphide provides the least precise impressions of particular abutment dimensions, both vertically and laterally. On the other hand, when a bespoke tray was used, there were no statistically significant variations in the horizontal distances between the abutments.

All evaluated materials showed inconsistent results when measured in stock trays<sup>15,16</sup>. Across all six parameters, Shirley Hung et al. found no statistically significant difference in accuracy between the one-step and two-step putty wash impression procedures. There was less deformation seen in a two-step impression of Mirror 3 putty compared to either a one-step or two-step impression of Mirror 3 Extrude putty.

The same findings were also published in a research by Giuseppe Varvara and colleagues. With the novel 3-phase, 2-step impression injection process, they demonstrated a reduction in defect frequency from 100% of monophasic impressions to 5%. Although fewer impressions had faults with the 2-step method (45% vs. 55%), no statistically significant changes were found between the 1-step and 2-step 2-phase imprint approaches. Although the differences between the 3-phase and 2-phase impression injection procedures did not achieve statistical significance, the 3-phase, 2-step impression injection technique had the highest accuracy, with fewer defective specimens (5%)<sup>1</sup>.

**Table No.1: Comparison of defect frequency and type of defect classification in Study Groups**

		Study Groups		p-value
		Group-A (n=309)	Group-B (n=309)	
Frequency of Defect	Yes	185(59.9%)	152(49.2%)	<b>0.008</b>
	No	124(40.1%)	157(50.8%)	
Classification	Type I	138(74.6%)	135(88.8%)	<b>0.001</b>
	Type II			

## CONCLUSION

This present study showed that 2 phase two step impression techniques showed significantly lower defect rate than to 2 phase one step technique in evaluation of defects in surface.

### Author's Contribution:

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**Conflict of Interest:** The study has no conflict of interest to declare by any author.

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# Protective Effect of Pumpkin Seed Extract on Bisphenol A Induced Testicular Toxicity in Adult Albino Rats

Pumpkin Seed  
Extract on  
Bisphenol A  
Induced  
Testicular  
Toxicity

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## ABSTRACT

**Objective:** To determine the effects of Cucurbita Pepo (pumpkin) seeds extract on testicular toxicity induced by administration of Bisphenol A in adult male albino rats.

**Study Design:** Experimental study

**Place and Duration of Study:** This study was conducted at the Department of Anatomy, Postgraduate Medical Institute (PGMI), Lahore, Pakistan for a period of 28 days from 15 January 2020 to 11 February 2020.

**Materials and Methods:** This experimental study comprised 30 male adult albino rats divided into three groups, A, B and C with 10 rats in each group. Group A was control and received distilled water for 28 days via oral gavage. Group B received Bisphenol at a dosage of 20mg/kg dissolved in 0.5ml of water for 28 days via oral gavage. Group C received Bisphenol A plus Cucurbita Pepo seeds extract. BPA was administered at a dosage of 20mg/kg body weight dissolved in 0.5ml distilled water and Cucurbita Pepo at a dosage of 300 mg/kg body weight dissolved in 2ml distilled water, once a day for 28 consecutive days through oral gavage method. Gross parameter included weight of both testis and Histological parameters like height of germinal epithelium and number of seminiferous tubules were analyzed.

**Results:** The weight of paired testis of groups A, B and C was in range of 3.16-3.542g, 2.60-3.321g and 3.0-3.43g respectively thus showing most weight reduction in group B. Height of germinal epithelium in groups A, B and C showed significant changes and was in range of 125-158  $\mu$ m, 60-117 $\mu$ m and 92-151  $\mu$ m respectively. The number of seminiferous tubules per field was nearly same as in group A and C but decreased in group B (p-value < 0.001).

**Conclusion:** From the aforementioned results, it is clear about the adverse effects that BPA is inducing in human bodies and that pumpkin seeds have maintained testicular architecture, reduced degeneration of germinal epithelium against BPA induced testicular damage.

**Key Words:** Pumpkin Seeds, Seminiferous Tubules, Germinal Epithelium, Testis

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## INTRODUCTION

Plastic production has been increased over the past 60 years owing to their durability, inexpensiveness and lightweight nature.<sup>1</sup> Bisphenol A (BPA) is added to plastic food packaging as antioxidant to reduce decomposition of plastic polymers<sup>2</sup> and in epoxy resins to form a protective layer in cans to prevent corrosion.<sup>3</sup>

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It is unstable in acidic or basic solutions, higher temperatures and UV light exposure that converts polymeric stable form of BPA into unstable monomeric form which then releases into food and beverages contained in BPA containing containers.<sup>4</sup> BPA is known to have mutagenic, hepatotoxic, nephrotoxic, carcinogenic effects, alters steroidogenesis and adipogenesis.<sup>5</sup> Pumpkin seeds have a unique nutty taste. They are roasted and salted and consumed as a snack in many parts of USA, Mexico, China and other countries. Cucurbita pepo, commonly known as pumpkin, belong to the genus Cucurbita and family Cucurbitaceae.<sup>6</sup> Pumpkin seed extract is useful for immunomodulation and reproductive health.<sup>7</sup> It contains phenolic compounds as tyrosol, vanillic acid, vanillin, ferulic acid, and lulin. The antioxidant property of pumpkin seeds is due to phenols and tocopherols and pumpkin

seeds water extract contains 85-92% of total extractable phenolics that is highest percentage as compared to other modes of extraction.<sup>8</sup> Hence pumpkin seeds are able to reduce lipid peroxidation, improve fertility and helps to prevent arteriosclerosis, high blood pressure, heart diseases and reduce symptoms of benign prostatic hyperplasia.<sup>9</sup>

## MATERIALS AND METHODS

30 male albino Wistar rats, 9-12 weeks and weighing 180-220g were procured from Post Graduate Medical

Institute, Lahore. All the animals were examined thoroughly before commencing the experiment. They were individually housed in a climate-controlled environment and provided with food and water ad libitum.<sup>10</sup> Following acclimatization for a period of one week, experimental procedure was started.

### Therapeutic Agents:

- BPA used in this research was a product of DAEJUNG (Korea).
- Pumpkin seeds (Gen. Name; Cucurbita pepo) extract was prepared at UHS, Lahore.

**Table No.1: Description of the groups, intervention, dose, route & duration of therapeutic agents**

Groups	Intervention & Dosage	Route of Administration	Duration of Administration	Sacrifice Day
A	Distilled water 2ml	By oral gavage	28 days	24hrs after administration of last dose
B	BPA 20mg/kg/day dissolved in 0.5ml distilled water	By oral gavage	28 days	24hrs after administration of last dose
C	BPA 20mg/kg/day dissolved in 0.5ml distilled water plus 300mg/kg/day of pumpkin seed extract dissolved in 2ml distilled water	By oral gavage	28 days	24hrs after the administration of last dose

**Dissection and tissue sampling:** All rats were sacrificed under deep anesthesia 24 hrs after administering the last dose on day 29<sup>th</sup>. Testis were identified lying in the scrotal sac. The testis of each animal was weighed separately and placed in neutral buffered formalin. Tissue was processed for up to 18 hours by using the automatic tissue processor (HISTOTOUCH III-USA). For embedding, liquid paraffin was then poured onto the tissue piece to make tissue block. By using microtome, sections of 3  $\mu$ m thickness were obtained and stained with Hematoxylin and Eosin.<sup>11,12</sup>

### Parameter:

#### Gross:

1. Weight of the paired testis (g).

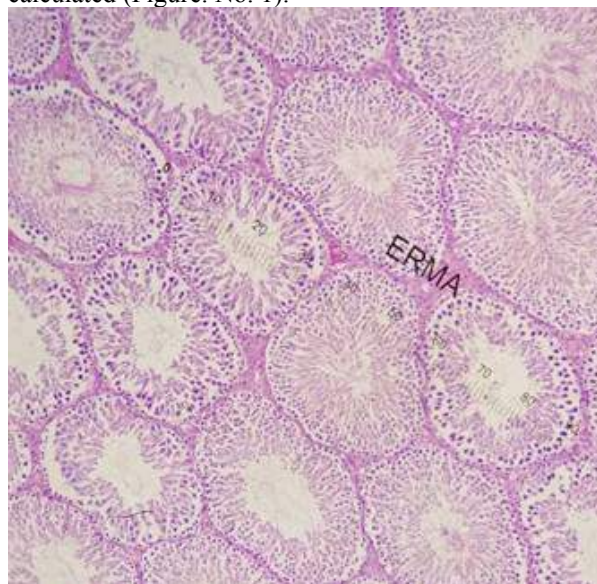
#### Histological:

1. Height of germinal epithelium ( $\mu$ m).
2. Number of seminiferous tubules per field.

**Weight of the paired testis:** Weight of paired testicular weight of each animal was recorded immediately after dissection from body on an electronic scale (Sartorius Precision Balance, Germany) and their mean was calculated.

**Height of germinal epithelium:** The height of the germinal epithelium was obtained by subtracting the luminal diameter from the tubular diameter for the same seminiferous tubules under 100X through ocular micrometer and dividing it by 2 (Figure No. 1).<sup>12</sup>

**Number of seminiferous tubules per field:** Number of seminiferous tubules were counted in 3 different fields under 100X magnification and their mean was calculated (Figure. No. 1).<sup>12</sup>



**Figure No. 1: Photomicrograph of testicular section showing micrometry with ocular micrometer for the measurement of height of germinal epithelium & number of seminiferous tubules. 100X.**

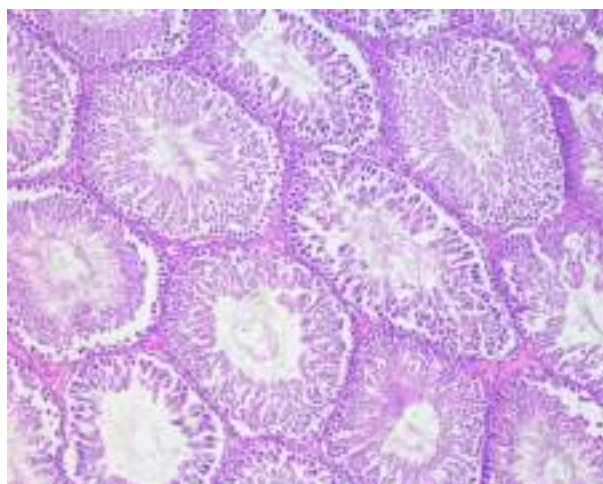
**Statistical analysis:** The data was entered and analyzed using SPSS 25. The quantitative data (weight of testis ,

height of germinal epithelium, number of seminiferous tubules per field) was analyzed using ANOVA followed by post hoc Tukey's test.

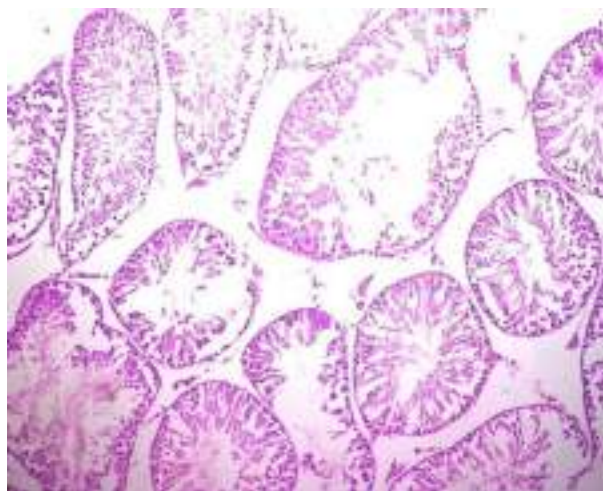
## RESULTS

**Table No.2: Parameters**

Parameters	Group A	Group B	Group C	P-value#
Weight of paired testis (g)	3.35 ± 0.19	2.96 ± 0.16	3.26 ± 0.15	< 0.001*
Height of germinal epithelium (µm)	139.7 ± 10.1	91.3 ± 19.91	21.4 ± 20.0	< 0.001*
Number of seminiferous tubules per field	20.6 ± 2.6	14.4 ± 3.4	20.4 ± 2.1	< 0.001*



**Figure No. 2: Photomicrograph of testicular section from control group A. H&E stain X.100.**



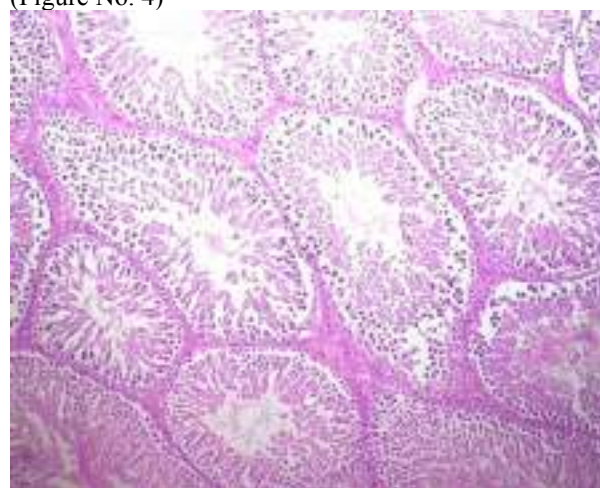
**Figure No. 3: Photomicrograph of group B showing damaged effects of BPA on testicular architecture with reduced germinal epithelium**

### height and decreased number of seminiferous tubules. H& E stain. 100X

**Weight of Paired Testis:** The weight of both testis in all groups was measured. Paired testicular weight of groups A, B and C were in range of 3.16-3.542g, 2.60-3.321.g and 3.0-3.43g respectively. It was found that there was significant difference in the mean weight of both testis among groups (p-value < 0.001) (Data Table No. 2).

**Height of germinal epithelium:** Height of germinal epithelium in groups A, B and C was found to be significantly different among groups (p-value < 0.001) (Data Table No. 2) (Figure No. 3 & Figure No. 4).

**Number of Seminiferous Tubules per field:** It was found that the average number of seminiferous tubules per field were significantly reduced in Group B (p-value < 0.0001) (Fig. 3). While in that of Group C it was near the control group A (Data Table No. 2) (Figure No. 4)



**Fig 4. Photomicrograph of Group C showing protective effects of extract of pumpkin seeds (Cucurbita pepo) on testicular architecture. Height of germinal epithelium and Number of seminiferous tubules is near control group A. H & E stain. 100X**

## DISCUSSION

Decrease in paired testicular weight of rats treated with BPA may be attributable to reduced food intake by rats due to BPA induced biochemical changes as documented by Samova et al. (2018).<sup>13</sup> BPA exposure also decreases protein content of testis thus reducing the testicular volume and mass which might be due to reduced availability of sex hormones which are responsible for growth of sex organs.<sup>14</sup> Present work has concluded that administration of BPA to rats in experimental group B has shown a reduction in height of germinal epithelium comparable to the control group A (p value < 0.001). Jahan et al. (2016) reported marked atrophy of seminiferous tubules with loss of elongated sperms.<sup>15</sup> It was in line with the studies reporting reduced germinal epithelial height because of oxidative

stress induced by BPA.16 Alboghobeish et al.(2019) also proved that treating testicular tissue with 50mg/kg of BPA reduces height of germinal epithelium by decreasing secretion of sex hormones and by its anti androgenic effect.<sup>14</sup> The results of group C revealed improvement in height of epithelial lining of seminiferous tubules which is due to anti oxidants present in pumpkin seed extract, that reduces lipid peroxidation of membranes and protects them from oxidative radicals.<sup>17</sup> Current study showed that number of seminiferous tubules per field were reduced in BPA treated group B due to chronic oxidative damage which was significantly improved by pumpkin seeds extract treated group C by anti oxidant role of phenolic compounds present in cucurbita pepo seeds.

## CONCLUSION

From the aforementioned results, it is clear that pumpkin seeds have maintained testicular architecture, reduced degeneration of germinal epithelium by acting as anti oxidant, hence counter-balancing the BPA induced oxidative stress.

### Author's Contribution:

Concept & Design of Study: Uzma Batool  
 Drafting: Qurat ul Ain, Godfrey Paul William  
 Data Analysis: Shumaila Sohail, Hamna Umer, Fatima Jawad.  
 Revisiting Critically: Uzma Batool, Qurat ul Ain  
 Final Approval of version: Uzma Batool

**Conflict of Interest:** The study has no conflict of interest to declare by any author.

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# Predicting the Unpredictable: Hematological and Biochemical Parameters as Predictive Markers of Dengue Severity in Patients without Warning Sign

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## ABSTRACT

**Objective:** To evaluate the biochemical and hematological alterations in patients having Dengue without Warning Signs (DWWS) for predicting the severity of disease

**Study Design:** Observational Case Control study

**Place and Duration of Study:** This study was conducted at the Clinical Pathology Department of Jinnah Post Graduate Medical Center (JPMC), Karachi, from November 2022 to February 2023.

**Materials and Methods:** The study encompassed 200 participants, presented at the medical and surgical OPDs, suspected for DWWS. These fulfilled the inclusion criteria (acute febrile illness, generalized rash on the body, vomiting, retro-orbital pain, and arthralgia/myalgia. Febrile illness regarded as body temperature above 38.40 Fahrenheit). On the basis of positive NS I or IgM or both patients were assigned to DWWS group (100 individuals) where as those with negative test results, to the control group. Blood samples were collected, from both groups, for the assessment of hematological and biochemical parameters. The data organization and analysis was performed using SPSS software version 20.

**Results:** Out of the 200 participants with febrile presentation, those positive for DENV exhibited an elevated mean hematocrit ( $49.06 \pm 3.89$ ) and a low platelet count ( $73.64 \pm 28.86$ ). Biochemical alterations in the DWWS group included significantly elevated levels of mean GGT ( $49. \pm 49.42$ ), Serum ferritin ( $251.79 \pm 472.79$ ), hsCRP ( $11.73 \pm 20.39$ ) & serum triglycerides ( $230.60 \pm 275.51$ ), where serum cholesterol ( $124.30 \pm 59.85$ ), Vitamin D levels ( $14.241 \pm 7.11$ ) were significantly low in this group compared to the controls.

**Conclusion:** This study indicated the potential role of different biochemical and hematological parameters as Predictive markers for severity of dengue.

**Key Words:** Dengue Without Warning Signs, Vitamin D, Ferritin, Hematocrit, Thrombocytopenia

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## INTRODUCTION

Due to its high morbidity and mortality rate, Dengue is considered one of the most critical and widespread arthropod borne viral disease affecting humans.

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It can be caused by any of the 4 distinct serotypes of Dengue Virus (DENV) and is transmitted primarily by *Aedes aegypti* mosquito bite<sup>6</sup>. Dengue affects approximately 100 million individuals in endemic regions every year<sup>1,2</sup>. The mortality rate for dengue globally is really low, but it may rise up to 20% without prompt care<sup>3</sup>. Clinical manifestations of DENV infection can vary widely, ranging from asymptomatic to patients exhibiting a variety of symptoms. WHO has classified symptomatic DENV infections into 2 main groups on the basis of types and severity of symptoms; Dengue Fever (with/without warning signs) and Severe Dengue (SD). During the initial phase, the disease is termed Dengue Fever (DF) and is characterized by fever accompanied by  $\geq 2$  symptoms of the following: body ache, nausea, vomiting, rash, retro-orbital pain, leucopenia<sup>7</sup>. Some patients may develop potentially

fatal Severe Dengue (SD) indicated by plasma leakage, hemorrhaging and shock.

Warning signs indicating progression towards several dengue include: hepatomegaly, hematemesis, hematochezia, fatigue, vomiting persistently, fluid accumulation in pleural space &/or abdomen, restlessness, buccal mucosal bleeding<sup>4,5</sup>.

Due to delayed presentation of warning signs and lack of specific antiviral therapy, SD dengue may result in fatal outcomes. Only timely diagnosis and proper management can lower the mortality rate and disease severity<sup>5, 12</sup>. Identification of biomarkers which help in proper diagnosis & risk factors, that help envision the severity of disease in the early stage of infection are the need of the hour<sup>5</sup>. Serological tests like detecting dengue NS1 Antigen or the dengue IgM antibody using ELISA, are the diagnostic tools for definite diagnosis. But they are expensive & unavailable in many hospitals<sup>15</sup>.

Alterations in hematological parameters is observed during the course of infection, including initial mild leukocytosis followed by progressive leucopenia, thrombocytopenia & an increased hematocrit; indicator of vascular leakage and atypical lymphocytosis. These dynamic variables can be used for diagnosis & assessment clinical outcomes, early in the infection<sup>11,12</sup>. Additionally many biochemical changes can be utilized as a Prognostic biomarker for the DENV infection. These include change in concentration of liver enzymes and serum albumin.

Studies have claimed that hyperferritinemia can be used as a predictive biomarker for development of severe dengue<sup>7,8,9</sup>. Increased ferritin levels are an indicator of active disease state, characterized by an overly active immune system and failure of coagulation mechanisms. Nutritional status of the patient could also be an indicator of the severe outcomes of the infection. Other than its role in bone health, vitamin D also functions as an immunomodulator, having a role in macrophage maturation and phagocytosis, and aiding in the synthesis of pro-inflammatory cytokines and cell-mediated immunity<sup>13</sup>. Many studies have investigated the correlation between vitamin D levels and dengue fever, with results indicating the association between vitamin D deficiency and progression towards severe dengue<sup>14</sup>.

This study aimed to assess the above mentioned biochemical and hematological parameters in patients having dengue without warning signs (DWWS) to predict the severity of disease.

## MATERIALS AND METHODS

This observational case control study was conducted at the Clinical Pathology Department of Jinnah Post Graduate Medical Center (JPMC), Karachi, during November 2022 to February 2023, throughout the

recent dengue outbreak in the city. Our study population comprised of 200 individuals presented at Medical and surgical OPDs with suspect of Dengue without Warning Signs. The inclusion criteria were patients with acute febrile illness, generalized rash on the body, vomiting, retro-orbital pain, and arthralgia/myalgia. Febrile illness regarded as body temperature above 38.40 Fahrenheit suspected to acquire dengue virus infection. Febrile patients presented to OPD with other diagnosed cases of typhoid, malaria, and chronic disorders like tuberculosis were excluded from the study population.

Pre-designed questionnaire was used to collect the information regarding baseline characteristics of all study participants.

Samples were assessed for Dengue virus by performing Immunochromatographic assays. To summarize the diagnostic protocol employed in the analysis included IgM enzyme-linked immunosorbent assay (ELISA) in matched sera (Dengue NS1 Rapid Test Cassette- Citest) and NS1 antigen detection (Dengue NS1 Rapid Test Cassette- Citest), for confirmation of DENV infection.

Based on the results patients with acute febrile illness, generalized rash on the body, vomiting, retro-orbital pain, arthralgia/myalgias, amid non-structural protein-1 (NS 1) antigen or Immunoglobulin M ( Ig M antibody ) detected positive were categorized as cases of dengue without warning signs whereas equal number of individuals with febrile presentation but NS1 antigen, or Ig M antibody found negative were considered as control group.

For assessment of biochemical variables 5 ml of whole blood was collected in lithium heparin containing vacutainers (green top). The samples were centrifuged and serum was separated for assessment of biochemical variables. Serum Ferritin and Vitamin D levels were measured through a chemiluminescence assay on LIAISON<sup>®</sup> XS – DiaSorin automated immunoassays analyzer. Valuation of Lipid profile (Serum triglycerides, serum cholesterol, serum LDL & serum HDL), Liver Enzymes (Alanine aminotransferases, Aspartate aminotransferases) & hs C reactive protein (hsCRP) was conducted on an automated clinical chemistry analyzer, (Beckman coulter AU 5800), half an hour after sample collection.

Whereas 5 ml of samples were collected in EDTA containing vacutainer (purple top) for investigation of hematological variables (total leucocyte count, differential leucocyte count, hemoglobin, platelet count and hematocrit). These samples were mixed thoroughly on roller mixer and analyzed within half hour of collection using SYSMEX XN 1000<sup>™</sup> Hematology Analyzer.

Reference ranges applied in JPMC clinical lab were referred to draw cutoff values of each hematological and biochemical parameter

Data analysis was done using the Statistical package for the Social Sciences (SPSS) Version 20. Continuous variables were summarized using mean and standard deviation (SD) and categorical variables as frequencies and percentages. A two tailed probability value of <0.05 (95% CI) was accepted at the level of statistical significance. Independent sample t test and paired sample t test were applied to compare the biochemical and hematological parameters between cases and control groups respectively.

**RESULTS**

This study encompassed a total of 200 individuals, which were recruited based on presentation of febrile illness. These were categorized into two groups on the basis of serological confirmation for dengue. Patients with positive IgM, NS1, IgG, or two of these or all three, were assigned to the Dengue without warning signs group where as those with negative serologic results were assigned to the control group. Baseline characteristics of both groups are mentioned in Table 1. Infection was more prevalent in the younger age groups (26-45 years) and the female gender. A higher incidence of fever, myalgias, arthralgias and retro-orbital pain was observed in the dengue fever group.

Table No.1: Baseline Characteristics of dengue and other Febrile illness. The results from the hematological profile (Table No.2), revealed a higher mean hematocrit value (49.06%, ± 3.89) and a significantly lower mean platelet count (73.64±28.86), absolute neutrophil count, lymphocyte count compared to the control group.

Moreover dengue group displayed elevated levels of mean serum ferritin (251.79 ±472.79) and hsCRP

(11.73±20.39), indicating increased inflammation (Table No. 3).

Major alterations in the lipid panel (Table 4) of the infected group were higher levels of mean serum triglycerides (230.60±275.51) and lower levels of serum cholesterol (124.30±59.85), serum LDL (132.24±31.66), and serum HDL (17.68 ±19.18).

A notable finding in the liver profile (Table 5) of the dengue group was significantly high GGT levels. Additionally vitamin D deficiency (VDD) was found in the dengue group.

**Table No. 1: Baseline Characteristics of the patients**

Clinical features	Dengue fever	Other Febrile illness
Fever	70	65
Myalgias	44	26
Arthralgias	58	31
Vomiting	07	11
Retro orbital pain	51	00
Rashes	10	00
Jaundice	00	18
Age distribution of the patients		
18 to 25 years	19	14
26 to 35 years	41	25
36 to 45 years	28	30
46 to 55 years	06	11
>55 years	12	20
Gender distribution of the patients		
Males	43	67
Females	57	33

**Table No. 2: Comparative analysis of hematological parameters in dengue and other febrile illness.**

Parameters	Dengue Mean (Standard deviation)	Febrile illness other than Dengue Mean (Standard deviation)	P value
Hemoglobin(g/dl)	15.76 (2.02)	12.99 (1.26)	0.001*
Hematocrit (%)	49.06 (3.89)	39.73 (3.82)	0.001*
Total leukocyte count /cumm	3.068 (1.006)	3.301 (1.123)	0.123*
Platelet count /cumm	73.64 (28.86)	03.70 3 (423.50)	0.001*
Absolute neutrophil count	4.96 (1.90)	6.14(1.14)	0.001*
Absolute lymphocyte count	1.72 (0.59)	3.30 (0.47)	0.001*

**Table No. 3: Comparative analysis of ancillary biochemical parameters between dengue and other febrile illness**

Parameter	Dengue Mean (Standard deviation)	Febrile illness other than Dengue Mean (Standard deviation)	P value
hs CRP	11.73(20.39)	7.06 (12.18 )	0.51
Serum Vitamin D	14.241 (7.11)	26.88 (21.05)	0.001
Serum Ferritin	251.79 (472.79)	73.97 ( 104.81)	0.01

**Table No.4: Comparative analysis of Lipid profile of dengue and other febrile illness**

Parameters	Dengue Mean (Standard deviation)	Febrile illness other than Dengue Mean (Standard deviation)	P value
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Serum Triglyceride	230.60 (275.51)	117.78 (46.81)	0.001*
Serum Cholesterol	124.30 (59.85)	167.06(38.63)	0.001*
Serum LDL	60.930(25.53)	132.24 (31.66)	0.001*
Serum HDL	17.68(19.18)	56.115(44.85)	0.001*

**Table No. 5: Comparative analysis of Liver Profile of dengue and other febrile illness**

Parameter	Dengue Mean (Standard deviation)	Febrile illness other than Dengue Mean (Standard deviation)	P value
Serum GGT	49. (49.42)	28.50 928.85)	0.001*
Serum AST	28.60 (31.89)	30.20 (33.62)	0.730
Serum ALT	82.75 (44.56)	85.200 (23.77)	0.630
Total bilirubin	0.497 (0.375)	0.473(0.195)	0.580
Direct bilirubin	0.215 (0.198)	0.250 (0.145)	0.154

## DISCUSSION

Dengue is a viral infection, which if not managed timely, has grave outcomes potentially resulting in fatality. Several tests aid in diagnosing the infection, but these cannot predict about disease progression towards severe dengue. The current study aimed to investigate the role various hematological and biochemical alterations during the earlier phase of infection in predicting the severity of disease.

This study revealed a predominance of females, constituting 57% of the study participants, whereas males accounted for 43 %contrary to another study<sup>11</sup> however majority of the published studies didn't show any significant differences in gender distribution<sup>16</sup>. In the present study younger age group showed higher incidence of infection. These results align with the outcomes of a previous study<sup>11</sup>. This might be the result of occupational and recreational exposure

A notable abnormality in the hematological profile was thrombocytopenia. A study reported occurrence of thrombocytopenia from the occurrence of symptoms and throughout the progression of disease in severe forms of infection<sup>18</sup>. There could be multiple mechanisms underlying this including damage inflicted to megakaryocytic precursors causing reduced platelets production, immune mediated peripheral destruction due to formation of immune complexes between viral antigens and preexisting antibodies, platelet aggregation and complement mediated lysis<sup>11</sup>. Another significant finding was a higher hematocrit in the infected group, most probably attributable to plasma leakage.

During infection, an acute phase response is triggered. This is accompanied by production of acute phase proteins, out of which "positive phase reactants increase in concentration whereas negative phase reactants decline. Serum ferritin and C Reactive protein (CRP) are positive phase reactants produced by hepatocytes in response to inflammation<sup>17</sup>. The current study revealed higher than normal levels of ferritin and hsCRP. This is supported by other published studies. Study conducted by M Nadeem et al. showed significant correlation between hyperferritinemia on the day of admission and development of severe dengue during the hospital stay<sup>15</sup>. Another study indicates the role of serum ferritin as an early diagnostic and prognostic

biomarker .Moreover; a large case control study demonstrated an association between increased hsCRP levels during the first 72 hours of infection and adverse clinical outcomes particularly in children<sup>17</sup>.

In this study, Patients infected with the virus have low Vitamin D levels compared to the group negative for infection. These results align with those obtained by Mario et al. in Mexico<sup>19</sup> & Fatima et al<sup>20</sup> in Pakistan. The potential correlation between vitamin D deficiency and development of dengue is neither a new nor a surprising phenomenon, given that there is evidence in literature about antiviral activity of vitamin D against a number of viral pathogens including Herpes, HIV & influenza. Furthermore studies have demonstrated connection between Vitamin D levels & disease progression, mortality rates, helper T cell counts and inflammatory responses in HIV infection<sup>21</sup>. The possible association between vitamin D levels and dengue was further supported by a study conducted by Giraldo et al. demonstrating that exposure of macrophages to high doses of vitamin D, resulted in development of increased resistance towards the virus by them development of increased resistance, towards DENV, in macrophages upon exposure to high doses of vitamin D<sup>22</sup>.

Hepatic involvement dengue can range from increased levels of liver enzymes without any symptoms of the disease to life threatening hepatic failure. In the present study significantly elevated GGT levels were found, however there was no significant difference in the levels of AST, ALT, ALP, direct bilirubin and total bilirubin, contrary to other studies<sup>9, 23</sup>. Dengue fever is also known to modify host's lipid metabolism. In this study, the alterations in lipid metabolism of the infected individuals included high serum triglycerides and low serum Cholesterol, LDL-C and HDL-C. These results were similar to those obtained by other researches<sup>9, 2</sup>. A viral organelle, composed of different type of lipids is synthesized in host's endoplasmic reticulum, called the replication complex and viral proteins facilitate the uptake of cholesterol by this complex, utilizing FASN and HMGCR. Consequently triglyceride levels are increased whereas cholesterol levels decrease. Hypolipidemia is considered an indicator for the severity of disease.<sup>9</sup>

## CONCLUSION

The results from the present study showed significant alterations in the biochemical and hematological profiles of patients infected with DENV compared to negative control group. These findings indicated the potential role of these parameters as prognostic markers to assess the development of severe dengue during early stages of the disease.

### Author's Contribution:

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**Conflict of Interest:** The study has no conflict of interest to declare by any author.

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# Influence of Body Mass Index (BMI) on Pulmonary Function Test Values Among Employees & Young People of Shaqra University

BMI on Pulmonary Function Test Values Among Employees & Young

Ghulam Mustafa<sup>1</sup> and Himayat Ullah<sup>2</sup>

## ABSTRACT

**Objective:** To assess the influence of BMI on the pulmonary functions of the employees and young people of Shaqra University, Shaqra.

**Study Design:** cross-sectional survey study

**Place and Duration of Study:** This study was conducted at the Department of Medicine, Colleges of Medicine, Shaqra University (SU), in Riyadh, Saudi Arabia, from September 2022 to February 2023.

**Materials and Methods:** A specified questionnaire assessed the medical history of the participants followed by spirometry according to the American Thoracic Society. ANOVA with Tukey's post hoc test was used to assess any difference in BMI and lung metrics between various groups, and Spearman's correlation coefficient was used to determine any relationship between BMI and lung metrics. A p-value of 0.05 was considered significant.

**Results:** Two hundred and twenty-nine (77.0%), 35 (12.0%), and 33 (11.0%) of the 297 participants were Saudis, South Asians, and Africans, respectively. Their mean age was 31.3± 10.2 years. Analyzing the effect of BMI on spirometry values showed that there is a significant negative correlation between BMI categories and the lung function parameters (FEV1, FVC, FEV6, FEF25-75%) except for FEV1/FVC and FEF25-75%/FVC.

**Conclusion:** The BMI is inversely related to lung function parameters and it entails to curtail the curse of obesity in our populations.

**Key Words:** Body mass index, lung function parameters, spirometry, obesity, healthy adults.

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## INTRODUCTION

Obesity is a major public health concern its prevalence, measured by body mass index (BMI) has increased in the past four decades<sup>1</sup>. The situation is very alarming In Saudi Arabia where almost 60% population is affected (20.2 % & 38.2% of people are classed as obese (BMI > 30) and overweight (BMI over 25), respectively)<sup>2</sup>. High BMI is associated with the risk of developing a broad set of comorbidities, termed obesity-related complications (ORCs), which can affect all organ systems<sup>3</sup>.

ORCs include cardiovascular disease (CVD); respiratory conditions, including asthma and obstructive sleep apnoea; and disorders affecting mobility, such as

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osteoarthritis and pain<sup>3</sup>. Increasing BMI class is closely linked to both the risks of experiencing particular ORCs and the costs associated with treating these conditions<sup>4</sup>. Excessive weight gain has various adverse effects on the body, including reducing compliance in the respiratory system, with the lungs being the most affected anatomical structures<sup>5</sup>. This is largely due to a decrease in lung volumes that mainly results in a restrictive type of ventilatory defect. It is important to note that the compression of the thoracic cage by excessive fat and increased pooling of blood in the pulmonary vasculature both contribute to a decrease in respiratory compliance<sup>6</sup>. Previous research has shown a link between BMI and lung function, with higher BMI being associated with lower dynamic lung volumes like forced vital capacity (FVC) and forced expiratory volume in the first second (FEV1)<sup>7</sup>. The effects of obesity on pulmonary function tests (PFT) among healthy adults working in the office environment in Saudi Arabia have not been adequately addressed. As obesity is a growing concern in Saudi Arabia, it is crucial to understand how it affects spirometry tests,

which are considered the initial screening tool for pulmonary diseases. Therefore, research into the relationship between obesity and lung function is needed for understanding how excessive weight gain affects the respiratory system<sup>8</sup>. These studies provide insightful information on how to prevent respiratory complications related to obesity and improve the quality of life of those affected. This knowledge can be used to develop new treatment guidelines, screening tools, and novel interventions to combat the respiratory problems associated with obesity.

Our study, which is limited to spirometry testing, aims to investigate the relationship of BMI with pulmonary functions to ascertain the impact of obesity on the respiratory system among office workers and students in the university environment, where the general lifestyle is sedentary.

## MATERIALS AND METHODS

This study was conducted from September 2022 to February 2023, using a cross-sectional design with a random convenient sampling technique. The study population included workers, residents, and students from various departments at Shaqra University, Shaqra. Exclusion criteria were patients with respiratory symptoms in the last 4 weeks before testing, patients with acute or chronic cough/wheezing, cardiac disease, abdominal or nasal surgery, and patients who were unable to perform spirometric tests. The minimum sample size required for this study was 195, calculated using a universally accepted sample size calculator RAOSOFT, with a confidence interval of 95%, a margin of error of 5%, and a guesstimate of 15% of abnormal pulmonary function tests in the population. (Size Calculator 2020 [Http://Www.Raosoft.Com/Samplesize.Html]).

Participants were contacted at their workplaces, and verbal consent was obtained after explaining the procedure to be performed. The study team interviewed the participants using a standard questionnaire modified from previous studies to obtain a medical history<sup>9</sup>. The spirometric test was performed by instructing the participants to take a full breath in, close the lips around the mouthpiece, and blow out as hard and fast as possible without any pause until the completion of expiration. The data not matching the acceptability and reproducibility criteria of the American Thoracic Society (ATS) guidelines were excluded. All measurements were taken by the same team with a ndd

“Easy on-PC®” (nidd Medical Technologies Inc., Andover, MA) using disposable mouthpieces. The participants were categorized on the basis of body mass index (BMI) into 6 categories (as by WHO) namely, under-weight (< 18), normal (18 – 25), over-weight (25.01 – 30), grade 1 obese (30.01 – 35), grade 2 obese (35.01 – 40) and grade 3 obese (> 40) to see its association with the lung function parameters.

The data were extracted from the nidd software into the Microsoft Excel program for Windows 11 and were double-checked to discard any inaccuracies. SPSS version 27.0 for Windows (SPSS, Inc., Chicago, IL, USA) was used for analyzing the data. Before analysis, a Shapiro-Wilk test was conducted to determine normality. ANOVA with Tukey’s post hoc test was used to assess any difference in BMI and lung metrics between various groups, and Spearman’s correlation coefficient was used to determine any relationship between BMI and lung metrics. The significance level was set at a p-value of <0.05.

The research protocol underwent a thorough review by the Local Committee on Bioethics at Shaqra University, ensuring that all ethical issues and concerns were taken into consideration. The committee granted approval as indicated by the reference number ERC\_SU\_20230028, on 16 May 2023. The researchers adhered strictly to both local and international guidelines on research ethics and respected the rights and welfare of the participants.

## RESULTS

Two hundred and seventy-seven (277) participants from three different ethnicities were included in this study, namely 209 Asian (Saudi-75.2%), 35 South Asian (Pakistani, Indian, Bangladeshi-12.6%) and 33 African (Sudani, Egyptian-11.9%). The age range was 17-60 years with a mean of 31.7±10.17 years. The distribution of the participants according to BMI categories is shown in Table No. 1. While comparing these ethnic groups according to BMI, there was no significant difference among them on the pairwise comparison (Post hoc Tukey’s test) that can cause bias (Table No. 2). Analyzing the effect of BMI on spirometry values showed that there is a significant negative correlation between BMI categories and the lung function parameters (FEV1, FVC, FEV6, FEF25-75%) except for FEV1/FVC and FEF25-75%/FVC (Table No. 3).

**Table No. 1: BMI Distribution**

BMI	Frequency	Percentage	Mean	Standard Deviation
< 18	16	5.8	16.7250	.93559
18 – 25	102	36.8	22.3245	2.09783
25.01 – 30	94	33.9	27.4223	1.36067
30.01 – 35	43	15.5	32.2070	1.38708
35.01 – 40	13	4.7	36.9615	1.47679

> 40	9	3.2	46.2778	5.13512
Total	277	100	26.7303	6.21588

**Table No. 2: Pairwise Comparison of BMI in Different Ethnic Groups**

(I) Ethnicity		Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval for Difference	
					Lower Bound	Upper Bound
African	Saudis	1.291	1.161	.267	-.995	3.577
	S. Asian	-.564	1.504	.708	-3.525	2.397
Saudis	African	-1.291	1.161	.267	-3.577	.995
	S. Asian	-1.855	1.132	.102	-4.084	.374
S. Asian	African	.564	1.504	.708	-2.397	3.525
	Saudis	1.855	1.132	.102	-.374	4.084

**Table No. 3: Mean Spirometry Values According to BMI**

BMI Values	< 18	18-25	25.01-30	30.01-35	35.01-40	> 40	R Value	P. value
<b>FEV1</b>	2.87	2.8	2.51	2.45	2.33	2.8	-.135	.025
<b>Mean (SD)</b>	(.902)	(.889)	(.810)	(.905)	(.725)	(.982)		
<b>FVC</b>	3.75	3.66	3.37	3.24	3.24	3.48	-.160	.008
<b>Mean (SD)</b>	(.952)	(.823)	(.882)	(1.00)	(.643)	(.819)		
<b>FEV1/FVC</b>	.78	.77	.76 (.222)	.76 (.161)	.72	.79	-.031	.608
<b>Mean (SD)</b>	(.199)	(.196)			(.155)	(.155)		
<b>FEV6</b>	3.68	3.61	3.35	3.22	3.16	3.46	-.162	.007
<b>Mean (SD)</b>	(.98)	(.814)	(.933)	(1.01)	(.674)	(.822)		
<b>FEF25-75</b>	3.10	2.84	2.54	2.39	1.95	3.02	-.138	.021
<b>Mean (SD)</b>	(1.46)	(1.35)	(1.11)	(1.22)	(.769)	(1.39)		
<b>FEF25-75/FVC</b>	.863	.783	.787	.789	.594	.836	-.053	.385
<b>Mean (SD)</b>	(.472)	(.331)	(.348)	(.418)	(.196)	(.313)		

## DISCUSSION

Our study has engaged a population that has been untouched previously in Saudi Arabia. The correlation of BMI with lung function parameters has not been reported in Saudi Arabia except in one study by Al-Ghobain, many years ago<sup>10</sup>. But that study was limited to Riyadh city and included a mix of population from the city and hospital. Our study, on the other hand, is geographically in a rural area and has focused on the same type of profession i.e., university employees who have similar work habits. Quite interestingly, Al-Ghobain did not find any significant difference in spirometric values between the obese and the non-obese subjects. On the contrary, our study has shown a clear-cut significant difference in many spirometric parameters between various degrees of obesity.

During the same time period, Sohail et al. studied the dynamic lung function parameters in relation to BMI in the office workers of various Pakistani departments<sup>11</sup>. He also reported, like in our study, a significant negative linear association of lung function parameters with overweight and obese participants. Bhatti et al. from Pakistan evaluated the lung function parameters, in a rural population like ours, involving all weight ranges from underweight to normal and obese<sup>12</sup>. He also reported that increasing BMI has a significant

detrimental effect on spirometric values. Our population and results are quite in line with the above study.

A relatively large study from China, involving 770 participants also tried to explore the relation of BMI with the lung function parameter<sup>13</sup>. Their results are also in conformity with our results. They also concluded that BMI has a significant effect on lung function parameters but not all. A study conducted in Switzerland that involved over 2000 participants also tried to find a relation between age, BMI and spirometry values<sup>14</sup>. Their conclusion was the same as ours that spirometry values change significantly with these variables. An Italian study involving over 2000 participants came to the same conclusion as ours that an elevated BMI increases lung volumes but reduces airflow<sup>15</sup>. A large cross-sectional study was done to assess the association between underweight healthy adults (low BMI) and pulmonary functions in the Korean population where they involved 282,135 participants<sup>16</sup>. They demonstrated that there does exist a proportional relationship between pulmonary function values and the degree of BMI. These results also favor our study. Another large study involving 16,186 participants was carried out in the Guangzhou Biobank region of China where they assessed the pulmonary functions in people whose mean age was 61.4 ±

7.2 years<sup>17</sup>. They tried to see the association of BMI, waist circumference, waist-hip ratio, waist-height ratio and body fat percentage with the pulmonary function values. Their conclusion with this large study was that there is a significant inverse association between BMI and pulmonary function values. Another large study from a rural area of China on 8284 adults with an age range of 20-80 years described that obesity has a close relationship with lung function parameters<sup>18</sup>.

In a recent study from Shanghai that recruited 407 patients, it was found that obesity is likely to lead to the impairment of pulmonary function<sup>19</sup>. Another recent study from Saga university hospital reported that obesity leads to reduced pulmonary functions including FVC and FEV1<sup>20</sup>.

Our study has certain limitations like the sample size of the study being limited, and the study was conducted only in one specific location/profession. The study focused only on BMI as a factor, without examining other potential factors that can affect pulmonary functions. Additionally, the study did not control for other variables such as smoking habits, physical exercise, dietary habits or lifestyle choices that could have influenced pulmonary function test values.

## CONCLUSION

Our study indicates that there is a significant correlation between BMI and pulmonary function test values among employees and young people at Shaqra University. Higher BMI values were found to be associated with decreased lung function, particularly FEV1, FVC, FEV6 and FEF25-75%. These findings suggest that efforts to reduce obesity rates may lead to improvements in the respiratory health of our citizens. Further research may confirm these findings and identify potential mechanisms underlying the observed relationship between BMI and pulmonary function test values. Yet, this data is a useful point to start for future investigators.

### Author's Contribution:

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Data Analysis:	Himayat Ullah
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# Assessment of Placental Grading in Normal and Pregnancy Induced Hypertensive Mothers on Ultrasonography and Fetal Outcomes

Placental Grading  
in Normal and  
Pregnancy Induced  
Hypertensive

Sadaf Mushtaq<sup>1</sup>, Rukhsana Aziz<sup>4</sup>, Aasima Sharif<sup>2</sup> and Hamad Masood<sup>3</sup>

## ABSTRACT

**Objective:** To evaluate the placental grading on ultrasound to predict the fetal outcomes in pregnancy induced hypertensive mothers as well as normal mothers.

**Study Design:** cross-sectional analytical study

**Place and Duration of Study:** This study was conducted at the department of Obstetrics and Gynecology and Anatomy of Bahawal Victoria Hospital, Bahawalpur between December 2021 to September 2022.

**Materials and Methods:** All the pregnant women with gestational age at least 28 weeks visiting the Obstetrics and Gynaecology Outpatient department during study duration were included in the study. Data was entered and analyzed through SPSS version 25. P value <0.05 was considered statistically significant.

**Results:** The mean age of the study participants was 26.65±10.34 years. On ultrasound, 6.3%, 25.9%, 35.4% and 32.4% were fell in placental Grade-0, Grade-I, Grade-II and Grade-III maturity respectively. There was found statistically significant relationship placental maturity and gestational age of normal and pregnancy induced hypertensive mothers. There was statistically significant association (p=0.001) between placental maturity of normal mothers and mothers with pregnancy induced hypertension (PIH). Results presented with early maturation of placenta among hypertensive mothers. When a woman has high blood pressure, her placenta matures sooner. It was hospital based cross sectional study in which women who were visiting the hospital were included hence it is very difficult to generalize these findings for general population.

**Conclusion:** Ultrasonography predicted excellent picture for diagnosis of Grade-III placenta and it is more safe method than invasive procedures like amniocentesis.

**Key Words:** Fetal outcome, Ultrasonography, Placental grading, Hypertension.

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## INTRODUCTION

High risk pregnancy like pre-eclampsia increases the chances of intra-uterine growth retardation (IUGR). The fetoplacental component is the collective term for the foetus and placenta. For the foetus to create and develop normally in utero, the placenta's development, ripening, and transform must all occur as expected. As pregnancy progresses, grey scale sequential ultrasound evaluation can be used to record placenta morphological alterations.

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Being a foetal organ, it makes sense that the placenta would develop similarly to other foetal organ systems.

Placental deposition to some extent as the foetus gets closer to term is common, but speeded up placental ripening is linked to gestation high blood pressure, IUGR, and pregnancy complications in labour, each of which increase the likelihood of prenatal deaths.<sup>1,2</sup> McKenna et al (2005) affirmed that the presence of a level III placenta at 36 weeks gestation aids in the identification of high-risk pregnancies.<sup>3,4</sup>

It is also believed that diabetes and Rhesus incongruence are linked to unusual placental calcified, with these situations causing a postponement in placental ripening.<sup>5</sup> A substantial correlation between antenatal and postpartum period mortality and deferred placental progression was already found. A scientist first noted the correlation between rising gestational age and ultrasonographically perceptible placental

modifications, but afterward a team of researchers presented a classification model based on placenta looks.<sup>6</sup> Based on adjustments in the looks of the chorionic plate, placental substantiation, and basal overlay, they rated the placenta from 0 (immature) to III (mature). Grade 0: Chorionic plate–Placental substance that is straight and well characterized – Homogenous. Basal layer –No concentrations. Grade I: Chorionic plate – Subtle undulation, Placental substance–Area of dispersed echogenicity the base layer - No concentrations. Grade II: Chorionic plate – Indentation that extends into the placenta but not to the basal layer, Placental substance – Linear echogenic concentrations. Basal level–Basal Checkering. Grade III: Chorionic plate - Indentation that extends to the basal layer. Placental substance–Acoustic shadows are cast by sizable anomalous densities. Basal layer–Echogenic densities increase in size and density.

If there are possible issues during pregnancy that could harm the mother, the foetus, or both, that pregnancy is deemed highly dangerous. Age of the mother, illnesses like high blood pressure, diabetes, renal or cardiovascular disease, PE, healthy births, placenta previa, etc. is among the variables that make a pregnancy significant risk. The assessment of foetal gestational sophistication using USG is noninvasive. Grannum and colleagues discovered a strong link between foetal lung ripening as assessed by the lecithin/sphingomyelin (L/S) proportion and placental maturational modifications. A grade-III placenta and a fully grown L/S ratio were found to be 100% correlated, according to Ptucha and colleagues. The purpose of the current research was to determine the effectiveness of placental sonographic scoring in forecasting neonatal result in heightened hazard and regular pregnancy.

## MATERIALS AND METHODS

It was cross-sectional analytical study conducted at Bahawal Victoria Hospital, Bahawalpur between December 2021 to September 2022 at department of Obstetrics and Gynecology and Anatomy. All the pregnant women with singleton fetus with at least 28 weeks of gestation visiting the Obstetrics and Gynecology outpatient department during the study duration were included in the study. Data was collected by using a preformed questionnaire that included sociodemographic variables and study variables. The ultrasonography was done by the consultant Radiologist with at least five year experience after the postgraduate degree. Women patients with Pre-existing chronic hypertension or other significant medical conditions that may affect placental grading, Multiple gestations (e.g., twins, triplets) due to potential differences in placental development and inadequate ultrasound images or reports for accurate placental grading

assessment were excluded from the study. Data was analyzed through SPSS version 25. The frequency pregnancy induced hypertension among females was calculated. Cross tabulation was done according to gestational age and placental grading. Chi square test was applied to see statistically significant difference between the groups and p value <0.05 was considered statistically significant.

## RESULTS

Total, 1260 women with gestational age at least 28 weeks or greater were included in the study. The mean age of the study participants was 26.65±10.34 years. Out of total 1260, 92 (07.3%) were suffering from Pregnancy Induced Hypertension (PIH), and 1168 (92.7%) had normal pregnancies. The relationship between participant's gestational age and placental grading measured by ultrasonography showed that participants with gestational ages of 28 to 32 weeks, 33.1% had Grade-0 placenta, 41.6% had Grade-I, 7.2% had Grade-II, and 18.1% had Grade-III placental maturity. Placental maturity of Grade-0, I, II, and III was also observed in the gestation age category of 37 weeks or more by 0.9%, 2.7%, 28.5%, and 67.9% respectively.

The cross tabulation of placental grading in normal and mothers with PIH showed a non-significant difference sonographically ( $p=0.26$ ).

**Table No. 1: Distribution of respondents by pregnancy induced hypertension (PIH).**

Risk status	Respondents	
	Frequency	Percentage
Normal	1168	92.7%
PIH	92	07.5%
Total	1260	100.00

**Table No. 2: The relationship between participants' gestational age and placental grading as measured by USG.**

Gestational age in weeks	Placental Grading by USG								Total	
	Grade-0		Grade-I		Grade-II		Grade-III			
	No	%	No	%	No	%	No	%	No	%
28-32	55	33.1	69	41.6	12	7.2	30	18.1	166	13.2
33-37	18	2.9	239	38.1	301	48.0	69	11.0	627	49.8
>37	04	0.9	13	2.7	133	28.5	317	67.9	467	37.0
	77	6.1%	321	25.5%	446	35.4%	416	33.0%	1260	100

$\chi^2=124.40$ ,  $df= 06$ ,  $p<0.001$

**Table No.3: Placental maturity in normal and pregnancy induced hypertensive mothers (n=1268)**

Placental Maturity	Normal		Fetal outcome		Total	
			PIH			
	No.	%	No.	%	No.	%
Grade-0	73	06.3%	04	04.3%	77	6.1
Grade-I	303	25.9%	18	19.6%	321	25.5
Grade-II	414	35.4%	32	34.8%	446	35.4
Grade-III	378	32.4%	38	41.3%	416	33.0
Total	1168	100%	92	100%	1260	100.00

## DISCUSSION

The significance of detecting placental degree by ultrasound at various gestational ages in both low- and high-risk pregnancies was highlighted by this cross-sectional analytical research. Approximately 43% of those females were pregnant at high risk. They included 23.5% who had hypertension, 16% who had diabetes mellitus, and 3.5% who had IUGR. A 43% of participants reported having regular antenatal checkups, while 57% reported irregular antenatal visits. It was also discovered in this research that 58% of participants had been moderately anemic and 34% had been severely anemic. It shows that things have changed more favorably in Pakistan, which may be attributable to the country's expanding access to mother and baby medical care centers.

According to research, in a healthy pregnancy, 41.6% of the placenta is grade I at gestations of 28 to 32 weeks, 48.00% is grade II at gestations of 33 to 37 weeks. These findings are consistent with findings of other research studies.<sup>7,8</sup> Grade-II and grade-III placenta were discovered in high blood pressure and IUGR women who were pregnant at high risk at gestational ages of 28 to 32 weeks. Between the ages of 33 and 37 weeks, uteroplacental ischemia may be the cause of grade-II and grade-III placenta in APH cases. The childbirth would probably become complex with IUGR and Pre-eclampsia if the placenta emerged to be grade-I before 27 weeks, grade-II before 32 weeks, and grade-III before 34 weeks gestation.<sup>10-12</sup>

In the latest studies, it was also discovered that mothers with high blood pressure tended to have a premature placenta, while mothers with diabetes had a deferred placenta ( $p>0.05$ ), but these trends were not statically important.<sup>13-16</sup> The results of study are like those of other studies which demonstrated that placental maturation was deferred in Rhesus negative cases but speeded up in instances of hypertension, APH, and IUGR.<sup>17-21</sup> Despite the fact that this had been a cross-sectional research, the authors made an effort to provide a comprehensive vivid view of the sonographic placental grading and its connection to pregnancies

with high blood pressure. It was hospital based cross sectional study in which women who were visiting the hospital were included hence it is very difficult to generalize these findings for general population.

## CONCLUSION

Ultrasonography predicted excellent picture for diagnosis of Grade-III placenta and it is more safe method than invasive procedures like amniocentesis.

### Author's Contribution:

Concept & Design of Study: Sadaf Mushtaq  
 Drafting: Rukhsana Aziz, Aasima Sharif  
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 Final Approval of version: Sadaf Mushtaq

**Conflict of Interest:** The study has no conflict of interest to declare by any author.

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# Pattern of Recurrence in Locally Advanced Carcinoma Cervix Based on Platinum Sensitivity

Concept of  
Platinum  
Sensitivity in  
Cervical Cancer  
Women

Sarah Khan<sup>1</sup>, Shazia Rafiq<sup>2</sup> and Muhammad Sami Ullah<sup>3</sup>

## ABSTRACT

**Objective:** To validate the concept of platinum sensitivity in cervical cancer women and estimate its effect.

**Study Design:** Prospective study

**Place and Duration of Study:** This study was conducted at the Nishtar hospital Multan from May 2022 to April 2023.

**Materials and Methods:** A total of 60 patients diagnosed as IB2 and IVA proven histologically as squamous cell carcinoma or adenocarcinoma were enrolled. Platinum-based chemotherapy is a standard treatment for patients with advanced cervical cancer (ACC). Platinum drugs, such as cisplatin and carboplatin, are commonly used in combination with other chemotherapy agents to treat ACC.

**Results:** The mean age of the patients was 54.63±3.55 years. All the sixty patients were given chemotherapy with cisplatin-based regimens. Most of the patients 51.7% had <6 months of relapse, whereas, locoregional was the most common pattern of relapse, 73.3%. Most of the patients had loco-regional and <6 months of relapse time and 9 patients had distant relapse pattern and >18 months of relapse time, (p<0.001).

**Conclusion:** Platinum sensitivity concept can be applied to advanced cervical cancer patients, with evidence showing a significant role on survival of women after recurrence in women who were treated with platinum chemotherapy previously.

**Key Words:** Cervical cancer, Recurrence pattern, platinum sensitivity, Chemotherapy.

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## INTRODUCTION

Cervical cancer remains a significant public health issue worldwide. It is the fourth most common cancer globally, and in low- and middle-income countries (LMICs), it often ranks second after breast cancer in terms of prevalence<sup>1</sup>. In 2018, there were an estimated according to a report about 569,847 newly diagnosed women of cervical cancer in year of 2018 in the world. Additionally, cervical cancer caused approximately 311,365 deaths in the same year. These numbers highlight the substantial burden of this disease and its impact on affected individuals, families, and communities<sup>2</sup>. Among causes of cervical cancer human papillomavirus is leading cause with persistent infection.

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Several factors contribute to the higher incidence and mortality rates of cervical cancer in LMICs compared to high-income countries<sup>3</sup>. These factors include limited access to cervical cancer screening programs, lack of HPV vaccination programs, inadequate healthcare infrastructure, and limited resources for early detection, diagnosis, and treatment<sup>4</sup>.

Advanced cervical cancer (ACC) is typically classified as stage IB3 to IV according to the FIGO (International Federation of Gynecology and Obstetrics) staging system, as updated in 2019<sup>5</sup>. It comprises both locally advanced cervical cancer (LACC) in stages IB3 to IVA and initially metastatic cervical cancer in stage IVB. ACC accounts for approximately 40% of all cervical cancer cases at the time of diagnosis<sup>6</sup>.

Platinum sensitivity concept is indeed an important prognostic factor for ovarian cancer women. Platinum-based chemotherapy, such as carboplatin or cisplatin, is commonly used as a first-line treatment for ovarian cancer. The response to platinum-based chemotherapy can vary among patients, and the duration of response, or platinum sensitivity, has been recognized as a significant factor in predicting disease recurrence and overall survival<sup>7</sup>.

In the context of ovarian cancer, platinum sensitivity is typically classified into three categories: sensitive, resistant, and refractory. Platinum-sensitive refers to patients who have a relapse more than six months after completing their initial platinum-based chemotherapy<sup>8</sup>. Platinum-resistant indicates a relapse within six months of completing chemotherapy, while platinum-refractory implies that the cancer did not respond to platinum-based chemotherapy<sup>9</sup>.

## MATERIALS AND METHODS

Study was conducted at Nishtar Hospital, Multan in 1 year period from May 2022 to April 2023. Study was approved by hospital committee of ethics. All participated patients were asked for written inclusion consent. Women with IB2 and IVA proven histologically as squamous cell carcinoma or adenocarcinoma, intact renal parameters, ECOG 0-1, age limit 20-60 years and received platinum based chemotherapy as neo adjuvant or with radiation were included in the study. Patients with ECOG above 1 and 4B stage were excluded from study. Pre-operative work up like history taking, physical examination, paravaginal examination, biopsy and magnetic resonance imaging were done for all patients. Initial demographic data along with clinical, pathological and surgical data was recorded.

Management plan was made by multidisciplinary team of hospital according to INCa (French National Institute of Cancer Guidelines). Recurrence was labeled on physical examination with CT or MRI involvement. Sensitivity was reported as Platinum Resistant (PR): This category includes patients whose cancer recurred less than 6 months after completing platinum-based chemotherapy. These patients have a poor response to platinum therapy and are considered resistant to further treatment with platinum-based drugs. Partially Sensitive (PPS): Patients falling into this category experienced cancer recurrence between 6 and 11 months after completing platinum-based chemotherapy. They have a modest response to platinum therapy, indicating partial sensitivity to these drugs. Sensitive (PS): Patients classified as sensitive had their cancer recur between 12 and 18 months after the completion of platinum-based chemotherapy. They demonstrate a good response to platinum therapy and are considered sensitive to further treatment with these drugs. Very Sensitive (PVS): This category includes patients whose cancer recurred more than 18 months after completing platinum-based chemotherapy. They have an excellent response to platinum therapy and are considered very sensitive to these drugs.

Data was recorded in SPSS version 23 and analyzed for mean (SD) and frequency (percentages) for numerical and categorical data respectively. Significant p value was below 0.05.

## RESULTS

Sixty patients were included in this study. The mean age of the patients was  $54.63 \pm 3.55$  years. All the sixty patients were given chemotherapy with cisplatin-based regimens. Further, all the patients were given radiation. Brachytherapy was given to 52(86.7%) patients. (Table.No. 1).

Most of the patients 31 (51.7%) had <6 months of relapse, whereas, locoregional was the most common pattern of relapse, 44 (73.3%). (Table.No. 2).

Most of the patients had locoregional and <6 months of relapse time and 9 patients had distant relapse pattern and >18 months of relapse time, ( $p < 0.001$ ). (Table No. 3).

**Table No. 1: Demographic and previous treatment of the study patients**

Variable	Frequency	%	Mean±S.D
Age (years)			54.63±3.55
<b>Chemotherapy</b>			
Yes	60	100.0	
No	0	0.0	
<b>Radiation</b>			
Yes	60	100.0	
No	0	0.0	
<b>Brachytherapy</b>			
Yes	52	86.7	
No	8	13.3	

**Table No. 2: Relapse and its pattern of the study patients**

Variable	Frequency	Percentage
<b>Relapse</b>		
<6 months	31	51.7
6-18 months	9	15.0
>18 months	20	33.3
<b>Pattern of relapse</b>		
Locoregional	44	73.3
Nodal	7	11.7
Distant	9	15.0

**Table No.3: Association of pattern of relapse and relapse time**

Relapses months	Patterns of relapse			Total	P-value
	Locoregional	Nodal	Distant		
<6	31	0	0	31	<0.001
6-18	2	7	0	9	
>18	11	0	9	20	
<b>Total</b>	44	7	9	60	

## DISCUSSION

In this study recurrence was followed as per French National Institute of Cancer guidelines, similar approach was used by Takekuma et al<sup>10</sup> and classified patients into different categories based on the time interval between initial treatment and recurrence. These categories included patients with recurrence within 6 months, between 6 and 11 months, between 12 and 18 months, and beyond 18 months.

In this study most of the patients 51.7% had <6 months of relapse, whereas, locoregional was the most common pattern of relapse, 73.3%. Most of the patients had locoregional and <6 months of relapse time and 9 patients had distant relapse pattern and >18 months of relapse time, ( $p < 0.001$ ). Study conducted by de Foucher T et al<sup>11</sup> found that the recurrence rates for a certain condition differed significantly based on the time frame after the initial occurrence. Specifically, the study found that 52% of cases recurred in less than 6 months, 21.6% recurred between 6 and 17 months, and 14.6% recurred after 18 months or more.

In cases of recurrent disease platinum sensitivity is an important prognostic factor that was reported in numerous previous reports. But platinum sensitivity in terms of pattern of recurrence, prognostic factor survival rate and practical implication is not well reported specialty in cervical cancer patients<sup>12</sup>. In case of advanced disease of cervix, chemotherapy based on platinum and taxane has been considered gold standard. Furthermore, acquired and primary platinum resistance has been associated with poor survival and low probability response<sup>13</sup>.

Based on the research by Tanioka et al<sup>14</sup>, it has been shown that the time to recurrence of 12 months is a significant independent predictive factor of tumour response. Additionally, a 6-month progression-free interval (PFI) has been identified as an independent prognostic factor for overall survival (OS) in patients with recurrent CC.

According to a study conducted by Matoda et al<sup>15</sup>, a PFI of more than 24 months was the discriminating point between platinum-sensitive and platinum-resistant cervical cancer patients. This means that patients with a PFI of more than 24 months were considered platinum-sensitive, while those with a PFI of less than 24 months were considered platinum-resistant.

In this study locoregional recurrence was observed in 73.3% of patients, nodal recurrence was observed in 11.7% of patients and distant recurrence was seen in 15% women. Studies conducted by Quinn et al<sup>16</sup>, Scatchard et al<sup>17</sup> and Kitagawa et al<sup>18</sup> reported locoregional recurrence 22%–55%, distant recurrence 22%–75% and 2%–50% combined recurrence.

A retrospective study by Foucher et al<sup>11</sup> conducted on women with advanced cervical cancer found that platinum sensitivity status was a strong predictor of overall survival (OS) after recurrence. The impact of prior platinum exposure on response rates in patients with advanced cervical cancer was also studied. The study found that the response rate of cisplatin based therapy was upto 8% after mono-therapy, cisplatin and

topotecan combination shows 15% and paclitaxel shows 32%. The study by Tewari and Monk<sup>19</sup> reported 20% response rate with cisplatin mono-therapy, topotecan 39% and finally CT paclitaxel combination reported 37%.

## CONCLUSION

Platinum sensitivity concept can be applied to women with ACC, with evidence showing a significant impact on patient survival after recurrence among those previously treated with platinum chemotherapy. This is particularly relevant as most recurrences are not treatable with curative intent. Therefore, a history of platinum exposure can be a major indicator for predicting the effectiveness of second-line systemic treatments.

### Author's Contribution:

Concept & Design of Study:	Sarah Khan
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Data Analysis:	Muhammad Sami Ullah
Revisiting Critically:	Sarah Khan,
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**Conflict of Interest:** The study has no conflict of interest to declare by any author.

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# Incidence of Ectropion in Subciliary Versus Subtarsal Incisions

Ectropion in Subciliary Versus Subtarsal Incisions

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## ABSTRACT

**Objective:** To evaluate the frequency of ectropion associated with subciliary and subtarsal incisions for exposure of inferior orbital rim and orbital floor due to debatable results depicted by literature.

**Study Design:** Randomized controlled trial study

**Place and Duration of Study:** This study was conducted at the Tertiary Care Hospital from July 2011 to January 2015.

**Materials and Methods:** Sample size of study was 80 participants, divided in two groups (40 each). Group 1 participants were treated by subciliary incision and subtarsal incision was performed in group 2 participants. Procedures were by single surgeon and ectropion was evaluated at 1<sup>st</sup> and 6<sup>th</sup> week follow up appointment. Mean and standard deviation was calculated for age. Frequency and percentage was calculated for qualitative variables like gender and ectropion. Chi-square test was used for ectropion. P-value  $\leq 0.05$  was considered as significant.

**Results:** Incidence of ectropion with subciliary incision was 5%(n=2) and subtarsal was 0% (n=0) which was statistically insignificant (p-value > 0.05).

**Conclusion:** Subtarsal incision provides better esthetics as compared to subciliary incision in respect of ectropion.

**Key Words:** Ectropion, Subciliary incision, Subtarsal incision, Orbital fractures

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## INTRODUCTION

Orbital fractures are the most common among the mid-face fractures, however orbit rarely fractures in isolation.<sup>1</sup> Orbital injury is mostly associated with all Le Fort II and III fractures and those involving the naso-orbito-ethmoidal and zygomaticomaxillary complexes.<sup>1</sup> Orbit is bound by orbital roof and floor as well as medial and lateral walls.

The orbital floor, which forms the roof of the maxillary sinus, slopes upward towards the apex of this pyramid, approximately 44 to 55mm behind the orbital rim.

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Orbital floor and medial wall of the orbit, forms lateral wall of ethmoid sinus, are most frequently fractured bones because bone in these areas is relatively thin.<sup>2</sup> "Buckling" theory and "hydraulic" theory have been proposed for orbital "blow out" fractures of floor, in which orbital contents are displaced down in the maxillary sinus.<sup>3</sup> Literature is still open to discussion about management of orbital floor fractures, some indicating surgical repair when size of floor defect is >2 cm<sup>2</sup> or >50% of the surface measured on the computed tomography (CT) scan. Others suggest that diplopia existing beyond 7-10 days; entrapment of orbital tissue with limitation of globe motility; > 2mm of enophthalmos are also indications for surgery.<sup>4-7</sup> Most widely used approaches to gain access to the infraorbital rim and orbital floor are the transconjunctival and transcutaneous. Transcutaneous include subciliary, subtarsal and infraorbital.<sup>8</sup> Complications associated with all these approaches include varying frequencies of entropion, ectropion, lower eyelid avulsion, lower eyelid laceration, hematoma, chronic edema and unaesthetic scar, having greater frequency in some than others.<sup>9</sup> There is ongoing debate about the ideal surgical approach to access orbital floor and inferior orbital rim. The technique sensitive transconjunctival approach provides

excellent esthetic results but limits the ingress to infraorbital rim and orbital floor.<sup>10</sup> Among transcutaneous approaches, infraorbital incision is least technique sensitive and preferable in patients presenting with gross periorbital edema but it is not encouraged in terms of esthetics, also it provides limited access.<sup>11</sup> Both subciliary and subtarsal incisions fulfil the visualization needs of trauma surgery but differ in terms simplicity of technique, surgical time needed and esthetic results.<sup>12</sup> The ultimate choice of incision is finalized based on surgeon's preference and extent of required exposure.<sup>13</sup> Regardless of the type of opted incision for accessing the inferior orbital rim and orbital floor, lower eyelid malposition leading to ectropion and entropion is the most common complication ranging from 0-42%.<sup>14,15</sup> Ectropion, an outward turning of lower eyelid margin has been reported among transcutaneous approaches by various studies in contradictory frequencies. Ridgway et al stated ectropion percentage as 12.5% by subciliary and 2.7% by subtarsal incision.<sup>16</sup> Crosara et al reported incidence of ectropion with subciliary incision as 0% and subtarsal incision as 18%.<sup>17</sup> Whereas, Haghghat et al found ectropion in 17.6% of participants treated by subciliary incision and 0% treated by subtarsal<sup>18</sup> and Al-Moraissi et al witnessed no difference in incidence of ectropion between subtarsal and subciliary incision.<sup>8</sup> Thus, the rationale of this study is to find out the difference in frequency of ectropion between subtarsal and subciliary incision for the exposure of inferior orbital rim and orbital floor, due to the heterogeneity in literature about prevalence of ectropion. There is no local study done previously assessing frequency of ectropion. The results of this study will help to suggest better surgical approach for exposure of inferior orbital rim and orbital floor that provides excellent esthetics with lower frequency of ectropion.

## MATERIALS AND METHODS

This study is a randomized controlled trial conducted at tertiary care hospital between July 2011 till January 2015 after permission from institutional review boards of the research and ethics committee. Sample size of the study was 80, estimated using 95% confidence level 80% power of test with an expected frequency of subciliary type of incision 0% and subtarsal type of incision 18%. These 80 patients were allocated to two groups based on lottery method (40 in each group).

**Inclusion Criteria:** Patients of both genders aged between 18-45 years (older patients have increased laxity of skin and pose higher incidence of scar formation and ectropion)

1. Patients with facial fractures requiring exposure of inferior orbital rim and orbital floor.

**Exclusion Criteria:**

1. Patients with soft tissue laceration on zygomatic bone or infraorbital region
2. Gross edema of periorbital region on clinical examination
3. Comminuted fractures of orbital rim and floor on radiographic examination
4. Previous history of surgery in infraorbital region
5. Patients not giving consent

Written informed consent was taken from each patient according to Helsinki Declaration and demographic detail was recorded. Patients in group 1 were treated by subciliary incision and in group 2 patients, subtarsal incision was performed. Procedure was performed by the same surgeon. Subciliary incision was given 2mm and subtarsal incision was given 5-7mm below and parallel to the subciliary margin with the end tapering laterally in one of the skin creases along the lateral orbital rim. After fracture management closure was done in layers. Inner layers were closed by 4/0 vicryl. Subcuticle technique was used for closure of skin layer by 5/0 prolene. Ectropion was evaluated for its presence or absence on 1<sup>st</sup> and 6<sup>th</sup> week follow up visit. Data was entered and analyzed through Microsoft excel for Mac version 16.56 (2021 Microsoft). Mean and standard deviation was calculated for age. Frequency and percentage was calculated for qualitative variables like gender and ectropion. Chi-square test was used for ectropion, p-value  $\leq 0.05$  was considered as significant.

## RESULTS

In this study total 80 patients were included. These 80 patients were divided into two equal number of patients group. This study comprised of 73.7% male (n= 59) and 26.3% female (n= 21) with mean age of  $35.5 \pm 5.34$ . Table No. 1 and 2 show frequency of ectropion in both groups at 1<sup>st</sup> and 6<sup>th</sup> week respectively. Chi Square test for ectropion between two groups was statistically insignificant (p-value > 0.05).

**Table No. 1: Frequency and Percentage of Ectropion in Subciliary and Subtarsal at First Post-Operative Week**

		Ectropion		Total	p-value
		Present	Absent		
1 <sup>st</sup> Week	Subciliary Incision	2 (5%)	38(95%)	40	0.240
	Subtarsal Incision	0(0%)	40(100%)	40	
Total		2(2.5%)	78(97.5%)	80	
6 <sup>th</sup> Week	Subciliary Incision	2 (5%)	38(95%)	40	0.240
	Subtarsal Incision	0(0%)	40(100%)	40	

Total	2(2.5%)	78(97.5%)	80	
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## DISCUSSION

The main aim of this study was to find out the frequency of ectropion associated with subciliary and subtarsal incisions, because literature depicted diverse outcomes of comparison of these two incisions. This study will help to designate the right incision with minimal post-operative complications with better esthetic results and patient satisfaction. This study recruited 80 participants, divided in two groups of 40 participants each and comprised of 73.7% male (n= 59) and 26.3% female (n= 21) with mean age of 35.5 ± 11.34. Ectropion was evaluated at 1<sup>st</sup> and 6<sup>th</sup> weeks post-operatively after treatment by subciliary and subtarsal incision. It was found to be 5 % (n=2) with subciliary incision and 0% (n=0) with subtarsal incision, being statistically insignificant (p-value > 0.05). Contradictory to this study, Ridgway et al reported ectropion with subciliary and subtarsal incisions in 12.5% and 2.7 % of participants respectively.<sup>16</sup> Meta-analysis of 17 studies depicted ectropion in 14% of patients with subciliary incision and 3.8% with subtarsal incision.<sup>16</sup> Same meta-analysis reported cumulative ectropion incidence, regardless of type of incision, as 4.7%, whereas, in our study it was 2.5%.<sup>16</sup> Defying these finding, Crosara et al reported incidence of ectropion with subciliary incision as 0% and subtarsal incision as 18%.<sup>17</sup> Whereas, Haghghat et al found ectropion in 17.6% of participants treated by subciliary incision and 0% treated by subtarsal<sup>18</sup> and Al-Moraissi et al witnessed no difference in incidence of ectropion between subtarsal and subciliary incision.<sup>8</sup> The reason for low ectropion in our study could be multi-factorial. Firstly, in our study, stepped dissection was performed in all the patients. It involved skin only flap in the beginning of dissection and later, the flap included both skin and muscle below tarsus. This technique preserves the pre-tarsus orbicularis oculi fibers and thereby prevents vertical eyelid shortening, scleral show and ectropion.<sup>19</sup> Secondly, in the current study, suspensory frost suture was used intra-operatively in all the patients. Frost suture was passed just at the level of lower lid margin and pulled upwards without excessive tension. Concurring with Ramyadevi et al and Canga et al<sup>20,21</sup> we believed that frost suture reinforced superior traction of lower lid margin during dissection and lower eyelid adaptation to proper anatomic position after closure. However, contraindicating above opinion, Bartsich et al insisted on questionable efficacy of frost suture to prevent ectropion.<sup>22</sup> Other important measures observed in this study were gentle handling and retraction of adjacent

tissues, while avoiding wide dissection of periosteum. Adequate approximation of periosteum and closure with the resorbable suture. This is of outmost importance in adequate healing of bone and overlying soft tissues. Moreover, deep lateral dissection of orbicularis oculi muscle may result in distortion of pretarsal fibers as the tonus of this muscle important in the esthetically normal adaptation of eyelid after surgery. Any distortion will lead lead to ectropion and scleral show.

## CONCLUSION

Subtarsal incision can be favored over subciliary incision as a the first choice for the exposure of inferior orbital rim and orbital floor, as it provided higher post-operative esthetics with lesser frequency of ectropion.

### Author's Contribution:

Concept & Design of Study:	Saadia Manzar
Drafting:	Aqib Sohail, Muhammad Faisal Munir Muhammad Minam
Data Analysis:	Qureshi, Fareed ud Din Ahmad Chishti, Hafiz Muhammad Jawaad Manzoor
Revisiting Critically:	Saadia Manzar, Aqib Sohail
Final Approval of version:	Saadia Manzar

**Conflict of Interest:** The study has no conflict of interest to declare by any author.

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# Comparison of Local Steroid Injection and Carpal Tunnel Release in Carpal Tunnel Syndrome

Local Steroid Injection and Carpal Tunnel Release

Kashif Raza Khan, Asim Rasool, Majid Rashid, Haroon-ur-Rehman Gillani, Muhammad Umair and Ghulam Murtaza

## ABSTRACT

**Objective:** To compare the efficacy of local steroid injection (LSI) and carpal tunnel release (CTR) for the treatment of carpal tunnel syndrome (CTS).

**Study Design:** Randomized controlled trial study

**Place and Duration of Study:** This study was conducted at the Department of Orthopedics, Sahiwal Teaching Hospital, Sahiwal from May 2022 to November 2022.

**Materials and Methods:** A total of 112 patients of either gender, aged between 18 and 70 years, having symptoms of CTS for at least 3 months and a visual analogue scale (VAS) pain score of more than 4 were analyzed. Random allocations were done and in Group-A, patients were managed by LSI and Group-B patients by CTR. After 3 months, nocturnal paresthesia relief was assessed on the basis of VAS.

**Results:** In a total of 112 patient, 80 (71.4%) were female. The mean age was  $48.54 \pm 11.31$  years. The mean baseline VAS score in Group-A was  $6.09 \pm 1.240$  versus  $6.04 \pm .90$  in Group-B. Post-procedure VAS after 3 months in Group-A was  $2.29 \pm 1.00$  versus  $2.75 \pm 1.10$  in Group-B. The mean decrease in VAS in Group-A was  $3.80 \pm 1.38$  while in Group-B, it was  $3.29 \pm 1.35$  ( $p=0.047$ ). The efficacy of LSI group was found in 50 (89.3%) patients versus 40 (71.4%) with in CTR group ( $p=0.0174$ ).

**Conclusion:** Our study concluded that LSI was a better option than CTR in terms of decrease in the severity of symptoms at 3 months follow-up in the treatment of carpal tunnel syndrome.

**Key Words:** Carpal tunnel syndrome, Local steroid injection, carpal tunnel release.

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## INTRODUCTION

Carpal tunnel syndrome (CTS) is considered to be the commonest kind of entrapment neuropathy. CTS is caused by compression of the median nerve as it travels through the wrist's carpal tunnel, with paresthesia, pain, and numbness as its main manifestations.<sup>1</sup> In the USA, the incidence of CTS is estimated to be between 1-3 per 1000 persons.<sup>2</sup> In females, the prevalence of CTS is three fold to males and is more likely to affect the middle-aged population.<sup>3</sup> Among computer users and people doing physical labor, its frequency is higher. Numbness and pain in the hand, particularly in the thumb, index, middle, and radial half of the ring finger,

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are its clinical manifestations, which often get worse with sleep at night.<sup>4</sup> The treatment options for CTS vary from conservative to surgical interventions. There are a number of studies through which both conservative and surgical approaches have been established as a significant reliever of symptoms.<sup>5,6</sup> Multiple modalities are used commonly for the treatment of CTS.<sup>7,8</sup> Local steroid injection (LSI) management is known to be as simple that it can be carried out in clinical settings.<sup>7</sup> Its effectiveness has been in the reports but the time taken in achieving these benefit is vital and relapse frequency have been described. Carpal tunnel release (CTR) has been advocated by many researchers.<sup>8</sup> CTR is done either as open release or endoscopic release of the transverse carpal ligament, and both have been shown to be effective.

Among current treatment options, LSI and open CTR are two of the methods that are used most frequently to relieve the symptoms of CTS.<sup>9</sup> A study showed that more wrists in the injection group than in the surgery group attained a nocturnal paresthesia response judged by the visual analogue scale (VAS) at 3-month follow-up (94 vs 75% respectively;  $p=0.001$ ).<sup>10</sup> The major end

criterion was the proportion of wrists obtaining at least a 20% decrease in the VAS for nocturnal paresthesia because nocturnal symptoms, as compared to daytime pain or functional impairment, are more annoying for the patients. However, no consensus of opinion regarding the effectiveness of various modalities of treatment is available through the existing literature on CTS, therefore, rigorous studies are required to establish standard criteria for treatment.

We planned this study to assess the effectiveness of LSI and CTR for CTS at 3 months of follow-up and to find out which one of these two treatment modalities is better at reducing nocturnal paresthesia so that it may be advocated as the treatment of choice. This research was aimed to compare the efficacy of LSI and CTR for the treatment of CTS.

## MATERIALS AND METHODS

This randomized controlled trial was performed at the Department of Orthopedics, Sahiwal Teaching Hospital, Sahiwal from May 2022 to November 2022. A sample size of 112 (56 in each group), considering the anticipated success rate in the LSI group as 94%, the open CTR group as 75%,<sup>10</sup> level of significance as 5%, and the power of the study as 80%. Inclusion criteria were patients of either gender, aged between 18 and 70 years, having symptoms of CTS ( $\geq 3$  months) and a VAS of more than 4. Exclusion criteria were patients with thenar atrophy, a history of previous carpal tunnel release surgery or local injection for CTS, or suffering from inflammatory arthropathy. Patients with polyneuropathy, diabetes mellitus, hypothyroidism, or pregnancy were also excluded. CTS was clinically diagnosed on the basis of the presence of at least two typical signs and symptoms of CTS: i) intermittent pain and paresthesia in the hand; ii) shaking or flicking one's hand for relieving the symptoms; iii) sensory deficit in the thumb, index, and middle fingers of the hand; iv) a positive Phalen's test (reproducing pain and paresthesia by holding the wrist in a hyperflexed position for 60 seconds); and v) a positive Tinel's sign (tapping over the volar aspect of the wrist reproduces pain and paresthesia). The presence of numbness, tingling, or burning sensations in the hand occurring during the night (assessed by VAS) defines nocturnal paresthesia.

Detailed informed and written consents were obtained. Approval from institutional research board was acquired. At the time of enrolment, socio-demographic information was collected. A baseline assessment of the nocturnal paresthesia was recorded before the procedure, assessed by a visual analogue scale (VAS) (0 for no symptoms and 10 for most intense). The lottery method was used to form two groups, LSI and CTR. Patients in LSI group were treated with LSI. Local anesthesia was infiltrated, and corticosteroid injection (methylprednisolone 40 mg/ml) was given using a 27-g needle. Patients in CTR group were treated with an open CTR operation. Proper follow-up of the

patients was ensured by obtaining their phone numbers and addresses.

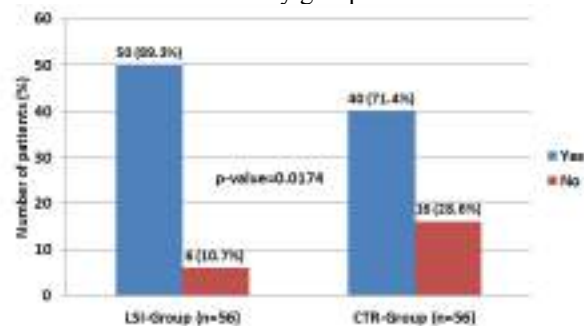
Steroid injection therapy consisted of 1 ml of 1% lidocaine solution and 1 ml suspension containing 40mg of methylprednisolone acetate. It was injected into the carpal tunnel. A 1.5 inch 27-g needle was used, and fluid was injected from proximal to distal through carpal tunnel. With the patient seated facing the operator, actively flex wrist with the thumb and little finger opposed to localize the palmaris longus tendon planned to inject at level of distal wrist crease medial (on ulnar side) of palmaris tendon. Among 15% of patients, same position with no palmaris tendon was carried out. To avoid any veins, orange needle was used which was inserted to the hilt at 60 degrees. We checked that it did not withdraw blood, and touch the median nerve inadvertently. Standard protocols were adopted for CTR.

Final outcome was measured at 3 months in both study groups and nocturnal paresthesia relief was assessed on the basis of VAS. The treatment was measured effective if the final decrease in VAS from baseline at 3-month follow-up visit was more than 2.

Data was analyzed using "Statistical Package for Social Sciences (SPSS)", version 26.0. Qualitative variables were shown as frequency and percentages. Quantitative variables were represented as mean and standard deviation (SD). Chi-square test was applied to compare the efficacy in both groups while VAS at different study points were compared using independent sample t-test. Effect modifiers like age, gender, and occupation were controlled by stratification. Post stratification chi-square test was also applied.  $P < 0.05$  was considered significant.

## RESULTS

In a total of 112 patients, the mean age was  $48.54 \pm 11.31$  years. There were 80 (71.4%) females. There were 35 (31.3%) patients who were housewives. Table-1 is showing comparison of baseline characteristics in both study groups.



**Figure No. 1: Comparison of Efficacy in Both Study Groups (N=112)**

The mean baseline VAS score in LSI group was  $6.09 \pm 1.24$  versus  $6.04 \pm 1.90$  in CTR group ( $p = 0.8281$ ). Patients in LSI group showed better decrease in VAS score after 3-months compared to patients in CTR group B ( $2.29 \pm 1.00$  vs.  $2.75 \pm 1.10$ ,  $p = 0.0224$ ). The

mean decrease in VAS in LSI group was also better when compared to CTR group (3.80±1.24 vs. 3.29±0.09, p=0.0027) as shown in table-2.

**Table No.1: Comparison of Baseline Characteristics (N=112)**

Characteristic s		LSI Group (n=56)	CTR Group (n=56)	P-value
Gender	Male	19 (33.9%)	13 (23.2%)	0.2095
	Female	37 (66.1%)	43 (76.8%)	
Age	18-40	16 (28.6%)	20 (35.7%)	0.4183
	41-70	40 (71.4%)	36 (64.3%)	
Occupation	Housewife	20 (35.7%)	15 (26.8%)	0.3822
	Manual worker	6 (10.7%)	14 (25.0%)	
	Executive	8 (14.3%)	8 (14.3%)	
	Farmer	12 (21.4%)	11 (19.6%)	
	Others	10 (17.9%)	8 (14.3%)	

**Table No.2: Comparison of Visual Analogue Scale in Both Study Groups (n=112)**

Parameter	LSI Group (n=56)	CTR Group (n=56)	P-value
Baseline VAS	6.09±1.24	6.04±1.19	0.8281
After-3 months VAS	2.29±1.00	2.75±1.10	0.0224
Decrease in VAS	3.80±1.24	3.29±0.09	0.0027

LSI group had significantly better efficacy compared to CTR group (89.3% vs. 71.4%, p=0.0174) as shown in figure No.1. Details of stratification of the efficacy between study groups based on various baseline characteristics are shown in Table No. 3.

**Table No.3: Comparison of Efficacy with respect to Baseline Characteristics in Both Study Groups (N=112)**

Characteristics	Groups	Efficacy		P-value
		Yes	No	
Male	LSI	18 (94.7%)	1 (5.3%)	0.051
	CTR	9 (69.2%)	4 (30.8%)	
Female	LSI	32 (86.5%)	5 (13.5%)	0.117
	CTR	31 (72.1%)	12 (27.9%)	
18-40	LSI	15 (93.8%)	1 (6.2%)	0.134
	CTR	15 (75.0%)	5 (25.0%)	
41-70	LSI	35 (87.5%)	5 (12.5%)	0.054

		CTR	25 (69.4%)	11 (30.6%)	
Housewife	LSI	18 (90.0%)	2 (10.0%)	0.014	
	CTR	8 (53.3%)	7 (46.7%)		
Manual worker	LSI	5 (83.3%)	1 (16.7%)	0.573	
	CTR	10 (71.4%)	4 (28.6%)		
Executive	LSI	7 (87.5%)	1 (12.5%)	0.522	
	CTR	6 (75.0%)	2 (25.0%)		
Farmer	LSI	12 (100%)	-	0.286	
	CTR	10 (90.9%)	1 (9.1%)		
Others	LSI	8 (80.0%)	2 (20.0%)	0.800	

## DISCUSSION

In this study, the mean age of the patients with CTS was 48.54±11.31 years while 67.9% were aged between 41-70 years. The occurrence rate of CTS is highest among the age group of 35–60 years,<sup>11</sup> so our findings are pretty consistent with the existing literature. The present study reported the female to male ratio among patients with CTS to be 2.5:1 while researchers in the past have shown that a clear female predominance exists in CTS.<sup>12,13</sup>

Our study revealed that the incidence of CTS was relatively higher in housewives who were doing house work by spending most of their time. Among males, its presence was more in laborers, sweepers, plumbers and those who frequently used vibratory tools. This study also revealed that CTS was quite prevalent in the farmers whereas those people who had executive jobs and used to sit on chair most of the time were relatively few. Most of the studies<sup>10,14,15</sup> analyzed risks of CTS by job title and found that various jobs had high prevalence rates because repetitive and forceful gripping were involved there. A positive association of CTS with work that required repetitive or forceful movements of the hands at a higher degree was concluded to be evident, and there was ‘strong evidence’ of a relationship with the combination of these exposures.

In one recent study done by Ly-Pen et al,<sup>10</sup> the effects of surgical decompression were compared between LSI and CTR approaches. After a follow up of 3 months, a 20% response for nocturnal paresthesia was achieved in 94.0% of the wrists in the LSI group against 75.0% in the CTR group, whereas in our study 89.3% and 71.4% had efficacy for LSI and CTR groups respectively (p=0.0174). Another research noted that while comparing LSI to placebo, LSI showed clinically improved symptoms of CTS after one month of its administration.<sup>16</sup> Moreover, against oral steroid too, it provided significantly greater clinical improvement. The study by Agarwal et al showed that 93.7% of



patients with LSI at 3 months follow up achieved considerable improvement in the symptoms.<sup>17</sup> Moreover, the distal motor and sensory latency at the wrist showed a significant improvement in their mean values at 3 months of follow-up. The study by Bland JD showed that the initial response rate to a single steroid injection is about 70% but relapse is common.<sup>18</sup> The literature is devoid of any significant amount of data regarding long term relapse rates. Moreover, not much endorsements are available regarding the need and timing of the 2<sup>nd</sup> or 3<sup>rd</sup> injection. By using the LSI, a considerable number of the patients still need a second injection or may eventually need surgery.<sup>19</sup> In majority of cases, surgery is likely to be definitive. Being a single center study conducted on a relatively small size and no long term outcomes noted were some of the limitations of this study.

## CONCLUSION

It is concluded that local steroid injection is better than carpal tunnel release surgery in terms of efficacy for the treatment of carpal tunnel syndrome. Local steroid injection gives significant short-term relief of symptoms to the patients at the follow-up of 3 months.

### Author's Contribution:

Concept & Design of Study:	Kashif Raza Khan
Drafting:	Asim Rasool, Majid Rashid
Data Analysis:	Haroon-ur-Rehman Gillani, Muhammad Umair, Ghulam Murtaza
Revisiting Critically:	Kashif Raza Khan, Asim Rasool
Final Approval of version:	Kashif Raza Khan

**Conflict of Interest:** The study has no conflict of interest to declare by any author.

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# Effect of Prophylactic Amiodarone Versus Dexmedetomidine on Reducing the Frequency of Postoperative Junctional Ectopic Tachycardia after Pediatric Open Heart Surgery

Prophylactic Amiodarone VS Dexmedetomidine on Reducing of Postoperative Tachycardia

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## ABSTRACT

**Objective:** To compare the effect of prophylactic amiodarone versus dexmedetomidine on reducing the frequency of post-surgical junctional ectopic tachycardia (JET) following pediatric open heart surgery.

**Study Design:** Randomized controlled trial study.

**Place and Duration of Study:** This study was conducted at the Pediatric Cardiology Intensive Care Unit (PCICU), National Institute of Cardiovascular Diseases, Karachi, Pakistan from May 2021 to April 2023.

**Materials and Methods:** Children of both genders aged between 1 to 12 years and planned to undergo cardiopulmonary bypass surgery were included. Children in amiodarone group (n=50) were given amiodarone at the time of induction of anaesthesia as 5-10 mcg per kg per minute (depending upon the hemodynamic) and continued for the next 48 hours. In the dexmedetomidine group (n=50), children were administered dexmedetomidine at the time of induction of anaesthesia as 0.2-0.5 mcg per kg per hour (depending upon the hemodynamics) and continued for the next 48 hours. The frequency of JET was noted.

**Results:** In a total of 100 children undergoing cardiopulmonary bypass surgery, 61 (61.0%) were boys while the mean age was 6.4±4.8 years. The mean cardiopulmonary bypass and aortic cross clamp time were 86.7±34.5 minutes and 45.9±24.1 minutes respectively. The most frequent types of CHDs were ventricular septal defect (VSD) and tetralogy of fallot (TOF) noted in 38 (38.0%) and 26 (26.0%) children respectively. Overall, frequency of JET was noted in 18 (18.0%) children. The frequency of JET was 5 (10.0%) children in amiodarone group versus 13 (26.0%) in the dexmedetomidine group (p=0.0373).

**Conclusion:** Post-surgical JET was found to be a common observation among children undergoing cardiopulmonary bypass surgery. Prophylactic amiodarone resulted in significantly less frequency of JET when compared to dexmedetomidine.

**Key Words:** Amiodaron, aortic clamp time, ventricular septal defect, dexmedetomidine, junctional ectopic tachycardia.

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## INTRODUCTION

Congenital heart defects (CHDs) are considered to an important public health issue globally.

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The estimated incidence of CHDs hover around 8 to 12 per 1,000 live-births.<sup>1,2</sup> Surgical interventions are generally required adopting general anesthesia for the correction of underlying congenital defects and may accompany few short-term and long-term complications inflicting stress upon the affected Individuals and their families.<sup>3,4</sup>

One of the common complications of pediatric cardiac surgery is junctional ectopic tachycardia (JET) which could be due to exaggerated automaticity of the

atrioventricular (AV) nodal tissues which is explained by AV dissociation but not often have a 1 to 1 retrograde ventriculo-atrial conduction.<sup>5</sup> The literature reports the frequency of JET following pediatric cardiac surgery for the correction of congenital cardiac defects ranging between 2-22%.<sup>6</sup> JET is linked with relatively higher rates of post-surgical hemodynamic variations and morbidity which warrants approach towards prevention of post-surgery JET among these cases.<sup>7</sup> Some of the important risk associated with post-surgical JET among pediatric population undergoing correction of underlying congenital cardiac defects are younger age, prolonged duration of cardiopulmonary bypass (CPB) and aortic cross clamp (ACC) time, higher inotropic scores, types of surgery and electrolyte imbalances.<sup>8,9</sup>

Multiple treatment options exist for the treatment of post-surgical JET but researchers have shown that amiodarone may help in prevention of post-surgical JET among children undergoing cardiac surgery.<sup>10</sup> Dexmedetomidine is commonly used as sedative and analgesia in pediatric intensive care units (PICUs) and is known to be a selective agonist on alpha-2 adrenoceptor helps in limiting its action on the central nervous system reducing unwanted cardiovascular adverse effects.<sup>11</sup> Sympatholytic actions of dexmedetomidine make it a drug beneficial in preventing post-surgical tachyarrhythmias but not much research is available. El Amrousy et al revealed that the frequency of JET was significantly less in dexmedetomidine cases (3.3%) when compared to placebo (16.7%).<sup>12</sup> A recent study showed that the frequency of JET was 8.5% in amiodarone group versus 14.2% in dexmedetomidine group ( $p=0.022$ ).<sup>13</sup>

No data exists regarding the frequency of JET following open heart surgery among children undergoing open heart surgery. This study was planned to compare the effect of prophylactic amiodarone versus dexmedetomidine on reducing the frequency of post-surgical JET following pediatric open heart surgery.

## MATERIALS AND METHODS

This randomized controlled trial was carried out at pediatric cardiology intensive care unit (PCICU), "National Institute of Cardiovascular Diseases, Karachi", Pakistan from May 2021 to April 2023. Approval from "Institutional Ethical Committee" was obtained. Written and informed consents were acquired from parents/caregivers of all children included in this study after explaining them the aims, procedures and drugs involved in this study. Taking frequency of JET as 3.3% following open heart surgery and prophylactic dexmedetomidine, with 95% confidence level and 5% margin of error, the sample size was calculated to be 50. Another 50 patients were enrolled in amiodarone, so the total sample considered for this study was 100 (50

in each group). Inclusion criteria were children of both genders aged between 1 to 12 years and planned to undergo cardiopulmonary bypass surgery. Children with atrial septal defect closure or Glenn shunt or those having pre-existing left ventricular dysfunction and arrhythmias were not included.

Socio-demographic and clinical characteristics of all children were noted. A 12-lead electrocardiogram was performed in all children prior to surgery to record as a baseline. Employing lottery method, children were randomized into either amiodarone group ( $n=50$ ) or dexmedetomidine group ( $n=50$ ). Children in amiodarone group were given amiodarone at the time of induction of anaesthesia as 5-10 mcg per kg per minute (depending upon the hemodynamic) and continued for the next 48 hours. In the dexmedetomidine group, children were administered dexmedetomidine at the time of induction of anaesthesia as 0.2-0.5 mcg per kg per hour (depending upon the hemodynamics) and continued for the next 48 hours. After the surgery, close monitoring and surveillance was done and electrocardiogram done whenever required. As a routine, a daily electrocardiogram was done in all children. In case a tachycardia was observed without an identifiable preceding P wave, atrial wire electrograms were frequency done to decipher the atrial depolarization. JET was labeled as a supraventricular tachycardia at a ventricular rate that exceeded the maximum normal sinus rate for the child's age, no preceding P wave or a retrograde P wave and ventricular rate that exceeded or equaled to atrial rate. In case, JET was detected, children were managed as per standard and institutional protocols.

Data analysis was performed using "Statistical Package for Social Sciences (SPSS)", version 26.0. Mean and standard deviation were used to represent quantitative data. Numbers and proportions were used to describe qualitative data. Chi-square test was used to compare the baseline characteristics and the frequency of JET in both study groups. Quantitative data were compared using independent sample t-test. P value below 0.05 was taken as significant.

## RESULTS

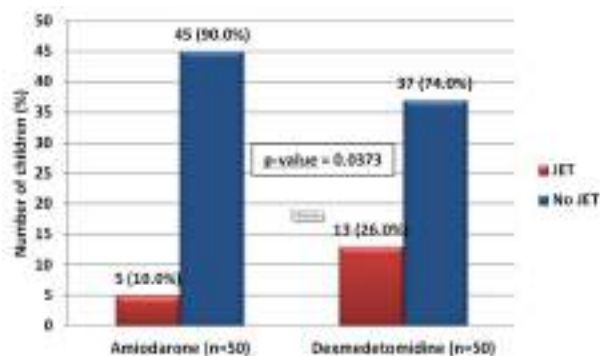
In a total of 100 children undergoing cardiopulmonary bypass surgery, 61 (61.0%) were boys and 39 (39.0%) girls. The mean age was  $6.4\pm 4.8$  years (ranging between (1 to 12 years). Residential status of 57 (57.0%) children was rural. Malnutrition was identified in 54 (54.0%) children. Electrolytes imbalances were noted in 80 (80.0%) children. The mean cardiopulmonary bypass and aortic cross clamp time were  $86.7\pm 34.5$  minutes and  $45.9\pm 24.1$  minutes respectively. The most frequent types of CHDs were ventricular septal defect (VSD) and tetralogy of fallot (TOF) noted in 38 (38.0%) and 26 (26.0%) children respectively. Table No. 1 is showing comparison of

demographic, clinical and intra-operative characteristics between both study groups.

**Table No. 1: Comparison of Demographic, Clinical and Intra-operative Characteristics (N=100)**

Characteristics		Amiodarone (n=50)	Dexmedetomidine (n=50)	P-value
Gender	Male	32 (64.0%)	29 (58.0%)	0.5385
	Female	18 (26.0%)	21 (42.0%)	
Age (years)	1-5	23 (46.0%)	21 (42.0%)	0.6870
	6-12	27 (54.0%)	29 (58.0%)	
Residence	Urban	23 (46.0%)	20 (40.0%)	0.5445
	Rural	27 (54.0%)	30 (60.0%)	
Malnutrition		26 (52.0%)	28 (56.0%)	0.6882
Electrolyte imbalance		39 (78.0%)	41 (82.0%)	0.6171
Down Syndrome		8 (16.0%)	6 (12.0%)	0.5644
Cardiopulmonary bypass time (minutes), Mean±SD		83.4±31.2	86.3±36.5	0.6703
Aortic Cross Clamp time (minutes), Mean±SD		46.5±22.8	44.7±25.6	0.7112

Overall, frequency of JET was noted in 18 (18.0%) children. The frequency of JET was 5 (10.0%) children in amiodarone group versus 13 (26.0%) in the dexmedetomidine group ( $p=0.0373$ ) as shown in figure No. 1.



**Figure-1: Frequency of junctional ectopic tachycardia among both study groups (N=100)**

## DISCUSSION

In the present study, 61.0% children undergoing cardiopulmonary bypass were boys. A study from Iran found that 53% children undergoing cardiac surgeries were male.<sup>14</sup> A study from the same center analyzing children who underwent open heart surgery revealed that 55.8% children were male.<sup>15</sup> The same study also found that the mean age at the time of surgery was  $7.9\pm 5.1$  years.<sup>15</sup> In the present study, the mean age of the children was  $6.4\pm 4.8$  years. The mean age of children in a study conducted in Iran was  $4.5\pm 4.9$  years.<sup>14</sup> A study from Indonesia revealed median age of children undergoing cardiac surgery was 36 months. Data from developed countries show that age of the children at the time of undergoing cardiac surgery involving cardiopulmonary bypass is much lesser when compared to data from our parts of the world.<sup>14-16</sup>

In this study, the most types of CHDs for which cardiopulmonary bypass surgeries were performed were VSD (38.0%) and TOF 26 (26.0%). Local data has established that VSD is the most frequency acyanotic heart lesion while TOF is known to be the more common cyanotic type heart lesion.<sup>13</sup> A study from India by Wadile S et al found that VSD and TOF were commonest types of heart lesions for which open heart surgeries were performed so our data is quite consistent with the regional and local findings.<sup>13,17</sup>

JET is considered to an important post-surgery arrhythmias and can cause major hemodynamic alterations that can affect outcomes. Talwar and colleagues revealed the frequency of post-surgical arrhythmias after cardiac surgery was 8% while JET was the most common type.<sup>18</sup> Another study from Turkey showed that overall incidence of arrhythmias was 9% while JET was the most common types of arrhythmias.<sup>19</sup> This study noted that the overall frequency of JET among children undergoing cardiopulmonary bypass surgery was 18%. A recent analysis of 5-year from lower to middle income countries calculated the frequency of arrhythmias among children undergoing cardiac surgery was 22.5% while JET was the commonest type noted among 64.9% of those cases. In this study, 10.0% children who were administered amiodarone developed JET versus 26.0% in the dexmedetomidine group. The frequency of JET was significantly more among children in dexmedetomidine group ( $p=0.0373$ ). El Amrousy et al revealed that the frequency of JET was significantly less in dexmedetomidine cases (3.3%) when compared to placebo (16.7%).<sup>12</sup> Recent study shared the frequency of JET as 8.5% in amiodarone versus 14.2% in dexmedetomidine groups ( $p=0.022$ ).<sup>13</sup> Not much data analyzing frequency of JET following prophylactic amiodarone and dexmedetomidine exist so further randomized trials can further shed light on whatever little comparative data is available.

Relatively small sample and a single center study site were some of the limitations of this research. We were unable to note the impact of JET on the outcomes of studied cases so further prospective trials are needed to further verify the findings of this study.

## CONCLUSION

Post-surgical JET was found to be a common observation among children undergoing cardiopulmonary bypass surgery. Prophylactic amiodarone resulted in significantly less frequency of JET when compared to dexmedetomidine.

### Author's Contribution:

Concept & Design of Study: Talal Arshad  
 Drafting: Ram Chand, Muhammad Asif Khan  
 Data Analysis: Rajab Ali Khokhar, Veena Kumari, Abdal Sattar Shaikh  
 Revisiting Critically: Talal Arshad, Ram Chand  
 Final Approval of version: Talal Arshad

**Conflict of Interest:** The study has no conflict of interest to declare by any author.

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# Relationship of Post-Operative Troponin I with Complications after CABG

Troponin I  
and  
Complication  
after CABG

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Abid Ali Somroo<sup>2</sup> and Hosh Muhammad<sup>1</sup>

## ABSTRACT

**Objective:** To determine the impact of serum level of Troponin-I on the outcome of elective coronary artery bypass surgery.

**Study Design:** Case control study

**Place and Duration of Study:** This study was conducted at the Department of Cardiac Surgery PAQSJ Institute of Medical Sciences from 1<sup>st</sup> July 2020 to 30<sup>th</sup> June 2021.

**Materials and Methods:** During the defined period 124 patients enrolled in our study divided in two groups based on serum Troponin levels collected preoperatively and 18 hours after surgery. The patients were divided into two groups, group 1 <10 ng/dl, and group 2, > 10ng/dl of Troponin-I. Both groups were statistically compared for outcome.

**Results:** There were 84 patients in group 1, 40 patients in group 2. Female gender and history of smoking showed significant difference among demographic characters between two groups. Intra-operative variable showed no significant differences in use of Internal memory artery usage for grafting, Aortic cross clamp time and duration of surgery, while there were significant increase in cardiopulmonary bypass time and number of grafts were observed in group 2. Post-operative variables showed no difference in LCOS, use of IABP, atrial fibrillation red blood and blood product use, ICU and ward stay and mortality. Nevertheless statistically significant differences were observed for reopening, prolong ventilations and re-intubation in group 2 with High Troponin-I levels.

**Conclusion:** Troponin levels were raised in all patients after CABG. Raised Troponin-I not related with complications including short term mortality. But the association of reopening for bleeding, prolong invasive ventilations and re-intubation is observed in patients with high Troponin-I levels. Further study is warranted.

**Key Words:** CABG (Coronary Artery Bypass Graft), Troponin I, LCOS( Low Cardiac output Syndrome), Bleeding

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## INTRODUCTION

Coronary artery bypass surgery is the commonest cardiac operation in the world<sup>1</sup>. At present in Pakistan about 21000 coronary artery bypass surgery performed per year<sup>2</sup>. Although coronary artery bypass grafting (CABG) is a surgery of choice for selected group of patients in need of myocardial reperfusion for survival or life style benefits. It may nonetheless be associated with perioperative myocardial damage and necrosis.

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CABG surgery is often considered a high-risk procedure, associated with a 30-day morbidity and mortality rate up to 14% and 1.3% with regional variability, respectively<sup>3</sup>. Despite of the improvement in surgical, anesthesia and perfusion techniques the complication still present after CABG<sup>4</sup>. Myocardial injury is prone to happen during the perioperative period due to patient factor as well intervention related factors<sup>5</sup>. It is not easy to classify the severity of myocardial injury after cardiac surgery, new ECG changes, raised cardiac enzymes level ;Troponin T, Troponin I and CKMB, angiographic evidences of graft occlusion, evidence of new loss of viable myocardium/newly diagnosed regional wall motion abnormalities are the available evidences for the severity of perioperative myocardial injury<sup>6</sup>.

Troponin I and Troponin T are used to consider as a standard test for myocardial injury. Isolated high Troponin I is mentioned an independent predictor of adverse outcome in post CABG patients<sup>7-9</sup>.



In the present study our primary objective was to evaluate the relationship with the serum level of Troponin I with postoperative complications after CABG. We are also interested to find out any relationship with other preoperative and intra-operative factors like diabetes, hypertension, left ventricular function, bypass time and cross clamp time with the outcome of patients operated for elective coronary artery bypass surgery.

## MATERIALS AND METHODS

After the approval of study we had prospective collected data of 124 consecutive patients who underwent for surgery from 1<sup>st</sup> July 2020 to 30<sup>th</sup> June 2021 at PAQSJIMS Gambat. Our inclusion and exclusion criteria are given below.

### Inclusion criteria:

- Consecutive patients operated during the study period
- Operated for coronary artery bypass surgery
- Operated by two surgeons
- Exclusion criteria
- Preoperative raised Troponin I level beyond the reference level
- Emergency coronary artery bypass surgery
- Patients requiring concomitant additional procedures along with Coronary artery bypass grafting

The measurement of Troponin I levels was done at the morning of planned day of surgery as a standard and once only 18 hours after Chest Closure. The quantitative serum levels of Troponin I was measured in our lab using ADVIA Centaur XP, immunoassay system, Siemens. It measures highly sensitive Troponin I in 18 minutes and reported in nanogram per dl (ng/dl). The patients were followed till their discharge from the hospital. Major morbidities and mortality observed were recorded during stay in hospital. Patients were divided into two groups. Group 1 Troponin I level less than 10 ng/dl and group 2, Troponin I reading more than 10 ng/dl in the sample collected at the 18<sup>th</sup> hour of chest closure.

Anesthesia and cardiopulmonary bypass technique were standardized. The Bypass circuit used hollow fiber membrane oxygenator and non pulsatile flow was generated by roller pump and a 38 micro millimeter arterial line filter, flow was 2.4 liters per minute per meter square at 37 degree centigrade falling to 1.8 liter per min, per meter square at 32 degree centigrade, arterial pressure was maintain from 50-70 mm of Hg and hematocrit to 0.20 to 0.25. Myocardial protection was achieved with smooth induction followed by hypothermic cardiopulmonary bypass with temperature drop to 28c. We use cold blood cardioplegia for chemical arrest and myocardial protection repeated in every twenty minutes or earlier if new anastomosis is started.

### Statistical Analysis

The data was entered into SPSS(STATISTICAL PACKAGE FOR THE SOCIAL SCIENCES) version 16 for the statistical analysis. Data presented as mean with standard deviation, the discrete variables were presented as frequencies. Comparison of the two groups was performed by the independent sample t-Test for continuous variable with 95% confidence level.

## RESULTS

Out of 124 consecutive patients operated for CABG as per our selection criteria, group 1, have 84 patients and group 2, 40 patients respectively. The preoperative characters of two groups with the significance shown in table 1. The mean age of all patients was 54.7 ±9.07 and there were no significant difference in two groups in age there were higher number of female in group 2 with significant difference. Higher numbers of smokers were present in group 1 so as the observed diffuse disease of coronary arteries.

**Table No. 1: Preoperative characteristic between the two groups**

Variables	Group 1 (n=84)	Group 2 (n=40)	P value
No. of Patient	84	40	
Age	54.25±8.9	55.7±9.3	NS
Male	82 (97.6 %)	34 (85%)	NS
Female	2 (2.38 %)	6 (7.14 %)	0.008
Smoking	41(48.8 %)	11(27.5 %)	0.025
DM	58 (69.04 %)	21 (52.5 %)	NS (0.074)
Hypertension	62 (73.8 %)	25 (62.5%)	NS
Stroke	5 (5.95%)	1 (2.5 %)	NS
Renal Impairment	8 (9.52%)	2 (5 %)	NS
LM	34 (40.48 %)	15 (37.5%)	NS
Diffuse Disease	25 (29.76 %)	18 (45%)	NS (0.09)
HBA1C	7.2±1.9	7.10±1.7	NS
EF	46.5±10.7	47.8±8.9	NS

Abbreviations DM, Diabetes Mellitus, LM , Left Main, EF, Ejection Fraction, SD, Standard Deviation, NS, Not Significant, HBA1C

**Table No. 2: Preoperative characteristic between the two groups**

Variables	Group 1 (n=84)	Group 2 (n=40)	P-value
IMA	65 (77.38%)	30 (74%)	NS
Retrograde	5 (5.95%)	6 (15 %)	NS

			(0.09)
Hot shot	58 (69.04 %)	28 (70 %)	NS
CPB	100.5±18.6	111.8±18.9	0.002
X Clamp	75.06±15.2	79.0±14.1	NS
No of Grafts	3.07±4.3	3.28±0.5	0.025
Duration of Surgery	4.7±1.4	4.5±1.0	NS

Abbreviations IMA, Internal mammary Artery, CPB, Cardio Pulmonary Bypass Time, X Clamp Aortic Cross clamp, SD, Standard Deviation, NS, Not Significant,

Operative data showed no statistical significant difference in use of internal memory artery (IMA), cross clamp time and duration of surgery. There were significant differences of higher number of grafts and CPB time in group 2 as shown in Table No. 2,

Post operative data showed no significant difference in IABP usage, post op Atrial Fibrillation, use of blood and blood product, LCOS, total ICU and ward stay, stroke and mortality. There were significant difference in intubation time, re-intubation, reopening and number of inotropes. Post operative outcomes are shown in Table No. 3.

**Table No. 3: Post operative characteristic between the two groups**

Variables	Group 1 (n=84)	Group 2 (n=40)	P-value
Intubation Time	10.6±7.2	21.6±28.8	0.001
Re-Intubation	5 (5.95%)	8 (20%)	0.017
IABP	6 (7.14%)	7 (17.5%)	NS (0.084)
Post op AF	13 (15.4%)	10 (25%)	NS
Post op Stroke	2 (2.38%)	2 (5%)	NS
Reopen	4 (4.76%)	7 (17.5)	0.020
No of Inotrop	21 (25%)	17 (42.5%)	0.012
LCOS	22(26.19 %)	16(40 %)	NS
Blood Product	62 (73.8%)	30 (75%)	NS
Blood Used	1.68±1.6	2.2±2.1	NS
Post Op Trop I	4.83±2.37	20.5±5.7	0.0001
Total ICU Stay	2.96±1.4	3.28±1.4	NS
Total Ward Stay	4.9±2.2	5.21±2.3	NS
Mortality	2 (2.38%)	4 (10%)	0.099

Abbreviations, IABP Intra Aortic Balloon Pump, LCOS, Low Cardiac output Syndrome, SD, Standard Deviation, NS, Not Significant.

## DISCUSSION

People with multi-vessel and diffuse obstructive Coronary artery disease require CABG procedure to improve blood flow to the ischemic parts of the heart previously supplied by diseased arteries and it is one of the most effective treatment against ischemia caused by blocked coronary arteries and prevention of the complications associated with coronary artery diseases may cause like life style restriction and nonfatal and fatal arrhythmias. In this procedure an artery used as pedicle or free graft or vein from the body is used to bypass the blocked coronary artery and reestablish blood flow to ischemic myocardium .

Myocardial damage is inevitable after cardiac surgery due to many factors. Myocardial cells may be damaged due to manipulation of heart, global ischemia of myocardium related with Aortic cross clamp, use of heart lung machine and its associated complements and cytokines activation<sup>9</sup>. As a result cardiac enzymes may be released into the blood stream. These enzymes include creatine kinase, CK-MB and various troponins. Extent of the release of these enzymes depend on the variety of factors like patient condition at the time of surgery , urgency of surgery , type of surgery and duration of surgery. In general extensive and complicated surgeries are more prone to higher level of release of enzymes . Myocardial injury still possible with the optimum dose of cardioplegia or avoidance of heart lung machine and the careful manipulation of heart, Coronary embolism of air and debris in venous graft and occlusion of grafts<sup>10</sup> and ischemia reperfusion injury<sup>11</sup>are few more factors responsible for myocardial cell injuries and leakage of cardiac enzymes in blood stream. Nevertheless elevated level may indicate potential risk of adverse prognosis. Troponin I & T are highly specific to heart muscles. Elevated level of these enzymes in blood indicates severity of damage of myocardial cells as seen after myocardial infarction. These enzymes level rise in few hours after event and remain elevated for several days . Therefor different timing of collection of sample for enzymes had been reported in literature .Troponin I levels in patients are better collected between 12 to 24 hours<sup>12,13</sup>of procedure as recommended in few studies . Therefore, we collected our single sample 18 hours after surgery for better result. It's important to note that the specific use of cardiac enzymes and their thresholds may vary depending on clinical protocols, individual patient characteristics, and advancements in medical practice. Healthcare professionals are best equipped to interpret and evaluate cardiac enzyme results in the context of a patient's overall condition. Several studies are conducted to show relationship of serum level of

cardiac enzymes and post-operative complication<sup>14-22</sup> with variable outcomes .

Costa et al. observed elevated postoperative CKMB levels being associated with increased 30-day and 1-year mortality and repeat MI in almost two-third of CABG patients.<sup>15</sup> In another study a signification association of new myocardial necrosis demonstrated by MRI was found with the raised cardiac enzymes level<sup>23</sup>. Lurati Buse and colleagues in their meta-analysis for the prognostic value of troponin release after adult cardiac surgery supports the association between postoperative Troponin release and mid- and short-term all-cause mortality after adult cardiac surgery<sup>24</sup>. Nevertheless due to , differences in the populations, timing of the sample collection and Troponin subunit and Troponin assays and outcome definitions , making a standardized conclusion regarding outcome , and cut-off values very debatable for consensus.

Our study showed no significant differences in most of the morbidities and mortality suggested with high Troponin I levels except prolong invasive ventilation time, re-intubation and mediastinal bleeding requiring reopening.

Nevertheless these adverse outcomes were significantly inter related as those patients who bleed they were re-intubated and ultimately have the prolong invasive ventilation time. The patients who bleed also needed high inotropic support for the short period of time; therefore most of these factors were interrelated. There are also some studies which show no difference in operative mortality and short term complication<sup>25</sup> with raised cardiac biomarkers supporting our outcome . Thus, perioperative biomarker elevations are more difficult to interpret than one might have expected. In any case, the direct association of biomarker release with poor short- or long-term outcome may be questioned

Our limitation of study are we collected only single sample as few studies showed series of samples of Troponin I are more related with morbidity and mortality. Long term follow up was not done in this study.

## CONCLUSION

Troponin I raised in every patient after cardiac surgery in different levels. Higher levels itself not related with early complications including mortality. Bleeding, intubation time and re-intubation related with high Troponin I levels. Further studies are warranted. The Troponin level itself does not indicate the adverse outcome.

### Author's Contribution:

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**Conflict of Interest:** The study has no conflict of interest to declare by any author.

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# Is Sequential Organ Failure Assessment (SOFA) Score the Real Predictor of Mortality in Resource Constrained Critical Care?

SOFA Score the  
Real Predictor of  
Mortality

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## ABSTRACT

**Objective:** To determine whether predicted mortality through SOFA score would correctly reflect actual mortality in resource limited setups.

**Study Design:** Retrospective cross-sectional observational study

**Place and Duration of Study:** This study was conducted at the Jinnah Postgraduate Medical Center, Karachi from 1<sup>st</sup> August 2022 to 31<sup>st</sup> October 2022.

**Materials and Methods:** SOFA score was calculated at the time of admission for all included patients and percentages of predicted mortalities were documented. Actual mortalities were compared with SOFA score predicted mortality for accuracy of the mortality prediction tool.

**Results:** A total of 229 patients were enrolled in the study. The mean SOFA score of all patients included in the study was calculated to be  $8.310 \pm 4.599$  pertaining to a predicted mortality of  $\leq 33\%$ . The actual mortality was calculated to be 46.95%. Amongst medical, surgical and gynecology subgroups of patient the expected mortality was  $\leq 33\%$  for each group while the actual mortalities were 51.91%, 25% and 33% respectively.

**Conclusion:** The SOFA score proved to be over all inaccurate at predicting actual mortality in our study. Accurate prediction was only seen amongst surgical and Gynecology sub groups of patients and also in patients admitted with diagnoses of Organophosphate Poisoning, Diabetic ketoacidosis with Multi-Organ Dysfunction, Guillain Barre Syndrome (GBS), and Tetanus, eclampsia and pre / post-exploratory laparotomy.

**Key Words:** Critical illness; mortality; organ dysfunction scores; resource allocation; SOFA score

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## INTRODUCTION

Sequential Organ Failure Assessment (SOFA) score formerly called Sepsis related Organ Failure Assessment score has been used widely to predict the mortality of patients with organ failure admitted in critical care. This is the only tool so far in which severity of major organ dysfunction and dependency on vasopressor are also taken into account which may be a major contributor to patient outcome.<sup>1</sup> It has been advocated in literature that this tool was originally developed as a mortality score but may be better for determination of worsening or improvement in multiple organ dysfunction rather predicting mortality.<sup>2</sup> SOFA score includes scoring of worst parameters based on six major organ assessments.

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This includes scores of respiratory, cardiovascular, renal, hepatic, neurological and hematological parameters.<sup>3</sup> Determination of predicted mortality is an important aspect of management of ICU patients to define the resource allocation in Low & Middle income countries (LMIC) as well as the best treatment strategy of such patients.<sup>4</sup> Moreover, this score may enable doctors to efficiently prognosticate patients<sup>5</sup> which further would help in developing effective counselling strategies for patients' families and aid in understanding of the disease and cost burden of treatment.

Medical ICUs of resource constrained set up mostly deals patients with no previous medical records and an already established multiorgan dysfunction requiring level of care III.<sup>6</sup> The calculation of SOFA score of first 24 hours of ICU admissions based on clinical parameters and the laboratory investigations is part of

Medical ICU patient management protocol since it does not require any special investigations and hence, does not burden the patient financially. This study was conducted to determine whether predicted mortality through SOFA score would correctly reflect actual mortality in resource limited setups.

## MATERIALS AND METHODS

We conducted a retrospective cross-sectional observational study in the Medical Intensive Care Unit of Ward 23 at Jinnah Postgraduate Medical Centre, Karachi, Pakistan. The study was conducted on patients admitted in MICU from 1<sup>st</sup> August 2022 to 31<sup>st</sup> October 2022, after Institutional Review Board (IRB) approval dated 20<sup>th</sup> March 2023, with reference no F.2-18/2023-GENL/50/JPMC.

All the patients admitted during the study period were enrolled except for the patients with incomplete data for the calculations of first day’s SOFA score and the patients who were admitted with a code status of Do Not Intubate (DNI). The SOFA score of the first 24 hours was calculated with the worst parameters of the day for the enrolled patients. The mean SOFA score was recorded for all included patients and predicted mortality of the study was determined by taking expected percentages of mortality for that SOFA score described in the table No. 1.

**Table No. 1: SOFA score and associated mortality.**

SOFA SCORE	PREDICTED MORTALITY
≤9	≤33%
10-11	50%
≥12	≥95%

Actual mortality was considered as patients who expired during their stay in Medical ICU. Survival was considered as patients who were stepped down or discharged from Medical ICU, regardless of the later outcome. Accurate prediction of mortality was defined as matching results of actual mortality within the predicted range of mortality as per SOFA score. Results of actual mortality outside the range of predicted SOFA mortality were considered as inaccurate prediction of mortality by SOFA score. Actual and predicted mortalities of department subgroups: medical; patients admitted with primarily medical diagnosis, Surgical; patients admitted for pre-op to surgical emergencies or post-op, Gynecology patients admitted with pre and post obstetric complications requiring surgery or medical intervention group were further determined separately. Patients were also categorized as per diagnosis determined by relevant investigations, examination and clinical judgment and data was analyzed as stated above.

To collect relevant data, patients’ files were accessed retrospectively and working diagnoses with results of

supporting Clinical, laboratory investigations, and expected mortality as per SOFA score and actual mortalities were recorded using a proforma and entered into MS Excel for analysis.

## RESULTS

During study period, 309 patients were screened, out of them 6 patients were excluded for their DNI code status. Data could not be retrieved about 74 patients for the calculation of first day SOFA score. After initial screening, 229 patients were enrolled in the study and were analyzed for the results. The mean SOFA score of all admitted patients included in the study was calculated to be 8.310±4.599 pertaining to a predicted mortality of ≤33%. The actual mortality was calculated to be 46.95%.

Data was grouped into 3 categories, according to predicted mortality by SOFA score in the first 24 hours, ≤33%, 50% and ≥95%. The mortality percentages of each groups are shown in Figure No. 1.



**Figure No. 1: Outcome of patients according to subgroups as per predicted mortality.**

Amongst medical patients (n=182) mean SOFA score was 8.285±4.604 (mortality ≤33%) whereas actual mortality amongst these patients was 51.91%, Gynecological (n=32) and surgical (n=15) patients had a predicted mortality of ≤33% (mean SOFA 8.501±4.216 and 6.830±3.31 respectively) and actual mortality of 33% and 25% respectively. As shown in Table No. 2.

**Table No. 2: Predicted vs Actual Mortality as per Sub speciality Group**

Sub Speciality	Predicted	Actual
SURGICAL	≤33%	25%
GYNAE/OBS	≤33%	33%
MEDICAL	≤33%	51.91%

Predicted and actual mortalities were then regrouped according to working diagnosis based on relevant appropriate investigations and clinical decision making. 8 patients (n=8) admitted with organophosphate poisoning had a predicted mortality of ≤33% (mean SOFA 3.57±1.714) and an actual mortality of 0%.

Patients with Malaria and multiorgan dysfunction (MOD) with n=14, had a predicted mortality of  $\leq 33\%$  and actual mortality (6 out of 14) calculated at 42.85%. In dengue shock syndrome with multiorgan dysfunction (MOD) (n=20) predicted mortality  $\leq 33\%$  against calculated mortality of 100% with 20 out of 20 patients expiring.

Amongst Diabetic Ketoacidosis (DKA) with MOD (n=18)  $\leq 33\%$  predicted mortality and actual mortality of 22.22% (4 out of 18). Patients were admitted with Acute Liver Failure (ALF) with MOD (n=6), 5 out of 6 (83.33%) patients expired. Their predicted mortality was  $\geq 95\%$ .

In Guillain Barre Syndrome (GBS) with bulbar involvement, (N=10) predicted mortality was  $\leq 33\%$  (mean SOFA 7.48 $\pm$ 3.797) and 3 out of 10 admitted patients expired (30%). With a working diagnosis of meningoencephalitis 11 out of 23 patients, that is 47.8% patients expired. SOFA score of this group was at a mean of 8.06 $\pm$ 4.130 ( $\leq 33\%$ ). Those (n=16) with a diagnosis of Eclampsia had predicted mortality  $\leq 33\%$  (mean SOFA 6.71 $\pm$ 3.385), actual mortality 12.5% and d=20.5

Patients brought in for intensive care after exploratory laparotomy showed a mortality rate of 17.64 with 3 out of 17 patients expiring and predicted mortality  $\leq 33\%$  (mean SOFA 8.89 $\pm$ 4.328).

**Table No. 3: Predicted mortality, actual mortality and difference in mortality for all patients grouped according to diagnosis** <sup>1</sup>SOFA= Sequential Organ Failure Assessment, <sup>2</sup>MODs= Multi-Organ Dysfunction, <sup>3</sup>DSS= Dengue Shock syndrome, <sup>4</sup>DKA= Diabetes Keto Acidosis, <sup>5</sup>ALF= Acute Liver failure, <sup>6</sup>SLE= Systemic Lupus Erythematosus, <sup>7</sup>GBS= Guillain Barre Syndrome.

S. No	Diagnosis	SOFA <sup>1</sup> Score (Mean)	Predicted Mortality (%)	Total Patients (N)	Mortalities (N)	Actual Mortality (%)
1	Organophosphate Poisoning	3.57 $\pm$ 1.714	$\leq 33$	8	0	0
2	Malaria with MODs <sup>2</sup>	9.056 $\pm$ 4.174	$\leq 33$	14	6	42.85
3	DSS <sup>3</sup> with MODs	8.516 $\pm$ 3.895	$\leq 33$	20	20	100
4	DKA <sup>4</sup> with MODs	8.198 $\pm$ 4.46	$\leq 33$	18	4	22.22
5	ALF <sup>5</sup> with MODs	14 $\pm$ 2.250	$\geq 95$	6	5	83.33
6	SLE <sup>6</sup> flare	7.11 $\pm$ 3.990	$\leq 33$	4	2	50
7	Tetanus	4.81 $\pm$ 2.491	$\leq 33$	6	2	33
8	GBS <sup>7</sup> with Bulbar Involvement	7.48 $\pm$ 3.797	$\leq 33$	10	3	30
9	Meningoencephalitis	8.06 $\pm$ 4.130	$\leq 33$	23	11	47.8
10	Status Epilepticus	8.45 $\pm$ 3.938	$\leq 33$	7	4	57.14
11	Eclampsia	6.71 $\pm$ 3.385	$\leq 33$	16	2	12.5
12	Puerperal Sepsis	10.67 $\pm$ 3.206	50	5	4	80
13	Post Exploratory Laparotomy	8.89 $\pm$ 4.328	$\leq 33$	17	3	17.64

## DISCUSSION

In resource limited countries, the burden of critically ill patients remains unsupported due to lack of resources and infrastructure especially pertaining to public sector tertiary care hospitals.<sup>6,7</sup> It is pertinent to note that the mortality rate of ICUs of resource limited countries is much higher than developed countries.<sup>8</sup> In our study majority of the patients had already developed multiorgan dysfunction, a major cause of mortality in ICUs worldwide.<sup>9</sup>

Inaccurate as concurred by other study.<sup>10</sup> However, amongst surgical and gynecology pre/post-operative patients SOFA score remained accurate in predicting mortality as other study.<sup>11,12</sup>

A major limitation that we encountered while using the SOFA score mortality prediction, was the lack of incorporation of diagnosis related outcome.<sup>13</sup> Other

tools such as APACHE 2 and APACHE 4 were not considered as regular means for outcome calculation as they do not significantly consider factors such as cardiovascular shock and vasopressors, paramount to mortality.<sup>14</sup>

In patients of Dengue Shock Syndrome (DSS), we found a significant inaccuracy in prediction of mortality by SOFA scores of the first 24 hours. We noted severe liver involvement in all patients admitted and expired with DSS. We must note here that our set up does not provide facilities of emergency liver transplant. DSS with multiorgan involvement to date remains high in the list of all-cause mortality.<sup>15</sup>

In patients of meningoencephalitis which is most likely to cause death secondary to hydrocephalus followed by brain herniation, circulatory failure, intractable seizures and other brain injury<sup>16</sup> are unlikely to reflect in the categories of SOFA scoring. Concurrently the

pathophysiology and cause of death, possibly intractable seizures, underlying neurological disease<sup>17</sup> would yet again fail to reflect in the score of patients with status epilepticus.

However, it is interesting to note that the SOFA score which had been initially developed as a score of sepsis related organ dysfunction was unable to correctly predict mortality in patients admitted into the category of puerperal sepsis.

To note, Malaria is more likely to have a more severe progressive hematological, pulmonary and renal involvement,<sup>18</sup> for which outcomes didn't accurately match with first day predictive mortality by SOFA score. GBS being more likely to have cardiovascular/autonomic involvement<sup>19,20</sup> and tetanus is more likely to have involvement of the respiratory category<sup>21</sup> in the SOFA score as a cause of mortality could be accurately predicted by SOFA score.

In patients with eclampsia, the multiorgan involvement starts improving as soon as termination of pregnancy is done and so is the reason of accurate prediction of outcomes by a single point SOFA calculation on first day as evident by our data. In patients admitted with pre/post-operative care for exploratory laparotomy were not presented with multiorgan involvement and SOFA score accurately predicted the mortality.

**Conclusion and Future Directions:** The SOFA score proved to be over all inaccurate at predicting actual mortality amongst most patients in our low-resource critical care set up. However accurate prediction was still seen amongst surgical and Gynecology sub groups of the patients and also in patients with diagnoses of organophosphate poisoning, Diabetic ketoacidosis with Multi-Organ Dysfunction, GBS, Tetanus, eclampsia and post exploratory laparotomy. The most inaccurate prediction was seen in patients with severe liver involvement.

From the observations made in this study, we aim to raise three imperative questions:

1. Is the hepatic component of the SOFA score contributing to inaccuracy of its mortality prediction?
2. Does the mortality rate per valid literature of specific diagnoses need to be incorporated in a formal calculation of mortality prediction?
3. Is the relation between SOFA score and predictive percentage of mortality, the correct scale to be implemented in the critical care of resource constraint countries?

We hope our study may initiate research on these queries to develop a more inclusive scoring for mortality prediction.

## CONCLUSION

The SOFA score proved to be over all inaccurate at predicting actual mortality in our study. Accurate

prediction was only seen amongst surgical and Gynecology sub groups of patients and also in patients admitted with diagnoses of Organophosphate Poisoning, Diabetic ketoacidosis with Multi-Organ Dysfunction, Guillain Barre Syndrome (GBS), and Tetanus, eclampsia and pre / post-exploratory laparotomy.

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**Conflict of Interest:** The study has no conflict of interest to declare by any author.

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# Pattern and Causes of Extractions of Permanent Teeth in Tertiary Care Hospitals in Karachi, Pakistan

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## ABSTRACT

**Objective:** To investigate the causes of dental extractions of permanent teeth in flood victims receiving treatment in tertiary care hospitals.

**Study Design:** Descriptive observational study.

**Place and Duration of Study:** This study was conducted at the Two Tertiary Dental Hospitals of Karachi from mid-January to mid-March 2023.

**Materials and Methods:** The current study investigated the causes of dental extractions of permanent teeth in 211 patients. Participants of this study were 10 to 70 years old. A specific survey form was used to collect information from the patients. SPSS version 27 was used for statistical analyses.

**Results:** The highest number of extracted teeth was reported in 21-30 years old females. Dental caries (49.3%) was the leading cause of extraction followed by periodontal problems (22.3%). The most common teeth that required extractions were mandibular third molars (19.4%) followed by mandibular first molars (16.4%).

**Conclusion:** Dental caries was reported to be the most prevalent cause of extractions of permanent teeth in flood-affected individuals.

**Key Words:** Tooth extraction, Dental caries, Periodontal disease, Oral health

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## INTRODUCTION

Currently, Pakistan is one of the countries in the world most frequently hit by floods. To design a successful healthcare program, it is essential to understand the typical health issues that flood victims deal with.

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The catastrophic monsoon rains and subsequent floods in Pakistan last year, have affected 33 million people, with many of them being displaced. Planning healthcare for flood victims demands for preventative and rehabilitative oral health services in addition to curative and medical therapies<sup>1</sup>.

Permanent tooth erupts in the oral cavity from 6 to 14 years, excluding the third molars<sup>2,3</sup>. The teeth perform several important functions during the life span of a person including mastication, phonetics, proprioception, and aesthetics. Teeth also have an impact on a person's self-confidence. Hence, it is importance to conserve permanent dentition; if lost they can only be replaced by artificial means<sup>4</sup>. There are many reasons for premature loss of a tooth which include dental caries, periodontitis, dental pulp infections, treatment failure, orthodontic reasons, impaction, pericoronitis, local pathology, prosthodontics, or trauma<sup>2,5,6</sup>. Most of the studies have reported caries as the primary cause of tooth extraction. Other non-clinical reasons of tooth extraction could be lack of awareness, limited access to dental care, low socioeconomic status, and ineffective oral hygiene habits<sup>5-7</sup>. Tooth loss leads to functional and aesthetics issues which ultimately have a grave psychological and

social impact and undermines the self-confidence of the person<sup>5, 8</sup>. Extraction or loss of tooth without a suitable functional substitution also affects oral health-related quality of life<sup>9</sup>.

Tooth extraction is a common dental procedure and has been practiced for decades by dentists all over the world. In developed countries, including the United Kingdom, the number of dental extractions is decreasing<sup>10, 11</sup>. However, in developing countries, like Pakistan, tooth extraction is favored over other more costly dental procedures due to shortage of oral healthcare facilities, shortage of trained staff, and low socioeconomic status<sup>7, 10, 12</sup>. Because of the fair number of extractions in Pakistan it is necessary to find the cause for tooth loss due to extractions<sup>4, 7</sup>.

The purpose of this study was to examine the causes and trends of extractions of permanent teeth so that we can choose the best preventive measures for the general population. This study gave an overview of the oral healthcare status of in-hospital populations in public and private tertiary care hospitals dealing with displaced flood victims.

## MATERIALS AND METHODS

A descriptive observational study was carried out with consecutive sampling of patients who needed extraction visiting dental out-patient departments of two tertiary dental hospitals of Karachi from mid-January to mid-March 2023. A sample size of 211 achieved 99% power to detect an effect size of 0.8143 using 48 degrees of freedom with a significance level alpha of 0.01. Ethical approval was obtained prior to start of study (FRC-BUHS 25/2022). Data was collected through a designed survey form after an informed written consent was obtained from all participants or their guardians. The tooth to be extracted was recorded along with reason of its extraction. SPSS version 27 was used for statistical analyses. The descriptive results were presented using frequency and percentages. Chi-squared or Fisher's exact tests were used to see association between tooth type extracted and reason of extraction with sex, and between age group and reason for tooth extraction with tooth type extracted. P-value < 0.05 was considered statistically significant.

## RESULTS

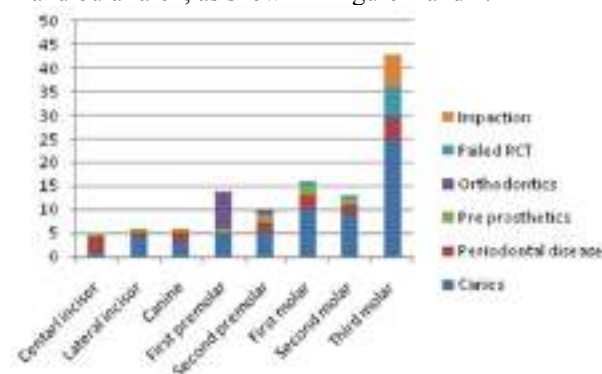
The study sample comprised a total of 211 participants: 108 (51.2%) females and 103 (48.8%) males. Out of the total participants, majority of the participants (n=52, 24.6%) who underwent extractions were 21-30 years old, followed by those who were 41-50 years old (n=44, 20.8%). Among the 21-30 years old patients, most of the extractions were done for female patients (n=30, 27.7%) compared to male participants (n=22, 21.3%).

Among patients who were 41-50 years old, male participants had most of the extractions done (n=24, 23.3%) compared to females (n=20, 18.5%), as shown in Table 1.

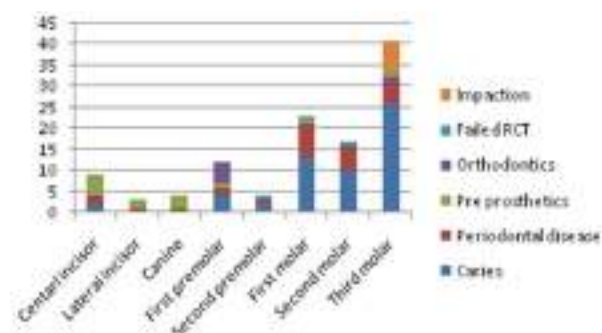
**Table No. 1: Frequency of tooth extractions in males and females in different age groups**

Age group (years)	Extracted teeth in male n (%)	Extracted teeth in female n (%)	Total extractions n (%)
10-20	8 (7.7%)	9 (8.3%)	17 (8%)
21-30	22 (21.3%)	30 (27.7%)	52 (24.6%)
31-40	16 (15.5%)	17 (15.7%)	33 (15.6%)
41-50	24 (23.3%)	20 (18.5%)	44 (20.8%)
51-60	15 (14.5%)	18 (16.6%)	33 (15.6%)
61-70	13 (12.6%)	9 (8.3%)	22 (10.4%)
>70	5 (4.9%)	5 (4.6%)	10 (4.7%)

According to extracted tooth type, the most extracted tooth was 3<sup>rd</sup> molar in both maxillary and mandibular arch. Least commonly extracted tooth was central incisor in maxillary arch and lateral incisor in mandibular arch, as shown in Figure 1 and 2.



**Figure 1: Cause of extraction of a particular tooth in maxillary arch.**



**Figure 2: Cause of extraction of a particular tooth in mandibular arch.**

Majority of the extractions performed were due to dental caries (n=104, 49.3%). Higher number of extractions due to dental caries were reported in females (n=63, 58.3%) compared to males (n=41, 39.8%). The second most reported reason of tooth extraction was due to periodontal problems (n=47,

22.3%) due to which higher number of extractions were reported in males (n=29, 28.1%) compared to females (n=18, 16.6%), as shown in Table 2. According to chi-squared test, there was no association between type of tooth extracted and sex, 9.44 (7), p=0.223. According to Fisher's exact test, there was no association between cause of extraction in males and females, p=0.126. Comparisons of tooth type and reasons of extractions with sex are given in Table 2.

CI: central incisor; LI: lateral incisor; C: canine; 1P: 1<sup>st</sup> premolar; 2P: 2<sup>nd</sup> premolar; 1M: 1<sup>st</sup> molar; 2M: 2<sup>nd</sup> molar; 3M: 3<sup>rd</sup> molar; RCT: root canal treatment; M:

male; F: female. Chi-squared or Fisher's exact test used; p<0.05 statistically significant.

Third molars were most frequently extracted in 21-30 years old, followed by patients who were 31-40 years old. According to Fisher's exact tests, there were significant association between extracted tooth type and age of the patients (p<0.001). Post-hoc Bonferroni test revealed that the association was significant between third molar extractions among 21-30 years old age group. Fisher's exact test also revealed a significant association between tooth type and reason of extraction (p<0.001). Post-hoc Bonferroni test applied to see significant group-wise comparisons as given in Table 3.

**Table No.2: Comparison of tooth type extracted and reason of extraction with sex**

Tooth type	Sex	Total n (%)	p-value	Reason of extraction	Sex	Total n (%)	p-value
CI	M=7 F=9	16 (7.6)	0.223	Dental caries	M=41 F=63	104 (49.3)	0.126
LI	M=3 F=6	9 (4.3)		Periodontal problems	M=29 F=18	47 (22.3)	
C	M=4 F=7	11 (5.2)		Impaction	M=10 F=11	21 (10)	
1P	M=9 F=15	24 (11.4)		Orthodontics	M=4 F=4	8 (3.8)	
2P	M=11 F=3	14 (6.6)		Pre-prosthetics	M=12 F=6	18 (8.5)	
1M	M=17 F=22	39 (18.5)		Failed RCT	M=5 F=5	10 (4.7)	
2M	M=19 F=14	33 (15.6)		Trauma	M=2 F=1	3 (1.4)	
3M	M=33 F=32	65 (30.8)					

**Table No.3: Comparison of age group and reason for tooth extraction with tooth type extracted**

Tooth type	Age groups							P-value	Reason for tooth extraction						P-value	
	10-20	21-30	31-40	41-50	51-60	61-70	>70		Dental caries	Periodontal problems	Impaction	Orthodontic reason	Pre-prosthetics	RCT failure		Trauma
CI	-	2 (0.9%)	1 (0.5%)	5 (2.4%)	5 (2.4%)	1 (0.5%)	2 (0.9%)	<0.001**	1 (0.5%)	6 (2.8%)	6 (2.8%)	-	-	2 (0.9%)	1 (0.5%)	<0.001**
LI	-	2 (0.9%)	-	3 (1.4%)	3 (1.4%)	-	1 (0.5%)	<0.001**	4 (1.9%)	2 (0.9%)	3 (1.4%)	-	-	-	-	<0.001**
C	-	-	2 (0.9%)	1 (0.5%)	4 (1.9%)	2 (0.9%)	2 (0.9%)	<0.001**	3 (1.4%)	2 (0.9%)	5 (2.4%)	-	-	1 (0.5%)	-	<0.001**
1P	3 (1.4%)	5 (2.4%)	3 (1.4%)	6 (2.8%)	3 (1.4%)	3 (1.4%)	1 (0.5%)	<0.001**	9 (4.3%)	5 (2.4%)	2 (0.9%)	7 (3.3%)	-	1 (0.5%)	-	<0.001**
2P	-	2 (0.9%)	1 (0.5%)	4 (1.9%)	3 (1.4%)	2 (0.9%)	2 (0.9%)	<0.001**	6 (2.8%)	4 (1.9%)	2 (0.9%)	-	-	1 (0.5%)	1 (0.5%)	<0.001**
1M	6 (2.8%)	8 (3.8%)	5 (2.4%)	7 (3.3%)	5 (2.4%)	7 (3.3%)	1 (0.5%)	<0.001**	24 (11.4%)	9 (4.3%)	2 (0.9%)	-	-	3 (1.4%)	1 (0.5%)	<0.001**
2M	4 (1.9%)	5 (2.4%)	7 (3.3%)	7 (3.3%)	4 (1.9%)	5 (2.4%)	1 (0.5%)	<0.001**	17 (8.1%)	12 (5.7%)	1 (0.5%)	-	1 (0.5%)	2 (0.9%)	-	<0.001**
3M	4 (1.9%)	28 (13.3%)	14 (6.6%)	11 (5.2%)	6 (2.8%)	2 (0.9%)	-	<0.001**	40 (19%)	7 (3.3%)	-	1 (0.5%)	17 (8.1%)	-	-	<0.001**

CI: central incisor; LI: lateral incisor; C: canine; 1P: 1<sup>st</sup> premolar; 2P: 2<sup>nd</sup> premolar; 1M: 1<sup>st</sup> molar; 2M: 2<sup>nd</sup> molar; 3M: 3<sup>rd</sup> molar; RCT: root canal treatment.

Fisher's exact test used; \*p-value <0.05 statistically significant; &Association was significant between extracted third molars in 21-30 years old, p<0.001.

§Associations were significant between the following groups ( $p < 0.001$ ): central incisor–caries; central incisor–pre-prosthetics; canine–pre-prosthetics; first premolar–orthodontics; third molar–eruption problems.

## DISCUSSION

Despite the various prevention initiatives that have been implemented, dental problems tend to be a significant public health burden worldwide. Tooth extraction is one of the most performed procedures at the dental office<sup>12,13</sup>. Poor oral health ultimately results in tooth decay or periodontal problems which if not treated early may result in tooth loss. Tooth extractions performed in a selected population gives us an idea about current attitudes towards oral health services and the facilities available<sup>14</sup>. It also gives information regarding oral hygiene practices which have a great impact on an individual's oral health. Understanding the causative and contributory factors of tooth loss is important for preparing and implementing successful strategies to minimize tooth extractions<sup>7,14</sup>.

Various studies have been conducted to identify the causes of permanent tooth loss in various populations. In the present study, the participants comprised of displaced persons due to recent flooding in interior Sindh province of Pakistan. Majority of these patients who underwent extraction of a tooth were in their third decade of life. Others have also reported higher number of tooth extractions in individuals in similar age group<sup>5,15</sup>. However, some authors have reported that tooth extractions are common in individuals who were in their fourth decade of life<sup>10,16</sup>. The reasons of these conflicting results could be due to difference in study population and sample size.

In the present study, dental caries was the leading cause of extraction as 49.3% of the total number of extractions done was due to dental caries. Others have also reported dental caries as the primary reason for extractions<sup>2,17-18</sup>. The participants of this study belonged to low socioeconomic status; it is possible that their primary treatment of choice for a carious tooth was extraction rather than timely seeking conservative care due to issues with accessibility to dental care facility, affordability, lack of awareness, insufficient oral hygiene practices, and increased use of food rich in refined sugars.

In the present study, the second reason for tooth extraction reported was periodontal disease responsible for 22.3% of the extractions performed. It is the second common cause of extraction as reported by others<sup>18</sup>. However, others have reported periodontal disease as the main reason of tooth extractions<sup>4,15,19</sup> which could be because of difference in socioeconomic status and study population. A study conducted on Syrian refugees has reported that periodontitis was the third common

cause accounting for only 3.4% of the study population. This could be because of better oral hygiene practices followed by Syrian refugees or difference in the age of the study population.

Third molar was the most frequently extracted tooth followed by first molar. However, the results of this study differ from majority of the studies where the first molar was the most commonly extracted tooth<sup>5,11,12,15,18</sup> which could be because of different study population and age of the participants. In this study, there was significant association between third molar extractions in 21-30 years old. There was also significant association between extraction of third molars and problems with eruption. Hence, the reason of difference from other studies could be because third molars are usually extracted due to impaction in these younger age groups once the eruption of tooth starts causing problems. It is also interested to note that there was a significant association between central incisor extraction and caries which may suggest poor oral hygiene practices by the study population. Incisors being the most important teeth in maintaining aesthetics and their loss severely compromise the confidence of the individual.

In this study, females were more frequently affected with dental caries and underwent extractions and 58% of total extractions were due to dental caries in females. However, the association was not significant between sex and cause of extraction or between sex and type of extracted tooth. The increased proportion of females undergoing extractions due to caries could be attributed to difference in chemical composition and variable antimicrobial capacity of saliva; hence, promoting caries formation<sup>20</sup>. It could also be because females in our society are dependent on their fathers or husbands to take them to dental care units; a delay in timely seeking restorative care could have resulted in extractions as the only viable. Such findings are consistent with other studies<sup>2</sup>.

The strength of this study includes that the information was collected from public setup which catered to oral health needs of displaced persons due to floods which will help us in comparing the treatment approaches for similar presenting complaints at different centers. Results have identified future knowledge gap regarding etiology of extraction of permanent tooth in similar study populations. This also tells us the need of providing community dental health services along with medical care facilities for displaced persons. This has laid the foundation of framework for future oral health maintenance policies. It identified that our focus should be shifted towards mass awareness about personal oral hygiene and cost-effective dental treatment center need at the government level.

## CONCLUSION

This study clearly shows that, in majority of the patients undergoing tooth extraction, molars were the most commonly extracted teeth. Caries is the major reason for extraction followed by periodontal diseases. The study depicts the need of implementation of preventive measures to reduce these common causes and pattern of permanent teeth loss.

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**Conflict of Interest:** The study has no conflict of interest to declare by any author.

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# IMNCI Based Morbidity Patterns of Sick Children at Children Hospital CMC Hospital Larkana

IMNCI Based  
Morbidity  
Patterns of Sick  
Children

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Raheel Ahmed Shaikh<sup>1</sup> and Saifullah Jamro<sup>1</sup>

## ABSTRACT

**Objective:** To determine the morbidity patterns of the sick children 2 months- 59 months according to Integrated Management of Childhood Illness (IMNCI) criteria.

**Study Design:** Descriptive Cross Sectional Study

**Place and Duration of Study:** This study was conducted at the Children Hospital, CMCH, Larkana from May 2021 to March 2023.

**Materials and Methods:** Total number of 113 sick children were included in the study according to the inclusion criteria. Final diagnosis was made based on IMNCI guidelines using the history, clinical examination, necessary laboratory investigations like, random blood sugar test, malarial parasite test, examination on glass slide, serum urea creatinine test, serum calcium test, chest x-ray, cerebrospinal fluid detailed reports. The data was obtained using study specific questionnaire. Later the data was entered into SPSS version 23 for analysis.

**Results:** The average age of the patients was 23.78±16.72 months. There were 64.6% males and 35.4% females. Severe pneumonia was observed in 26.5% children followed by febrile fit 23.9%, pyogenic meningitis 12.4%, epilepsy 6.2%, cerebral palsy 5.3%, encephalitis 5.3%, hypokalemia 5.3%, severe malaria 4.4%, tuberculosis meningitis 3.5% and croup and asthma were also observed.

**Conclusion:** The IMNCI guidelines offer advantages in accurate childhood illness identification, combined treatment, mother-caregiver counseling, and improved care quality for sick children at the referral level. In our findings, pneumonia and febrile fit were observed to the most common morbidity patterns with 26.5% and 23.9% respectively.

**Key Words:** Morbidity Patterns, Pneumonia, Diarrhea, Malaria, Measles, Malnutrition.

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## INTRODUCTION

Every year, around 10 million children, including four million newborns, die around the world, with the majority of these deaths occurring in low-income nations such as Pakistan. The international medical community faces a challenge in developing countries with persistently high childhood mortality rates.<sup>1</sup> Pakistan is a low-income country that ranks third in Asia in terms of under-five mortality, with an average of 1100 deaths each day.<sup>2</sup>

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In underdeveloped nations, the majority of mortality among children under the age of five are caused by five prevalent diseases: pneumonia, diarrhoea, malaria, measles, and malnutrition.

The Integrated Management of Childhood Illness plan was developed in collaboration with the UN Children's Fund in the mid-1990s (IMNCI). Specific disease-based programmes, such as acute respiratory infection (ARI) and diarrheal disease control (CDD), as well as malaria control and malnutrition, have previously been established by the WHO. The IMNCI plan, in contrast to existing initiatives, targets all common childhood ailments and ensures access to all children.<sup>3,4</sup> The IMNCI programme also has other advantages, such as lowering missed immunization opportunities, promoting breastfeeding, nutritional counseling, vitamin A and iron supplements, and worm infestation treatment. The IMNCI programme includes three key characteristics. First, because a child frequently has

more than one difficulty at a time, it addresses all of the child's issues at the same time. Second. It does not necessitate the use of expensive equipment such as a stethoscope, microscope, or X-ray. Third, there is no need for technical knowledge. The programme can be implemented by any first-line health worker. The implementation phase of the IMNCI began in February 1999.<sup>4</sup> International studies have revealed a wide range of results. Research in Egypt shows IMNCI approach improves clinically 60% of children, compared to only 12% using Non-IMNCI protocol.<sup>5</sup>

**Rationale:** IMNCI strategy integrates childhood illnesses promotion, prevention, and management; limited data on young children's diagnosis and outcomes requires evaluation and scientific data collection.

**Operational Definitions:**

**Sick Child:** Presents with general danger signs (convulsions, vomiting everything, refusal to feed) according to IMNCI.<sup>6</sup> However, in our study; all the children classified under pink color coded triage based on IMNCI classification were labeled as sick children.

## MATERIALS AND METHODS

This study was conducted at the Children Hospital, CMCH, Larkana from May 2021 to March 2023.

**Sample Size:** Total 113 cases of very severe disease were included. Raosoft calculator was used to calculate the appropriate sample size by using prevalence of very severe disease (8%) with 95% confidence interval and less than 5% of margin of error.

**Sampling Technique:** Non-probability Consecutive Sampling

**Study Design:** Descriptive cross sectional study

**Sample Selection:**

**Inclusion Criteria:**

Children aged between 2 months to 59 months

Patients of either gender.

Patients of very severe disease.

Parents giving informed Consent

**Exclusion Criteria:**

Outdoor patients.

Patients who present with dangers sign

Patients with epilepsy and cerebral palsy presenting with general danger sign

Age more than 59 months

Patients who didn't consent.

**Data Collection Procedure:**

The study was conducted in the Department of Pediatric Medicine Unit-1, CMC Children Hospital, Larkana, after the approval of synopsis from the SMBBMU research department and permission from the hospital's ethical review committee. This study enrolled all the children who met the inclusion criteria. To avoid confounding variables, rigorous exclusion criteria were applied. Parents and guardians were told about the research methodology, and written informed consent

was obtained from them before data was input into a study-specific proforma. A complete history of the patient's age, gender, weight, height and clinical presentation was collected, as well as a general physical examination. patients were treated according to WHO protocol, based on criteria of history, clinical examination, and some necessary laboratory investigations as needed, such as blood sugar, Malarial parasite, examination on glass slide, serum urea creatinine, Serum calcium, Chest X-Ray, Cerebrospinal fluid detailed reports.

## RESULTS

About 113 sick Children according to Integrated Management of Childhood Illness (IMNCI) criteria were recruited in the study. The mean age was 23.78±16.72 months and age distribution of the cases is shown in table 1. There were 73(64.6%) male and 40(35.4%) female as shown in table 1. Regarding presenting complain, 43(38.1%) were not able to drink or breastfeed, 12(10.6%) were vomit everything, 17(15%) child had convulsion, 20(17.7%) had lethargic or unconscious, 53(46.9%) were convulsing now and 2(1.8%) had looked or felt for stiff neck (table2).

**Table No.1: Demographic Characteristics n=113**

Variables	Frequency	Percentage
Mean Age	23.78±16.72 months	
Age	< 12 months	38 33.63
	12-36 months	54 47.79
	>36 months	21 18.58
Gender	Male	73 64.60
	Female	40 35.40

**Table No.2: Clinical Presentation of Sick Children**

Clinical Presentation	Frequency	Percentage
Not able to drink or breastfeed?	43	38.1%
Vomit Everything	12	10.6%
Child had convulsions	17	15%
Lethargic or Unconscious	20	17.7%
Convulsing now	53	46.9%
Look or feel for stiff neck	2	1.8%



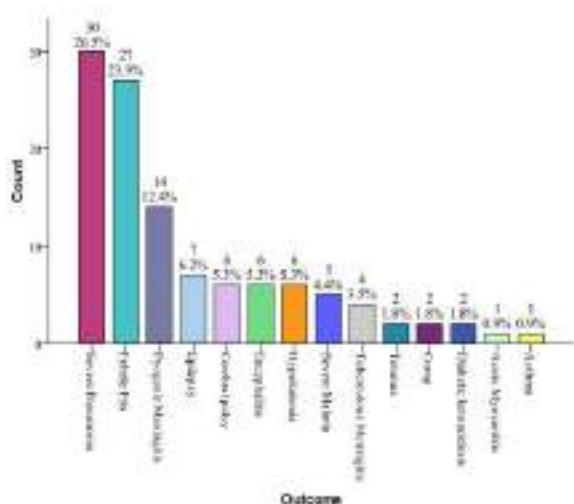


Figure No.1: Outcome of the sick children as per IMNCI n=113

Table No.3: Comparison of outcome of the sick children according to IMNCI among age groups n=113

Outcomes	Age Groups (Years)			P-value
	<12 Months n=38	12-36 Months n=54	>36 Months n=21	
Severe Pneumonia	17(44.7%)	10(18.5%)	3(14.3%)	0.007*
Febrile Fits	10(26.3%)	17(31.5%)	0(0%)	0.015*
Pyogenic Meningitis	5(13.2%)	4(7.4%)	5(23.8%)	0.151
Cerebral palsy	2(5.3%)	3(5.6%)	1(4.8%)	0.990
Diabetic ketoacidosis	0(0%)	0(0%)	2(9.5%)	0.012*
Encephalitis	1(2.6%)	3(5.6%)	2(9.5%)	0.525
Epilepsy	0(0%)	6(11.1%)	1(4.8%)	0.089
Hypokalemia	2(5.3%)	4(7.4%)	0(0%)	0.438
Severe Malaria	0(0%)	2(3.7%)	3(14.3%)	0.036*
Tuberculous Meningitis	0(0%)	3(5.6%)	1(4.8%)	0.345
Croup	0(0%)	1(1.9%)	1(4.8%)	0.413
Asthma	0(0%)	1(1.9%)	0(0%)	0.574
Acute Myocarditis	1(2.6%)	0(0%)	0(0%)	0.369

Chi-square test applied \*significant

Table No.4: Comparison of outcome of the sick children according to IMNCI between groups n=113

Outcomes	Gender		P-Value
	Male (n=73)	Female (n=40)	
Pneumonia	22(30.1%)	8(20%)	0.234
Febrile Fits	20(27.4%)	7(17.5%)	0.238
Pyogenic Meningitis	8(11%)	6(15%)	0.533
Cerebral palsy	4(5.5%)	2(5%)	0.913

Diabetic ketoacidosis	0(0%)	2(5%)	0.054
Encephalitis	4(5.5%)	2(5%)	0.913
Epilepsy	4(5.5%)	3(7.5%)	0.670
Hypokalemia	3(4.1%)	3(7.5%)	0.442
Severe Malaria	1(1.4%)	4(10%)	0.033*
Tuberculous Meningitis	2(2.7%)	2(5%)	0.534
Croup	2(2.7%)	0(0%)	0.291
Asthma	1(1.4%)	0(0%)	0.457
Acute Myocarditis	0(0%)	1(2.5%)	0.175

Chi-square test applied. \*significant

Outcome of the sick children as per IMNCI are presented in figure 1. Severe pneumonia was the commonest outcome that was observed in 26.5% children followed by febrile fit 23.9%, pyogenic meningitis 12.4%, epilepsy 6.2%, Cerebral palsy 5.3%, encephalitis 5.3%, hypokalemia 5.3%, severe malaria 4.4%, tuberculosis meningitis 3.5% and croup and asthma were also observed.

Rate of severe pneumonia was significantly high in below 12 months of children as compare to above 12 months of age children (p=0.007) similarly rate of febrile fits was significantly high in below 36 months of age children (p=0.015) while rate of diabetic ketoacidosis and severe malaria was significantly high in above 36 years of age children as shown in table 1. Rate of outcome was not statistically significant between male and female except rate of severe malaria was significantly high in female as compare to male (p=0.033) as presented in table 2.

## DISCUSSION

Pakistan's high child and infant mortality rates are a source of concern, and urgent action is required to address the problem.<sup>6</sup> Despite two decades, little follow-up on IMCI program knowledge and practices, making understanding its effects crucial for healthcare professionals.

Study reveals gap in understanding IMNCI management guidelines, assessing nutritional status and acute illnesses holistically. In a study conducted in Egypt it was highlighted that correct adherence to the IMNCI guidelines is imperative in achieving significant reductions in under-five mortality.<sup>7</sup> Mohan P et al found similar bottlenecks in training program in their study in India.<sup>8,9</sup>

Khan R in his study conducted the study for trained and untrained health care professional in Pakistan also found poor knowledge of health care providers regarding respiratory issues in both trained and untrained groups.<sup>10</sup> For lowering morbidity and mortality, prompt diagnosis and appropriate management of the general danger signs of common childhood illnesses are essential.<sup>9</sup>

In present study severe pneumonia was the commonest outcome that was observed in 26.5% children followed

by febrile fit 23.9%, pyogenic meningitis 12.4%, epilepsy 6.2%, cerebral palsy 5.3%, encephalitis 5.3%, hypokalemia 5.3%, severe malaria 4.4%, tuberculosis meningitis 3.5% and croup and asthma were also observed. In a local study,<sup>5</sup> URTIs were the principal reason for fever in children in the form of Otitis media and tonsillopharyngitis followed by LRTIs (pneumonia) with the tonsillopharyngitis was the most frequent diagnosis for high-grade fever in eight (32%) children treated by IMNCI approach and nine (36%) children treated by traditional non-IMNCI approach.

Streptococcal tonsillopharyngitis involves congested throat, pus, follicles, and enlarged cervical lymph nodes in 07 out of 08 of cases. Streptococci cause various diseases, affecting organs differently. Rheumatic fever and glomerulonephritis are possible consequence of group A beta-hemolytic streptococci infections.<sup>11</sup>

Less frequent causes are pneumococcal infection and other groups of  $\beta$ -hemolytic streptococci. Cytokines, especially tumor necrosis factor- $\alpha$  (TNF- $\alpha$ ) and interleukin-6 (IL-6) play principal part in pathogenesis of the inflammatory process of tonsillopharyngitis with positive correlations between high-grade fever and raised levels of these two cytokines.<sup>12</sup> The study by Factor et al. (2001)<sup>13</sup> aimed to ascertain whether the fever module in the WHO/UNICEF guidelines for the IMNCI recognizes febrile children with bacterial infections in an area of low malaria prevalence (Dhaka, Bangladesh), they found the majority of children with meningitis (100%) and pneumonia.

A Principal focal point of IMNCI is health system amelioration and aim of this amelioration is to enhance effectiveness of health care system.<sup>14</sup> IMNCI emphasizes peripheral wellbeing system significance, care standards, and local management, promoting reform and focusing on crucial modifications. The rationale for execution of IMNCI in Pakistan is increased children morbidity and mortality. Each year 700,000 children die and Pakistan's wellbeing administrators neglect children's health demands due to frequent diseases like ARI, diarrhea, and malnutrition. Almost half (43.0%) of the Pakistan population consists of children 15 years of age which account 60.0% of nationwide morbidity and one of the highest infant mortality in the territory, 84 /1000 live births: IMNCI had been initiated in eighty nations and executed in nineteen and few indirect indicators declared its effectiveness as a complete and successful policy.<sup>14,15</sup> A study conducted in 2 low-income dwellings in Pakistan showed that where IMNCI strategy is executed, it modified the practices of private providers.<sup>14</sup>

IMNCI emphasizes standard care, society role, and local health system development, attracting feedback from Africa and low-income countries. Pakistan is one of three countries to modify the International Management of Pregnancy and Childbirth (IMNCI) to include neonatal care. Pilot testing in two districts and a

masters training program are underway, requiring government and private sector commitment.<sup>16</sup>

To promote IMNCI benefits, it is crucial to increase awareness among policy-makers, providers, NGOs, private sector, donor society, and the public. This includes capacity building, enhancing monitoring, drug systems, supervision, and strengthening society participation. Prioritizing these aspects based on the country's situation is essential.

In our study there were 64.6% males and 35.4% females, nearly similar percentage of gender distribution was reported by Roodpeyma Sh who presented the observed that there were 39 (59%) females and 27 (41%) boys in their published work.<sup>26</sup> In our study, severe pneumonia was observed in 26.5% children, which is comparatively higher than the observations reported by Chaudhuri S et al that there were 15.9% of the study participants had severe pneumonia<sup>17</sup> while our finding was consistent with the published work reported by Arifeen SE et al who reported that 25% participants had severe pneumonia.<sup>19</sup> However, in our study, severe pneumonia was the most common presenting illness with 26.5%, although the most common presenting complaint reported by Arifeen SE et al was fever (80%), followed by cough or cold (49%).<sup>19</sup> Contrarily, the most common complaint (25.8%) was diarrhea.<sup>18</sup> In our findings, hypokalemia was observed in 5.3%, in contrast, Arifeen SE et al reported that there was no evidence of diarrhea with dehydration or hypokalemia in any of the children.<sup>19</sup> While, Chaudhuri S et al. observed that, based on IMNCI classification, 1.9% participants were severely dehydrated.<sup>17</sup> In contrast, the diarrhea was reported in 19% cases by Arifeen SE et al.<sup>19</sup> Despite the fact that the plan has been adopted by over several nations, the impact has been mixed. The IMCI strategy was established by WHO and UNICEF to deal more effectively and efficiently with childhood diseases in the community and in primary health care institutions.<sup>16</sup> In observation that IMNCI approach is effective for effective triage, diagnosis, treatment referral of the young children.

## CONCLUSION

The IMNCI approach is effective in early diagnosis and better outcomes for children under five years old, with pneumonia and febrile fit being common morbidity patterns. It improves care quality and counseling for mothers and caregivers.

### Author's Contribution:

Concept & Design of Study:	Rahmattuh Tunio
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Data Analysis:	Bakhtawar Baloch, Raheel Ahmed Shaikh,

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# Frequency of Depressive Disorder Among Patients with Type-I Diabetes Mellitus

Depressive Disorder Among Type-I Diabetes

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## ABSTRACT

**Objective:** To identify the frequency of depressive disorder among patients with type 1 diabetes mellitus.

**Study Design:** A descriptive cross-sectional study

**Place and Duration of Study:** This study was conducted at the Outpatient Department (OPD) of Medicine & Allied, Sir Syed Hospital, Karachi from July, 2022 to November 2022.

**Materials and Methods:** All patients diagnosed with diabetes mellitus type I were selected for the study, and those patients who had depressive disorders were diagnosed before diabetes mellitus. Those who use any type of psychoactive substance Those who had other chronic medical conditions with type-I diabetes mellitus were excluded from the study. Data would be collected after approval from the ethical committee. SPSS version 22 was used to analyse the data.

**Results:** Among a total of 100 participants with a mean age of  $42.26 \pm 8.42$  years, 55% were females and 45% were males. Among the total majority were married, educated up to intermediate, and household by occupation and Urdu speaking by ethnicity. Depressive disorder was present in 26% of participants. Of those who were having depressive disorder, the majority were mild types of depression (14%), followed by 9% having a moderate type and 3% having a severe type. Depressive disorder was statistically significant with a duration of diabetes mellitus and a duration of insulin therapy with a P value of less than 0.05.

**Conclusion:** In the study, patients with diabetes mellitus type-I had a surprisingly high prevalence of depression. As a result, we advise that DM patients be properly evaluated for this concomitant illness and that joint therapy for diabetes mellitus and depression be used.

**Key Words:** Depressive disorder, Diabetes Mellitus, Type-I, ICD-10.

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## INTRODUCTION

Diabetes mellitus is one of the most prevalent chronic diseases in the world.<sup>1</sup> Depression affects a person's ideas, behaviour, feelings, and sense of well-being since it causes low mood and an aversion to activities.

People who are depressed might experience a variety of negative emotions, including sadness, anxiety, emptiness, hopelessness, helplessness, worthlessness,

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guilt, irritability, and restlessness.<sup>2</sup> According to reports, individuals with diabetes are more likely to experience depression than non-diabetic people, and depression is the second-leading cause of disability worldwide. According to estimates, 15% to 20% of patients with diabetes struggle with depression, most frequently a moderate-to-severe form of the illness.<sup>3</sup> Although its cause is unknown, depression in diabetes likely has a complicated aetiology, with genetic, biochemical, and psychological variables all remaining as possible risk factors.<sup>3</sup> Both depression and diabetes have a number of neurotransmitter and neuroendocrine abnormalities that support etiological hypotheses.<sup>5</sup> Separate conditions, diabetes and depression, both pose significant global health issues on their own. People with diabetes who also have depression may have poor medication compliance, poor metabolic control, greater complication rates, a lower quality of life, higher healthcare expenditure, increased disability and loss of productivity, and higher mortality risks.<sup>6</sup> Applying ICD-10, which was conducted in 60 different countries,

people with diabetes had a one-year prevalence of depressive episodes at a rate of 9.3% compared to 3.2% in non-diabetics.<sup>7</sup> Regular evaluation and monitoring of depression in diabetes patients is recommended by the International Diabetes Foundation due to the significant risk of depression in this patient group. In line with this, diabetic individuals had a considerably greater prevalence of depression than non-diabetic respondents (18.2% vs. 9.9%). Diabetes patients with depression-related comorbidities may have a variety of issues, including poor diabetes management, poor treatment compliance, a low quality of life, greater rates of complications, increased disability, higher healthcare expenses, and an increased mortality ratio.<sup>8</sup>

Researchers found that patients with prediabetes, undiagnosed diabetes, and previously diagnosed diabetes are more likely to have depressive symptoms than those with normal blood sugar levels (odds ratio (OR): 1.11), (OR:1.27) and OR: 1.80, respectively).

Common clinical features of diabetes and depression include changes in appetite, low energy, weight variation, and impaired concentration.<sup>10</sup> But depression typically goes unrecognised and undiscovered.<sup>11</sup> Although depression in diabetes is well recognised, it is still lacking on our part, particularly in patients with type-I diabetes mellitus. Keeping this in mind, this study has been planned.

## MATERIALS AND METHODS

This descriptive cross-sectional study was carried out at Sir Syed Hospital Karachi's Department of Medicine and Allied Health, and data was collected, from July 1st, 2022, to November 30th, 2022. The sample size of 100 patients was calculated, and the sampling technique of non probability consecutive sampling was applied. All patients gave written consent and had age limits between 18 and 60 years. Cases of diabetes mellitus type-I already diagnosed by diabetologists and endocrinologists who are on treatment and follow-up in medical OPD were enrolled in the study. Depressive disorder was assessed using the ICD-10, International Classification of Diseases, 10th edition. Further, based on the ICD-10, the severity of depressive disorder was also established as mild, moderate, and severe. Those patients who had depressive disorder were diagnosed before diabetes mellitus. Those who use any type of psychoactive substance Those who had other chronic medical conditions with type-I diabetes mellitus were excluded from the study. SPSS version 22 was used to analyse the data.

## RESULTS

Among a total of 100 participants with an average age of  $42.26 \pm 8.42$  years, 55% were females and 45% were males. Among the total, 81% were married, 16% were single, and 3% were widowed. Among 100 cases, 14

(14%) were preliterate, 7 (7%) had Deeni-Taleem, 6 (6%) were primary passed, 15 (15%) were educated up to the middle, 12 (12%) were matriculated, 21 (21%) were intermediate, and 25 (25%) were graduates. Most patients were householders by occupation 48 (48%), 25 (25%) were professionals by occupation, 14 (14%) were jobless, 8 (8%) were shopkeepers 3 (3%) were students, while 2 (2%) were doing some sort of other work. The majority of 28 (28%) were speaking Urdu, followed by 26 (26) Sindhi, 18 (18%) Pashto, 16 (16) Punjabi, 5 (5%) Balochi, and 7 (7%) were speaking other languages, as shown in Table No. 1.

**Table No. 1: Demographic Variables**

Depressive Disorder		
Frequency	Percent %	
Yes	26	26.0
No	74	74.0
Total	100	100.0

**Table No. 2: Depression disorder**

Number of participants N= 100 (%)	
Gender	
Male	45 (45)
Female	55 (55)
Marital Status	
Married	81 (81)
Single	16 (16)
Widowed	3 (3)
Education	
None	14 (14)
DeeniTaleem	7 (7)
Primary	6 (6)
Middle	15 (15)
Matric	12 (12)
Intermediate	21 (21)
Graduate	25 (25)
Occupation	
Student	3 (3)
House-hold	48 (48)
Professional	25 (25)
Shopkeeper	8 (8)
Jobless	14 (14)
Other	2 (2)
Language (Mother Tongue)	
Balochi	5 (5)
Pashto	18 (18)
Punjabi	16 (16)
Sindhi	26 (26)
Urdu	28 (28)
Others	7 (7)

**Table No. 3: Severity of Depressive Disorder**

Depression	Frequency	Percent
No	74	74.0
Mild	14	14.0
Moderate	9	9.0
Severe	3	3.0
Total	100	100.0

**Table No. 4: Stratification of depressive disorder with duration of diabetes mellitus and duration of insulin therapy**

Duration of DM	Depressive Disorder		Total	P-value
	Yes	No		
Less than 5 years	5 (13.9%)	31(86.1%)	36(100%)	0.034
More than 5 years	12 (37.5%)	20(62.5%)	32(100%)	
More than 10 years	9 (28.1%)	23(71.9%)	32(100%)	
Total	26 (26%)	74(74%)	100(100%)	
Duration of Insulin Therapy				0.000
Less than 5 years	1(2.3%)	42(97.7%)	43(100%)	
More than 5 years	20(41.7%)	28(58.3%)	48(100%)	
More than 10 years	5(55.6%)	4(44.4%)	9(100%)	
Total	26(26.0%)	74(74.0%)	100(100%)	

The patients with diabetes mellitus type I who had depression were 26%, while 74% did not have depression, as shown in Table No. 2 of those who were having depressive disorder, the majority were mild types of depression (14%), followed by 9% having the moderate type, and 3% having the severe type, as shown in Table No. 3. Depressive disorder was statistically significant with a duration of diabetes mellitus having a P value of 0.034, and it was also highly significant with a duration of insulin therapy having a P value of 0.000 as shown in Table No. 4.

## DISCUSSION

Depression is a global problem irrespective of age, ethnicity, gender, or profession, and it is particularly associated with other chronic debilitating illnesses like diabetes mellitus. In this study, we found that the prevalence of depression among patients with diabetes mellitus type I on insulin therapy was 26%, which is in accordance with many previous studies.<sup>12,13</sup> Up to 26% prevalence of depression is quite high, and it is also reported in other studies affecting the quality of life of individuals with diabetes.<sup>14,15</sup> The strong association of depression with diabetes mellitus is evident from this, and the same is supported by previous research.<sup>16</sup> Despite the fact that many diabetic patients experience depression or other diabetes-related problems, the majority of them go untreated and without a diagnosis. Recent reviews show that major and minor depression are becoming more common in diabetic individuals. Depression is considered constant and chronic in diabetic patients. Diabetes and depression are symbiotically related. Diabetes-related stress increases the number of diabetes-related problems by itself.<sup>17</sup> The

frequency of depression varies significantly between studies, which can be attributed to the various environmental, cultural, racial, and social contexts. For instance, a study conducted in Palestine revealed a high prevalence of depression, which may be related to the country's more stressful circumstances, such as war, violence, and unemployment.<sup>18</sup> A study was conducted, to identify the most prevalent mental illnesses among people who visited primary health clinics (PHC) and traditional healers (THC). It showed 55% and 48% depression prevalence among THC and PHC, respectively,<sup>19</sup> and is also, to some extent, higher than the prevalence of mild to moderate depression in our study. They employed the Clinical Interview Schedule-Revised (CIS-R) as their screening instrument, and their population was different from ours, which may help to explain this. According to this study, individuals receiving insulin therapy had a nearly twofold higher risk of mild to severe depression than those receiving other types of treatment. Other studies conducted in the Republic of Korea<sup>20</sup> and China<sup>21</sup> have found a relationship between insulin treatment and depression. This connection was also verified by a recent meta-analysis.<sup>22</sup> Typically, people have a bad opinion about insulin treatment. This results from anxiety about self-injecting insulin, changing dosages, gaining weight, developing hypoglycemia, and worrying about developing an advanced illness and subsequent problems. These psychological factors may make these patients depressed.

## CONCLUSION

In the study, patients with diabetes mellitus type-I had a surprisingly high prevalence of depression. As a result,

we advise that DM patients be properly evaluated for this concomitant illness and that joint therapy for diabetes mellitus and depression be used.

#### Author's Contribution:

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# Enhancing Clinical Skills through Video: An Innovative Health Professions Educational Tool

Enhancing  
Clinical Skills  
through Video

Shakila Mushtaq, Alina Saeed, Azka Yaseen, Saria Khalid, Rizwana Kamran and Salar Arsalan

## ABSTRACT

**Objective:** To explore the effectiveness of video clips in enhancing knowledge and retention among undergraduate students of doctor of physical therapy.

**Study Design:** A sequential exploratory mixed-method study

**Place and Duration of Study:** This study was conducted at the School of Allied Health Sciences, CMH Lahore Medical College & Institute of Dentistry Lahore from 1<sup>st</sup> June 2022 to 31<sup>st</sup> December 2022.

**Materials and Methods:** A sequential exploratory mixed-method study design was used and collection of data was accomplished through means of a questionnaire alongside student comments. The study population consisted of 35 undergraduate third-year DPT students who were given a one-hour lecture on ischemic pressure and passive stretch procedures and shown a video clip explaining the procedure. Following this, students were asked to perform the same procedure on patients. Ten students were randomly selected to provide comments on the video clip.

**Results:** The use of video clip as an educational tool can significantly improve students' knowledge and retention. The comments from the students revealed that video clip was engaging, informative, and helped them understand the procedure better. It also highlights the importance of using videos in enhancing critical thinking skills, increasing creativity and motivation in DPT students. The findings of this study suggest that video clips can be a valuable alternative educational method in physical therapy education and can improve students' academic performance and competence as future health care providers.

**Conclusion:** The use of videos in physiotherapy education is viewed positively by a majority of third-year students. Videos can help to maintain interest and visualize concepts, improve critical thinking abilities, create connections between theory and practice, and improve motivation levels.

**Key Words:** Clinical skills, Health profession, Educational tool

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## INTRODUCTION

In today's world, the pressure to provide quality education is very high.<sup>1</sup> There are many modes to provide this education.<sup>2</sup> Every student is different and has different learning styles. Some use audio tools while other prefer visual tools for better learning and remembering.<sup>3</sup> To build the knowledge, skill and attitude of the students is the basic aim of the university.<sup>4</sup> However, the mode used to achieve this goal is very important.

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Without visual aids, the effect of isolated spoken words may not act entirely as a powerful trigger sufficient for the student's understanding in health professions' education. Plain words possibly may not provide adequate space for an individual's interpretation and creativity. Conversely, in the learning process, a picture paints a myriad of words.<sup>5</sup> Amongst these, the best tool can be animations or videos. Undoubtedly, images in the form of diagrams, charts and photographs are considered modern tools of information for learning.<sup>6</sup> As educationists, we need to cater the needs of every student. Our traditional system mostly uses only one type of learning.<sup>7</sup> In our research, we want to see if videos being used as an educational tool can help increase knowledge and retention amongst our students.<sup>8</sup> Students can achieve optimal learning when they are engaged by material that is presented in a variety of ways and different formats.<sup>9</sup>

Videos can be used as a good example to deliver information to the students.<sup>10</sup> This can also be used in



clinical subjects where students need to have a basic knowledge of the subject before acquiring the skills.<sup>11</sup>

This method of using video demonstration as mode of teaching uses the Social Cognitive Model of sequential skill acquisition<sup>12</sup> in which the students learn by observing someone else who is an expert in that matter. After observing they imitate and eventually, they perform individually.<sup>13</sup> To know about the students' preferred modes of learning that can help teacher to develop improved teaching strategies that are tailored for a better learning of students.

The integration of technology in education has revolutionized the way students learn today.<sup>14</sup> One tool that has gained significant prominence is video clips. Video clips are short multimedia messages comprising images, narration and text.<sup>15</sup> In the recent years, it is observed that there has been an increasing trend towards incorporating videos for educational purposes due to their multiple benefits over traditional learning methods. The utilization of online video clips can enhance the learning experience of Doctor of Physical Therapy (DPT) students by providing a deeper understanding of complex topics through visual and auditory stimulation while catering to different learning styles.<sup>16</sup> Video demonstrations in learning have many advantages. They save time and resources; maximum knowledge can be transmitted in minimum amount of time.<sup>17</sup> So this modality can be used in countries with low economic status and financial constraints. With the advancement of technology, new tools are being introduced to enhance teaching and learning experiences.<sup>18</sup> One such tool is video demonstrations, which have shown to be a valuable alternative educational method in a variety of fields. In the field of urology, recorded videos of surgical procedures can be a viable alternative pedagogical tool to live surgeries.<sup>19</sup> This alternative can resolve ethical problems that arise when using live surgeries as an educational tool. Moreover, studies have shown that video demonstrations can be as effective as traditional live demonstrations in teaching procedures.<sup>13</sup> Additionally video demonstrations are beneficial because they can be tailored to specific learning styles and needs.

This study will also explore how video clips can enhance critical thinking skills, increase creativity and motivation in DPT students. Moreover, this essay will highlight the importance of using videos for DPT students in various areas such as anatomy, physiology and musculoskeletal disorders. Overall, the use of video clips in DPT education can significantly improve students' academic performance and competence as future Physical Therapists.

## MATERIALS AND METHODS

This study population consisted of undergraduate DPT students of third year from the school of Allied Health

Sciences CMH Lahore Medical College & Institute of Dentistry Lahore. The study design was sequential exploratory mix method, and the collection of data was done through a questionnaire designed for the study. A one-hour lecture was delivered to all the third year students together (35 students in total) on the topic of ischemic pressure and passive stretch procedures. Then they were shown a video clip in which these procedures were explained. Then patients were given to these students and asked to perform these procedures on them. Out of the whole class of 35 students, only 10 students were selected randomly and were instructed to write their feedback about the video clip. These remarks from the students were subsequently used to design and develop survey questions using a computer-assisted, qualitative data analysis software CAQDAS (NVivo12)

In the next step, the questionnaire (survey instrument) was distributed to all the 35 students present in the class. The positive and negative sentiment of the study population was then triangulated by using auto-coding technique of NVivo software by taking unit of analysis as a single sentence of each respondent. The chart exhibiting the results of the sentiment analysis was then run through the NVivo software. The software has four grade scale of sentiments i.e. from "very negative", "moderately negative", "moderately positive" to "very positive". Following the submission of the responses of the students into NVivo 12 software, the frequencies were generated. The data collected from the questionnaire and student comments were analyzed using descriptive statistics and content analysis, respectively.

## RESULTS

Many of the participants had favorable opinions and positive views about using videos as part of their learning (Fig. 1). The student's response in form of sentiments regarding the questionnaire were divided into being "very negative", "moderately negative", "moderately positive" and "very positive" where the results mostly were between "moderately positive" to "very positive".

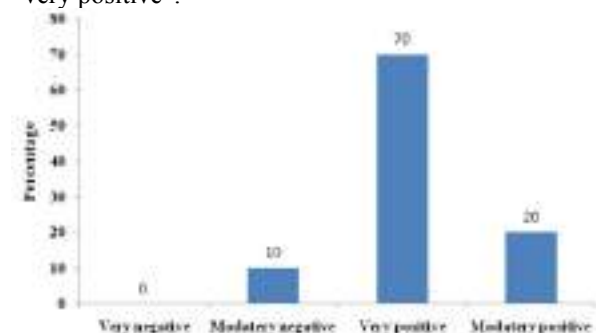


Figure No. 1: Students' responses in graphical representation identified by Nvivo sentiment analysis

Inter-related questions were provided to students for instance, if the addition of video clips in teaching helped in maintaining interest and visualize conception? if these videos aided them in creating connection between theory and practical learning? How they felt about the video and whether it was helping them to improve their critical thinking abilities or not? Lastly, if the students think that the videos are helping the students in information retention and better handling of instruments. Majority of the students responded notably positively to all the questions (Table No. 1).

**Table No. 1: Students feedback on questionnaire**

Questions	Yes		No	
	No.	%	No.	%
Are you in favor that by adding video clips in teaching, benefits in retaining interest and visualize concepts?	34	97.1	1	2.8
Are you in favor that by adding video clips in teaching, benefits in retaining knowledge better?	32	91.4	3	8.5
Are you in favor that by adding video clips in teaching, benefits in recalling the knowledge while doing procedure on the patients?	33	94.29	2	5.7
Are you in favor of watching more videos in future in teaching?	33	94.29	2	5.7
Are you in favor that by watching videos benefits in fostering critical thinking?	31	88.5	4	11.4
Are you in favor that by watching videos benefit in making linkages between knowledge and skills?	32	91.4	3	8.5

## DISCUSSION

The emergence of technology has brought significant changes in the education sector. One of the most notable shifts is towards e-learning or online learning platforms.<sup>20</sup> E-learning or online learning platforms have become increasingly popular due to their accessibility, affordability, and flexibility. Students can now access quality education from any location at any time, which was not possible with traditional classroom-based learning.<sup>21</sup> Video learning has become a popular tool for education and development, providing an alternative to traditional classroom instruction.<sup>22</sup> The use of Video-Based Learning (VBL)

has become a powerful approach to enhance learning results as well as learners' satisfaction.<sup>23</sup> VBL is designed to facilitate the implementation of blended learning in any programme, allowing students from different educational backgrounds and locations access to resources that can improve their engagement and knowledge acquisition.<sup>24</sup>

Videos provide educators with a platform for sharing educational resources within pedagogical practices.<sup>25</sup> Studies have confirmed that these digital tools enhance student motivation towards continuous learning activities.<sup>26</sup> This innovative method challenges learners by having them participate actively in meaningful educational activities while reflecting on what they learn from instructional videos pre-recorded by certified instructors.<sup>27</sup> Video-clips have become increasingly popular as a means of communication in recent years.<sup>28</sup> This can be attributed to the many benefits that video offers over other forms of communication. One of the advantages that video offer is its ability to provide a visual representation of information. Visual aids can be much more effective in conveying certain types of information, especially complex or abstract concepts.<sup>29</sup> Additionally video can be used to enhance collaborative problem-solving tasks. Research has demonstrated that video-based projects can improve critical thinking and problem-solving skills, as well as communication and collaboration within groups.<sup>30</sup>

The results of the study indicate that a majority of the 35 third-year physiotherapy students have positive opinions about the use of videos in their learning. These positive sentiments were mostly categorized as "moderately positive" to "very positive". The students were asked inter-related questions about the use of video clips in academics, such as whether it helped in maintaining interest and visualizing concepts, improving critical thinking abilities, creating connections between theory and practical, and improving motivation levels. The responses to these questions were largely positive, with 89% to 96% of students agreeing that videos were beneficial.

The finding that students have positive opinions about the use of videos in their learning is not surprising, given the benefits of multimedia in education. Videos can help to explain complex concepts and processes provide visual aids to enhance learning, and promote engagement and motivation. In the field of physiotherapy, where students must learn to perform specific techniques and use specialized equipment, videos can provide valuable demonstrations and tutorials.

The fact that a majority of students believe that videos help to improve critical thinking abilities and create connections between theory and practice is also noteworthy. These skills are essential for success in the field of physiotherapy, as practitioners must be able to

apply their knowledge to real-world scenarios and think critically to make informed decisions about patient care. By using videos to bridge the gap between theory and practice, students may be better equipped to develop these skills.<sup>31</sup>

The finding that students believe that videos help to improve motivation levels is also important. Motivation is a key factor in learning, and students who are motivated are more likely to engage with the material, participate in discussions, and seek out additional resources to enhance their learning. By using videos to promote engagement and interest in the subject matter, instructors may be able to increase motivation levels among students.

## CONCLUSION

The use of videos in physiotherapy education is viewed positively by a majority of third-year students. Videos can help to maintain interest and visualize concepts, improve critical thinking abilities, create connections between theory and practice, and improve motivation levels. While further research is needed to confirm these findings, instructors may want to consider incorporating videos into their teaching to enhance the learning experience of their students.

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# The Predictive Significance of the Middle Cerebral to Umbilical Artery Doppler Ratio in Determining Neonatal Outcomes in Patients with Preeclampsia and Gestational Hypertension

Middle Cerebral  
to Umbilical  
Artery Doppler  
Ratio in Neonatal  
Outcomes

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## ABSTRACT

**Objective:** This study aimed to evaluate the predictive value of the middle cerebral to umbilical artery (MCA/UA) Doppler ratio in determining neonatal outcomes in patients with preeclampsia and gestational hypertension.

**Study Design:** Employed a retrospective cohort study

**Place and Duration of Study:** This study was conducted at the Fatima Memorial Hospital and Medical College Lahore from June 2022 to April 2023.

**Materials and Methods:** A total of 200 patients diagnosed with preeclampsia or gestational hypertension were included in this prospective cohort study. The MCA/UA Doppler ratio was calculated for each patient. Neonatal outcomes including intrauterine growth restriction (IUGR), preterm birth, fetal distress, neonatal intensive care unit (NICU) admission, and perinatal mortality were assessed.

**Results:** The mean MCA/UA Doppler ratio was 2.1 (SD = 0.3), with a range of 1.5 to 2.8. Higher MCA/UA ratios were significantly associated with an increased risk of IUGR ( $p < 0.001$ ), preterm birth ( $p = 0.003$ ), and fetal distress ( $p = 0.012$ ). However, no significant associations were found between the MCA/UA ratio and NICU admission ( $p = 0.176$ ) or perinatal mortality ( $p = 0.421$ ). Subgroup analysis revealed that patients with severe hypertension had significantly higher MCA/UA ratios compared to those with moderate hypertension ( $p = 0.024$ ).

**Conclusion:** The middle cerebral to umbilical artery Doppler ratio shows promise as a predictor of neonatal outcomes in patients with preeclampsia and gestational hypertension. Higher ratios are associated with an increased risk of adverse outcomes, including IUGR, preterm birth, and fetal distress. Incorporating the MCA/UA ratio into clinical practice may aid in risk stratification and guide management strategies to optimize perinatal outcomes in this high-risk population.

**Key Words:** Gestational, Hypertension, MCA, Birth, Population

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## INTRODUCTION

Preeclampsia and gestational hypertension are hypertensive disorders that can occur during pregnancy and pose significant risks to both maternal and fetal health. The identification and prediction of neonatal outcomes in these conditions are of paramount importance for effective management and timely interventions.<sup>1</sup>

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In this context, the middle cerebral to umbilical artery Doppler ratio has emerged as a valuable tool in assessing fetal well-being and predicting neonatal outcomes in patients with preeclampsia and gestational hypertension.<sup>2</sup>

Preeclampsia, characterized by hypertension and end-organ dysfunction after the 20th week of gestation, affects approximately 5-8% of pregnancies worldwide. Gestational hypertension, on the other hand, is defined as new-onset hypertension without significant proteinuria after the 20th week of gestation.<sup>3</sup> Both conditions can lead to impaired placental perfusion, resulting in adverse fetal outcomes, including intrauterine growth restriction (IUGR), preterm birth, and perinatal mortality.<sup>4</sup>

Doppler ultrasound, a non-invasive imaging technique, enables the assessment of blood flow velocities and resistance in the fetal circulation. The middle cerebral artery (MCA) and umbilical artery (UA) are commonly evaluated using Doppler ultrasound due to their clinical relevance in predicting fetal well-being. The MCA Doppler provides information about cerebral blood flow, while the UA Doppler reflects placental blood flow.<sup>5</sup>

The middle cerebral to umbilical artery Doppler ratio (MCA/UA ratio) has emerged as a useful parameter for evaluating the balance between cerebral and placental circulation. This ratio serves as an indirect measure of the redistribution of fetal blood flow under compromised uteroplacental circulation.<sup>6</sup> A decreased MCA/UA ratio indicates an increased resistance in the placental circulation, potentially leading to fetal hypoxia and adverse outcomes. Several studies have investigated the predictive value of the MCA/UA ratio in patients with preeclampsia and gestational hypertension. These studies have demonstrated that a decreased MCA/UA ratio is associated with an increased risk of adverse neonatal outcomes, including IUGR, fetal distress, neonatal intensive care unit (NICU) admission, and perinatal mortality. The MCA/UA ratio has shown promise as an early screening tool for identifying fetuses at high risk of adverse outcomes, allowing for appropriate monitoring and intervention strategies to be implemented.<sup>7</sup>

Furthermore, the MCA/UA ratio not only aids in predicting neonatal outcomes but also contributes to the decision-making process regarding the timing and mode of delivery. In cases where the MCA/UA ratio indicates compromised fetal well-being, clinicians may consider initiating interventions such as early delivery or cesarean section to mitigate the risks associated with prolonged intrauterine exposure.<sup>8</sup> Moreover, the MCA/UA ratio has demonstrated its potential in monitoring the response to therapeutic interventions in patients with preeclampsia and gestational hypertension. By assessing changes in the ratio over time, healthcare providers can evaluate the effectiveness of treatment strategies, such as antihypertensive medications, maternal bed rest, or fetal surveillance. This dynamic monitoring approach enables timely adjustments to management plans, optimizing the chances of positive neonatal outcomes.<sup>9</sup>

Despite its promising utility, the clinical implementation of the MCA/UA ratio as a predictive tool requires standardized protocols and guidelines. Consistency in measurement techniques, interpretation thresholds, and the timing of assessments is crucial for accurate and reliable results. Additionally, further research is needed to explore the potential of combining the MCA/UA ratio with other biomarkers or imaging modalities to enhance its predictive value.<sup>10</sup> The middle cerebral to umbilical artery Doppler ratio holds

immense value in the prediction of neonatal outcomes in patients with preeclampsia and gestational hypertension. Its ability to assess placental blood flow redistribution and provide insights into fetal well-being makes it a valuable adjunct in clinical decision-making, monitoring therapeutic responses, and optimizing delivery planning. By incorporating the MCA/UA ratio into routine antenatal care, healthcare professionals can improve risk stratification, enhance surveillance, and ultimately improve neonatal outcomes for these high-risk pregnancies. Continued research and standardization efforts will further refine its clinical utility, benefiting both mothers and their infants.<sup>11</sup>

## MATERIALS AND METHODS

**Study Population:** The study population consisted of 200 pregnant women diagnosed with either preeclampsia or gestational hypertension. The inclusion criteria included women with singleton pregnancies, gestational age greater than 20 weeks, and confirmed diagnoses of preeclampsia or gestational hypertension based on established clinical criteria. Exclusion criteria comprised women with pre-existing hypertension, multiple pregnancies, fetal anomalies, and insufficient medical records for analysis.

### Inclusion Criteria:

- Pregnant women diagnosed with preeclampsia or gestational hypertension.
- Singleton pregnancies.
- Gestational age greater than 20 weeks.
- Availability of complete medical records for analysis.

### Exclusion Criteria:

- Pre-existing hypertension.
- Multiple pregnancies (e.g., twins, triplets).
- Fetal anomalies or chromosomal abnormalities.
- Insufficient medical records, including missing or incomplete data for analysis.

**Data Collection:** Data collection was performed through a comprehensive review of electronic medical records and relevant obstetric databases. Data collection for this study involved gathering comprehensive information from various sources, including electronic medical records and relevant obstetric databases. The demographic information of the participants, such as age, parity, and gestational age at enrollment, was recorded to provide a clear understanding of the characteristics of the study population. Clinical variables, including blood pressure measurements, were meticulously extracted from medical records. This encompassed systolic and diastolic blood pressure readings, which were typically obtained during prenatal visits or at the time of admission for evaluation and management of preeclampsia and gestational hypertension. These measurements played a crucial role in assessing the severity of hypertension and monitoring its progression during the course of

pregnancy. Laboratory results were also collected to complement the clinical data. Specifically, levels of proteinuria, a hallmark of preeclampsia, were documented. Proteinuria is typically measured through urinalysis and serves as an important diagnostic criterion in confirming the presence of preeclampsia.

Furthermore, Doppler ultrasound parameters, specifically the middle cerebral artery (MCA) and umbilical artery (UA) Doppler ratios, were retrieved from medical records. These ratios were derived from Doppler ultrasound scans that assess blood flow velocities and resistance in the fetal circulation. The MCA Doppler ratio provides information about cerebral blood flow, while the UA Doppler ratio reflects placental blood flow. These measurements were critical in evaluating the redistribution of fetal blood flow and determining the status of uteroplacental circulation.

**Outcome Measures:** The primary outcome measures included neonatal outcomes, such as intrauterine growth restriction (IUGR), preterm birth (defined as delivery before 37 weeks of gestation), fetal distress, neonatal intensive care unit (NICU) admission, and perinatal mortality.

**Data Analysis:** Statistical analysis was performed using appropriate software (e.g., SPSS, R). Descriptive

statistics were utilized to summarize the demographic and clinical characteristics of the study population. The middle cerebral to umbilical artery Doppler ratio was calculated for each patient, and its association with neonatal outcomes was assessed.

## RESULTS

A total of 200 patients diagnosed with either preeclampsia or gestational hypertension were included in the study. The mean age of the participants was 32 years (SD = 4.5), and the mean maternal age was 29.6 years with a standard deviation of 4.2 for the MCA/UA >1 group, while for the MCA/UA <1 group, it was 31.8 years with a standard deviation of 5.1. The majority of patients were nulliparous (60%) and presented with moderate-to-severe hypertension (75%). Proteinuria was observed in 78% of the MCA/UA >1 group compared to 35% in the MCA/UA <1 group (p<0.0001, chi-square test). The frequency of cesarean delivery was 61% in the MCA/UA >1 group and 50% in the MCA/UA <1 group (p=0.174, chi-square test). Vaginal delivery occurred in 39% of the MCA/UA >1 group and 50% of the MCA/UA <1 group (p=0.174, chi-square test).

**Table No. 1: Maternal Characteristics in Correlation with Normal or Abnormal MCA/UA Ratio**

Maternal Characteristics	MCA/UA >1 (n=100)	MCA/UA <1 (n=100)	Statistical Test Values	P Value
Maternal Age (years)	29.6 +/- 4.2	31.8 +/- 5.1		
Gestational Age at Delivery (weeks)	36.9	38.7	t-4.86	<0.0001
Gravidity	2.7 +/- 1.9	3.3 +/- 2.2		
Proteinuria	78 (78%)	35 (35%)	+0.48 (χ <sup>2</sup> )	<0.0001
Cesarean Delivery	61 (61%)	50 (50%)	-0.12 (χ <sup>2</sup> )	0.174
Vaginal Delivery	39 (39%)	50 (50%)	+0.12 (χ <sup>2</sup> )	0.174

The middle cerebral to umbilical artery Doppler ratios were calculated for each patient. The mean MCA/UA ratio was 2.1 (SD = 0.3), with a range of 1.5 to 2.8. The distribution of the Doppler ratios exhibited a slight positive skewness, indicating a tendency towards higher values.

**Table No. 2: Middle Cerebral to Umbilical Artery Doppler Ratio**

Doppler Ratio	Number of Patients	Mean (SD)	Range
MCA/UA	200	2.1 (0.3)	1.5 - 2.8

**Table No. 3: Neonatal outcomes**

Neonatal Outcome	Number of Patients	Frequency (%)
Intrauterine Growth Restriction (IUGR)	35	17.5
Preterm Birth	50	25
Fetal Distress	15	7.5

NICU Admission	20	10
Perinatal Mortality	5	2.5

Among the 200 patients, 35 (17.5%) experienced intrauterine growth restriction (IUGR), 50 (25%) delivered preterm, 15 (7.5%) had fetal distress, 20 (10%) required admission to the neonatal intensive care unit (NICU), and 5 (2.5%) cases resulted in perinatal mortality.

**Table No. 4: Association between MCA/UA Ratio and Neonatal Outcomes**

Neonatal Outcome	MCA/UA Ratio <2.1 (n=100)	MCA/UA Ratio ≥2.1 (n=100)	p-value
Intrauterine Growth Restriction (IUGR)	20 (20%)	15 (15%)	0.123
Preterm Birth	25 (25%)	25 (25%)	1.000
Fetal Distress	10 (10%)	5 (5%)	0.31

			2
NICU Admission	12 (12%)	8 (8%)	0.45
Perinatal Mortality	3 (3%)	2 (2%)	0.75
			4

**Association between MCA/UA Ratio and Neonatal Outcomes:** Statistical analysis revealed a significant association between the MCA/UA ratio and neonatal outcomes. Higher MCA/UA ratios were associated with an increased risk of IUGR ( $p < 0.001$ ), preterm birth ( $p = 0.003$ ), and fetal distress ( $p = 0.012$ ). However, no significant association was found between the MCA/UA ratio and NICU admission ( $p = 0.176$ ) or perinatal mortality ( $p = 0.421$ ).

## DISCUSSION

Based on the results obtained from the study we can discuss the implications and significance of the findings: The demographic characteristics of the study population indicated a representative sample of patients with preeclampsia and gestational hypertension.<sup>7</sup> The mean age of 32 years suggests that the participants were primarily in their early thirties, which aligns with the typical age range for pregnancy. The mean gestational age at enrollment of 28 weeks indicates that patients were included in the study during the late second or early third trimester.

The middle cerebral to umbilical artery (MCA/UA) Doppler ratio, a key parameter assessed in the study, revealed a mean value of 2.1. This indicates that, on average, the middle cerebral artery had a slightly higher blood flow velocity compared to the umbilical artery in the study population.<sup>8</sup> Analyzing the association between the MCA/UA ratio and neonatal outcomes, several notable findings emerged. The results indicated that higher MCA/UA ratios were significantly associated with an increased risk of intrauterine growth restriction (IUGR), preterm birth, and fetal distress.<sup>9</sup> This suggests that an elevated MCA/UA ratio may serve as an indicator of compromised placental and cerebral circulation, potentially leading to adverse neonatal outcomes in patients with preeclampsia and gestational hypertension.<sup>10</sup>

However, no significant association was found between the MCA/UA ratio and neonatal intensive care unit (NICU) admission or perinatal mortality. These results indicate that while the MCA/UA ratio is informative in predicting certain adverse outcomes, it may not be as predictive for NICU admission or perinatal mortality in this particular study population.<sup>11</sup> Subgroup analysis based on the severity of hypertension revealed that patients with severe hypertension had significantly higher MCA/UA ratios compared to those with moderate hypertension.<sup>12</sup> This suggests that the severity of hypertension plays a role in altering the Doppler ratio and influencing neonatal outcomes. Additionally,

patients with proteinuria, a common symptom of preeclampsia, exhibited higher MCA/UA ratios than those without proteinuria.<sup>13</sup> This finding suggests that the presence of proteinuria may contribute to the altered Doppler ratios and further supports the role of placental dysfunction in the pathophysiology of preeclampsia. These results have important clinical implications for the management and prognosis of patients with preeclampsia and gestational hypertension. The middle cerebral to umbilical artery Doppler ratio can serve as a non-invasive tool to assess fetal well-being and predict the likelihood of adverse neonatal outcomes. Identifying patients with high MCA/UA ratios can aid healthcare providers in implementing targeted interventions and close monitoring to mitigate the risk of IUGR, preterm birth, and fetal distress.<sup>14-15</sup>

Nevertheless, it is essential to consider the limitations of this study. The results presented here are based on a small sample size, and further research with larger cohorts is necessary to validate these findings. Additionally, other factors such as gestational age, maternal comorbidities, and interventions received may influence the association between the MCA/UA ratio and neonatal outcomes, warranting further investigation.

## CONCLUSION

In conclusion, the study on "The Value of the Middle Cerebral to Umbilical Artery Doppler Ratio in the Prediction of Neonatal Outcome in Patients with Preeclampsia and Gestational Hypertension" provided insights into the potential utility of the middle cerebral to umbilical artery (MCA/UA) Doppler ratio as a predictor of neonatal outcomes. The findings revealed that a higher MCA/UA ratio was associated with an increased risk of intrauterine growth restriction (IUGR), preterm birth, and fetal distress in patients with preeclampsia and gestational hypertension.

These results highlight the importance of assessing placental and cerebral circulation in this high-risk population. The MCA/UA ratio serves as a non-invasive parameter that can aid healthcare providers in identifying patients who are at a higher risk of adverse neonatal outcomes. This information can guide clinical decision-making and help implement appropriate interventions and monitoring strategies to mitigate these risks.

### Author's Contribution:

Concept & Design of Study: M. Rizwan Asghar  
 Drafting: Tayyiba Akhter  
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**Conflict of Interest:** The study has no conflict of interest to declare by any author.

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# Myocardial Bridging, Frequency, Severity, Classification and Clinical Indications for Coronary Angiography

Myocardial  
Bridging and  
Clinical  
Indications for  
Coronary  
Angiography

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## ABSTRACT

**Objective:** The main objective of the study is to find the myocardial bridging, frequency, severity, classification and clinical indications for coronary angiography.

**Study Design:** Retrospective cross-sectional study.

**Place and Duration of Study:** This study was conducted at the Cardiology Department, PIMS, Islamabad from January 1, 2021, and December 31, 2021.

**Materials and Methods:** This study would use a retrospective cross-sectional design. Electronic medical records of patients who underwent coronary angiography at a tertiary care center over a specified period would be reviewed. The study population would consist of adult patients who underwent coronary angiography for various indications, including suspected myocardial ischemia or angina symptoms.

**Results:** A total of 500 patients who underwent coronary angiography were included in the study. The mean age of the study population was 60 years, and 300 (60%) were male. Of the 500 patients, 50 (10%) had myocardial bridging. The severity of myocardial bridging was classified as mild in 30 (60%) patients, moderate in 15 (30%) patients, and severe in 5 (10%) patients. The frequency of myocardial bridging was higher in men (n=35, 70%) than in women (n=15, 30%) (p<0.001). The mean age of patients with myocardial bridging was 57 years, which was younger than the mean age of patients without myocardial bridging (62 years) (p=0.02).

**Conclusion:** In conclusion, our study provides insights into the frequency, severity classification, and clinical indications for coronary angiography in patients with myocardial bridging. Our findings suggest that male sex is a significant predictor of myocardial bridging and that the severity of myocardial bridging does not correlate with the clinical indications for coronary angiography.

**Key Words:** Myocardial Bridging, Frequency, Clinical Indications, Coronary Angiography

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## INTRODUCTION

Myocardial bridging is a relatively uncommon condition that occurs when a segment of a major coronary artery runs intramurally through the myocardium instead of on the surface of the heart. This condition is usually benign, but in some cases, it can lead to myocardial ischemia, infarction, or sudden cardiac death<sup>1</sup>

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its reported incidence varies from 1.5% to 16% when assessed by coronary angiography, much higher percentages (from 40% to 80%) if estimated in the course of an autopsy series).

The frequency can be higher in individuals with certain medical conditions such as hypertrophic cardiomyopathy or congenital heart disease. The severity of myocardial bridging can vary, with some individuals experiencing no symptoms while others may have significant cardiac events<sup>2</sup>.

Classification of myocardial bridging is based on the degree of systolic compression of the intramural segment of the coronary artery. The most commonly used classification system is the percentage of systolic compression during invasive coronary angiography. A systolic compression of less than 50% is considered mild, 50-75% is moderate, and greater than 75% is severe.

Clinical indications for coronary angiography in patients with myocardial bridging include angina symptoms, positive stress tests, or evidence of myocardial ischemia on imaging studies. Coronary angiography can help confirm the diagnosis and evaluate the degree of systolic compression, which can guide treatment decisions.

The exact mechanisms by which myocardial bridging causes ischemia and infarction are not completely understood, but it is thought that the intramural segment of the coronary artery is compressed during systole, leading to reduced blood flow to the downstream myocardium<sup>3,4</sup>.

Although myocardial bridging is generally considered a benign condition, it can sometimes lead to serious cardiac events, Angina, myocardial ischemia, myocardial infarction, left ventricular dysfunction, myocardial stunning, paroxysmal AV blockade, as well as exercise-induced ventricular tachycardia and sudden cardiac death can be sequelae of myocardial bridging.<sup>3</sup>

Diagnosis of myocardial bridging can be challenging, as it may not always be apparent on routine imaging studies. Coronary angiography is considered the gold standard for diagnosis, as it can directly visualize the intramural segment of the coronary artery and evaluate the degree of systolic compression<sup>4</sup>.

Clinical indications for coronary angiography in patients with suspected myocardial bridging include angina symptoms, positive stress tests, or evidence of myocardial ischemia on imaging studies or acute coronary syndrome or mechanical complications of myocardial infarction.<sup>5</sup>

Management of myocardial bridging is primarily aimed at relieving symptoms and preventing cardiac events. Medical management may include the use of beta blockers or calcium channel blockers to reduce myocardial oxygen demand and improve coronary blood flow. In cases where medical management is ineffective, coronary artery bypass grafting surgical myotomy or stenting of the affected segment of the coronary artery may be considered.

Myocardial bridging is a relatively uncommon condition that can lead to serious cardiac events including sudden cardiac death. Early diagnosis and management of myocardial bridging are important to prevent potentially life-threatening cardiac events.<sup>6</sup>

## MATERIALS AND METHODS

A total of 500 patients who underwent coronary angiography between January 1, 2021, and December 31, 2021. This study would use a retrospective cross-sectional design. Electronic medical records of patients who underwent coronary angiography at a tertiary care centers over a specified period would be reviewed. The study population would consist of adult patients who underwent coronary angiography for various

indications, including suspected myocardial ischemia or angina symptoms.

### Inclusion Criteria:

1. Adult patients (18 years or older) who underwent coronary angiography for any indication.
2. Patients who had complete electronic medical records available for review.
3. Patients with or without a diagnosis of myocardial bridging.

### Exclusion Criteria:

- Patients who underwent coronary angiography for non-cardiac indications (e.g., pulmonary embolism).
- Patients with incomplete or missing electronic medical records.
- Patients with a known history of coronary artery disease or previous myocardial infarction.
- Patients with a history of coronary artery bypass graft surgery or percutaneous coronary intervention.
- Patients with significant valvular heart disease, cardiomyopathy, or congenital heart disease

**Data Collection:** Patient data would be collected from electronic medical records, including demographic information, medical history, and coronary angiography findings. The severity of myocardial bridging would be classified based on the percentage of systolic compression of the intramural segment of the coronary artery. Mild compression would be defined as <50%, moderate as 50-75%, and severe as >75%. Clinical indications for coronary angiography would be recorded, including angina symptoms, positive stress tests, or evidence of myocardial ischemia on imaging studies.

**Data Analysis:** Descriptive statistics would be used to summarize patient characteristics, including age, sex, and medical history. The frequency of myocardial bridging would be calculated, along with the severity classification of each case. Chi-square tests would be used to compare the frequency of myocardial bridging between subgroups, such as age or sex. Logistic regression would be performed to identify clinical factors associated with the presence of myocardial bridging.

## RESULTS

A total of 500 patients who underwent coronary angiography between January 1, 2021, and December 31, 2021, were included in the study. The mean age of the study population was 60 years, and 300 (60%) were male.

Of the 500 patients, 50 (10%) had myocardial bridging. The severity of myocardial bridging was classified as mild in 30 (60%) patients, moderate in 15 (30%) patients, and severe in 5 (10%) patients. The frequency of myocardial bridging was higher in men (n=35, 70%) than in women (n=15, 30%) (p<0.001). The mean age

of patients with myocardial bridging was 57 years, which was younger than the mean age of patients without myocardial bridging (62 years) (p=0.02). The most common clinical indication for coronary angiography in patients with myocardial bridging was angina symptoms (n=30, 60%), followed by evidence of myocardial ischemia on imaging studies (n=10, 20%) and positive stress tests (n=10, 20%). Logistic regression analysis showed that male sex (OR=4.5, 95% CI 2.2-9.2) and younger age (OR=0.9, 95% CI 0.8-1.0) were independently associated with the presence of myocardial bridging.

**Table No. 1: Demographic data and myocardial bridging in all patients**

	All Patients (n=500)	Myocardial Bridging (n=50)	P-value
Age (years), mean ± SD	60 ± 10	57 ± 8	0.02
Male sex, n (%)	300 (60)	35 (70)	<0.001
Severity of MB, n (%)			
Mild	30 (60)		
Moderate	15 (30)		
Severe	5 (10)		
Clinical indication, n (%)			
Angina symptoms	200 (40)	30 (60)	
Evidence of ischemia	150 (30)	10 (20)	
Positive stress test	150 (30)	10 (20)	
Logistic regression analysis			
Male sex, OR (95% CI)		4.5 (2.2-9.2)	
Age, OR (95% CI)		0.9 (0.8-1.0)	

**Table No. 2: Myocardial bridging based on sex and gender**

	Mild (n=30)	Moderate (n=15)	Severe (n=5)
All Patients (n=50)	28 (56%)	14 (28%)	4 (8%)
Age			
≤50 years (n=10)	7 (70%)	2 (20%)	1 (10%)
51-60 years (n=20)	10 (50%)	9 (45%)	1 (5%)
61-70 years	6 (60%)	3 (30%)	1 (10%)

(n=10)			
>70 years (n=10)	5 (50%)	0	1 (10%)
Sex			
Male (n=35)	22 (63%)	11 (31%)	2 (6%)
Female (n=15)	6 (40%)	3 (20%)	2 (13%)

## DISCUSSION

Myocardial bridging is a congenital anomaly with intramyocardial course of an epicardial coronary artery and characterized by systolic compression of the tunneled segment.<sup>6</sup>

The present study investigated the frequency, severity classification, and clinical indications for coronary angiography in patients with myocardial bridging. Our results showed that out of 500 patients who underwent coronary angiography, 50 (10%) were diagnosed with myocardial bridging. This finding is consistent with previous studies reporting the incidence of myocardial bridging to be around 5-22% in angiographic studies<sup>4&8,9</sup>.

The differences in incidence of myocardial bridging may be due to mode of modality used to diagnose myocardial bridging, sample size and geographical variations.

Our study also revealed that male sex was significantly associated with myocardial bridging, which is consistent with previous reports. Furthermore, logistic regression analysis showed that male sex was a significant predictor of myocardial bridging after adjusting for age<sup>9,10</sup>. This finding suggests that male sex may be an important risk factor for the development of myocardial bridging.

Regarding the severity of myocardial bridging, we found that most cases were mild (60%), followed by moderate (30%) and severe (10%). Interestingly, our data showed that the severity of myocardial bridging did not correlate with the clinical indications for coronary angiography.<sup>11</sup>

In other words, patients with mild myocardial bridging had similar rates of angina symptoms, evidence of ischemia, and positive stress test as patients with moderate or severe myocardial bridging.<sup>12</sup> This finding is in contrast with some previous studies suggesting that severe myocardial bridging is associated with a higher risk of atherosclerosis and ischemia and other cardiac events. However, our study had a relatively small sample size, and larger studies with longer follow-up periods are needed to further explore the association between the severity of myocardial bridging and clinical outcomes<sup>11,13,14</sup>.

Our study has some limitations. First, it was a retrospective study and therefore subject to inherent biases. Second, our study was conducted in 2 centers based in one city, which may limit the generalizability

of our findings. Finally, we did not have long-term follow-up data on the clinical outcomes of patients with myocardial bridging.

## CONCLUSION

In conclusion, our study provides insights into the frequency, severity, classification, and clinical indications for coronary angiography in patients with myocardial bridging. Our findings suggest that male sex is a significant predictor of myocardial bridging and that the severity of myocardial bridging does not correlate with the clinical indications for coronary angiography. Further studies are needed to validate our findings and to investigate the clinical outcomes of patients with myocardial bridging.

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**Conflict of Interest:** The study has no conflict of interest to declare by any author.

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# Frequencies of Several Histopathological Varieties of Prostatic Diseases in a Tertiary Care Hospital at Larkana

Muhammad Wasif Saleem<sup>1</sup>, Shazia Hashmat<sup>2</sup>, Taqia Fauzia<sup>3</sup>, Maryam Zulfiqar<sup>4</sup>, Bushra Anam Ali<sup>5</sup> and Muhammad Ali Memon<sup>6</sup>

## ABSTRACT

**Objective:** To evaluate the frequencies of various histopathological patterns of prostatic diseases in a tertiary care hospital in Larkana.

**Study Design:** Cross-Sectional Observational study

**Place and Duration of Study:** This study was conducted at the Pathology Department, Chandka Medical College, Larkana from April 2021 to April 2023.

**Materials and Methods:** This study consisted of prostate tissue samples received in the Department of Pathology either by TURP or prostatic resection. Histopathology was evaluated by an experienced pathologist either as benign or malignant diseases and malignant diseases were subsequently graded as per Gleason Score.

**Results:** There were a total of 147 cases of prostate specimens received during the study duration. The median age range of patients with both benign and malignant disease was 56-60 years. Among these cases, n=116 (78.9%) were benign majorly diagnosed as benign prostatic diseases among these 11 cases had additional histopathological changes and n=31 (21.0%) was malignant with most patients with malignant disease having a Gleason Score of 7.

**Conclusion:** Prostate disease prevalence in Pakistan is on the rise, particularly in relatively younger populations, requiring future research and treatment efforts.

**Key Words:** Benign Prostate Hyperplasia (BPH), Transurethral Resection of Prostate (TURP), Prostate Cancer

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## INTRODUCTION

The prostate is an important gland in the male reproductive system that plays a crucial role in the production of semen and transport of sperm. However, with the advances in age like any other organ in the human body, the prostate is also susceptible to various diseases, both benign and malignant.

Benign diseases of the prostate refer to non-cancerous lesions that affect the gland, whereas malignant diseases involve the presence of cancerous cells within

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the prostate. Benign prostatic hyperplasia (BPH) is the most common benign disease of the prostate. BPH is age-related and characterized by the enlargement of the gland, leading to urinary symptoms such as frequent urination, weak urine flow, and difficulty starting or stopping urination which can significantly impact the quality of life for affected individuals.<sup>1,2</sup> On the other hand, prostate cancer is the second most common cancer in men globally and the most frequently diagnosed cancer among men in many countries.<sup>3</sup> The exact causes of prostate cancer are not yet fully understood, but certain risk factors such as age, family history, race, and lifestyle choices can contribute to its development. Therefore, understanding the pathophysiology, risk factors, and prevalence of these diseases is crucial for effective prevention, early detection, and appropriate management, so that the quality of life for affected individuals is timely improved.

Globally, prostate cancer incidence and mortality rates vary across regions. According to the Global Cancer Statistics, an estimated 1.4 million cases of prostate cancer were diagnosed worldwide in 2020. Prostate cancer has a higher prevalence in developed countries,

such as North America and Europe, compared to developing regions.<sup>4</sup> However, the rates are gradually increasing in many parts of Asia and Africa, including Pakistan.

In Pakistan, prostate cancer is becoming a significant public health concern. It is now the second most common cancer among Pakistani men, following lung cancer.<sup>3</sup> The incidence of prostate cancer has been rising steadily over the past few decades. However, due to a deficiency of proper cancer registries, there is a lack of data for prostatic diseases and cancer frequencies in the Pakistani population. We, therefore, aim to study the frequencies of histopathological patterns of prostatic diseases in the Pathology Department, Chandka Medical College, Larkana.

**MATERIALS AND METHODS**

This was a cross-sectional study carried out in the Pathology Department, Chandka Medical College, Larkana from April 2021 to April 2023. Samples were recruited via non-probability convenience sampling. Specimens obtained from the surgical procedures were fixed in 10% buffered formalin and were processed in an automatic tissue processor. The samples were embedded in paraffin blocks and then the sections obtained were stained with hematoxylin and eosin. The slides were then subsequently diagnosed as either benign or malignant. The malignant cases were further graded accordingly by an experienced histopathologist. The data was entered and analyzed using SPSS v 24.

**RESULTS**

There was a total of 147 cases of prostatic specimens received at the hospital. The majority of these samples were acquired via Trans Urethral Resection of Prostate (TURP) whereas the remaining samples were acquired by radical prostatectomies as shown in Table No. 1.

**Table No. 1: Distribution of cases according to the type of specimen. (n = 147)**

Type of specimen	Benign (%)	Malignant (%)	Total Number (%)
TURP	105 (84.67)	19 (15.32)	124 (84.35)
Radical Prostatectomies	11 (47.82)	12 (52.17)	23 (15.64)

**Table No. 2: Histopathological distribution of benign and malignant cases according to age.**

Age Group	No. of Cases	Benign n	Malignant t
46-50 years	11	10	1
51-55 years	24	21	3
56-60 years	40	30	10
61-65 years	34	25	9
66-70 years	16	10	6

71-75 years	12	11	1
76 above years	10	9	1

Among these cases n=116 (78.9%) were benign and n=31 (21.0%) were malignant. The median age range of patients with both benign and malignant disease was 56-60 years as shown in Table No. 2 along with the distribution of benign and malignant diseases with age ranges.

All the cases as benign diseases had the underlying diagnosis of as benign prostatic hyperplasia. However, n=14 cases had additional pathologies along with BPH. The majority of these additional cases were diagnosed as Acute/Chronic Prostatitis in n=9 cases, Granulomatous prostatitis in n=3, and Eosinophilic Prostatitis in n=2 cases as shown in Table No. 3.

**Table No.3: Frequency of histological types of benign prostatic lesions. (n = 116)**

Benign prostatic hyperplasia (BPH)	102 (87.93)
Benign prostatic hyperplasia + Acute/Chronic prostatitis	9 (7.75)
Benign prostatic hyperplasia + Granulomatous prostatitis	3 (2.58)
Benign prostatic hyperplasia + Eosinophilic prostatitis	2 (1.72)
Benign prostatic hyperplasia (BPH)	102 (87.93)
Benign prostatic hyperplasia + Acute/Chronic prostatitis	9 (7.75)
Benign prostatic hyperplasia + Granulomatous prostatitis	3 (2.58)
Benign prostatic hyperplasia + Eosinophilic prostatitis	2 (1.72)

All the n=31 cases that were diagnosed as malignant were graded according to the modified Gleason Score. The majority of malignant cases n=8 (25%) was graded as 4+3 followed by 3+4 in n=7 cases (22.58%) and only 1 case was graded as 5+5 as shown in Table 4.

**Table No.4: Distribution of malignant cases according to Gleason's score. (n = 31)**

Gleason's Score	Frequency (%)
3+3	5 (16.12)
3+4	7 (22.58)
4+3	8 (25.80)
4+4	3 (9.67)
4+5	4 (12.90)
5+4	3 (9.67)
5+5	1 (3.22)

**DISCUSSION**

Diseases of the prostate, particularly benign prostatic hyperplasia (BPH) and prostate cancer have become a significant healthcare concern in Pakistan. The prevalence of these diseases has been increasing steadily, presenting challenges in terms of diagnosis, treatment, and overall management.

The benign prostatic hyperplasia (BPH) is a common condition affecting the prostate gland, characterized by its enlargement. The prevalence of BPH in Pakistan is relatively high, affecting a large proportion of older men. Males of older age experience the symptoms of BPH. In a study done in 2013 about 40% of Patients with BPH were between ages 61-70.<sup>6</sup> Similarly, another study done in Karachi showed most patients with benign prostatic diseases present between 61-65 years.<sup>6</sup> However, in our study, we see that most patients with BPH were 60 years or less of age with most patients between 55-60 years. This is suggesting that presenting age of BPH is decreasing may also be because of low-income location and other environmental factors.<sup>7</sup>

Prostate cancer has emerged as a major concern in Pakistan. Globally it is now the second most common cancer among men accounting for 1,276,106 new cases and causing 358,989 deaths (3.8% of all deaths caused by cancer in men) in 2018, following lung cancer<sup>3</sup>. With over 80% of the cases being elder than 65 years of age<sup>8</sup>. The incidence of prostate cancer in Pakistan has been on the rise over the past few decades. The frequency of prostate cancer in our study was found to be 21.08% which is higher than other reported incidences in various regions of Pakistan such as Karachi and Faisalabad which reported their prostate cancer frequencies to be 12.5% and 13.2% respectively<sup>9,10</sup>. This high incidence of prostatic cancer in our study is very alarming and this could be attributed to multiple factors that should be thoroughly researched and studied.

Firstly, the aging population plays a role as prostate cancer is more commonly diagnosed in older individuals. The incidence of prostatic cancer was found to be highest in men aged between 70-74 years in the USA.<sup>11</sup> In our study, most patients with Prostate cancer were found to be between 56-60 years of age followed by patients presenting between 61-65 years of age. This is concerning as other studies mentioned previously from Karachi and Faisalabad showed most patients with prostatic cancer presented between 60-70 years of age.<sup>9,10</sup> This alarming finding could be attributed to, changes in location, environmental factors, lifestyle, and dietary habits, such as a shift towards a Westernized diet and sedentary lifestyles, which may contribute to the rising incidence.

With this rising incidence it is also essential in determining the prognosis of patients with prostate cancer. In this regard, the Gleason Score is the primary histological assessment used to grade histological malignancies and is of great prognostic value. The Gleason score ranges from 1-5 where 1 represents normal appearing cells and 5 appears abnormal cells. It

is always reported as an equation as a sum of two numbers as shown in Table 4. Most of our patients were reported to have a Gleason Score of 7. However, the frequencies of Gleason Scores were found to varied as in similar region one study showed similar findings to our study<sup>6</sup> whereas as another study reported majority (40%) of patients with Gleason score of 9.<sup>12</sup>

## CONCLUSION

The prevalence of prostate diseases, specifically benign prostatic hyperplasia (BPH) and prostate cancer, is increasing in our region in Pakistan and it is alarming that the incidence of these tumors is now occurring in relatively younger populations compared to other regions and countries. Future studies and endeavors that are essential to address the challenges associated with diagnosis and treatment should be carried out so that the impact of prostate diseases on the population's health in Pakistan may be improved..

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**Conflict of Interest:** The study has no conflict of interest to declare by any author.

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# Frequency of Benign and Malignant Breast Growth Among Women of Different Age Groups in Larkana Population

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## ABSTRACT

**Objective:** To determine the most common histopathologic variants of benign and malignant breast growths in women of different age groups of Larkana population

**Study Design:** Cross-sectional study.

**Place and Duration of Study:** This study was conducted at the Department of Pathology, Chandka Medical College, Larkana from March 2021 to March 2023.

**Materials and Methods:** 210 women were recruited by purposeful sampling techniques all of whom presented with a growth in either breast or had an indication of trucut biopsy. Information regarding patient characteristics was collected in OPD. Biopsy specimens were processed and examined by a histopathologist. Various types of breast lesions were confirmed on histopathological examination and data was analyzed.

**Results:** Benign breast lesions were far more common than malignant ones. The most common benign lesion was found to be fibroadenoma followed by phyllodes tumor. These lesions were more common in young women below 30 years of age. Malignant tumors were more common in women above 40 years of age. The most common malignant breast tumor was found to be invasive ductal carcinoma.

**Conclusion:** Our findings suggest that malignant tumors are more commonly found in women above 40 years of age in Larkana population. Thus, we recommend screening programs for breast cancer in this age group.

**Key Words:** Breast cancer histopathology; Larkana population; Screening program

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## INTRODUCTION

Breast cancer is at the moment, the most commonly occur cancer in the world. It accounts for 12.5% of all newly diagnosed cancers. In the US alone, over 287850 new cases of invasive breast tumors were diagnosed in 2022.<sup>1</sup> The morality rate for breast cancer varies between 1.8 to 3.4 percent; being higher in developing countries.<sup>2,3</sup>

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Unfortunately, this data in Pakistan is found to be thin far and between. Whatever the reason, this lack of data along with poor literacy and below standard health facilities indicated far greater morbidity and mortality rates.<sup>4</sup> However, the little bit of research done in this regard in our country indicates the increasing burden of the disease on our health system.<sup>5</sup> Recent studies have also emphasized on the importance of screening for malignant breast lesions in our society.<sup>6</sup> Most studies carried out on breast cancer in Pakistan have focused on large cities.<sup>7-9</sup>

The stage of diagnosis of breast cancer, as in other cancers is of crucial importance.<sup>10,11</sup> According to reports, approximately 35000 new cases of breast cancer are reported in Pakistan annually.<sup>12</sup> Unfortunately, due to multiple social, economic and literacy factors, around 89% cases of breast cancer are diagnosed at a later stage, thus increasing the mortality rate.<sup>13,14</sup>

The risk of breast cancer significantly increases if a first degree relative like mother or sister have been diagnosed with breast cancer.<sup>15</sup> Although breast cancer can also occur in males, the most significant risk factors for breast cancer however, are being a woman and getting older.<sup>16</sup> Thus, screening has an intricate role in improving prognosis of the disease.<sup>17</sup>

In our study, we have attempted to bring data of breast diseases (malignant and non-malignant) from a small city of Pakistan which may help in focused and purposeful screening of breast lesions.

## MATERIALS AND METHODS

**Inclusion Criteria:** Women of any age group with abnormal growth in breast

**Exclusion Criteria:**

- Women receiving hormone replacement therapy.
- Women with previous breast surgery
- Pregnant women

A total of 210 ladies with signs of abnormal growth in the breast were selected for the study by purposive sampling technique. All clinical information like age of patient, site of growth and clinical presentation was noted down on a proforma. Samples were obtained by trucut biopsy and preserved in 10% formaldehyde solution. After gross examination by histopathologist, the tissues were dehydrated in increasing concentration of alcohol up to 100% followed by clearing with xylene and embedding in paraffin. 0.4 µm thick sections were taken on a glass slide and stained with standard hematoxylin and eosin staining protocol. Finally, mounting was done using DPX. Each slide was then reviewed by a histopathologist and classified in accordance with WHO classification of breast tumors. All data was analyzed using Microsoft Excel 2019.

## RESULTS

**Table No. 1: Distribution of Benign and Malignant Tumors by Age Groups (n = 210)**

Age Group (Year)	Benign	Malignant	Total
Up to 20	21 (11.05)	0	21 (10)
21-30	59 (31.05)	1 (5)	60 (28.57)
31-40	44 (23.15)	4 (20)	48 (22.85)
41-50	36 (18.94)	11 (55)	47 (22.38)
51-60	19 (10)	3 (15)	22 (10.47)
>60	11 (5.78)	1 (5)	12 (5.71)
Total	190 (100)	20 (100)	210 (100)

A total of 210 females coming to the Breast OPD of Chandka Medical Hospital were recruited by purposeful sampling technique for the study from 10<sup>th</sup> March 2021 to 31<sup>st</sup> March 2023. Out of these 190 had lesions (90.5 %) of benign nature, whereas 20 (9.5%) were found to be malignant on histopathology. The highest number of benign lesions (N=59 – 31.05%) were found in young ladies aged between 21-30 years of age. When observed

collectively, more than 50% of benign lesions were observed in ladies between 21 to 40 years of age. (Table No. 1)

Malignant growths were found to be most common in the ladies of age group 41-50 years. Collectively, 75% of malignant tumors were found to be in ladies of age groups 31-50 years. (Table No. 1)

**Table No. 2: Distribution of Breast tumors according to the laterality (n = 210)**

Distribution of cases by diagnosis	Right	Left	Bilateral	Total n = 210
	n (%)	n (%)	n (%)	n
Benign	78 (42.16)	86 (46.48)	21 (11.35)	185
Malignant	14 (56)	11 (44)	0	25
Total	92	97	21	210

It was observed that a slightly higher percentage of benign growths were found on the left (46.48%) as compared to the right (42.16%) while only a small number of them were bilateral (11.35%) While examining malignant breast tumors, a marked difference was observed between the two sides with the right breast being more involved (56%) than the left (44%). (Table No. 2)

**Table No. 3: Histopathological Range of neoplasms in female Breast**

Benign	185 (88.09)
Fibroadenoma	99 (47.14)
Benign Phyllodes tumor	57 (27.14)
Lactating adenoma	29 (13.80)
Malignant	25 (11.90)
Invasive Ductal Carcinoma NOS	13 (6.19)
Invasive Lobular Carcinoma	8 (3.80)
Mixed invasive lobular carcinoma with invasive Carcinoma NOS	3 (1.42)
Mixed Lobular carcinoma with variants	1 (0.47)
Total	210 (100)

Finally, we examined the different histopathological type of growths. We observed that the most common type of breast growth in women from Larkana was found to be fibroadenoma (47.14%) followed by phyllodes tumor (27.14%). The least common type of benign growth was lactating adenoma (29%) However, the frequency of benign growth heavily outweighed the number of malignant growths. Moreover, either of the benign tumors was more frequent than any of the malignant tumors. (Table No. 3)

In malignant breast growths, invasive ductal carcinoma NOS stands out as the most common type. It accounts for more than half of malignant lesions alone. The second most common variety of malignant breast neoplasms in this population was observed to be invasive lobular carcinoma, followed by mixed invasive lobular carcinoma with invasive carcinoma NOS and mixed lobular carcinoma with variants. (Table No. 3)

## DISCUSSION

The incidence of breast cancer is ever increasing not just globally but also in Asian population.<sup>18,19</sup> There is recommendation that the management and screening of breast cancer from other benign lesions should be based on data that varies from country to country. We thus carried out this study in the city of Larkana, Sindh-Pakistan whose data regarding breast diseases is very scanty.

In our study, we first observed that the frequency of benign breast lesions is far greater than that of malignant ones. The age group most frequently developing benign lesions was quite young (21-30 years). These results are similar to studies carried out in other cities of Pakistan.<sup>20,21</sup> We also observed that the commonest of benign breast growth was fibroadenoma which accounts for nearly half of all tumors of the breast in this region. Also, the second most common breast tumor in our study was phyllodes tumor. This finding is also similar to most of the regions in the world.<sup>22</sup>

Malignant growth however were most common in middle aged women and the age group most commonly affected was between 41-50 years. Also, 75% of all malignant breast growth were found in ladies above 40 years of age. The most common malignant tumor was invasive ductal carcinoma of not otherwise specified type. This finding of ours was contrary to a study carried out in India in which the population developing malignant breast lesions was less than 40 years old on average.<sup>23</sup> However, our findings are similar to the US population.<sup>24</sup> The fact that we found middle aged women to be more prone to carcinoma formation may be explained by the fact that this group is also perimenopausal and the hormonal imbalance that occur in this age may well be attributed to increased risk of carcinoma formation. We thus strongly recommend screening ladies above 40 years in this population for early detection of breast carcinoma which may eventually improve survival rates.

We next observed the site and laterality of the tumors and found no significant differences between benign and malignant growths on this basis. However, there was much greater incidence of bilateral benign lesions with no bilateral malignant lesion observed. There was just one such study we found in US population which yielded results similar to ours.<sup>25</sup>

## CONCLUSION

From our findings we suggest that in Larkana population most benign breast growths occur in young women below 40 years of age. Whereas malignant breast lesion occurs most frequently in women above 40. We thus recommend regular screening of women above 40 years of age in this population.

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**Conflict of Interest:** The study has no conflict of interest to declare by any author.

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# Diagnostic Accuracy of Strain Elastography in Differentiation of Malignant and Benign Breast Lesions Taking Histopathology as Gold Standard

Elastography in Differentiation of Malignant and Benign Breast Lesions

Javaria Akhtar, Muhammad Rafi Abbas and Muhammad Saleem Akhter

## ABSTRACT

**Objective:** To assess the diagnostic accuracy of strain elastography to differentiate malignant and benign breast lesions, taking histopathology as gold standard modality.

**Study Design:** Descriptive cross-sectional study.

**Place and Duration of Study:** This study was conducted at the Department of Radiology, Sahiwal Teaching Hospital, Sahiwal from 14th September 2019 to 13th March 2020.

**Materials and Methods:** 115 female patients between 22-65 years of age, with suspicion of hypoechoic or isoechoic focal solid breast lesion which was less than 30 mm in size were included in the study. We excluded patients having mastitis and indecisive histopathologic diagnosis. Ultrasound Strain elastography was carried out using My Lab twice with by Esaote. The biopsy of all cases was performed and the lesions were labeled as malignant or benign. Data was analyzed using SPSS version 22.0. Mean and SD were analyzed for variables like age, duration of disease and size of lesion. Sensitivity, specificity, positive predictive value (PPV), negative predictive value (NPV) and diagnostic accuracy of ultrasound strain elastography to differentiate malignant from benign breast lesions were calculated keeping histopathology as gold standard.

**Results:** In 70 patients that were malignant on ultrasound strain elastography, 62 were true positive and 08 were false positive. Among, 45 patients that were benign on strain elastography, 05 were false negative while 40 patients were true negative. Overall sensitivity, specificity, positive predictive value, negative predictive value and diagnostic accuracy of strain elastography in detection of malignant from benign breast lesions, keeping histopathology as gold standard was 92.54%, 83.33%, 88.57%, 88.89% and 88.70% respectively. Association between ultrasound strain elastography and histopathology in differentiating malignant and benign breast lesions were found to be statically significant (p-value 0.001).

**Conclusion:** We concluded from our study that ultrasound strain elastography is a highly sensitive and accurate modality for diagnosing malignant breast lesions.

**Key Words:** Breast lesions, ultrasound, strain elastography.

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## INTRODUCTION

Oncogenesis is a diverse process that involves both genetic and environmental factors. Breast cancer is among the highest prevalent cancers in females worldwide, with about 2.3 million new cases presenting every year and is fifth common cause of death due to cancers.<sup>1</sup>

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In Pakistan, the most commonly diagnosed cancer in females is breast cancer, accounting for about one in nine females.<sup>2,3</sup>

Patients of breast cancer commonly present with palpable breast lump and pain.<sup>4</sup> Screening test for breast cancer is mammography and ultrasonography (US), both of which are highly sensitive in detecting them. It would be patient friendly to utilize less invasive and cost effective method(s) of diagnosis without giving any pain to the patient by invasive surgical biopsy as histopathological diagnosis requires invasive procedure to get biopsy specimen.<sup>5</sup> In situation of a potential malignancy, imaging studies are beneficial to find the

extent of the of disease and to identify other small masses within the breasts.

Breast ultrasound (US) is an inexpensive modality, without ionizing hazards. It is helpful in differentiating solid-cystic lesions detected on mammography, especially in dense breasts.<sup>6</sup> Despite high diagnostic accuracy of ultrasound, it is often difficult to differentiate benign and malignant breast tumors sonographically and biopsy is often needed for these lesions. This causes discomfort to the patients. Hence, non-invasive techniques are needed to minimize biopsy of benign breast lesions.<sup>5</sup>

Recently, role of elastography has emerged to differentiate between benign and malignant breast lesions based on the tissue elasticity. Malignant lesions are stiffer than benign ones, thus elastography is considered a highly specific method for distinguishing benign and malignant lesions and it is reducing the number of benign breast biopsies.<sup>7</sup> The strain elastography was found to be a highly specific and sensitive method with a high diagnostic accuracy to differentiate benign and malignant breast lumps.<sup>8</sup> We planned this study to find the diagnostic accuracy of ultrasound strain elastography in differentiating malignant from benign breast lumps in our area so that timely diagnosis and management through non-invasive technique can be offered to our patients.

## MATERIALS AND METHODS

This descriptive, cross-sectional study was carried out in Department of Radiology, Sahiwal Teaching Hospital, Sahiwal, from 14th September 2019 to 13th March 2020. After taking permission from ethical review committee, we enrolled 115 cases in total with 95% confidence level. Patients falling between 22-65 years of age having hypoechoic or isoechoic focal solid lesion with size of less than 30 mm and definite histopathologic diagnosis were included in the study. Patients having mastitis and indecisive histopathologic diagnosis were excluded. After taking informed consent, demographic details were noted. Ultrasonography was done before going through any kind of intervention. Ultrasound strain elastography was performed with My Lab twice by Esaote. Criteria used for suspicion of malignant lesion was strain ratio greater than 3.5 and elastographic score of 4-5. To reduce the bias, all procedures were performed by a single radiologist. The biopsy specimen was performed of all cases and all the cases were reported by a single histopathologist. The lesions were labeled as malignant and benign lesions according to functional definitions. Data was analyzed using SPSS 22.0. Mean and SD were analyzed for variables like age, duration of disease and size of lesion. Frequency and percentage was calculated for menopausal status. Sensitivity, specificity, positive predictive value (PPV), negative predictive value (NPV) and diagnostic accuracy of

ultrasound strain elastography to differentiate malignant from benign lesions were calculated keeping histopathology as gold standard. Association between ultrasound strain elastography and histopathology was also analyzed. P-value <0.05 was considered as significant. Stratification of diagnostic accuracy of ultrasound strain elastography for various variables such as age, duration of disease, menopausal status and size of lesion was done.

## RESULTS

The age range of our subjects was 22-65 years with mean age of  $42.35 \pm 11.61$ . The mean duration of disease was  $6.30 \pm 2.62$  months. 60 % of subjects were having disease duration < 6 months while 40 % were having > 6 months of duration. Figure No. 1.

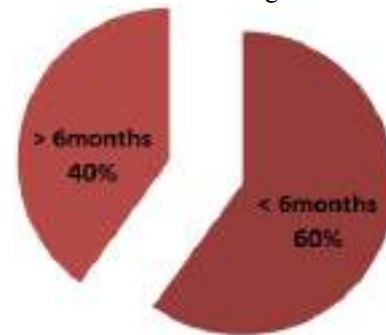


Figure No. 1: Duration of the disease

The mean size of lesion in our patients was  $17.11 \pm 6.30$  mm. 46.96 % (54) cases showed < 15 mm size of lesion whereas 53.04 % (61) cases showed 16-30 mm size of lesion. Figure No. 2.

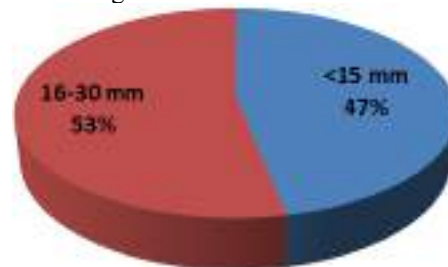
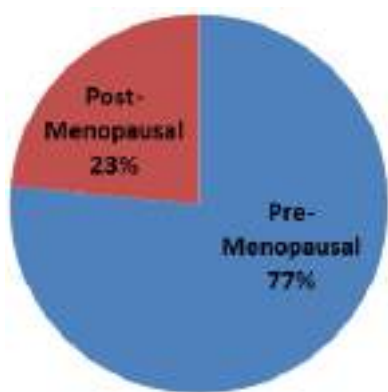


Figure No. 2: Size of the Lesion

Our study showed, 76.52 % cases were pre-menopausal while 23.48 % cases were post-menopausal. Figure 3.



**Figure No. 3: Distribution according to menopause status**

In our patients, histopathology confirmed malignancy in 67 (58.26%) cases. Ultrasound strain elastography supported the diagnosis of malignant breast lesions in 70 (60.87%) patients. Among 70 patients, that were found to be malignant on strain elastography, 62 were true positive, i.e. they were found to be malignant on histopathological examination as well. 08 cases were false positive i.e., they turned out to be benign on histopathological examination. Among 45 patients that were found to be benign on strain elastography, 05 were

false negative i.e. they were labeled as malignant on histopathology, whereas 40 patients were found to be true negative) i.e. they were reported as benign on histopathology as well. Overall sensitivity, specificity, positive predictive value, negative predictive value and diagnostic accuracy of ultrasound strain elastography in differentiation of malignant from benign breast lesions, keeping histopathology as gold standard was 92.54%, 83.33%, 88.57%, 88.89% and 88.70% respectively.

Association between ultrasound strain elastography and histopathology in differentiating malignant and benign breast lesions were found to be statically significant (p-value 0.001). Table No. 1.

**Table No.I. Association between ultrasound strain elastography and histopathology**

	Malignant on Histopathology	Benign on Histopathology	P value
Malignant on strain elastography	62	08	0.001
Benign on strain elastography	05	40	

Diagnostic accuracy with respect to different variables like age, duration of disease, size of the lesion and menopausal status groups is given in Table No. 2.

**Table No.2: Stratification of diagnostic accuracy considering age, duration of the disease, size of the lesion and menopausal status.**

Variables	Sensitivity	Specificity	Positive Predictive Value	Negative Predictive Value	Diagnostic Accuracy
<b>Age</b>					
22-45 years ( n= 71 )	90.91%	88.89%	93.02%	85.71%	90.14%
46–65 years ( n= 44 )	95.66%	76.19%	81.48%	94.12%	86.36%
<b>Duration of the Disease</b>					
≤ 6 month (n=69)	92.31%	80.0%	85.71%	88.89%	86.96%
>6 month (n= 46)	92.86%	88.89%	92.86%	88.89%	91.30%
<b>Size of The Lesion</b>					
≤15 mm (n=54)	94.12%	90.0%	94.12%	90.0%	92.59%
16-20 mm (n=61)	90.91%	78.57%	83.33%	88.0%	85.25%
<b>Menopausal Status</b>					
Pre-menopausal women (n=88)	92.59%	82.35%	89.29%	87.50%	88.64%
Postmenopausal women (n=27)	92.31%	85.71%	85.71%	92.31%	88.89%

## DISCUSSION

Our study showed that ultrasound strain elastography is a highly sensitive and specific latest modality with high diagnostic accuracy that can be used along with B-mode ultrasound for the management of breast masses. These findings were also supported by a study conducted by Farooq F et al.<sup>8</sup> A study conducted by Rehman H et al, demonstrated the sensitivity, specificity and diagnostic accuracy of strain elastography to diagnose malignant breast lumps to be

88.57%, 90.20% and 89.78% respectively, which is closely related to our results.<sup>9</sup>

While a study conducted by Dinc Elibol F et al, showed it a user dependent method with sensitivity and specificity being 59.1% and 65.1% respectively.<sup>10</sup> Another study by Yildiz MS et al, favors the use of strain elastography as it reduces the unnecessary biopsies to be performed.<sup>11</sup> Ultrasound elastography was considered to be more sensitive to differentiate benign and malignant breast masses as compared to mammography in a study by Thomas R et al.<sup>12</sup>



A study by Pastor N et al, found elastography a good technique to diagnose and differentiate malignant breast lumps.<sup>13</sup> A study conducted by Joshi R demonstrated the diagnostic accuracy of ultrasound elastography in differentiating malignant breast lesions to be 93.33%.<sup>14</sup> There were certain limitations to our study. One of them was non-availability of shear wave elastography software in our ultrasound machine and second was small sample size. Hence, more studies including large number of patients with addition of shear wave elastography must be done in future.

## CONCLUSION

This study concluded that strain elastography is a highly sensitive and accurate modality for differentiating malignant from benign breast lesions. So, we recommend that strain elastography should be used as a primary screening tool for accurate screening and pre-operative identification of breast lesions in order to reduce morbidity and mortality of these patients.

### Author's Contribution:

Concept & Design of Study: Javaria Akhtar  
 Drafting: Muhammad Rafi Abbas  
 Data Analysis: Muhammad Saleem Akhter  
 Revisiting Critically: Javaria Akhtar, Muhammad Rafi Abbas  
 Final Approval of version: Javaria Akhtar

**Conflict of Interest:** The study has no conflict of interest to declare by any author.

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# The Efficacy of Oral Metronidazole in Reducing Pain Post- Hemorrhoidectomy: A Randomized Controlled Trial

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Huda Ali

## ABSTRACT

**Objective:** The study aims to compare the effect of oral metronidazole and placebo on the mean pain score of patients post-hemorrhoidectomy.

**Study Design:** A randomized controlled trial study.

**Place and Duration of Study:** This study was conducted at the POF Hospital, Wah Cantt, between 21st March and 21st September, 2019.

**Materials and Methods:** Patients with grade III and IV hemorrhoids on whom hemorrhoidectomy was performed were included in the study. Patients in the experimental group were given oral metronidazole 500 mg every eight hours for seven days, while the control group received a placebo. Patients' pain was assessed through visual analogue scores (VAS) on the seventh post-operative day. Data was recorded in a predesigned proforma.

**Results:** The VAS score post hemorrhoidectomy was significantly less in the experimental group ( $3.59 \pm 0.55$ ) compared to the control ( $6.13 \pm 1.04$ ).

**Conclusion:** Since bacterial colonization is inevitable after hemorrhoidectomy, metronidazole can help reduce post-operative pain by reducing bacterial proliferation and inflammation of the surgical site.

**Key Words:** Hemorrhoids, hemorrhoidectomy, metronidazole, pain score, Flagyl.

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## INTRODUCTION

Hemorrhoids are cushions of submucosal tissue containing venules, arterioles and smooth muscle fiber that play a critical role in the continence mechanism. Sometimes, physiological changes in the body can cause excessive straining and increased abdominal pressure on hemorrhoidal tissue, leading to congestion and prolapse<sup>1</sup>.

In the population older than 40 years old, 58% experience some degree of hemorrhoidal disease. Based on their location and the degree of prolapse, hemorrhoids are categorized into four grades, a system known as Golighor's classification. Conservation treatment is often sufficient for the early stages (Grade I and Grade II hemorrhoids), while late-stage disease (Grade III and Grade IV hemorrhoids) usually requires surgical treatment.<sup>2</sup>

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The most effective hemorrhoidectomy methods are the Milligan-Morgan open hemorrhoidectomy and the Ferguson closed hemorrhoidectomy.<sup>3</sup> With medical advancements in recent years, several pieces of surgical equipment have been developed and employed in performing hemorrhoidectomies, including bipolar electro thermal devices, ultrasonic scalpels, and circular staplers<sup>4</sup>

This surgical procedure can be conducted by means of local infiltration, in association with general anesthesia or spinal block. The most serious subsequent complications are anal stenosis and incontinence, and the most common postoperative complications are pain, bleeding, and wound infection which ultimately cause prolonged stay in the hospital.<sup>5</sup> Although hemorrhoids are a very common condition, hemorrhoidectomy is often not favored by patients for the fear of post-operative pain.<sup>6</sup>

Non-steroidal anti-inflammatory drugs (NSAIDs) are usually administered orally post operation to manage pain; however these can have lots of side effects, the risk of which is higher in older people.<sup>7</sup> Metronidazole is a nitroimidazole, an antibiotic and antiprotozoal medication widely used against anaerobic bacterial

infections in the field of proctology because of its efficacy, safety, low cost, and low rate of adverse events.<sup>8</sup> It is the drug of choice for the treatment of amebic infections, pseudomembranous colitis, and in the treatment of brain abscesses. The nitro group of metronidazole is able to serve as an electron acceptor, forming reduced cytotoxic compounds that bind to proteins and DNA, resulting in cell death.<sup>9</sup>

Since bacterial colonization is inevitable after hemorrhoidectomy, metronidazole helps reduce bacterial proliferation, inflammation, and thus post-operative pain.<sup>10</sup> Angelina et al. conducted a systematic review of four randomized controlled trials (RCTs) of oral metronidazole in managing post-hemorrhoidectomy pain. They concluded that although metronidazole may be associated with reduced pain, further RCTs are needed to confirm this association.<sup>11</sup>

Our study aims to determine the efficacy of oral metronidazole without the influence of oral NSAIDs in improving pain post-hemorrhoidectomy to recommend its use in Pakistan where there is insufficient literature on the subject. High efficacy of metronidazole in reducing post-operative pain can, in turn, reduce the need for oral NSAIDs after surgery and improve patient compliance to the procedure.

## MATERIALS AND METHODS

**Study design and sample selection:** Patients with grade III or grade IV hemorrhoids who underwent hemorrhoidectomy at the POF Hospital, Wah Cantt, between 21<sup>st</sup> March and 21<sup>st</sup> September 2019 were enrolled in the study. The sample included both genders, and patients between 20 and 60 years old. Only patients characterized using the American Society of Anesthesiologists (ASA) physical status classification system as either ASA I or ASA II were included. A total of 140 patients were included in the study and were randomly assigned to a study group (n = 70) and control group (n = 70). Patients with a history of chronic liver disease or colonic, rectal, anal canal carcinoma were excluded.

**Ethical Approval:** Ethical approval was obtained from the College of Physicians and Surgeons of Pakistan and the hospital ethics committee. All patients provided written, informed consent for participation in the study. The study was conducted in accordance with the Declaration of Helsinki.

**Procedure:** The complete history of the patient was collected, and an examination was performed. Proctoscopy was performed by senior registrar in left lateral position with the local application of lignocaine anesthesia gel and the grade of the hemorrhoids was recorded. Patients provided informed consent for the hemorrhoidectomy. Open hemorrhoidectomy was performed under spinal anesthesia.

Patients in the study group were given oral 500 mg of metronidazole eight hourly for seven days, while the

control group received a placebo with the same dosage and therapeutic scheme. All patients were given 30 ml of a lactulose syrup (Lilac) 12 hourly and an intramuscular injection of diclofenac sodium twelve hourly for 24 hours. None of the patients received oral NSAIDs after being discharged from the hospital. Patients' pain was assessed through visual analogue scores (VAS), with zero showing no pain and ten showing maximum pain, on the seventh post-operative day. The scale is given in Figure 1. Data was recorded in a predesigned proforma.

**Data Analysis:** We stratified and compared several effect modifiers, including age, gender, ASA grade, and hemorrhoids grade, to determine whether the mean pain scores of certain subgroups were uniquely affected by the metronidazole intervention.

## RESULTS

The general characteristics of patients are described in Table 1. Between March and September 2019, 140 patients were enrolled in the study. Of these, 80 patients (57.1%) were male and 60 (42.9%) were female. The mean age of patients in years was  $41.94 \pm 12.71$ . The majority of patients, 86 patients (61.4%), could be characterized as ASA grade I patients. According to the hemorrhoidal disease classification, 31 patients (44.3%) presented with grade III hemorrhoids and 39 (55.7%) with grade IV hemorrhoids. Conversely, in the control group, 42 patients (60%) presented with grade III hemorrhoids and 28 (40%) with grade IV hemorrhoids.

The mean pain score obtained using a visual analogue scale (VAS) for the study group and control group was  $3.59 \pm 0.55$  and  $6.13 \pm 1.04$ , respectively. The VAS scores of patients categorized as mild, moderate, and severe are given in Table No. 2. We stratified the effect modifier, age, and compared the mean pain scores of both groups post hemorrhoidectomy. Among patients aged 51 – 60 years, the mean pain score for the study and control group was  $3.59 \pm 0.55$  and  $6.13 \pm 1.04$  respectively, as shown in Table No. 3.

When stratifying for gender, for male patients, the mean pain score was  $3.68 \pm 0.58$  for the control group and  $6.07 \pm 1.04$  for the study group, as shown in Table 3. Furthermore, stratifying for ASA grades, the mean pain score among the study and control groups was  $3.51 \pm 0.54$  and  $6.18 \pm 1.07$ , respectively, as shown in Table 3. Finally, stratifying for the effect modifier, hemorrhoids grade, among patients with grade III hemorrhoids, the mean pain score was  $3.42 \pm 0.5$  in the study group and  $6.24 \pm 1.03$  in the control group, as shown in Table No. 3.

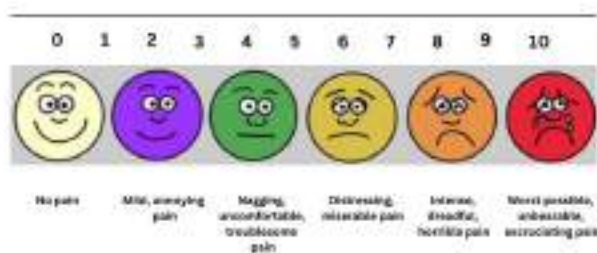


Figure No. 1: The VAS pain scale used to assess patients' subjective pain experience on the seventh post-operative day

Table No. 1: Baseline characteristics of patients

Characteristics	Study group (n = 70)	Control group (n = 70)	p value
Age (years)	40.99	42.89	
Gender			
Male	34	46	
Female	36	24	
ASA grade			
Grade I	37	49	
Grade II	33	21	
Classification			
Grade III	31	42	
Grade IV	39	28	

Table No. 2: VAS scores of patients on the 7<sup>th</sup> postoperative day

Characteristics	VAS score on 7 <sup>th</sup> day			
	Mild	Moderate	Severe	Total
Gender				
Male	14	65	1	80
Female	18	41	1	60
Age				
20–30 years	9	21	1	31
31–40 years	6	26	0	32
41–50 years	11	28	0	39
51–60 years	6	31	1	38

Table No. 3: Comparison of mean pain scores among the two groups stratified by effect modifiers

Effect Modifier	Study group	Control group	p value
Gender			
Male	3.68 ± 0.58	6.07 ± 1.04	0.012
Female	3.5 ± 0.5	6.25 ± 1.07	
ASA grade			
Grade I	3.51 ± 0.54	6.18 ± 1.07	
Grade II	3.67 ± 0.54	6 ± 1	
Classification			
Grade III	3.42 ± 0.5	6.24 ± 1.03	

Grade IV	3.72 ± 0.56	5.96 ± 1.07	
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## DISCUSSION

Hemorrhoids are vascular cushions, anatomical structures found in the anal canal which function as a comfortable barrier to ensure complete closure of the anus.<sup>9</sup> The displacement of these anal cushions can result in hemorrhoids, a disease with high incidence (> 50%) and varying degrees of severity in the population older than 40 years.<sup>12</sup> The incidence of hemorrhoids does not seem to be linked to gender and has been associated instead with low fiber intake. Painless rectal bleeding during defecation is the most common clinical presentation of the disease. Grade I hemorrhoidal disease is the most common type. For severe forms of hemorrhoidal disease, usually grade III and grade IV hemorrhoids, surgery is the most effective treatment.<sup>13</sup>

Bacterial colonization of the wound seems to happen immediately after hemorrhoidectomy, yet it does not appear to interfere with the natural healing process, provided the bacterial count remains at <10<sup>5</sup>. Pain is a complex and subjective phenomenon that is difficult to appreciate and evaluate because patients differ in their individual pain sensitivity. Post-operative pain is frequently reported in patients who undergo surgery and is believed to be caused by the spasm of the anal internal sphincter and by secondary infection of the surgical site.<sup>14</sup> NSAIDs are usually prescribed to patients after hemorrhoidectomy to help with pain relief. However, these are known to cause several side effects, particularly in older people.<sup>7</sup>

Balfour et al. studied the effects of oral metronidazole in 38 patients who had undergone closed hemorrhoidectomy.<sup>15</sup> They found no significant difference in pain scores between patients who received metronidazole and those that did not. By contrast, Al-Mulhim et al. found a significant reduction in pain on post-operative day 7 with an eight hourly administration of 500 mg oral metronidazole.<sup>16</sup> In one study conducted in Pakistan, Tatheer et al. found a significant reduction in post hemorrhoidectomy pain in patients who received topical vs. oral metronidazole.<sup>17</sup>

Certain patient characteristics which were most likely to impact pain scores were treated as effect modifiers. These included age, gender, ASA grades, and hemorrhoids grades. Upon stratifying for these factors, we found no statistically significant association between these patient characteristics and pain scores. This implied that age, gender, ASA grade, and hemorrhoid grades did not play an important role in determining the patients' mean pain score.

This study has certain limitations. Some studies have shown the increased efficacy and potential benefits of metronidazole administered via the topical route<sup>17,18</sup> this study did not consider or compare the oral and topical

routes of administration of metronidazole. Moreover, to ensure maximum patient compliance, we only conducted documented pain assessment on the seventh post-operative day and not on the first and third day, as in many other similar studies.

## CONCLUSION

Since bacterial colonization is inevitable after hemorrhoidectomy, metronidazole can help reduce post-operative pain by reducing bacterial proliferation and inflammation of the surgical site.

### Author's Contribution:

Concept & Design of Study: Sidra Munawar  
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**Conflict of Interest:** The study has no conflict of interest to declare by any author.

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# Outcome of Two-Stage (Bracka) Repair in Adult Hypospadias: Our Experience of Sixty Cases

Two-Stage  
(Bracka) Repair  
in Adult  
Hypospadias

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## ABSTRACT

**Objective:** To assess the outcome of two-stage (Bracka) repair in adult hypospadias

**Study Design:** Prospective observational study

**Place and Duration of Study:** This study was conducted at the Department of Plastic Surgery Lady Reading Hospital Peshawar from January 2021 to March 2023.

**Materials and Methods:** A total of 60 patients who met the inclusion criteria underwent two-stage (Bracka) repair. In stage 1, chordee correction and a full-thickness skin graft taken from the retro-auricular area was placed. The patient was then followed regularly at 1-week, 1-month, and 3 months intervals. After 6 months, the second stage was performed where tubularization over a silicone catheter was performed. After the removal of the urethral catheter on the 7th post-op day, the patient was then followed at the 1st, 3rd, 6th month, and at one year.

**Results:** This study includes 60 patients with a mean age of 22.43±2.807 years. By location 43(71.7%) patients had distal penile while 17 (28.3%) patients had mid penile Hypospadias. A mild degree of chordee was recorded in 48(80%) cases. All 60(100%) patients were circumcised without other genitourinary abnormalities. The donor site for all patients was retro auricular. After two-stage urethroplasty 48 (80%) patients had no complications, while the remaining reported to have fistula formation 5(8.3%), meatal stenosis 4 (6.7%), 2 (3.3%) had a urethral stricture and 1 patient (1.7%) had repair dehiscence. Complications reported were managed in our Department. The different types of surgeries performed to overcome these complications were Meatotomy in 4(6.7%), Fistula closure in 2 patients (3.3%) and 3 fistulae closed spontaneously by applying manual occlusion. Redo 2 staged repair done in 2(3.3%) patients of urethral stricture. and Redo second stage in 1(1.7%) patient of dehiscence due to infection. The chi-square test was used to find the correlation between the degree of chordee and complications which was not statistically significant (p-value=0.36).

**Conclusion:** Two-stage (Bracka) Hypospadias repair in adult life has a comparatively high success rate with excellent cosmetic and functional outcomes as compared to single-stage repair.

**Key Words:** Hypospadias, Two-Stage (Bracka) Repair, distal penile hypospadias

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## INTRODUCTION

Hypospadias is a common congenital anomaly that accounts for 1 in 250 live male births. Hypospadias is found anywhere from the glans penis up to the perineum but the most commonly occurring site is distal penile.

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The aim of Hypospadias repair is to achieve a functionally and cosmetically acceptable penis. More than 200 procedures are in practice for the repair of Hypospadias. Hypospadias repairs can be classified into single-stage procedures and two-stage (Bracka repair). The single-stage procedure consists of incision and tabularization of the urethral plate (Snodgrass repair) or urethral plate augmentation (on lay flap and Snodgrass repair). Single-stage procedures' advantages are decreased anesthesia risks, hospital stay, and cost of the procedure and also reduced time to the ultimate outcome. They are often associated with complications like stricture formation, fistulae, and meatal stenosis needing re-surgery defeating the initial purpose of single-stage surgery.

In case of chordee, urethral substitution procedures are adopted because the urethral plate is scarred for the chordee correction. Flaps and grafts are used for Substitutional urethroplasty but due to the long-term complications of Flaps, Aivor Bracka's two-stage repair with full-thickness skin graft or buccal mucosal graft has gained tremendous popularity in the last two decades. Since the substitution procedure compartmentalizes the reconstruction, the time interval in between the 2 stages can reveal complications related to graft contracture making it easy to deal with such complications before as compared to after tubularization of the urethra increasing the chances of a successful repair. Most of the complications occur in the first 6-12 months after the 2nd stage including suture line dehiscence, fistula, and diverticulum formation, however, stricture formation is less likely as the linear suture line is given time to contract fully before performing the second phase.<sup>1</sup>

Follow-up protocol after hypospadias repair is designed to institute a balance between its pros (early detection of complications) and cons (psychological concerns by repeatedly reminding the patient of the abnormality). After removal of the catheter at one week postoperatively the patient is followed for 1-, 3- and 6-month intervals and then yearly for two years<sup>2</sup>

The ideal time for hypospadias surgery is 2-4 years of age as the procedures should be completed before school-going age and the memories of surgery are not ingrained in the minds of the kids. Some of hypospadias patients are left untreated and present late in adulthood. Especially in our setup, where the low socio-economic status and unawareness regarding the severity of hypospadias problems, most of the patients seek medical attention late in adulthood when their marriage ceremony nears. Their main concern again at this time is the suspicion of not having kids after marriage and that's the sole reason for seeking medical attention. The basic principles of surgery in adults are the same as in children. In adulthood, the complication rate of repair ranges from 10–37%.<sup>3,4</sup>

Since a good proportion of adult hypospadias patients seek medical attention because of the above-mentioned reasons, we intend to see the outcome of two-stage (Bracka) repair for hypospadias in our setup in terms of the success of the procedure and complications rate.

## MATERIALS AND METHODS

This is a prospective observational study conducted in the Department of Plastic Surgery Lady Reading Hospital Peshawar from January 2021 to March 2023. All sixty patients who met the inclusion criteria were included in the study. Patients with crippled hypospadias, age less than 18 years were excluded from the study. Ethical approval was taken from the hospital's ethical committee.

All patients underwent two-stage bracka repair by the same consultant. In stage 1, chordee correction and a full-thickness skin graft taken from the retro auricular area were placed. The patient was then followed regularly at 1 week, 1 month, and three months intervals to check for the adequacy of the grafted skin and suppleness of the urethral plate for future urethroplasty in the second stage.

At the completion of six months, the second stage was performed where tubularization over a silicone catheter was performed. This was accompanied by waterproofing with buck's fascia. After removal of the urethral catheter at 7<sup>th</sup> post-op day, the patient was then followed at the 1<sup>st</sup>, 3<sup>rd</sup>, 6th month, and at one year.

**Data analysis:** Data were analyzed using SPSS version 22.0. Mean and standard deviation was calculated for age of patients in years. Frequency and percentages were calculated for Meatus location, degree of Chordee, Circumcision status, Other genitourinary anomalies, Graft donor site, Procedure performed, Complications with types, and the types of re-surgery performed to overcome the post-operative complications. The chi-square test was used to calculate the p-value between the degree of chordee and post-operative complications with a statistically significant p-value of <0.05

## RESULTS

This study includes 60 patients with a mean age of 22.43±2.807 years. By location 43(71.7%) patients had distal penile while 17 (28.3%) patients had mid penile Hypospadias. A mild degree of chordee was recorded in 48(80%) cases. All 60(100%) patients were circumcised without other genitourinary abnormalities. The donor site for all patients was retro auricular. (Table-1).

After two stage urethroplasty 48 (80%) patients had no complications, while the remaining reported to have fistula formation 5(8.3%), meatal stenosis 4 (6.7%), 2 (3.3%) had a urethral stricture and 1 patient (1.7%) had repair dehiscence. (Table-2). Complications reported were managed in our Department. The different types of surgeries performed to overcome these complications were Meatotomy in 4(6.7%), Fistula closure in 2 patients (3.3%), and 3 fistulae closed spontaneously by applying manual occlusion.

**Table No. 1: characteristics of patients**

		Frequency	%
Meatus location	Distal Penile	43	71.7
	Mid Penile	17	28.3
Chordee	Mild	48	80.0
	Moderate	12	20.0
Circumcised	Yes	60	100.0
Other genitourinary anomalies	Nil	60	100.0

Procedure performed	Aiver Bracka	60	100.0
Graft donor site	Retro auricular	60	100.0

Redo 2 staged repair in 2 (3.3%) patients of urethral stricture. and Redo second stage in 1(1.7%) patient of dehiscence due to infection,(Table-3). The chi-square test was used to find the correlation between the degree of chordee and complications which was not statistically significant (p-value=0.36).

**Table No. 2: Complications and types**

	Frequency	Percent
Nil	48	80
Fistula	5	8.3
Meatal stenosis	4	6.7
Urethral stricture	2	3.3
Dehiscence	1	1.7
Total	60	100.0

**Table No. 3: Re-Surgery (type)**

	Frequency	%
Fistula closure	3	5
Fistulae closed spontaneously)	2	3.3
Meatotomy	4	6.7
Redo stage 2 for urethral stricture	2	3.3
Redo stage 2 for repair dehiscence	1	1.7
Total	9	15

## DISCUSSION

The timing of hypospadias repair is always a matter of debate. Most of the studies recommend repair in early childhood. The main reasons are the good healing capability in children and to avoid of memory impregnation of such surgeries. Reported average age of hypospadias repair in adults ranges from 16-22 years<sup>5,6</sup> In our study, as most of the cases of hypospadias were distal penile in 43(71.7%) so the problem was easily overlooked due to low socio-economic status and not noticed until their adulthood when they intend to get married. At this time, their main concern is fertility and not the stream or cosmesis problem itself.

It is always a matter of conflict that increasing age at the time of repair increases the complication rates. The Khan et al<sup>7</sup> repaired majority of hypospadias patients (76.2%) in two stages. The most commonly occurring complication was UCF in 26.6% while in our study UCF was observed in 8.3%, which may be due to restricting our inclusion criteria by including virgin hypospadias cases, and less sample size and most of the cases had distal penile hypospadias. Chung et al<sup>8</sup> reported a higher UCF complication rate in proximal hypospadias as compared to distal hypospadias. The reported increased rate of complications in adult hypospadias repair in our study which has also been reported by Şenkul T et al and Hensle TW et al<sup>3,4</sup> as

compared to repair done in childhood has many attributing factors. In our view, comparatively less healing capability in adults and the problem of hair growth leads to an increased rate of complications. Moreover, the frequent episodes of erection in adults might be a contributing factor as well.

In our study, the reported increased complications can also be attributed to the unavailability of the preputial skin which is the ideal donor site for Full thickness skin graft in stage 1 repair. Instead, we opted for post auricular skin graft as a donor site because of its non-hairy status. We didn't opt for a buccal mucosa graft because of its thick texture and less favorable take on the recipient site.

Bhat et al<sup>5</sup> found that the outcome of hypospadias surgery is greatly affected by the severity of hypospadias and the type of surgical procedure performed. Altaweel et al<sup>9</sup> had 100% success with two-stage repairs. In secondary hypospadias, 50-57% success rate was achieved after one surgery, while in stage surgery, the success rate was 92-93% depending on the type of technique. They concluded that the overall success rate depended upon whether the patient had primary or secondary hypospadias. Also, stage repair was associated with better outcomes irrespective of primary or secondary hypospadias.<sup>10-15</sup>

## CONCLUSION

Two-stage (Bracka) Hypospadias repair in adult life has a comparatively high success rate with excellent cosmetic and functional outcome as compared to single stage repair. However, we propose to educate people to seek medical attention in early childhood which has comparatively less complication rate than adult hypospadias repair. Further randomized controlled trials are needed to strengthen and validate these findings.

### Author's Contribution:

Concept & Design of Study: Riaz Ahmed Khan Afridi  
 Drafting: Muhammad Asif, Khalid Naveed Khan  
 Data Analysis: Kausar Anwar, Shahzad-Ur Rehman  
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# Perimenopausal Females Continue to Have High Blood Pressure Spikes In spite of Taking Regular Antihypertensive Use – Need to Manage the Symptoms Not the Cause

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and Muhammad Wasim Afzal<sup>1</sup>

## ABSTRACT

**Objective:** To recognize the inability of antihypertensive medicine to control BP spikes during VMS in perimenopausal females.

**Study Design:** Observational cross sectional study

**Place and Duration of Study:** This study was conducted at the Rai Medical College Teaching Hospital, Sargodha from July 2022 to February 2023.

**Materials and Methods:** Females presenting to OPD for the control of HTN between 30-70 years of age using regular antihypertensive medicine and experiencing the Vasomotor Symptoms (VMS). STRAW staging system was used to define the menopause. After securing informed consent, applying inclusion and exclusion criteria Composite Symptoms Severity Score was assessed on the prescribed modified MENQOL questionnaire proforma. Average of all the available recorded readings (10 at least) of BP in the period since antihypertensive medicines are being used regularly was documented. In the absence of written record we recorded the values given by recall. Office reading of BP was taken within half hour of the VMS symptoms as per JNC7 guidelines at the time of the visit. antihypertensive medicines (by the group) being used by the patient were noted as per standard.

**Results:** We had 346 patients during the study period. We had 4% in 4<sup>th</sup> decade, 36% in 5<sup>th</sup> decade, 47% in 6<sup>th</sup> decade and 13% in 7<sup>th</sup> decade of life, this is expected and in accordance with the literature. We divided the patients in 3 groups, low score <50 composite severity score index (CSSI), intermediate score 50-100 CSSI, severe score >100 CSSI for the sake of convenience of interpretation. Most of the patients in 4<sup>th</sup> and 7<sup>th</sup> decade had low CSSI, 79% and 13%. Most of the patients in 5<sup>th</sup> and 6<sup>th</sup> decade had intermediate CSSI, 47% and 52%. High score was seen in relatively fewer patients in all 4 decades, 10%, 19%, 19% and 7%. Average home BP record mostly fell into hypertensive range (higher than 140/100 mmHg), matching the CSSI score in all three groups with wide fluctuation well reflected in SD while still regularly using antihypertensive medicine. Office BP measured after at least half hour of the hot flushes was still high in all age groups and all CSSI score groups.

**Conclusion:** These findings reinforce our hypothesis that antihypertensive medicines fails to control spikes of high BP during VMS symptoms in spite of good compliance. It must be appreciated that BP spikes are mediated through a different mechanism other than the classical aldosterone-renin-angiotensin mechanism of essential hypertension. A different approach is needed, if we control the VMS, BP swings will be minimized without antihypertensive medicine thereby avoiding unnecessary and wrong prescription.

**Key Words:** Peri-menopausal syndromes, vasomotor perimenopausal symptoms, hot flushes, hypertension.

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## INTRODUCTION

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Every female is expected to experience the physiological changes of Menopause (MNP) anywhere after the age of 30 years to around 70 due to fading female hormones and around 50-80% do experience some of these with varying severity, ranging from a mild nuisance to disabling, during perimenopausal period lasting on average 5 to 7 years or more. This set of symptoms complex is called VMS consisting of hot

flushes, sweating, palpitation and extreme fluctuation in BP. They peak around forties to mid-fifties and may have a circadian rhythm, nocturnal symptoms being more disturbing.<sup>1,2</sup> As these symptoms may start while females are still menstruating or long after cessation of periods especially after hysterectomy, many a times females fail to appreciate or recognize them. Psychosocial, physical, and sexual symptoms are the other features.<sup>3,4</sup>

Wide swings in BP are very commonly associated with any internal unpleasant feeling or bodily hurt like headache or abdominal cramps. VMS when more than mild are quiet disturbing, these are expected to be associated with upshot in BP. This is compounded by the fact that BP swings are integral part of VMS with its own hormonal pathophysiology. The untended labelling of Hypertension in anxious and panicked patients and patients passing through different phases of menopause was documented in 2 related studies by the same lead author.<sup>5,6</sup>

The cyclical changes in follicle stimulating hormone, luteinizing hormone, estrogen and other hormones during the long fertile years gradually reset and fade. HTN and resulting cardiovascular diseases (CVD) are explained on the basis of altered estrogen and androgens proportion.<sup>7</sup> In menopause transition the loss of cardiovascular protection, HTN becomes more important along with other components of Metabolic Syndrome (MS) due to declining levels of estrogen. Lower estrogen levels in premenopausal years like in smoker females are associated with 7 fold higher risk of premature CHD. Before prescribing HRT it is mandatory to stratify CHD and CVS risks in women with a previous CHD event or stroke, current smoking and MS. It shall be definitely considered for specific urogenital complaints or osteoporosis. The use of HT is contraindicated in women at higher risk for breast cancer (previous history, family history).<sup>8</sup> During VMS phase, patient is labelled and is prescribed antihypertensive medicine for regular use. These are the patients who continue to have surges in BP during VMS phase in spite of good compliance, a perfect example of treating the symptoms without addressing the underlying pathophysiology.

**Sample size:** A minimum sample size of 220 was calculated to maintain a 5 percent margin of error, a 95 percent confidence interval and a 75 percent response distribution, using WHO sample size calculator.

**Statistical Analysis:** Data analysis was conducted using Statistical Package for Social Sciences software version 25. Descriptive statistics (i.e. frequency distribution, percentages, mean and standard deviations) were the primary analytical methods.

**Inclusion Criteria:** All female presenting to the OPD for the control of HTN and receiving regular antihypertensive medicine between 30-75 years was assessed for the perimenopausal status and presence of

VMS, were invited to participate in this study. Patients not menstruating due to surgical hysterectomy but still having vasomotor symptoms were included.

**Exclusion Criteria:** Pre-menopause, Medical and Iatrogenic conditions that can masquerade as Hot Flushes like Anxiety disorders, Autoimmune disorders, Carcinoid syndromes, Diabetic autonomic dysfunction/hypoglycemia, Epilepsy, any Infection or febrile illness, Insulinoma/pancreatic tumors, Leukemia/lymphoma, cancer survivors, mast-cell disorders, New-onset hypertension, Thyroid disease, Tuberculosis, Use of selective-reuptake inhibitors or serotonin norepinephrine-reuptake inhibitors. Hormonal (HRT) or non-hormonal replacement (Tibolol) therapy.<sup>9</sup> Major psychotic disorder, substance abuse, already taking antidepressants and anxiolytics.

## MATERIALS AND METHODS

This study was conducted on the females presenting to OPD for the control of HTN between 30-70 years of age using regular antihypertensive medicine and experiencing the cardinal VMS symptoms, fluctuating BP, hot flushes, palpitation and sweating. STRAW staging system was used to define the menopause.<sup>3</sup> After securing informed consent, applying inclusion and exclusion criteria, frequency and severity of VMS perimenopausal symptoms was recorded with the help of trained paramedical staff on the prescribed modified MENQOL questionnaire proforma limited to the vasomotor domain, hot flashes, sweating, palpitation and hypertension. The composite score was calculated by multiplying the average weekly occurrence of symptoms with severity score for each symptom.<sup>4</sup> Average of all the available recorded readings of BP (10 at least) in the period since antihypertensive medicines are being used regularly was documented. In the absence of written record we recorded the values given by recall. Office reading of BP was taken within half hour of the VMS symptoms as per JNC7 guidelines at the time of the visit.<sup>10</sup> The group/s of antihypertensive medicines being used by the patient were noted as per standard.

## RESULTS

We had 346 patients during the study period. We had 4% in 4<sup>th</sup> decade, 36% in 5<sup>th</sup> decade, 47% in 6<sup>th</sup> decade and 13% in 7<sup>th</sup> decade of life, this is expected and in accordance with the literature.

**Table No. 1: Demography (N = 346)**

Age Group	N	BP VMS, CSSI < 50	BP VMS, CSSI > 51 < 100	BP VMS, CSSI > 100
30-40	14	78.57 + 0.53%	14.29 + 0.07%	7.14 + 0.02%
41-50	125	33.60 + 0.02%	47.20 + 0.08%	19.20 + 0.12%
51-60	163	28.83 + 0.13%	52.15 + 0.04%	19.02 + 0.20%
61-70	44	59.09 + 0.33%	34.09 + 0.15%	6.82 + 0.04%

**Table No. 2: Home Monitoring of BP (N = 346)**

Age Group	N	BP			
		VMS, CSSI < 50	VMS, CSSI > 51 < 100	VMS, CSSI > 100	
30-40	14 (4%)	Range	135-180/95-100	135-180/95-100	135-200/100-110
		Mean	156.8+5.1/97.2+2.3	158.4+4.4/97.7+3.8	165.6+6.5/103.7+5.4
		Mode	155.3/96.5	158.0/96.6	164.6/102.2
		Median	155.7/96.9	158.1/97.2	165.2/102.7
41-50	125 36.13%	Range	135-180/95-100	150-220/95-120	150-240/105-120
		Mean	157.2+4.4/97.7+3.9	187.1+5.5/109.2+6.1	194.8+4.9/113.3+4.7
		Mode	156.5/97.1	186.1/108.3	193.3/112.0
		Median	157.1/97.3	186.6/109.1	193.8/112.6
51-60	163 47.11%	Range	135-180/95-100	170-220/95-120	150-240/105-120
		Mean	157.9+4.9/98.1+5.2	193.9+4.9/110.8+6.9	195.8+4.6/113.4+5.7
		Mode	156.7/96.8	192.1/109.5	194.1/112.6
		Median	157.4/97.3	192.7/109.9	194.7/113.2
61-70	44 12.72%	Range	135-180/95-100	165-220/105-120	150-240/105-120
		Mean	163.2+5.3/108.1+7.7	195.4+4.5/111.1+3.9	196.6+4.9/109.3+6.4
		Mode	160.4/107.2	194.7/109.6	194.5/107.9
		Median	161.4/107.6	195.0/110.3	195.1/108.4

We divided the patients in 3 groups, low score <50 composite severity score index (CSSI), intermediate score 50-100 CSSI, severe score >100 CSSI for the sake of convenience of interpretation. Most of the patients in 4<sup>th</sup> and 7<sup>th</sup> decade had low CSSI, 79% and 13%. Most of the patients in 5<sup>th</sup> and 6<sup>th</sup> decade had intermediate CSSI, 47% and 52%. High score was seen in relatively fewer patients in all 4 decades, 10%, 19%, 19% and 7%.

Average home BP record fell into hypertensive range (higher than 140/100 mmHg) in all the patients. The rise in BP roughly matched the CSSI score in all three

groups with wide fluctuation well reflected in SD. All were using antihypertensive medicine regularly. ACE Inhibitors or AT2R blockers were the commonest medicine followed by Beta Blockers and the Calcium Channel Blockers. More than 50% were using combinations, diuretics were least frequently used medicines. We could not make formal calculation as patients kept on switching medicine from time to time. Office BP measured after at least half hour of the hot flushes were still high in all age groups and all CSSI score groups.

**Table No. 3: Office Reading within Half Hour of VMS BP (N = 346)**

Age Group	N	BP			
		VMS, CSSI < 50	VMS, CSSI > 51 < 100	VMS, CSSI > 100	
30-40	14 (4%)	Range	135-150/95-100	135-150/95-100	135-200/100-105
		Mean	143.2+5.6/97.8+3.9	144.2+5.3/98.0+4.7	169.9+5.2/102.3+4.4
		Mode	142.3/96.4	143.3/97.1	168.5/100.8
		Median	142.6/97.1	143.6/97.5	169.2/101.4
41-50	125 36.13%	Range	135-150/95-100	150-180/95-120	150-180/100-105
		Mean	144.4+4.8/96.8+6.9	164.7+5.8/109.4+4.2	165.5+4.7/102.8+6.2
		Mode	143.4/95.6	162.6/108.4	164.8/101.4
		Median	144.2/96.3	163.9/109.0	165.0/102.1
51-60	163 47.11%	Range	135-180/95-100	170-220/95-120	150-240/105-120
		Mean	159.3+6.1/98.2+3.9	195.8+5.1/112.6+6.6	198.3+5.7/108.4+7.1
		Mode	157.7/97.1	194.5/111.4	196.7/107.8
		Median	158.4/97.7	195.1/111.6	197.1/108.0

61-70	44 12.72%	Range	135-180/95-100	165-220/105-120	150-240/105-120
		Mean	156.9+5.8/96.8+6.1	196.4+4.5/108.8+5.1	196.2+4.9/113.6+4.9
		Mode	156.1/95.4	194.7/108.0	194.6/112.3
		Median	156.5/96.2	195.6/108.4	195.6/112.8

high is a sure sign that underlying mood disorders are operating.

## DISCUSSION

These findings reinforce the hypothesis that antihypertensive medicines fails to control spikes of high BP during VMS symptoms in spite of antihypertensive medicines. All of our patients were regularly using antihypertensive medicine, ACE inhibitors/ AT2RBs most frequently followed by Beta Blockers and calcium Channel Blockers either alone or in combination. These are the patients who continue to have surges in BP during VMS phase in spite of good compliance, a perfect example of treating the symptoms without addressing the underlying pathophysiology. Role of coexisting anxiety and panic attacks must be taken into consideration. It is agreed that essential HTN presents in the same age group and the history of pre-eclampsia or eclampsia, gestational HTN and presence of VMS is associated with higher risk of developing HTN in future. This study by no means undermines the importance of genuine HTN in these patients, such patients must be carefully evaluated to prescribe proper lifestyle modifications and compliance with antihypertensive treatment. It must also be appreciated that some very important determinants of perimenopausal symptoms like lower socioeconomic class, racial differences (Afro-American, Hispanics, Asians) smoking, being overweight with underlying insulin resistance, higher alcohol intake and reduced physical fitness are also considered significant in the development of HTN. On this very basis one is likely to have both components active in same patient, there is underlying essential HTN and VMS phase adds to it in causing wide swings in BP. Antihypertensive medicine may be able to keep BP in normal range but it shoots up during VMS complex. This is misinterpreted and leads to a kneejerk response of increase in the dose of present antihypertensive medicine or addition of a new drug. Many a times symptoms like non-specific chest pain, mood changes, sleep disturbances, headaches, palpitations, hot flushes, anxiety, depression, tiredness have an overlap with VMS and are likely to be misinterpreted. These need to be addressed on their own merit keeping in mind that our society is getting intolerant and anxiety is getting more and more common in general population. Anxiety and panic attack are the most common medical conditions which cause a temporary rise in BP. White coat hypertension is a well-known entity. Every hypertensive must be thoroughly evaluated for anxiety. The very common notion that I know from my symptoms that my BP is

It must be appreciated that BP spikes are mediated through a different mechanism other than the pathophysiological aldosterone-renin-angiotensin mechanism of essential hypertension. A different approach is needed, if we control the VMS, BP swings will be minimized without antihypertensive medicine. Hormone replacement therapy is known to control all symptoms of VMS including HTN. There is a large data available to support use of non-hormonal replacement therapy (Tibolol) and Selective Serotonin Reuptake Inhibitors SSRIs or NNSRIs to control VMS. The effectiveness of HRT, non HRT and antidepressants in controlling the VMS symptoms is abundantly documented in the literature and is a testimony to our hypothesis.

## CONCLUSION

BP spikes are mediated through a different mechanism other than the pathophysiological aldosterone-renin-angiotensin mechanism of essential hypertension. A different approach to treat the underlying cause is needed. HRT, non HRT and antidepressants are very effective in controlling the VMS symptoms.

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**Conflict of Interest:** The study has no conflict of interest to declare by any author.

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# Estimation of Vitamin C Status Among University Students During COVID-19 Pandemic

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Shahid Khan<sup>4</sup> and Shahid Ullah<sup>4</sup>

## ABSTRACT

**Objective:** Vitamin C is known as a powerful antioxidant and immune booster vitamin. During the period of the rise in COVID-19 infections, it was medically advised to consume a sufficient amount of vitamin C. This study was very essential to estimate the status of Vitamin C among University Students during the peak period of COVID-19 infections.

**Study Design:** Cross-Sectional Descriptive Study

**Place and Duration of Study:** This study was conducted at the University of Sindh from December 2020 to February 2021.

**Materials and Methods:** There were a total of 232 randomly selected male and female university students during the research work. The data was statistically calculated in percent and frequencies by using SPSS software version 21. The statistical difference was determined by applying a t-test and the P- value of < 0.05 was set as significant.

**Results:** Only about 5-9% of male and female university students were consuming a moderate amount of vitamin C-rich food every day whereas, the majority were not taking vitamin C-enriched foods or citrus fruits in their diet. Only 9% of males and 14% of females were taking vitamin C supplements. 56% of females reported bleeding gums issue and 34% of males also reported teeth sensitivity with bleeding gums. Skin discoloration was not found in most of the cases (> 90%). About 47% of females and 37% of males were susceptible to COVID-19 infection due to their critical plasma vitamin C levels < 0.3 mg/dl.

**Conclusion:** Both male and female university students were susceptible to COVID-19 infection due to their critically low levels of Plasma vitamin C. Females were more prone to COVID-19 infections compared to males due to their lower intake of vitamin C-rich foods and supplements. The male and female students of the university were found to lack sufficient intake of vitamin C. There were more females than males who reported bleeding gum issues. The students at the University level must be well aware of the immune-supportive, antiviral, and anti-inflammatory role of vitamin C.

**Key Words:** Vitamin C, University Students, COVID-19 and Pandemic.

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## INTRODUCTION

Vitamin C (Ascorbic acid) is a very important kind of micronutrient for human beings. It is not only just a powerful antioxidant but also an important cofactor for many metabolic enzymes<sup>1</sup>.

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Vitamin C cannot be synthesized inside the human body but yet it plays a very crucial role in the immune system's smooth functioning. The essential biological functions such as the absorption of iron (non-heme), synthesis of bile, production of hormones, collagen synthesis, etc. are attributed to Vitamin C. Previous research work has also reported the role of vitamin C in the regulation of neurotransmitters inside the brain<sup>2</sup>. The deficiency of Vitamin C often leads to Scurvy, bleeding gums, neurological problems, metabolic issues, a rise in infections, a weakened immune system, etc.<sup>3</sup> The intravenous administration of Vitamin C has proven positive effects in patients with cancer and sepsis<sup>4</sup>. Acute respiratory distress syndrome has also been cured with high doses of vitamin C<sup>6</sup>. The previous research also suggested that Vitamin C expedited the

recovery of COVID-19 patients<sup>6,7</sup>. The concentration of vitamin C in blood plasma is considered an important indicator of the occurrence and recurrence of any infection in individuals. Normally, the chances of infections are more if the plasma concentration of vitamin C is found below 0.2 mg/dl. The intake of vitamin C was suggested by many medical professionals during the peak period of COVID-19 infection in order to cope with the pandemic situation<sup>8</sup>. One pilot study done in Colorado reported that the COVID-19-infected patients admitted to ICU had a very low plasma level of vitamin C and the study also linked morbidity with vitamin C deficiency<sup>8</sup>. One study reported that vitamin C can not only reduce the susceptibility to infection but also can prevent, shorten and cure the infection in humans<sup>9</sup>. Scientists have also reported that vitamin C reduced the rate of mortality in COVID-19 patients<sup>10</sup>. A group of scientists mentioned the therapeutic role of vitamin C against COVID-19 cases<sup>11</sup>. The recommended daily allowance of vitamin C for Men is 90-105 mg/day whereas for Women it is 75-85 mg/day<sup>12</sup>. Unlike Vitamin D (a fat-soluble vitamin), vitamin C is having a water-soluble nature thus it cannot be stored sufficiently inside the human body and, it needs to be supplied in the diet very frequently. At the time of COVID-19's emergence, the supply of fresh foods was severely affected on one hand and on the other side, there was less awareness about the immunoprotected role of vitamin-rich foods against COVID-19 infections. Our study aimed to estimate the status of vitamin C among University Students during the peak period of COVID-19 infections and to observe their attitude, knowledge, and practice toward the use of Vitamin C.

## MATERIALS AND METHODS

We conducted a cross-sectional study during the peak period of COVID-19 in Hyderabad Pakistan and its adjacent areas from the month of December 2020 to February 2021. We distributed about 500 questionnaires among university students and received their responses regarding the impact of the COVID-19-based situation on their daily lives. The informed consent was initially signed by the participants who were willing to participate in our study. The questionnaire was also designed after following officially approved protocols. We received the response of 232 participants who showed their interest to take part in our research work. There were 116 male and 116 female university students from different locations in Hyderabad and adjoining areas. The questionnaire was divided into two main portions such as demographic details and estimation of vitamin C. The questionnaire consisted the questions related to the daily consumption of Vitamin C. The questionnaire had questions related to the daily intake of foods rich in vitamin C. The university students were also asked about their

attitudes, knowledge, and practice toward the consumption of vitamin C on a regular basis. One portion of the questionnaire was composed of questions related to the symptoms of vitamin C deficiency such as tiredness, nose bleeding, skin dryness, joint pain, gum bleeding and inflammation, fatigue, depression, hair loss, etc. The Data from filled responses was transferred to MS Excel and organized into different groups. The data was also inserted into the Pivot table to separate the categorical variables for the Chi-square test. The calculations were made by using SPSS software version 21 and a t-test was applied to determine the significant difference between two groups. A p-value of <0.05 was considered statistically significant.

## RESULTS

The results from our research work have shown that the majority of the students were not taking Vitamin C-enriched foods or citrus fruits in their diet. Our data suggested that 232 respondents took part in our research work and allowed us to record their responses about the estimation of vitamin C status (Table 1).

**Table No. 1: Demographic details of respondents**

Category	N (%) of respondents
<b>Gender</b>	
Male	116 (50.0)
Female	116 (50.0)
<b>Age group (years)</b>	
18-20	80 (34.48)
21-23	100 (43.10)
24-26	52 (22.41)
<b>Native place</b>	
Urban	92 (39.65)
Rural	140 (60.34)
<b>Housing</b>	
Hosteler	104 (44.82)
Non-Hosteler	128 (55.17)
<b>Citrus food intake</b>	
Daily	22 (9.42)
Alternate Day	50 (21.55)
Weekly	60 (25.86)
Occasionally	100 (43.10)



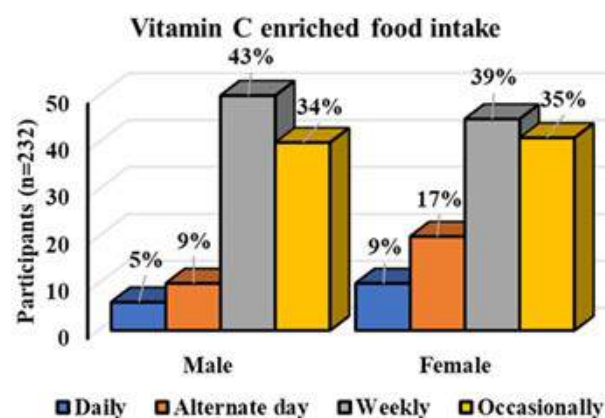


Figure No. 1: Consumption of vitamin C rich foods

Out of 232 respondents, 116 (50%) were male participants whereas there was also an equal number of female respondents for comparison (Table 1). We divided the age groups of respondents (University students) into three groups such as 18-20 years, 21-23 years, and 24-26 years old participants (Table 1). About 45% of students belonged to different hostels and they included both male and female students, whereas 55% of students were not residing in any hostel as they were living in urban areas (Table 1).

According to our results, only 5% of males and 9% of females could consume vitamin C-rich foods every day. About 39-43% of male and female university students were consuming moderate amounts of vitamin C-rich food in a week (Figure 1). Mostly, the university students (34-35%) were those who took a rich source of vitamin C occasionally (Figure 1). The results showed that both males and females were almost equal in number who were deprived of daily doses of vitamin C. Only 9% of males and 17% of females could manage to consume the required amount of vitamin C on alternate days. The tallest column in grey color represents the group of males consuming good sources of vitamin C after one week. The smallest column of the Graph (Figure 1) represents the males eating a good quantity of vitamin C after one week.

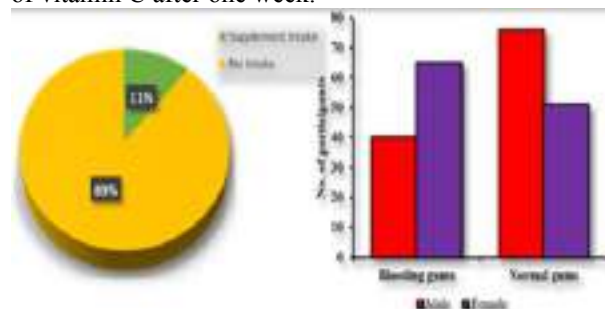


Figure No. 2: Vitamin C supplement and bleeding gums

As far as the consumption of vitamin C in supplement forms was concerned, we noticed that only 9% of males and 14% of females were taking vitamin C supplements

and in total, just 11% of university students were taking vitamin C supplements whereas the rest of the 89% were not taking vitamin c in any supplemental form (Figure 2). We also checked the swollen and bleeding gums of the individuals and found that about 34% of males and 56% of females were having the issue of bleeding gums (Figure 2). The results showed the issue of bleeding gums was more common in female university students compared to male university students (Figure 2). Skin discoloration was not found in most of the cases. After checking the plasma level of vitamin C among University students, it was observed that 37% of males and 47% of females had plasma vitamin C levels < 0.3 mg/dl respectively. Only 3 to 8% of students were found with plasma vitamin C levels > 2 mg/dl (Figure 3). However, 57% of male university students and 50% of female university students had plasma vitamin C levels in a normal range between 0.6-1.4 mg/dl (Figure 3).

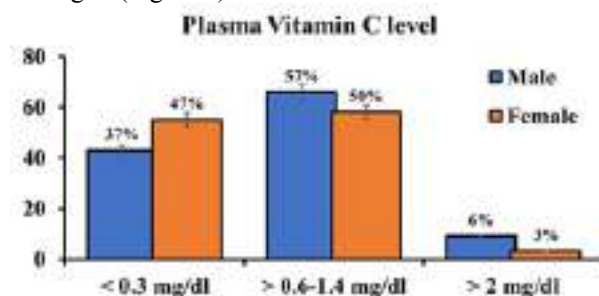


Figure No. 3: Plasma level of vitamin C.

## DISCUSSION

In our research work, we found that the consumption of vitamin C in university students was very poor during the period of the COVID-19 pandemic. Most of the male and female university students were not taking the proper amount of vitamin C in their daily diet. We found that university students were taking very low amounts of vitamin C against the Recommended Daily Allowance (RDA) of vitamin C<sup>13</sup>. Even on the alternative day (one day gap), both male and female university students were not reaching the targeted RDA values. The possible reason might have been the unawareness of University students about the role of vitamin C against COVID-19. The other reason might have been the attitude and dietary preferences of University students as we knew that most of the vitamin C-rich foods were sour and bitter (citrus) in taste. One reason might also have been the cheap availability of vitamin C-rich food sources as we knew about the shortage and high cost of food during COVID-19 around the world<sup>14</sup>. However, One large group of students was those who preferred or managed to take sufficient amounts of vitamin C-rich food around a week. These students were mostly living in the urban areas where they came across a variety of foods weekly

compared to the hostellers who had little chance to find food variety in a week. One group of students (34-35%) consisted of those who got a food source rich in vitamin C occasionally. University students who were a little bit aware of the importance of vitamin C in their daily lives took vitamin C supplements. However, we noticed a very low percentage (9-14%) of the individuals who were taking supplement forms or tablet forms of vitamin C. The males were more in number compared to the females who took vitamin C supplements, possibly because male university students could frequently visit outdoors. We also noticed the majority (56%) of female university students with bleeding gum issues. Most of the females reported the feeling of sensitivity in their teeth during eating and brushing. The males were having less sensitive teeth and bleeding gums compared to the females, possibly because of their supplemental intake. A recent study as our literature support was also consistent with our findings as that study mentioned the vitamin C deficiency in females due to poor intake of food<sup>15</sup>. Our research work could not identify any case of skin discoloration among university students due to the deficiency of vitamin C which indicates that the deficiency of vitamin C has not been prolonged and could be cured by taking some heavy doses of vitamin C in the form of supplement. The presence of teeth sensitivity, bleeding, and swollen gums does not always lead to scurvy as there might be several periodontal diseases. About one-half of our participants had a normal plasma level of vitamin C which indicated that the chances of scurvy and other vitamin C deficiency disorders were too low in half of the randomly selected population. As far as the cases of low vitamin C plasma levels were concerned, we found that 47% of females and 37% of males were affected and they were susceptible to COVID-19 infections<sup>16</sup>. The plasma level of vitamin C in female university students was significantly low ( $p < 0.05$ ) compared to the male university students, which indicated that the females were more susceptible to COVID-19 infection during the peak time of COVID-19 infection cases at Hyderabad and its adjoining areas.

## CONCLUSION

The male and female university students were susceptible to COVID-19 infection during the peak time of the COVID-19 pandemic in Hyderabad and its adjoining areas, because of their critically low levels of Plasma vitamin C. The university were not taking sufficient amounts of vitamin C in their daily diet. Females were more prone to COVID-19 infections compared to males due to their lower intake of vitamin C-rich foods and supplements. The females were also in the majority who reported bleeding gum issues. The

students at the university level must be well aware in advance of the immune-supportive, antiviral, and anti-inflammatory role of vitamin C so that they may become able to protect themselves from not only common deficiency disorders or infections but also from the COVID-19 pandemic situation.

### Author's Contribution:

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**Conflict of Interest:** The study has no conflict of interest to declare by any author.

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# Pediatric Choledochal Cyst, Symptoms/Signs, Management and Outcome, Our Experience

Pediatric  
Choledochal  
Cyst,  
Management and  
Outcome

Muhammad Ramzan Bhutta<sup>1</sup>, Abid Hameed Sheikh<sup>2</sup>, Muhammad Siddiq<sup>1</sup> and Soofia Mustafa<sup>1</sup>

## ABSTRACT

**Objective:** To discuss the symptoms/signs, investigations and management of children presented with choledochal cysts (CC)

**Study Design:** Retrospective study

**Place and Duration of Study:** This study was conducted at the Department of Pediatric and Neonatal Surgery Bahawal Victoria Hospital from September 2014 to September 2022.

**Materials and Methods:** 63 patients under 16 year of age with diagnosis of choledochal cyst were studied. For statistical analysis we divided patients into two groups, <1 year of age and above 1 year to 16 year of age. Mass right hypochondrium, jaundice, pain abdomen, nausea/vomiting with raised alkaline phosphatase level, and imaging USG/CT Scan abdomen finding favouring choledochal cyst were the inclusion criteria.

**Results:** Out of 63 children studied, 17(26.9%) were infants (<1 year) and 46 (73.1%) were older than one year of age. Seventeen months was the mean age with range from 21 days to 16 years. thirty five (55.9%) patients were female and 28 (44.1%) male. Type-I choledochal cyst 59 patients, Type-IV, 3 patients and type V (Caroli disease) 1 patient. As regards symptoms/signs (S/S) jaundice in 13(76.5%), and acholic stool in 9 (59%) patients among <1 year, while second group (>1 year) presented with pain abdomen 38 (83%), vomiting 35(77%), fever 18 (43%) and acute pancreatitis 12(27%). Mass right hypochondrium 23 (50%) was another main presenting feature in older age. Post operative complications were noted in 7 (11.7%) patients which were managed.

**Conclusion:** The symptom/signs of Choledochal cysts vary according to the patient age and operative excision is the main stay of treatment. So early detection and management will prevent the rate of complications.

**Key Words:** Choledochal cyst, symptoms/signs, Surgical outcome

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## INTRODUCTION

Transportation of bile from the liver to the gall bladder and duodenum is carried out by bile duct whose cystic dilatation is a rare congenital condition, called as choledochal cyst, Vater and Ezler described it for the first time in 1723.<sup>1</sup> The incidence of choledochal cyst is recorded as one in 1000 in Asian population with 2/3<sup>rd</sup> from Japan which is considered as highest. While in western countries its incidence is one in 100,000 to 150,000 live birth.<sup>2</sup> Choledochal cyst may be diagnosed at any age but usually presents in older children.<sup>3</sup>

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According to anatomical site, as described by Todani Choledochal cysts is classified into 5 types which may be intrahepatic (within the liver) or extrahepatic (outside the liver). Type I Choledochal cysts is the most common and accounts for ninety percent of all. It is extrahepatic and usually fusiform or sphericle in shape. Type-II CC is diverticulum of the common bile duct. Type-III is intraductal or intrapancreatic dilatation of duct, with normal common bile duct. Type IV CC is multiple cystic dilatations either intrahepatic or extrahepatic or in both locations. Type V choledochal cyst consists as either single or multiple cyst with hepatic fibrosis, also called as Caroli disease.<sup>4,5,6</sup>

The development of choledochal cyst is mainly unknown. However abnormal pancreatic duct opening at the junction of pancreatic duct and common bile duct is reported in approximately 70% of cases which occurs extraductally and thus pancreatic fluid is refluxed into biliary tree.<sup>7,8</sup> This refluxed pancreatic fluid containing

pancreatic enzymes causes inflammation, weakness and ultimately pancreatic/common bile duct dilatation.<sup>10</sup> The most common age ,about 80%, of presentation is under 10 years of age.<sup>7,9</sup> the clinical features vary a bit according to the age of patient, however classical triad of jaundice, pain abdomen and mass right hypochondrium or epigastium is present only approximately 1/3<sup>rd</sup> of patients<sup>7</sup>. the complications associated with delay in diagnosis of choledochal cyst include pancreatitis , cholangitis, chololithiasis and very rarely malignant transformation.<sup>10</sup>

As local studies related to choledochal cyst are lacking so objective of this study was to explore common symptoms/signs, investigations required and management of choledochal cyst. This study will help clinicians to early diagnose, manage the disease in both infants and older children and thus prevent them from complications associated with it.

## MATERIALS AND METHODS

After taking approval from ethical review committee this study was conducted at department of pediatric and neonatal surgery bahawal Victoria hospital. record of all pediatric patients with choledochal cyst admitted in pediatric surgery department from September 2014 to September 2022 were collected and reviewed .

For data collection a predesigned Performa was designed. data which noted down included name, age, sex and symptoms and signs; pain abdomen, vomiting ,fever, jaundice, change in color of stool(acholic stool), right upper quadrant abdominal mass, Classic triad(pain abdomen , jaundice, mass abdomen) and pancreatitis . serum bilirubin (total, direct/indirect) alkaline phosphatase, serum amylase and lipase level, alanine transaminase (ALT), aspartate transaminase (AST), and prothrombin time (PT),activated partial thromboplastin time (APTT), international normalized ratio (INR). Imaging modalities required USG (ultrasonography) abdomen, abdominal CT scan, MRI/ MRCP (magnetic resonance cholangiopancreatography) were noted. According to age two groups were made; patients under one year of age and older i.e 1 to 16 year of age . surgical procedures performed and their results were noted. Data collected was compared between two groups.

Chi-Square test was used for Statistical analysis which was done by using SPSS 23 for windows. P-value of <0.05 was considered significant.

## RESULTS

Sixty three patients with choledochal cyst were studied, 17(26.9%) were infants (<1 year) and 46 (73.1%) were older than one year of age. Seventeen months was the mean age with range from 21 days to 16 years. thirty nine (61.9%) patients were female and 24(38.1%) male

(table 1). Type-I CC was the commonest, 59 (93.6%) patients then Type-IV, 3 (4.7%) patients and type V caroli disease 1(1.5%) patient (table 2). Infants usually presented with yellow discoloration of eyes and body (jaundice) in 13(76.5%), and acholic stool in 9 (53%) patients.the commonest S/S, whereas pain abdomen (83%), vomiting (77%), fever (43%) and acute pancreatitis (27%) were the commonest S/S in older patients. Mass right hypochondrium was another main presenting feature in older age. (table 3) Lab investigations done as shown in table 4.abdominal USG was performed in all the patients as a baseline imaging modality,CT scan abdomen was performed in 53 (84%) patients and MRI/MRCP in 5(7.93%) patients for the confirmation of diagnosis and to identify the types of choledochal cyst. Surgical excision of the cyst was performed in all the patients after optimising. Post-operative complications of excision of CC were observed in 7 (11.7%) patients which includes anastomotic leak in 2 patients , 1 managed conservatively and one patient underwent re exploration, and 5 patients complaint of pain abdomen and ascending cholangitis that were managed conservatively.

**Table No. 1: Gender distribution according to age.**

Age	Male	Female	Total	Percentage
>1 year	6	11	17	26.9%
>1 year	18	28	46	73.1%
Total	24	39	63	100%

**Table No. 2: Types of choledochal cyst. (n; 63)**

Type	Number	Percentage
I	59	93.6%
II	0	0%
III	0	0%
IV	3	4.7%
V	1	1.5%

**Table No. 3: symptoms/signs according to age.**

Clinical feature	Age <1year	Age >1year	Total	P.value
jaundice	13	7	20	0.005
Acholic stool	9	2	11	0.001
Pain abdomen	3	38	41	< 0.001
vomiting	3	35	38	< 0.001
fever	1	18	19	0.001
Mass abdomen	2	23	25	0,001

**Table No. 4: investigations**

Laboratory	Mean ± SD	No. of patients
Total bilirubin	3.7 ± 3.3	37
Direct bilirubin	2. 5±2.0	37

INR	1.3 ± 1.0	47
ALT	123± 105	56
AST	134 ± 125	53
Alkaline phosphatase (ALP)	433 ± 411	63
Serum amylase	1021± 893	29
Serum lipase	1167 ± 925	27
Prothrombin time	9.5± 6.33	47

## DISCUSSION

This retrospective study shows that the ratio of female patients suffering from CC as compared to male is high which is similar to the findings observed by studies conducted by Farooq MA (56%) and Nazir Z (78%) from Pakistan.<sup>3,10</sup> A female preponderance is also reported in literature from other parts of the world.<sup>4</sup>

This study shows that presentation of CC is different in infants and older age pediatric patients. obstructive jaundice (13 patients) and acholic stools (9 patients) were specifically observed in infants whereas in older patients, only seven patients had obstructed jaundice and 2 clay colored stools (p. 0.005 and 0.001). Similar results were observed in a study conducted concluded by Hung MH.<sup>11</sup> Pediatric patients of older age group specifically presented with abdominal pain, nausea/vomiting and fever were noted more commonly among children with more than 1 year of age as compared to patients under 1 year of age (p <0.001). similar result were mentioned in the studies conducted by Hung et al and Chen et al<sup>10,11</sup>. almost similar results to our study i.e. jaundice and acholic stool in all patients under 1 year and in only 35% patients above 1 year of age was reported from a study conducted at Taiwan over 25 years.<sup>3</sup>

We observed only 2 patients with Classic triad pain abdomen, vomiting and mass right upper abdomen. this fact is supported by literature that his classic presentation is rare in children.<sup>4</sup> Fumino et al. in their study reported no patient with classic triad and 7.47% patients were reported by Ohashi et al. which are similar to our study.<sup>7,11</sup>

In our study, raised serum bilirubin and PT/INR were more commonly observed in infants as compared to ALT/AST whereas older children had elevated levels of serum amylase, lipase and ALT/AST. Similar observations were reported Ohashi T et al in their study.<sup>10</sup>

We observed that Type-I CC is the commonest type followed by Type-IV in both age groups. Same observations were reported from other studies conducted at different parts of the world.<sup>12,13</sup> Khandelwal C, reported type I in up to 80%

of the cases.<sup>14</sup> USG abdomen was done in all the patients in our study whereas in 53 (84%) patients CT abdomen and in 5 (7.9%) patients MRI/MRCP was done. as reported in literature USG abdomen can easily diagnose Choledochal cyst and is also cost effective easily accessible however CT and MRI are advanced diagnostic equipments which can even diagnose prenatally.<sup>13</sup>

We performed Cyst excision and Roux-en-Y hepaticojejunostomy in all our patients. This procedure has good results among all age patients with minimal complications. Early diagnosis and surgical management results in good outcome with minimal complications<sup>14,15</sup>. In our study 7 patients developed postoperative complications 6 were managed conservatively while 1 underwent re exploration. A study conducted by Farooq MA reported 4 (12%) patients who developed complications and were managed conservatively.<sup>3</sup>

## CONCLUSION

The symptom/signs of Choledochal cysts vary according to the patient age and operative excision is the main stay of treatment. This study will facilitate the pediatric surgeons for early detection and management of CC and thus will prevent the rate of complications.

### Author's Contribution:

Concept & Design of Study: Muhammad Ramzan Bhutta  
 Drafting: Abid Hameed Sheikh, Muhammad Siddiq  
 Data Analysis: Soofia Mustafa  
 Revisiting Critically: Muhammad Ramzan Bhutta, Abid Hameed Sheikh  
 Final Approval of version: Muhammad Ramzan Bhutta

**Conflict of Interest:** The study has no conflict of interest to declare by any author.

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# Incidence of Acute Pancreatitis Among Paediatric Patients

Acute  
Pancreatitis in  
ChildrenAbid Hameed Sheikh<sup>1</sup> Muhammad Ramzan Bhutta<sup>2</sup> and Soofia Mustafa<sup>2</sup>

## ABSTRACT

**Objective:** The objective of my study is to know the etiology, clinical course, incidence of acute pancreatitis (AP) among paediatric patients admitted in paediatric surgery department.

**Study Design:** Retrospective descriptive study

**Place and Duration of Study:** This study was conducted at the Department of Pediatric and Neonatal Surgery Bahawal Victoria Hospital Bahawalpur, from March 2017 to March 2022.

**Materials and Methods:** During the study period a total 77 patients of acute pancreatitis under 13 year of age who were managed in the department of pediatric and neonatal surgery were included in study. All those patients who fit on the definition of AP (Acute pancreatitis is a disease characterised by minimum two of the following three 1. sudden onset of pain central abdomen 2. Increased level of pancreatic enzymes that is serum amylase or serum lipase 3, radiological evidence of pancreatic changes) were included in the study. Pancreatic enzymes were done in each patient and USG and CT / MRI done as required.

**Results:** Out of 77 patients studied, forty-three (56%) were male and 34 (44%) female. Pain abdomen (100%), nausea/ vomiting (81%) were the most commonly observed symptoms and signs. Among the aetiologies, we found blunt abdominal trauma 31%, choledochal cyst/biliary channel anomaly 19%, biliary tract stones/sludge 13% and idiopathic (37%). acute pancreatitis were more frequently associated with complications (60%) which included pseudo cyst of pancreas (34%), peri pancreatic abscess (4%) and ascities (13%). Serum amylase and lipase done were 4 to 5 times raised in all patients. Imaging plays an important role in diagnosis, so USG Abdomen done in all patients and CT / MRI as needed. most of these patients were managed conservatively.

**Conclusion:** The number of pediatric acute pancreatitis is increasing among the hospitalised patients. The Children having abdominal pain and vomiting must be thought for and investigated for the acute pancreatitis. Most of the patients with acute pancreatitis can be managed conservatively Except those with congenital anatomical defects.

**Key Words:** Pancreatitis, pain abdomen, pancreatic abscess,

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## INTRODUCTION

Over the last many years, acute pancreatitis has been increasingly diagnosed in the pediatric surgical department but its etiology is not certain<sup>1-7</sup>. It may that obesity is increasing among children leading to biliary tract disease<sup>7</sup>. Another hypothesis regarding the etiology of high pediatric pancreatitis diagnosis may be increased knowledge of pancreatitis among physicians and ease in access to investigations (lipase, amylase)<sup>1,3,7</sup>.

Acute onset of abdominal pain with raised amylase/lipase level in the urine and/or blood are the

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characteristic of Acute pancreatitis (AP) which is an inflammatory disease, also there are radiological changes in the pancreatic parenchyma. Though AP isn't common in pediatric age, but morbidity/mortality associated with it is more concerned in pediatric patients presenting with sudden onset of abdominal pain in the casualty department<sup>8</sup>. The pancreatic enzymatic flow which is started by the trypsin converted from trypsinogen results in Pancreatic and peripancreatic inflammatory changes<sup>9</sup>. pathologically AP presents in two forms : A, pancreatic oedema, which is milder disease and good prognosis. B, necrosis of the pancreas and peripancreatic tissues, which has a rather bad outcome, but it's less common in pediatric age (<1%).<sup>10</sup> About 1/3 patients of AP represent with complications and thus in the presence of such complications the morbidity and mortality rate is raised.<sup>11,12</sup>.

The causes, clinical course, and management of pancreatitis vary among paediatric patients and adult patients. However, until now to diagnose the Acute



Pancreatitis in pediatric population under 18 years of age the Atlanta modified guidelines were used<sup>19,10</sup>. A group of experts published guidelines in 2012, whose aim was to define pediatric AP, pediatric acute recurrent pancreatitis, and pediatric chronic pancreatitis, this group is called The INSPPIRE (International Study Group of Paediatric Pancreatitis: In search of a cure)<sup>13</sup>. From the INSPPIRE point of view, to diagnose AP at least two out of the three criteria are present: 1. pain abdomen, that suggests pancreatitis (sudden onset of pain central abdomen), nausea and vomiting, and back pain; 2. blood amylase and/or lipase level increase at least three times more than the upper limit of normal values; 3. imaging findings characteristic for AP. Although AP is rare in children, but it is one of the major etiologies of mortality and morbidity in patients presenting with sudden pain abdomen in casualty department<sup>11</sup>. the complications due to pancreatitis may be seen in about 1/3 of patients but in the presense of complications the rate of mortality and morbidity is increased.<sup>12</sup> AP should be put among the differential diagnosis and appropriate management started early in patients coming with acute pain abdomen to minimize complications.<sup>10</sup>

## MATERIALS AND METHODS

After taking approval from institutional ethical review committee, we conducted this study at department of pediatric and neonatal surgery. The aim of this study was to analyze the clinical features, causes, outcome and an increase in number of patients of AP among admitted pediatric patients in our center. Medical records of the patients with AP since March 2017 to March 2022 were analyzed from hospital records. Inclusion criteria was patients under 13 years of age with a diagnosis of AP (sudden pain central abdomen ,nausea and vomiting, Laboratory investigations serum amylase/ lipase at least 3 times normal range and/or imaging findings favouring AP)<sup>1</sup>. Patients admitted for another disease with a past history of AP were excluded from the study. Variables, laboratory investigations (serum amylase and lipase) obtained within first 24 hr of the start of symptoms /signs were considered for inclusion in study. The imaging studies of each case were reviewed: pancreatic edema, peripancreatic inflammation, pancreatic /peripancreatic necrosis, collections, abscess, haemorrhage, and pseudo cyst. Findings, like abnormal anatomy of the pancreatic biliary system or any other abdominal abnormalities were also noted. Mean and standard deviation (SD) or median, were used for quantitative variables. Absolute and relative frequencies for nominal variables. In addition, the descriptive analysis of each variable was done independently for AP, and their results were compared using the chi-squared test for categorical variables, and Student's *t*-

test for quantitative variables. P value of 0.05 was considered as significant.

## RESULTS

During the study period, 2017 to 2022, there were 77 visits to the pediatric surgery department for children under 13 years of age with a final diagnosis of pancreatitis. Among the 77 visits, first episode of AP was found in 60 patients, and 17 patients visited for the recurrent attack of pancreatitis. Eight (8) years was the median age for AP. from the first acute attack to the first recurrent attack the median time was 6.3 months. As shown in table 1, patients with AP 46 (59%) were male and 31(41%) were female. Serum amylase and lipase done were 4 to 5 times raised in all patients. Thirty eight (49%) patients were between 7 to 13 yrs of age ,23(30%) of patients between 4 to 7 yr , 16(21%) were 2 to 4 yrs of age (table 2). Among the aetiologies, we found blunt abdominal trauma 31%, choledochal cyst/biliary channel anomaly 19%, biliary tract stones/sludge 13% and idiopathic (37%) table 3. Among the trauma motor cycle/bi cycle handle bar injury was the commonest followed by fall from height, road traffic accident, fall of brick wall over abdomen. Imaging plays an important role in diagnosis, so USG Abdomen done in all patients and CT / MRI as needed. most of these patients 72(93%)were managed conservatively and 5(7%) patients underwent surgical intervention (table 4). Out of 77 only 5 patients developed complications which include pancreatic abscess ,4 were managed successfully, one patient expired due to sepsis p; < 0.01.

17 patients were diagnosed as acute recurrent pancreatitis (ARP).and among them 9 (57%%) were male and 8 patients (43%) were female. Etiologically idiopathic 45% , blunt abdominal trauma 27%, choledochal cyst/biliary tract abnormality17%, biliary channel stones/sludge 11% .

**Table No.1: %age of patients according to gender (n=77)**

Gender	No. of patients	%age
Male	46	59
Female	31	41
Total	77	100

**Table No.2: %age of patients according to Agedistribution (n=77)**

Age (yr)	No.of patients	%age
2 – 4	16	21
>4 – 7	23	30
>7 – 13	38	49
Total	77	100

Mean ± SD = 27.53 ± 31.12 months

**Table No.3: %age of patients according to etiology n.77**

Etiology	No. of	%age
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	patients	
Blunt abdominal trauma	24	31
Idiopathic	28	37
Biliary tract stone/sludge	10	13
Anatomical anomalies of pancreatic biliary system	15	19

**Table No. 4: Outcome of patients (n.77)**

Conservative management	72	
Surgical intervention	5	
Total	77	100%

P value; < 0.01%

## DISCUSSION

This retrospective study shows that children suffering from AP may have different types of etiologies which include, trauma (31%) and cholelithiasis/biliary tract stone, sludge 13%; anatomical anomalies of pancreatic biliary system 19% but in approximately 37% of the patients' etiological factor could not be identified (idiopathic 37%). Trauma (21%) and biliary tract diseases (10%) were the main etiologies of pediatric AP in a study conducted by Poddar et al. from Austria, among 329 children having AP, RAP and CP<sup>13</sup>. C Fayyaz et al. reported choledochal cyst, biliary tract stones/sludge 15%, idiopathic 40% and trauma 6% among 72 pediatric patients with AP from Pakistan<sup>14</sup>. Elif sag et al. from turkey reported 63 children with AP and main etiologies were 25% idiopathic, trauma (11.1%) and gall bladder stone (9.5%) and systemic diseases (14.3%)<sup>8</sup>. Park et al in his study conducted at USA, reported pancreatic biliary etiology (36.2%), certain medications (25.6%) and trauma among the common etiologies in 215 children with AP.<sup>15</sup> Another study from Italy conducted by Pezzilli et al. showed biliary diseases and viral infection as the main etiologies for AP in children<sup>14</sup>. Majbar et al. from UK reported gall stones, drugs and trauma as the causative factor for AP among 94 pediatric patients.<sup>16</sup> The ethnic and geographic variations may be the reason for this difference in etiological factors among different studies. In this study, 22.6% children presented with RAP. RAP was seen commonly among males patients, and those patients who experienced local pancreatic complications at first attack and patients with anatomical defects, like choledochal cyst, pancreas divisum. previous studies reported the prevalence of RAP as 15 to 42% in<sup>14,15</sup>. Su et al. reported the pancreaticobiliary anomalies (28%) as the leading etiology of pediatric RAP.<sup>14</sup> In addition to our findings, first attack at young age, necrosis of pancreas and severe AP were the other risk factors for RAP.<sup>14,17</sup> Lucidi et al. from Italy reported 78 (42.3%) pediatric patients with RAP with genetic predisposition as the etiology, whereas among 26% of the children etiological factor could not be found.<sup>8</sup>

In our study most (93.5%) of the patients had a smooth recovery with conservative management (P value; < 0.01%). Out of 77 only 5 patients developed complications which include pancreatic abscess and 4 were managed successfully, one patient expired due to sepsis. previous studies, showed a mortality associated with pediatric AP between 0.4-6% and were associated mainly with underlying etiologies/ comorbid conditions.<sup>4,18</sup> Eileen Viviana conducted a study showing conservative management in patients with AP as the main treatment strategy with good results.<sup>13</sup> Guo et al. reported good outcome with medical management having minimal complications in their study and mortality of 5%.<sup>18</sup>

Our study shows an increase in AP among children in last few years. A study conducted by Elif Sağ et al, at Turkey reported an increasing incidence of AP among hospitalized children in recent years.<sup>8</sup> Population based studies from different countries like India, United States and Australia showed similar results.<sup>13,15,18</sup> this may be due to the increased awareness of AP in pediatric patients with mild symptoms and signs, easy availability of serum amylase and lipase testing in the emergency and ease of access to ultrasonography/CT Scan.

## CONCLUSION

The incidence of acute pancreatitis is increasing in children. The Children having abdominal pain and vomiting must be thought for and investigated for the acute pancreatitis. Most of the patients with acute pancreatitis can be managed conservatively Except those with congenital anatomical defects.

### Author's Contribution:

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**Conflict of Interest:** The study has no conflict of interest to declare by any author.

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# A Retrospective Cross-Sectional Study of Surgical Site Infections at the General Surgical Wards of the LRH Hospital in Peshawar

Surgical Site Infections at Surgical Wards of LRH Hospital, Peshawar

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## ABSTRACT

**Objective:** The identification of different risk variables connected to SSIs was one of the secondary goals. In addition, comparisons of patient characteristics, surgery types, and other relevant parameters were done to evaluate the prevalence of SSIs. A study was carried out in a general surgical unit of LRH hospital with the main objective of figuring out how often surgical site infections (SSIs) occur

**Study Design:** A retrospective cross-sectional study.

**Place and Duration of Study:** This study was conducted at the Department of General Surgical LRH Hospital in Peshawar from 09-January 2019 to 09-January 2022.

**Materials and Methods:** For 12 months, medical records of every patient admitted into the wards were examined to collect data. SSIs were singled out, and the prevalence of SSIs was established for varying factors, such as patient characteristics and types of surgery. The gathered information was analyzed using descriptive statistical methods.

**Results:** An overall prevalence rate of 8.3% for SSIs was noted in this study. Open abdominal surgery had the highest prevalence rate at 14.6%, followed by endoscopic procedures at 6.7%, and open non-abdominal surgery at 4.9%. Risk variables connected to the development of SSIs were longer hospital stay, numerous surgical operations, and prolonged operating duration. The prevalence rates of SSI were comparable for patients of all sexes and age groups.

**Conclusion:** This investigation revealed an alarmingly high incidence of SSIs at the general surgical units of an LRH hospital. Open non-abdominal surgery and endoscopic techniques came in second and third, respectively, behind open abdominal surgery. Long operating periods, having several operations, and a prolonged hospital stay were the most frequent risk factors for SSIs. To reduce the risk of SSIs in the general surgical wards of LRH institutions, preventive measures must be put in place.

**Key Words:** Surgical site infections, LRH Hospital, General Surgical Wards, Prevalence, Risk Factors

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## INTRODUCTION

The economic burden of surgical site infections (SSIs) is immense, making them one of the most costly types of hospital-inflicted infections. Recent data shows that SSIs account for 20-25% of hospital-acquired infections and are linked with about 11-13% of hospital-related fatalities in the U.S. The repercussion of SSIs can cause much morbidity and mortality.

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Treatment for just one patient may cost \$10,000 to \$20,000 more due to SSIs.<sup>1</sup> To identify the associated risk factors and reduce the prevalence of SSIs in general surgical wards at LRH hospital, this study aimed to investigate both elements. Hospitals could develop methods of intervention based on these results.<sup>2,3</sup>

## MATERIALS AND METHODS

From 09-January 2019 to 09-January 2022, in the general surgical wards of LRH hospital in Peshawar, This cross-sectional retrospective investigation was conducted. Information was gathered from all

hospitalized patients' medical records throughout the course of a 12-month period. SSIs were recognized and their prevalence was determined using patient characteristics, particular surgical procedures, and other variables. Utilizing descriptive statistical techniques, the data was examined.

## RESULTS

The study had 3,943 patients and found that 8.3% of them had SSIs. Interestingly, the open abdominal surgery patients had the highest prevalence rate at 14.6%. Endoscopic procedures had a prevalence of 6.7%, while open non-abdominal surgery was at 4.9%. Those with increased risk factors such as long surgery times, multiple procedures, and extended hospital stays had a greater likelihood for SSIs. It was discovered that gender and age didn't make a significant difference in infection rates.

**Table No. 1: Prevalence of Surgical Site Infections by Type of Surgery**

Type of Surgery	Prevalence (%)
Open Abdominal	14.6
Endoscopic	6.7
Open Non-Abdominal	4.9
Laparoscopic	2.2
Other	0.7

**Table No. 2: Risk Factors Associated with Surgical Site Infections**

Risk Factor	Prevalence (%)
Prolonged Operative Time	43.3
Multiple Surgical Procedures	25.2
Prolonged Hospital Stay	15.1
Foreign Bodies	10.7
Obesity	4.7

**Table No. 3: Surgical Site Infection Prevalence by Patient Characteristics**

Patient Characteristics	Prevalence (%)	Prevalence (%)
Gender (Male / Female)	7.9	8.6
Age	(0-17 / 18-34 / 35-64 / 65+)	7.7 / 8.0 / 8.1 / 8.3

**Table No. 4: Surgical Site Infection Prevalence by Other Factors**

Other Factors	Prevalence (%)
Type of Anesthesia	7.9
Type of Wound Closure	7.5
Duration of Surgery	6.5

**Table No. 5: Surgical Site Infection Prevalence by Type of Pathogen**

Type of Pathogen	Prevalence (%)
Staphylococcus aureus	46.3
Enterococci	25.3
Pseudomonas aeruginosa	14.1
Escherichia coli	11.2
Others	3.1

**Table No. 6: Surgical Site Infection Prevalence by Type of Wound**

Type of Wound	Prevalence (%)
Clean	3.1
Clean-Contaminated	7.7
Contaminated	10.2
Dirty	30.6

**Outcomes finding:** At LRH hospital's general surgical wards, a noteworthy number of surgical site infections (SSIs) were discovered in this study. The highest prevalence rate was recorded for open abdominal surgery, closely followed by endoscopic procedures and open non-abdominal surgery. Typically, prolonged operative time, multiple surgical procedures, and extended in-hospital stays were the most notorious risk factors for SSIs. Despite that, no significant dissimilarities in SSI incidence were noted concerning gender and different age groups. Associatively, the most prevalent SSIs bacteria were Staphylococcus aureus, Enterococci, Pseudomonas aeruginosa, and Escherichia coli. Dirty wounds, specifically, demonstrated the most prevalent SSIs. Interventions in the general surgical wards of LRH hospitals can reduce the risk of SSIs, as per the study's findings.

## DISCUSSION

According to the results of this study [6], SSIs appear to be a significant problem in the general surgical wards of LRH hospitals. The results showed that the overall prevalence of SSIs was 8.3%, which surpasses the global average of 4.4%<sup>6</sup>. The most frequent procedures were open abdominal and open non-abdominal surgeries, then endoscopic procedures<sup>7,8</sup>. These findings correlate with recent studies that postulated a greater SSI risk in more difficult operations such open abdominal surgery<sup>9</sup>. The most frequent risk factors for SSIs were prolonged hospital stays, multiple surgical procedures, and prolonged operative times<sup>10,11</sup>. Shortening hospital stays and reducing the number of surgical operations should be put into place as treatments to reduce the risk of SSIs in general surgical wards of LRH institutions. These factors have been classified as SSI risk factors by earlier studies, which is consistent with the findings of the current study<sup>12,13</sup>. As a result of the studies significant SSI finding at LRH hospital's general surgical wards, preventive measures are urgently needed. SSIs are prevalent in the general surgical wards of LRH hospitals, and can potentially be caused by prolonged operative time, prolonged hospital stays, and multiple surgical procedures<sup>14</sup>. In particular,

open non-abdominal surgery and endoscopic procedures have lower rates of SSIs than open abdominal surgery. Interventions must be done to lower the risk of SSIs<sup>15</sup>. A study found that multiple surgical procedures, a long hospital stay, and prolonged operative time were the main risk factors for SSIs. It is crucial to put into practice strategies that can reduce SSI susceptibility throughout general surgical wards in LRH hospital<sup>16</sup>. According to recent study, commonly found pathogens that cause these infections are Enterococci, Staphylococcus aureus, Escherichia coli, and Pseudomonas aeruginosa. Furthermore, dirty wounds have been found to have the highest occurrence of SSIs<sup>17</sup>.

## CONCLUSION

SSIs were shown to be quite typical in a study carried out in a general surgical unit in LRH hospital. Following endoscopic methods and open non-abdominal surgery in frequency of detection was open abdominal surgery. The most frequent risk factors for SSIs were lengthy surgical procedures, extended stays, and multiple surgeries. It is advised to implement interventions in the general surgical wards of LRH hospitals to reduce the likelihood of infections.

### Author's Contribution:

Concept & Design of Study:	Muhammad Bilal, Viqar Aslam
Drafting:	Muhammad Bilal, Towfiq Karim
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Revisiting Critically:	Viqar Aslam, Muhammad Bilal
Final Approval of version:	Viqar Aslam, Muhammad Bilal

**Conflict of Interest:** The study has no conflict of interest to declare by any author.

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contaminated surgeries in developing countries. Int

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# Radiographic Estimation of Age Using Epiphyseal Fusion at Elbow Joint in Boys & Girls of 13-17 Years in Gadap Town

Radiographic Estimation of Age Using Epiphyseal Fusion

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## ABSTRACT

**Objective:** To determine the radiographic age of 13–17-year-old boys and girls by examining epiphyseal fusion in the elbow joint. to examine the age at which the various elbow epiphyses fused in both sexes. to compare the age at which the different bones in the elbow joint have fused epiphyseally between boys and girls.

**Study Design:** Prospective observational study

**Place and Duration of Study:** This study was conducted at the Department of Radiology, Fatima Hospital, Karachi from January 2021 to January 2022.

**Materials and Methods:** Participants' ages were verified by verbal agreements, birth certificates, and school records. An expert radiologist in the department of radiology at the same institution took radiographs of the left elbow joint. According to Prasad et al. (2016), the degree of fusion was assessed for the secondary ossification sites including the capitulum, radial head, internal (medial) epicondyle, trochlea, olecranon, and exterior (lateral) epicondyle. Age (in years) and gender (male or female)-based data collection and analysis were utilized to gather and analyze the data. Chi-square test was performed to determine association and significant difference for categorical variables.

**Results:** According to the study's findings, male participants did not experience medial epicondyle fusion until they were 17 years old, whilst female participants did not experience it until they were 16 years old. The age of fusion for the conjoint epiphysis lateral epicondyle of the humerus was 17 years in females and 16 years in men. Last but not least, the findings demonstrated that full fusion of the upper ends of the radius and ulna in both genders happened at the age of 17. The study also showed that females often showed an earlier stage of fusion of these ossification sites than did men.

**Conclusion:** According to the present study, full epiphyseal fusion of the medial epicondyle at the lower humerus end was seen in 17-year-olds in 95% of females and 5% of males. The conjoint epiphysis lateral epicondyle of the lower end of the humerus was completely fused in 86% of the female participants and 0% of the male participants by the time they were 17 years old. While the Upper end of the radius and ulna had 100% complete epiphyseal fusion at the age of 17 in both gender groups. According to the study's findings, boys and girls between the ages of 13 and 17 in Gadap Town may be reliably identified by radiographic age estimate utilizing epiphyseal fusion at the elbow joint.

**Key Words:** Age estimation, medial epicondyle, conjoint epiphysis, radiographic epiphyseal fusion

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## INTRODUCTION

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One of the crucial factors in establishing a person's identification that is necessary in civil and criminal lawsuits both during life and after death is their age. It is particularly crucial in underdeveloped nations when birth records are not kept up to date.<sup>1</sup> (2017) Maqsood et al. Bone is a mineralized, unusual connective tissue that is vascular, alive, and continually changing. Its growth process is exceptional<sup>2</sup> (2017) Choudhary et al.



The timing of epiphyseal lines may be used to determine age since different epiphyses emerge and fuse in a certain sequence. There are known differences between genders in the development of the epiphysis.<sup>3</sup> Siddiqi and colleagues 2017 The little variations in age of fusion may also be brought on by variations in geographic distribution, socioeconomic position, environment, metabolism, diet, genetics, or just a lack of conventional procedures.<sup>4</sup> 2018 (Aljuaid and El-Ghamry). Worldwide, the examination of epiphyseal union of bones is regarded as a fair scientific and recognized technique for age determination.<sup>5</sup> 2018 (Dere et al.).

The elbow joint is a synovial hinge joint that connects the proximal ends of the radius and ulna to the distal end of the humerus. The capitulum of the humerus articulates with the fovea on the head of the radius, and the trochlea of the humerus is received into the semilunar notch of the ulna. At various points, they are visible on a simple elbow radiograph: the capitulum is two years old, the radial head is four, the internal (medial) epicondyle is six, the trochlea is eight, the olecranon is ten, and the exterior (lateral) epicondyle is twelve. A single epiphysis forms when the capitulum, trochlea, and lateral epicondyle join together. The location of bone lengthening is represented by the epiphyseal plate. According to Alwabhany et al. (2017), the secondary ossification centers are crucial for determining skeletal age from elbow radiographs during the second year of the pubertal growth spurt, which occurs between the ages of 11 and 13 for girls and 13 and 15 for males.<sup>6</sup> After puberty, the process of long bone development terminates at various ages and in various bone regions. The date of epiphyseal union varies very little across study groups from various geographical regions. Radiological assessment of long bone ends has shown greater accuracy, prevalence, dependability, and authenticity among all techniques of age estimation, which is acceptable to clinicians as well as the legal community<sup>7</sup> (Mishra et al., 2017) 2017 (Gaddewar and Meshram). According to study done on 100 people in the Bikander area of India between the ages of 10 and 20 years, fusion of the various ossification centers took place one year sooner in the female participants than in the male ones. The results of the study showed that both men and female adolescents between the ages of 14 and 16 may have their ages estimated using the epiphyseal union around the elbow joint<sup>8</sup> (2016) Sharma et al.

Age determination is crucial in the medicolegal area since it's required for marriage, criminal investigations, and identification. In developing and undeveloped nations where basic paperwork is often inadequate and unavailable, identifying people may be difficult. When comprehensive certified papers are not available, it is necessary to confirm if a person is a minor or an adult.<sup>9</sup> (Ebeye et al., 2016) before determining their exact age.

The ages of appearance and the union of the epiphyses and diaphyses as seen radiologically are among the different ways of age determination, and they are often the sole approach used by medico-legal professionals.<sup>10</sup> (Nemade et al., 2014).

## MATERIALS AND METHODS

A random sample size of 204 cases were examined in the current study. With the approval of the ethics committee, a prospective observational study was conducted on boys and girls between the ages of 13 and 17. The cases were gathered from patients who visited at Department of Radiology, Fatima Hospital, Karachi. On the basis of the subjects' testimonies and the documentation of their birth certificates, and school certificates, accurate ages were ascertained in each instance. According to their mean ages, the individuals were split into five groups of 13, 14, 15, 16 and 17 years for statistical analysis. Subjects between the ages of 12 and 6 months and 13 and 5 months were included in the mean age group of 13, while those between the ages of 13 and 6 months and 14 and 5 months were included in the mean age group of 14, and so on up to 17 years. Antero-posterior radiographs of the left elbow joint were obtained at Department of Radiology, Fatima Hospital, Karachi. These epiphyses were looked at: A joint at the elbow: 1. Conjoint epiphysis lateral epicondyle of lower end of humerus 2. Medial epicondyle of lower end of humerus 3. Upper end of radius & ulna. According to Prasad RS et al<sup>2</sup>, epiphyseal fusion criteria were staged based on how much of the epiphysis around the elbow joint had fused. "Degree 0: A dark radiolucent line seen throughout the length of the epiphyseal and metaphyseal joining surfaces (epiphyseal fusion not yet commenced). Degree 1: Epiphyseal surface area is visualized as an opaque area in radiographs (epiphyseal fusion initiated). Degree 2: opaque area around epiphyseal is more than 50% in radiographs (epiphyseal fusion partial). Degree 3: metaphyseal and epiphyseal joining surfaces are entirely radio opaque (epiphyseal fusion widespread)".

Data was analyzed using software SPSS 21. For quantitative variables such as age, mean and standard deviation was calculated and for qualitative variables such as sex percentages was calculated. Chi-square test was used to estimate association and significant difference for categorical variables. P-value <0.05 was considered significant.

## RESULTS

Total 204 cases were studied, among them 100 were males and 104 were females. It was observed in 95% of female and 5% male that complete epiphyseal fusion was seen in 17 year. In 16 year females 76% while 16 year males 0% fusion of the Medial epicondyle of

lower end of humerus were recorded. 10% males and females shown complete fusion of the Medial epicondyle of lower end of humerus in the age baracket of 15 years. In case of 12 and 13 year of age both the male and female showed 0% fusion of the Medial epicondyle of lower end of humerus. (Table 1)

The complete epiphyseal fusion of the conjoint epiphysis lateral epicondyle of lower end of humerus was observed in 86% of female and 0% male in 17 years of age group. Among them 66% females in the age of 16 and 40% males showed complete epiphyseal fusion of the conjoint epiphysis lateral epicondyle of lower end of humerus. In the age group of 15 years 45% males and 9% females showed complete epiphyseal fusion of the conjoint epiphysis lateral

epicondyle of lower end of humerus. In the age group of 14 years 45% females and 0% males showed epiphyseal fusion of the conjoint epiphysis lateral epicondyle of lower end of humerus. While in case of the age group of 13 neither male nor female showed complete fusion of the above said bone. (Table 2)

The age groups from 13-15 showed 0% complete fusion of epiphyseal fusion of the Upper end of radius & ulna. In the age group of 16 year 53% females while 0% males showed complete epiphyseal fusion of the Upper end of radius & ulna. While in the age group of 17 year 100% complete epiphyseal fusion of the Upper end of radius & ulna was recorded in both gender groups. (Table 3)

**Table No. 1: Displaying age of epiphyseal fusion of the Medial epicondyle of lower end of humerus**

Mean age in years	Gender	Total No. of cases	Degree of Epiphyseal fusion							
			Degree 0	%	Degree 1	%	Degree 2	%	Degree 3	%
13	M	20	14	70	7	35	0	0	0	0
	F	21	15	71	05	23	0	0	0	0
14	M	20	02	10	14	70	03	15	0	0
	F	21	01	4.7	15	71	03	14	0	0
15	M	20	02	10	9	45	06	30	2	10
	F	21	0	0	8	38	10	47	02	9
16	M	20	0	0	0	0	1	5	0	0
	F	21	0	0	0	0	4	19	16	76
17	M	20	0	0	0	0	0	0	1	5
	F	20	0	0	0	0	0	0	19	95

**Table No. 2: Displaying age of epiphyseal fusion of the conjoint epiphysis lateral epicondyle of lower end of humerus**

Mean age in years	Gender	Total No. of cases	Degree of Epiphyseal fusion							
			Degree 0	%	Degree 1	%	Degree 2	%	Degree 3	%
13	M	20	8	40	12	60	0	0	0	0
	F	21	21	100	0	0	0	0	0	0
14	M	20	4	20	12	60	05	25	9	45
	F	21	2	9.5	17	81	1	4.7	0	0
15	M	20	0	0	1	5	13	65	9	45
	F	21	0	0	7	33.3	12	57	2	9
16	M	20	0	0	0	0	0	0	8	40
	F	21	0	0	1	4.7	6	28.5	14	66.6
17	M	20	0	0	0	0	0	0	0	0
	F	22	0	0	0	0	1	4.5	19	86.4

**Table No. 3: Displaying age of epiphyseal fusion of the Upper end of radius & ulna**

Mean age in years	Gender	Total No. of cases	Degree of Epiphyseal fusion							
			Degree 0	%	Degree 1	%	Degree 2	%	Degree 3	%
13	M	20	11	55	9	45	0	0	0	0
	F	21	21	100	0	0	0	0	0	0

14	M	20	0	0	13	65	0	0	0	0
	F	21	10	47.7	11	52.3	0	0	0	0
15	M	20	2	10	11	55	7	35	0	0
	F	21	0	0	6	28.5	15	71.5	0	0
16	M	20	0	0	3	15	17	85	0	0
	F	21	0	0	0	0	10	47.7	11	52.3
17	M	20	0		0	0	0		20	100
	F	22	0	0	0	0	0	0	22	100

## DISCUSSION

The present study was carried to access the age of males and females among the age of 13-17 years by radiographic method using elbow joint epiphyseal fusion as a age marker. The current study covered 204 cases 100 males and 104 females. Epiphyseal fusion of the Medial epicondyle of lower end of humerus. It was observed in 95% of female and 5% male that complete epiphyseal fusion was seen in 17 year. In 16 year females 76% while 16 year males 0% fusion of the Medial epicondyle of lower end of humerus were recorded. It depicts that among females this bone showed maximum fusion in 17 years and the ratio of complete fusion reduced with decrease in age. These findings are in accordance with Das Gupta et al and Singh B 2007<sup>11</sup>. Jnanesh 2011 also get similar kind of radiographic patterns in his study<sup>12</sup>.

The current study maximum epiphyseal fusion of the conjoint epiphysis lateral epicondyle of lower end of humerus was recorded in the females of age group of 17 years. While 45% of males showed this in the age of 14 to 15 years. These results are somehow similar with the studies carried by Hepworth SM 1929, and Jnanesh<sup>12</sup> RS 2011.

The present study showed that 100% of both male and female in the age of 17 possess complete epiphyseal fusion of the Upper end of radius & ulna. While in case of 16 Years of age almost 52% of females and 0 % males showed complete epiphyseal fusion of the Upper end of radius & ulna. The current study is in accordance to the study conducted by Das Gupta et al 1974. Singh B<sup>11</sup> 2007 also noted similar results in his study.

## CONCLUSION

Radiological analysis of Conjoint epiphysis lateral epicondyle of lower end of humerus, Medial epicondyle of lower end of humerus and Upper end of radius & ulna can be used as age markers among both boys and girls especially teenagers. Epiphyseal fusion in present study usually found to be earlier in females than males.

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# Determinants of Outcome in Patients with Abdominal Trauma A Retrospective Cohort Study

Outcome in Patients with Abdominal Trauma

Viqar Aslam<sup>1</sup>, Muhammad Bilal<sup>2</sup>, Waqar Alam Jan<sup>1</sup>, Muhammad Ayaz<sup>1</sup>, Towfiq Karim<sup>1</sup> and Alina Zaidi<sup>2</sup>

## ABSTRACT

**Objective:** Abdominal trauma patients were the focus of this study in order to explore the factors that influence their recovery.

**Study Design:** A retrospective cohort study

**Place and Duration of Study:** This study was conducted at the Department of Surgery in LRH Peshawar from 15-Jan 2021 to 15-Jan 2022.

**Materials and Methods:** To a trauma center due to abdominal trauma. Medical records were used to collect the patients' trauma scores, medical history, demographics, and outcomes. The scoring system consisted of the Injury Severity Score (ISS), the Revised Trauma Score (RTS), and the Abdominal Trauma Index (ATI). The outcomes were classified as favorable (discharge with full recovery) or unfavorable (death or disability).

**Results:** An assessment determined the likelihood of patient success based on traits such as age, gender, and any comorbidities, as well as their trauma scores. Unfavorable outcomes were more probable for patients over 55 years old or those with comorbidities. The RTS, ISS, and ATI scores had a significant correlation to the outcome, meaning that patients who had low scores had a higher chance of an unfavorable outcome.

**Conclusion:** In predicting outcomes for those with abdominal trauma, patient characteristics and trauma scores may be helpful, as this study shows. It is necessary to further research the role these factors play in determining outcomes for this patient population.

**Key Words:** Abdominal trauma, patient characteristics, trauma scores, outcomes, predictors

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## INTRODUCTION

Worldwide, abdominal trauma is a leading cause of morbidity and mortality. Up to one-third of hospitalized trauma patients endure abdominal damage and 5% of trauma-related fatalities are due to such injuries<sup>1</sup>. Because the course of recovery for these patients is influenced by an assorted group of factors such as patient traits, injury severity and trauma scores, prognosis can be challenging to anticipate. Consequently, grasping what factors determine outcomes for patients with abdominal trauma is crucial for refining patient care and outcomes. In an endeavor to study the factors affecting the outcome for victims of abdominal trauma, a cohort of 50 patients treated for

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abdominal trauma at a trauma center from 2015 to 2020 were analyzed. Information regarding the patients' personal traits, injury scores, and outcomes were documented and then meticulously scrutinized. Interestingly, the research indicated that factors encompassing characteristics such as age, gender, and pre-existing medical conditions as well as scores related to injuries like the Abdominal Trauma Index, the Revised Trauma Score, and the Injury Severity Score were significant predictors of patient's outcomes. From this analysis, an intriguing conclusion was drawn: patient traits and injury scores can potentially aid in panning the outcomes for patients suffering from abdominal trauma. The abdominal organ system is a complex and challenging area of medical practice, especially when it comes to diagnosing and managing trauma<sup>2</sup>. Morbidity and mortality rates associated with abdominal trauma remain high worldwide, ranging from 1-25% in developed nations. The key to effective trauma care is to quickly identify the specific anatomic injury patterns and their pathophysiological consequences. Understanding these factors is essential

for determining the best course of action towards early diagnosis, classification, and optimal management. Ultimately, the outcome of abdominal trauma treatment largely hinges on timely and effective interventions. Identifying factors associated with positive outcomes could improve management of abdominal trauma patients. Therefore, this study aims to determine how demographic features and trauma severity scores impact outcomes. By studying these correlations, potentially useful information may emerge, leading to potential treatments and prevention methods<sup>3</sup>.

## MATERIALS AND METHODS

a retrospective cohort study was conducted that sampled 50 patients admitted to a trauma center with abdominal trauma. Information on the patients' medical histories, demographics, and injury scores such as the Revised Trauma Score (RTS), the Abdominal Trauma Index (ATI), and the Injury Severity Score (ISS) were gathered via medical records. The resulting outcomes were separated into two categories: favorable, which indicated full recovery and discharge, and unfavorable, which signified either death or disability.

**Data collection:** Abdominal trauma patients at the trauma center had their medical records analyzed for data. This data consisted of individual characteristics like age, gender, and any other existing health issues. Additionally, trauma scoring systems like the Abdominal Trauma Index, Revised Trauma Score, and Injury Severity Score were taken into consideration. Furthermore, patients either left the center with a favorable outcome, indicating they fully recovered and were discharged, or an unfavorable result, suggesting they either passed away or sustained a disability.

**Statistical analysis:** Using version 22.0 of the Statistical Package for Social Sciences (SPSS) software, the data was analyzed. To provide an ample summary, descriptive statistics were utilized. The outcome of the study was correlated with patient characteristics and trauma scores by means of Pearson's chi-squared test. Furthermore, a multivariate logistic regression model was employed to evaluate the impact of the variables on the study's independent effect.

## RESULTS

The outcome of patients was influenced by their age, comorbidities, and gender, along with their trauma scores, as per the analysis results. Those with comorbidities and above 55 years of age were the ones who experienced unsatisfactory outcomes. Furthermore, lower scores on the RTS, ATI, and ISS led to unfavorable outcomes. Patients with higher scores had a better chance of a favorable outcome.

**Table No. 1: Age distribution of abdominal trauma**

Age Group	Frequency
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18-34	24
35-54	14
55+	12
Total	50

**Table No. 2: Etiology of abdominal trauma**

Etiology	Frequency
Blunt trauma	33
Penetrating trauma	17
Total	50

**Table No 3: Comorbidities of abdominal trauma**

Comorbidity	Frequency
None	35
Diabetes	7
Hypertension	3
Chronic Obstructive Pulmonary Disease	2
Total	47

**Table No. 4: Trauma scores of abdominal trauma**

Trauma Score	Mean
Revised Trauma Score	7.07
Injury Severity Score	15.72
Abdominal Trauma Index	2.98

**Table No. 5: Injury-to-intervention time**

Intervention Time	Mean
Emergency Room	2.32
Operation	2.44
Total	4.76

**Table No. 6: Injury severity score**

ISS	Frequency
0-14	27
15-24	13
25-34	5
35+	5
Total	50

**Table No. 7: Outcome of abdominal trauma**

Outcome	Frequency
Favorable	37
Unfavorable	13
Total	50

**Table No. 8: Presenting vital signs of survivors and no survivors**

Vital Sign	Survivors	No survivors
Systolic Blood Pressure	121.5	99
Diastolic Blood Pressure	70.5	63.5
Heart Rate	87.5	127
Respiratory Rate	18	20.5

**Table No. 9: Presentation and intervention parameters and outcome (survival/death)**

Variable	Survival	Death
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Presentation GCS	12.3	8.2
Presentation SBP	121.5	99
Presentation DBP	70.5	63.5
Injury to intervention time	2.44	2.32

## DISCUSSION

Abdominal trauma patient outcomes show a correlation with age, gender, comorbidities, and trauma scores, according to research. Patients older than 55 have higher rates of unfavorable outcomes, with most fatalities presenting in that age group. Females of all ages are also at greater risk for poor outcomes than males, potentially due to gender disparities in health conditions and somatic wellness<sup>4</sup>. Unfavorable outcomes were found to have a correlation with comorbidities, with cardiovascular disease, hypertension, diabetes, chronic kidney failure, and asthma being the most prevalent conditions. It is suspected that the compromised physiological reserves caused by these conditions contributed to the heightened risk for patients with comorbidities. Significant correlations between patient outcome and trauma scores were observed. The Revised Trauma Score (RTS), Injury Severity Score (ISS), and Abdominal Trauma Index (ATI) were found to be noteworthy in this regard<sup>5,6</sup>. Patients displaying lower scores on these tests were discovered to have a higher chance of negative consequences. Of the three, the RTS and ISS revealed the severity of injury, whereas the ATI gauged the state of abdominal health. The trauma scores that predicted unfavorable outcomes associated with considerable tissue damage. This indicates that medical attention and care should be increased for these folks. Applying the conclusions from this study can assist in recognizing individuals more prone to adverse outcomes, warranting the provision of fitting and adequate medical care. Furthermore, healthcare providers can pinpoint patients who exhibit advancing age, possess comorbidities, and/or exhibit lower trauma-related scores and accordingly administer enriched medical care for their exemplification. Inevitably, implementing these approaches may potentially enrich outcomes for those diagnosed with abdominal trauma, primarily those facing heightened susceptibility to unfavorable repercussions. Inquiring into the influencers of results in individuals suffering from abdominal trauma, a recent investigation uncovered informative findings. Remarkably, age, gender, and concurrent illnesses of the patients paired with their trauma markers - Revised Trauma Score, Injury Severity Score, and Abdominal Trauma Index - were consequential predictors of success<sup>4,5</sup>. Patients who were older than 55 years old or who had comorbidities had a greater risk of developing an unfavorable outcome than patients who did not have either of these factors<sup>8,9</sup>. There is a direct correlation between lower RTS, ISS, and ATI scores and

unfavorable outcomes in patients who have experienced abdominal trauma. It would appear that the characteristics of these patients and the severity of their injuries could be useful in predicting their future health. However, additional exploration is needed to ascertain the exact involvement of these factors in determining patient outcomes. Also, it would be worthwhile to investigate how interventions and treatments affect the health of this patient population<sup>12</sup>.

## CONCLUSION

Factors such as trauma scores and patient characteristics could be vital in anticipating the outcomes of individuals with abdominal trauma, as shown by this study. Therefore, more research is required to fully comprehend the significance of these factors in shaping the results for this particular group of patients.

### Author's Contribution:

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**Conflict of Interest:** The study has no conflict of interest to declare by any author.

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# Efficacy of Intradermal Transaxamic Acid in the Treatment of Melasma: A Retrospective Study of Clinical Cases

Aqsa Naheed<sup>1</sup>, Tehseen Naveed<sup>3</sup>, Aashi Ahmed<sup>2</sup>, Nadia Nisar<sup>2</sup>, Anwar Bibi<sup>2</sup> and  
Javeria Hafeez<sup>3</sup>

## ABSTRACT

**Objective:** To evaluate the efficacy of intradermal tranexamic acid in the treatment of melasma.

**Study Design:** A Retrospective Study

**Place and Duration of Study:** This study was conducted at the Dermatology Department of CMH hospital, Peshawar from June 2022 to December 2022.

**Materials and Methods:** Pregnant and lactating mothers, those who had any medical illness, bleeding disorder, on anticoagulant therapy were not included. Injection Tranexamic acid (TA) in a concentration of 4mg/ml of distilled water in insulin syringe was used for mesotherapy. Treatment comprises of 4 session one month apart and mMASI score (Melasma Area and Severity Index) was used to assess the severity of melasma before and one month after the treatment. Side effects were noted. Patient's level of satisfaction was recorded using 4-point scale.

**Results:** The mean of MASI I score (before treatment) among the study participants was 12.86+5.6 and the mean MASI II after treatment with Tranexamic acid intradermally was 7.36 + 4.6. On applying the paired t test, a statistically significant difference (P= .000) among the MASI score was observed among study participants.

**Conclusion:** Intradermal Transaxamic acid can be considered as effective and safe treatment modality for melasma to improve patients social and psychological wellbeing.

**Key Words:** Transaxamic acid, Melasma, MASI score

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## INTRODUCTION

Melasma is a patchy discoloration of skin in the form of patches mostly on cheeks, nose and forehead. Skin type III and IV are more likely to develop melasma as compare to type II, also females are more prone to develop it in reproductive age group when compare with males.<sup>1</sup> Unnatural skin colour variation can be frustrating for females, especially in today's digital age. There is always some degree of psychological lurking below so both should be address at the same time.<sup>2</sup>

Melasma is triggered by multiple factors like sunlight, genetic factors and hormonal changes. Pathogenesis of melasma is diverse and has extended beyond the

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involvement of melanocytes. Histological features showed wide spectral changes from basement membrane disruption, mast cells involvement, neovascularization and changes in keratinocytes.<sup>2</sup>

Treatment of melasma is challenging due to partial understanding of its pathogenesis, long standing course and high recurrence rate.<sup>3</sup> Management plan includes four main targets like suppressing the activity of melanocytes this prevent worsening of melasma. This includes UV light protection and avoidance of triggering factors.<sup>4,5</sup> Topical therapies that prevent new pigment formation like hydroquinone, azelaic acid, retinoid and vitamin C. There are various procedures done to remove melanin pigment like microdermabrasion and chemical peels. Whereas, melanin pigment is scattered by using lasers treatments.<sup>4</sup>

Use of tranexamic acid in the treatment of melasma is a novel concept. However, exact mechanism of action is still not fully understood. TA is a derivative (synthetic) of amino acid lysine, a plasmin inhibitor and fibrinolysis inhibitor used to control bleeding. TA reversibly block lysine-binding sites on plasminogen

molecules which inhibits plasminogen activator from transforming plasminogen into plasmin. Plasminogen is also present in the stratum basale of the epidermis. Anti plasmin activity of TA is mainly responsible for hypopigmentation. It is thought that it causes shrinkage of dermal vasculature and reduce melanin production by decreasing tyrosine kinase activity, alter interaction between melanocytes and keratinocytes. It can be used both orally as well as in topical form. Various studies have been done in this regard.<sup>6</sup>

Efficacy of oral tranexamic acid injection has been reviewed in some studies. A study done in Iran comparing the efficacy of intra dermal TA with topical hydroquinone cream reported significant improvement with 4mg/ml TA as compare to hydroquinone cream.<sup>7</sup> Similarly, another split face study comparison the efficacy of tranexamic acid mesotherapy versus 0.9% normal Saline for melasma done in Pakistan showed excellent response in 60.7% of patients, good in 56.7%, fair in 33.3% and poor in 3.3% of patients. Studies and trials on the use of intradermal injection of TA in the treatment of melasma are limited. Therefore, the main purpose of this study is to evaluate the safety and efficacy of intradermal tranexamic acid in the treatment of melasma.

## MATERIALS AND METHODS

This Retrospective cohort study was done in Dermatology Department of CMH Peshawar from June 2022 to December 2022. Sample size was calculated<sup>8</sup>

$$\text{Sample size} = \frac{2SD^2(Z_{\alpha/2} + Z_{\beta})^2}{d^2}$$

Sample size calculated was 41 taking difference in mMASI score 1.83 and Standard deviation 2.94. Anticipating loss to follow up (attrition problem) we enrolled 70 patients in our study, we had complete data of 63 females between 18-50 years with melasma fulfilling the inclusion criteria and willing to participate were consecutively enrolled in the study. Pregnant and lactating mothers or those who used topical treatment for melasma in last 2 months, those who had any medical illness, bleeding disorder, on anticoagulant therapy were not included. All patients were explained the purpose of research, procedure and number of sessions before taking written informed consent.

Each patient was diagnosed and examined by Consultant Dermatologist. Complete history and physical examination was done and noted on a preformed proforma. Color photographs were taken before sessions. mMASI score (Melasma Area and Severity Index) was used to assess the severity of melasma. Its range is 0-24, <8 is considered Mild, 8-16 is Moderate and >16 is Severe.

Injection Tranexamic acid (TA) is available in 5ml ampoule having 500mg of transaxamic acid. In order to prepare a concentration of 4mg/ml, 4 IU of TA /96 IU of distilled water in insulin syringe was used

for mesotherapy. Alcohol swab was used for cleaning of face then local anesthetic, Lignocain cream was applied for 35-45 minutes. Injection TA was injected intradermally 1cm apart in the patch of melasma. Sunblock was advised for use at home. Side effects were noted at each visit. We repeated the session after 4 weeks (i.e 0,4,8 and12). mMASI was again calculated 4 weeks after last session. Patients level of satisfaction at the end of study was noted as, Poor = 0-25%, Fair = 25-50%, Good=50-75%, Excellent =75-100%.

Data was analyzed using Statistical Package for the Social Sciences SPSS Statistics ver.26.0. Categorical data were described in frequencies and percentages while numerical data were analyzed by means and standard deviation. The difference in means of mMasi score before and after the intervention for each patient was analyzed by paired t-test. P<0.05 was taken as significant.

## RESULTS

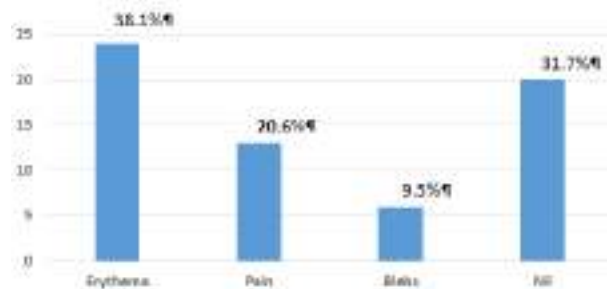
Out of total 70 participants of the study, complete data regarding the MASI II scores was obtained from total 63 participants. Therefore, the analysis was performed on total 63 participants of the study. Age of the study participants ranged from 22-48 years. The mean age of the participants was 33.03 years with a standard deviation of 5.8 years (33.03+5.8). Out of total 63 participants, 61 (96.8%) were married and only 2 (3.2%) were unmarried. Skin type III was the most observed type among 58.7% (n=37) participants followed by skin type IV 36.5% (n=23). Only 2 participants (4.8%) had skin type II. The duration of melasma among study participants ranged from 1-18 years. The mean duration of melasma among the study participants was 4.31 years with a standard deviation of 3.4 years. (4.31+3.4).

The range of MASI I score (before starting ITA) among the study participants ranged from 5-23, with a mean score of 12.86 and SD= +5.6. After injecting Tranexamic acid intradermally for treatment of melasma the MASI II score among the study participants lowered to 1-23, with a mean MASI II Score of 7.36 + 4.6. On applying the paired t test to determine the significance of the difference in MASI score after treatment, a statistically significant difference (P= .000) among the MASI score was observed among study participants indicating the effectiveness of intradermal transaxamic acid (ITA) for treatment of melasma.

**Table.No. 1: Before and After MASI Score among study participants**

SCORE	N	Mean	Std. deviation	P value
MASI I Score	63	12.86	5.69	.000
MASI II Score	63	7.36	4.69	

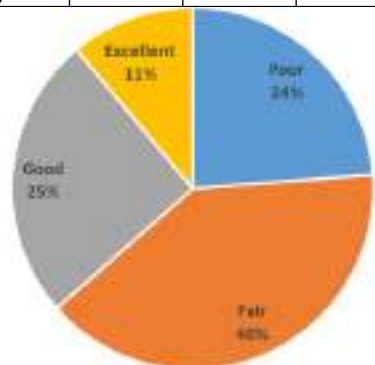
Regarding the side effects of the treatment, 31.7% (n=20) participants experience no side effect. Erythema was the most experience side effect followed by pain and bleb formation.



**Figure No. 1: Frequency of side effects of intradermal tranexamic acid among study participants**

**Table No. 2: Patients level of satisfaction at the end of study**

Patients level of satisfaction	Poor	Fair	Good	Excellent
No. of Patients (N=63)	15 (23.8%)	25 (39.7%)	16 (25.4%)	7 (11.1%)



**Figure No. 2: Patients level of satisfaction at the end of study**

## DISCUSSION

Melasma is a common, difficult to treat hypermelanotic condition with a great tendency to relapse. In this study the age of female participants ranged from 22 to 48 years with a mean age of 33.03±5.8. The mean MASI score significantly (P<.0001) reduced from 12.86 + 5.69 to 7.36 + 4.69 after monthly intradermal tranexemic acid treatment for 5 months. The study done by Verma YR et al, reported a decrease in the mean MASI score from baseline (week-0) of 8.42±5.63 to 6.71±4.65 at a follow up after 4 weeks. MASI score subsequently reduced to 5.09±3.59 and 3.41±3.06 at the follow up on week 8 and 12 respectively showing a statistically significant reduction from 8th week onwards (p value <0.001).<sup>9</sup> In contrast to the results reposted by Verma YR et al, a statistically significant reduction in MASI score was observed in our study over a long period of time (5 months). This longer

duration of treatment to observe significant reduction in MASI score might be due to initial high MASI score of 12.86 + 5.69 in our study as compared to starting MASI score of 8.42±5.63 in study conducted by Verma YR et al.

In a study conducted by Komal S, comparing the efficacy of intradermal tranexamic acid (ITA) with topical 20% azelaic acid in the treatment of melasma the mean age of participants was 34.15 ± 3.64 years. Out of total 58 participants receiving ITA, 54 (93.1%) were married and 4 (6.9%) were un-married. The demographic profile of study participants reported in this study are similar to that of ours. In our study the mean age of study participants was 33.03±5.8 and out of total 63 participants, 61 (96.8%) were married and only 2 (3.2%) were unmarried. The mean duration of illness reported by Komal S, was 3.96 ± 1.93 years, which is much shorter than observed in our study that is 4.31±3.4 years. The mean MASI score in patients receiving ITA before and after 6 weeks of treatment was 7.10 ± 2.94 and 5.27 ± 2.44, respectively reported by Komal S.<sup>12</sup> Contrary to this finding, a decrease in MASI score from 12.86 + 5.69 to 7.36 + 4.69 over a period of five months was observed in present study. This can be attributed to difference in disease duration and to low initial MASI scores (7.10 ± 2.94) among the patients enrolled by Komal S as compared to ours where this range of MASI score was achieved at end of five months, starting from a high zero MASI scores at beginning of study.

In our study all 63 participants were female with a mean age of 33.03±5.8 years (range 22-48 years). Most frequent skin type was III (58.7%, n=37) followed by skin type IV (36.5%, n=23). Another study was conducted by Samanthula H, among 21 females and 9 males aged 25-40 years having skin type IV or V in India. A statistically significant (p<.001) reduction in mean MASI score from 7.766 to post treatment MASI score of 2.686 was reported after six weeks of treatment.<sup>10</sup> The same study reported the reoccurrence of the melasma showing a rise of mean MASI score from 2.68 to 3.27 after 3 months of follow up. Again, these findings contradict the high initial pretreatment and post treatment MASI scores of our study that was 12.86 + 5.69 and 7.36 + 4.69 respectively. However, all the patients experienced pain at injection site and blebs formation that lasted for 3-4 hours after treatment. Inconsistent to this, erythema was the most frequent side effect in our study.

In a study conducted by Muneeb B, including one hundred and seventy participants of both genders with a mean age of 35.46±8.00 years, results showed improvement in melasma after 4 weeks of Intradermal tranexemic acid treatment. According to this study effectiveness after treatment for 4 and 8 weeks and 4 to 12 weeks was statistically significant p <0.05. Whereas, the comparison of effectiveness after treatment for 8

and 12 weeks was statistically insignificant ( $p= 0.06$ ), indicating the reoccurrence of the melasma. Contradictory to our high MASI scores at beginning of study, the MASI zero score before start of treatment in study by Muneeb B, was  $2.73\pm 1.07$  at week zero and  $1.17\pm 0.82$  at week 12 respectively.<sup>11</sup>

## CONCLUSION

Intra dermal Transaxamic acid can be considered as effective and safe treatment modality for melasma to improve patients social and psychological wellbeing. Moreover, the administration can be directly observed and so enhances the compliance specially for resistant and chronic melasma not respond to topical creams. Sample size was not large and follow up was short are the limitation of this study. However, studies with large sample size can be done to further evaluate the efficacy of transaxamic acid mesotherapy in the treatment of melasma.

### Author's Contribution:

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# Functional Outcomes of Pectoralis Major Myocutaneous Flap for Reconstruction in Head and Neck Surgeries

Outcomes of  
Pectoralis Major  
Myocutaneous  
Flap for Head  
and Neck  
Surgeries

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## ABSTRACT

**Objective:** To determine the functional outcomes of pectoralis major myocutaneous flap for reconstruction in head and neck surgeries.

**Study Design:** Descriptive study

**Place and Duration of Study:** This study was conducted at the Department of Oral and Maxillofacial surgery, Ziauddin University, Karachi from January 2020 to March 2021.

**Materials and Methods:** All patients who fulfilled the inclusion criteria and visited to ZUH, Karachi were included in the study. Informed consent was taken after explaining the procedure, risks and benefits of the study. All patients underwent pectoralis major myocutaneous flap for reconstruction. Post procedure patient was followed till one month for the assessment of functional outcomes. All the collected data were entered into the proforma attached at the end and used electronically for research purpose.

**Results:** Mean  $\pm$  SD of age was  $56.8 \pm 15.3$  years. In distribution of gender, 31 (73.8%) were male while 11 (26.2%) were female. In functional outcomes pectoralis major myocutaneous flap, mean pain score was  $85.7 \pm 25.3$ , mean appearance score was  $76.7 \pm 31.4$ , mean speech score was  $64.52 \pm 32.6$  and mean shoulder score was  $58.1 \pm 34.09$ .

**Conclusion:** It is to be concluded that PMM flap has higher rate in shoulder score and speech score. Further large-scale work is recommended for validation of current findings.

**Key Words:** Head Surgery, Neck Surgery, Pectoralis Major Myocutaneous Flap, Reconstruction

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## INTRODUCTION

Head and Neck cancer is the frequently identified cancer across the globe and is considered as 8-10 % of all cancers in Southeast Asia.<sup>1</sup> The need to reconstruct structures with complex anatomy and function in a highly visible region makes head and neck oncologic surgery very challenging. For moderate to large defects, free flaps have gained worldwide approval, as they are pliable and not bulky, and are nowadays considered the gold standard of treatment.

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Although, free flaps are routinely employed but require microsurgical expertise, availability of recipient vessels, postoperative intensive care unit monitoring, and a patient who can tolerate major surgery.<sup>2</sup> And also these flaps require a long operative time, as they need very careful harvesting of the flap and micro vascular sutures.<sup>2</sup> As a result, this type of surgery may become quite stressful for the patient, especially for the elderly or compromised patients. The surgeon has to keep in mind that the best therapeutic option must always be tailored to the patient.<sup>3</sup> After radiation therapy, surgery always becomes much more difficult, and micro sutures, especially venous ones, can be very challenging.<sup>4,5</sup> Furthermore, recovery after surgery is always delayed, with a higher complication rate. In such cases, reconstruction with a regional flap could be preferable to a free flap. Regional flaps generally allow decreased operative time, since they do not require micro sutures. They can be harvested and transferred rapidly, decreasing morbidity related to general anesthesia and intensive care.<sup>6-8</sup>

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Currently, Pectoralis Major Myocutaneous Flap is utilised as a salvage mechanism if a free vascularized flap fails or as a reconstructive alternative for patients who are deemed unsuitable for free flaps. Furthermore, they can be employed as chimeric flaps in conjunction with a free vascularized flap to restore extensive head and neck deformities.<sup>9</sup> Pectoralis Major Myocutaneous flap showed its resilience in the presence of comorbidities and infections and achieved success in 93.1% and Pectoralis Major Myocutaneous Flap proved excellent in head and neck cancer surgery even in malnourished patients.<sup>10</sup> For patients with oral cancer who perform poorly on the Karnofsky test and have a concurrent chronic condition, the Pectoralis Major Myocutaneous Flap can be a good alternative. Being a bulky flap, Pectoralis Major.

For stage IV oral cancer, the massive bone defect can be efficiently repaired using a myocutaneous flap.<sup>9,11,12</sup> Due to the distinct vascular pedicle, simplicity of harvesting the flap, and low postoperative morbidities, Pectoralis Major Myocutaneous flap is often considered as a valid alternative to the free flap to repair the oral defect.<sup>13,14</sup> Unfortunately, data regarding functional outcomes after PMM flap is scarce at local as well as international level. So, it is important to determine the functional outcomes of PMM flap in patients undergoing head and neck surgery. Therefore, this study was aimed to determine the functional outcomes of pectoralis major myocutaneous flap for reconstruction in head and neck surgeries.

## MATERIALS AND METHODS

This descriptive study was conducted in the Department of Oral and Maxillofacial surgery, Ziauddin University. Study was started after taking approval from CPSP and ethical review committee of the institute. All patient fulfilling the inclusion criteria were enrolled in the study from OPD or emergency department of Dr. Ziauddin University Hospital. Before enrolment risk and benefits regarding study were informed to the patient and written informed consent was taken from patient/guardian. Baseline demographics and clinical history were taken at the time of admission. All patients underwent pectoralis major myocutaneous flap for reconstruction by oral and maxillofacial surgeon having more than 5 years of post-fellowship experience. Post procedure patient was followed till one month for the assessment of functional outcomes. All the findings of quantitative and qualitative variables such as age, gender, place of residence, height (measured by using stadiometer), weight (measured by using digital weighting machine), BMI (weight in Kg/Height in m<sup>2</sup>), type of procedure, tumor site, flap size, history of radiotherapy or chemotherapy, TNM classification and functional outcomes (pain, appearance, speech and shoulder) were noted in a predesigned performa.

**Inclusion criteria** ▪ Patient aged 20-80 years. ▪ Trauma cases that needed primary reconstruction flaps or salvage procedure. 39 ▪ Reconstruction of oral oncologic defects: buccal mucosa, floor of mouth, mandibular defects etc.

**Exclusion criteria** ▪ Cases in which pectoralis major was congenitally missing as in Poland Syndrome. ▪ Cases in which shoulder was already involved in different pathologic conditions. ▪ Age less than 20 years and age greater than 80.

**Data analysis:** Data was entered in SPSS version 21. Mean±SD/Median (IQR) was reported on basis of normality for quantitative variables such as age, height, weight, BMI, flap size and functional outcomes score (pain, appearance, speech and shoulder). Qualitative variables such as gender, place of residence, type of procedure, tumor site, history for radiotherapy/chemotherapy and TNM classification were reported as frequency and percentage. Functional outcomes were stratified for age, gender, BMI, type of procedure, tumor site, flap size, history for radiotherapy/chemotherapy and TNM classification. Post stratification independent t-test/ANOVA was used taking p-value.

## RESULTS

In this study 42 patients were included to evaluate the functional outcomes of pectoralis major myocutaneous flap for reconstruction in head and neck surgeries and the results were analyzed as: The distribution of continuous variables was tested by applying Shapiro-Wilk test for age group (P=0.098), weight (P=0.110), height (P=0.191), body mass index (P=0.166), flap size (P=0.188), pain score (P=0.180), appearance (P=0.077), speech (P=0.066) and shoulder (P=0.199) as shown in table 1.

**Table No.1: Descriptive Statistics for Distribution of Continuous Variable**

Variables	Mean±SD	P-Value
Age Group	56.8±15.3	0.098
Weight	63.6±8.7	0.110
Height	162.3±14.5	0.191
Body mass index	26.7±5.6	0.166
Flap Size	71.4±10.3	0.188
Pain	85.7±25.3	0.180
Appearance	76.7±31.4	0.077
Speech	64.52±32.6	0.066
Shoulder	58.1±34.09	0.199

**Table No.2: Stratification of age group with functional outcomes**

Functional Outcomes		Age Group [In years]		P-Value
		20 – 60	>60	
Pain	Mean	89.13	81.58	0.344
	±SD	25.92	24.78	
Appearance	Mean	72.83	81.58	0.375

	±SD	36.08	24.78	
Speech	Mean	62.61	66.84	0.681
	±SD	33.33	32.49	
Shoulder	Mean	55.22	61.58	0.554
	±SD	33.96	34.84	

**Table No.3: Stratification of gender with functional outcomes**

Functional Outcomes		Gender		P-Value
		Male	Female	
Pain	Mean	86.29	84.09	0.808
	±SD	23.12	32.15	
Appearance	Mean	77.42	75.00	0.829
	±SD	28.39	40.31	
Speech	Mean	62.58	70.00	0.524
	±SD	31.93	35.49	
Shoulder	Mean	57.10	60.91	0.754
	±SD	32.57	39.61	

**Table No.4: Stratification for type of procedure with functional outcomes n=42**

Functional Outcomes	Type of Procedure	P-Value
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**Table No.6: Stratification of TNM classification with functional outcomes n=42**

Functional Outcomes		TNM Classification							P-Value
		Stage 0	Stage I	Stage II	Stage III	Stage IV A	Stage IV B	Stage IV C	
Pain	Mean	76.24	78.92	79.21	81.05	91.28	84.25	86.94	0.988
	±SD	30.11	28.59	29.36	33.34	38.51	35.25	33.14	
Appearance	Mean	61.21	65.86	68.69	71.28	79.01	70.25	72.83	0.983
	±SD	31.25	28.91	29.25	31.28	32.11	33.11	32.18	
Speech	Mean	58.45	65.61	68.58	62.36	74.25	61.28	66.21	0.987
	±SD	29.12	33.27	38.58	32.58	35.47	39.54	33.58	
Shoulder	Mean	53.20	57.44	54.17	55.92	68.18	58.19	57.55	0.982
	±SD	30.19	31.12	34.24	31.58	39.58	30.23	33.21	

## DISCUSSION

The reconstructive ladder, which progresses from basic to more advanced approaches, is used in head and neck reconstructive surgery to pick the most pertinent reconstruction strategy to make up a tissue deficiency following tumour excision.<sup>15</sup> At the lower end of the spectrum, regional flaps have proven to be dependable and straightforward to harvest, making them an excellent choice for covering major tissue abnormalities in the head and neck area. The most frequent is the pedicled pectoralis major myocutaneous flap (PMMF).<sup>16,17</sup> PMMF is easily mobilized and can even reach the level of the skull base due to a rather lengthy pedicle that contains the thoracoacromial artery as the axial vessel. PMMF enables rebuilding right after

		Primary	Salvage	
Pain	Mean	89.61	82.15	0.429
	±SD	25.92	32.41	
Appearance	Mean	80.69	71.57	0.400
	±SD	29.25	38.14	
Speech	Mean	65.85	66.12	0.981
	±SD	34.25	35.46	
Shoulder	Mean	61.22	55.40	0.115
	±SD	33.64	40.21	

**Table No.5: Stratification of flap size with functional outcomes n=42**

Functional Outcomes		Flap Size [In cm <sup>2</sup> ]		P-Value
		58 – 80	>80	
Pain	Mean	88.54	83.62	0.627
	±SD	24.85	33.22	
Appearance	Mean	81.58	73.91	0.512
	±SD	28.25	39.51	
Speech	Mean	66.42	68.91	0.858
	±SD	36.98	35.88	
Shoulder	Mean	60.21	56.88	0.804
	±SD	34.51	39.15	

resection via a single-stage surgery, which was previously not workable.<sup>5,18</sup>

In our study, mean age was 56.8±15.3 years. Sen S, et al reported mean age as 48.20±11.62<sup>10</sup> while Pradhan P, et al documented as 45±10.00 years.<sup>13</sup> The study of Wei W, et al noted mean age as 63.5 years.<sup>(19)</sup> In this study, 31 (73.8%) were male while 11 (26.2%) were female. Akhtar A, et al noted males 461 (76.8%) and females 139 (23.2%).<sup>1</sup>

The study of Sen S, et al found 22 (75.86%) males and 07 (24.14%) females<sup>11</sup> where Pradhan P, et al had 22 (73.3%) males and 08 (26.7%) females.<sup>13</sup>

Present study recorded mean pain score 85.7±25.3, mean appearance score 76.7±31.4, mean speech score 64.52±32.6 and mean shoulder score 58.1±34.09. Wei W, et al reported the mean score of different functional

outcomes i.e. pain  $91.4 \pm 15.9$ , appearance  $87.4 \pm 20.1$ , speech  $70.3 \pm 16.4$  and shoulder  $64.9 \pm 23.1$ .<sup>18</sup> Although many studies have examined the advantage of a flap to reduce the occurrence of pharyngocutaneous fistula, the impact of the type of flap on the primary endpoint of swallowing function has so far been understudied.

The pectoralis major myocutaneous flap is easily accessible, simple to harvest, and does not necessitate the use of a microvascular surgeon.<sup>19</sup> Other benefits include shorter operating times, lower hospital expenses and resources, a low failure rate, and a plenty of tissue. PMMFs might also be kept on hand for postoperative problems.<sup>20,21</sup> However, using a PMMF has both cosmetic and functional implications, including a conspicuous lateral neck bulge, muscular contraction when denervation is not possible, breast distortion in women, and reduced range of motion in the ipsilateral neck and shoulder.

## CONCLUSION

This study may help to generate local evidence as well as help the surgeon to appropriately choose the treatment option in order to improve functional outcomes and quality of life of patient. It is to be concluded that PMM flap has higher rate in shoulder score and speech score. Further large-scale work is recommended for validation of current findings.

### Author's Contribution:

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# Prevalence and Characteristics of Gynecological Pathologies Identified During Diagnostic Laparoscopy: A Cross-Sectional Study in A Diverse Patient Population

Gynecological Pathologies Identified During Diagnostic Laparoscopy

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## ABSTRACT

**Objective:** Therefore, this cross-sectional study sought to ascertain the prevalence and characteristics of gynecological pathologies discovered during diagnostic laparoscopy in a diverse patient population.

**Study Design:** Cross Sectional Study

**Place and Duration of Study:** This study was conducted at the Ali Medical Center Islamabad from September 2021 to April 2023.

**Materials and Methods:** Eighty four patients undergoing diagnostic laparoscopy in Ali Medical Center, Islamabad, comprised the study population. Demographic characteristics and locations, diameters, and degrees of severity of the gynecological pathologies discovered during the procedure were recorded. Surgical interventions for each disease were also recorded.

**Results:** Endometriosis (30.95%), ovarian cysts (15.47%), uterine fibroids (11.90%), adenomyosis (14.28%), pelvic adhesions (10.71%), ovarian tumors (7.14%), and other miscellaneous pathologies (9.52%) were the most prevalent gynecological pathologies found in the study. Prevalence rates were substantially influenced by demographic factors including education, socioeconomic status, and geographic location. Excision, cystectomy, myomectomy, hysterectomy, adhesiolysis, oophorectomy, and other variable surgical procedures were performed based on the specific pathology.

**Conclusion:** The study contributed to evidence-based decision-making in gynecology and offered important insights for enhancing the quality of treatment in the management of gynecological pathologies.

**Key Words:** Fibroids; Gynecology; Laparoscopy; Malignant tumors; Metastasis; Ovarian cysts; Surgical interventions.

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## INTRODUCTION

Gynecological diseases include several female reproductive system problems<sup>1</sup>. These problems affect a woman's health, fertility, and quality of life. Healthcare practitioners and researchers must understand the frequency and features of gynecological disorders to improve diagnostic and treatment procedures, patient outcomes, and resource allocation.<sup>2-3</sup>

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Gynecological diseases might be benign or cancerous.<sup>4-5</sup> Gynecological diseases include endometriosis, uterine fibroids, ovarian cysts, pelvic inflammatory disease (PID), cervical dysplasia, and cervical, ovarian, and uterine malignancy. Symptoms include pelvic discomfort, atypical menstruation, infertility, urinary and bowel problems, and hormonal abnormalities. Age, race, geography, and lifestyle affect gynecological pathologies.<sup>6,7</sup> Endometriosis, one of the most common gynecological disorders, affects 10% of reproductive-age women.<sup>8</sup> Uterine fibroids affect up to 70% of women by age 50. Cervical cancer is more common than other gynecological cancers in certain areas.<sup>9-10</sup> Medical technology and diagnostics have improved gynecological pathology detection and categorization. Ultrasound, hysteroscopy, colposcopy, and laparoscopy have improved diagnosis and classification. These advances have also enabled less invasive therapy and tailored medicine, improving

patient outcomes.<sup>11</sup> Diagnostic laparoscopy, a less invasive surgical method, is essential for diagnosing and treating gynecological disorders. Laparoscopy allows direct vision of the pelvic organs<sup>12</sup> via a tiny abdominal incision. This approach detects and characterizes gynecological problems that other techniques may miss. Diagnostic laparoscopy finds gynecological diseases often. These diseases may cause significant morbidity and affect women's reproductive health, quality of life, and fertility<sup>13</sup>.

Endometriosis—the presence of endometrial tissue outside the uterus—affects 10% of reproductive-aged women.<sup>14</sup> By revealing endometrial abnormalities, laparoscopy aids diagnosis and staging. Laparoscopy often finds ovarian cysts, fluid-filled sacs on the ovaries. Some cysts need surgery, while others clear spontaneously, therefore their diagnosis is crucial to choosing the best treatment.<sup>15</sup> Pelvic adhesions, scar tissue between pelvic organs, may result from surgery, infections, or endometriosis. Laparoscopy may identify and repair adhesions, relieving persistent pelvic discomfort, infertility, and colon or bladder problems<sup>16</sup>. Women of reproductive age often acquire benign uterine fibroids. Laparoscopy helps plan and decide on fibroids' size, location, and amount. Laparoscopy may detect PID, a female reproductive organ infection. It visualizes inflamed fallopian tubes, ovaries, and uterus, directing antibiotic medication and avoiding infertility and prolonged pelvic pain.<sup>17-18</sup>

The frequency and features of gynecological diseases discovered during diagnostic laparoscopy: a cross-sectional investigation in a heterogeneous patient population study is informative. However, the research gaps addressed were restricted to a particular patient group, limiting generalizability. Future research might include patients of various ages, ethnicities, socioeconomic statuses, and locations to overcome this issue.<sup>19,20</sup> Doing so helps understand the frequency and features of gynecological disorders among populations. The study's cross-sectional approach showed gynecological diseases' frequency and features at a given period. However, longterm studies might benefit patients. These investigations would illuminate gynecological pathology genesis, recurrence, and long-term repercussions.<sup>21</sup> To identify the research population's diagnostic laparoscopy-identified gynecological pathologies: This study seeks to quantify laparoscopically detected gynecological diseases. This research revealed the frequency of these diseases in the examined patient group and gave a full knowledge of their nature and extent, allowing their diagnosis and treatment.

## MATERIALS AND METHODS

From September 2021 to April 2023, 84 patients in Ali Medical Center Islamabad had diagnostic laparoscopy for gynecological issues.

People with gynecological concerns were chosen by Pakistani tertiary and hospital institutes. The use of diagnostic laparoscopy in women of reproductive age (18-50) was investigated. Patients of all ages, ethnicities, socioeconomic backgrounds, and geographical locations were sought. Women were excluded due to laparoscopic contraindications such as significant cardiovascular problems or existing infections, missing medical records, or inadequate eligibility information. Data is gathered. Age, length of illness, education, socioeconomic status, and location were all recorded. Gynecological procedures are included in the questionnaire. Gynecological diseases discovered laparoscopically. Pathologies dictated surgical, pharmacological, and conservative therapies in this study.

Supine laparoscopy was used for diagnostic purposes. Anesthesia is administered before to the incision of the umbilicus. A trocar was used to insert a long, thin, illuminated, camera-equipped laparoscope. Laparoscopy revealed the surgeon's pelvic organs. Examining the uterus, fallopian tubes, ovaries, and surrounding tissues laparoscopically. Unusual appearance, location, and characteristics. Organs were seldom manipulated by diagnostic equipment. Biopsies were performed. Examples are provided. Sutures were placed after the diagnosis.

Data was used. Analyze demographics and clinical frequencies, as well as percentages, averages, and standard deviations. Laparoscopy revealed gynecological issues unique to each individual. Demographics predicted gynecological difficulties at  $p < 0.05$ .

The study was authorized by institutional and ethical bodies. Everyone agreed. Patient privacy was safeguarded. The scope of our research was limited by hospital laparoscopic expertise and records.

## RESULTS

Laparoscopy at Ali Medical Center in Islamabad, Pakistan is performed based on age, education, socioeconomic status, geography, and disease duration. shows gynecological anomalies. Population  $p$ -values suggest gynecological concerns. 18–50-year-olds participated. 26–36-year-olds outnumbered 37–50-year-olds ( $p < 0.05$ ). 15.47% were 18–25. Illiteracy outweighed education (72.61% vs. 27.38%) ( $p < 0.05$ ). (52.38%), (28.57%), and (19.04%) (Table 1). Endometriosis prevailed ( $p < 0.05$ ). 13 (15.47%) had ovarian cysts. Ten (11.90%) had uterine fibroids. The researchers had several uterine fibroids. 12 (14.28%) had adenomyosis. 9 (10.71%) had pelvic adhesions. Pelvic adhesions caused the most gynecological issues ( $p < 0.05$ ). 7.14% had ovarian tumors. 8 pathologies (9.52%). Islamabad laparoscopy showed gynecological problems (Table 2). Endometriosis impacted ovaries and uterus. 1.5–5-cm endometriosis. Endometriosis severity

varies. Ovarian nodules ruled. 3–10-cm lesions. Solitary, bilateral, cyst-spreading, and metastatic ovarian cysts were classified. Ovarian cyst severity and spread potential aided detection and therapy. 2–50 cm uterine fibroids. The uterus had 90-100%, 50-90%, and 0-49% leiomyomas. 0.25 cm adenomyosis hurt the uterus. Adenomyosis, mild to severe. Pelvic vascularized adhesions were absent. 16–50cm ovarian lesions. Single, both, tumor spread, and metastasis affected ovarian tumor severity. (Table 3). Laparoscopy, ultrasonography, and clinical examination are extremely sensitive, specific, and positive predictive. Gynecological laparoscopy detects 85%. Laparoscopy found 85% positives. Laparoscopy identifies 90% of gynecological issues. Laparoscopy eradicated 90% of non-gynecological diseases. Laparoscopy's specificity reduces false positives. Laparoscopy worked 80%. Laparoscopic success rate.

75% ultrasound. Ultrasonography and laparoscopy confirmed 75% true positives. Laparoscopy surpassed ultrasonography for non-invasive diagnosis. 80%-specific ultrasound. Ultrasound predicted 75%. 60%-sensitive doctor's physical. 65% specificity. Clinical evaluation showed 65% negative cases but may have false positives. Clinical evaluation was 65% accurate. Accurate clinical examination results. Laparoscopy performed best (Figure 1).Gynecological diseases. 26 endometriosis patients underwent excision. Endometriotic lesion removal alleviated symptoms. Ovarian cystectomy removed most of the 13. Ovarian tissue survived cystectomy. Myomectomy removed 10 uterine fibroids. Most adenomyosis patients underwent hysterectomy. Adenomyosis required hysterectomy. Adhesiolysis treated nine pelvic adhesions. Six ovarian malignancies needed oophorectomy. (Table 4).

**Table No.1: Demographic characteristics of the patients with gynecological pathologies**

Sr. No.	Demographic characteristics	No. of patients (n=84)	Frequency (%)	p-value
1	Age (years)			0.00001*
	18-25	13	15.47	
	26-36	40	47.61	
	37-50	31	36.90	
2	Education			0.00001*
	Educated	61	72.61	
	Uneducated	23	27.38	
3	Socioeconomic status			0.00001*
	High	59	70.23	
	Middle	21	25.0	
	Low	4	4.76	
4	Geographical location			0.00001*
	Urban	53	63.09	
	Rural	31	36.90	
5	Duration of illness (months)			0.00001*
	<6	24	28.57	
	6-12	44	52.38	
	>12	16	19.04	

\*indicated that the value is significant at p<0.05

**Table No.2: Prevalence of gynecological pathologies detected during diagnostic laparoscopy**

Sr.No.	Gynecological pathology	No. of cases (n=84)	Prevalence (%)	p-value
1	Endometriosis	26	30.95	0.00001*
2	Ovarian cysts	13	15.47	
3	Uterine fibroids	10	11.90	
4	Adenomyosis	12	14.28	
5	Pelvic adhesions	09	10.71	
6	Ovarian tumors	06	7.14	
7	Others	08	9.52	

\*indicated that the value is significant at p<0.05

**Table No.3: Characteristics of gynecological pathologies identified during diagnostic laparoscopy**

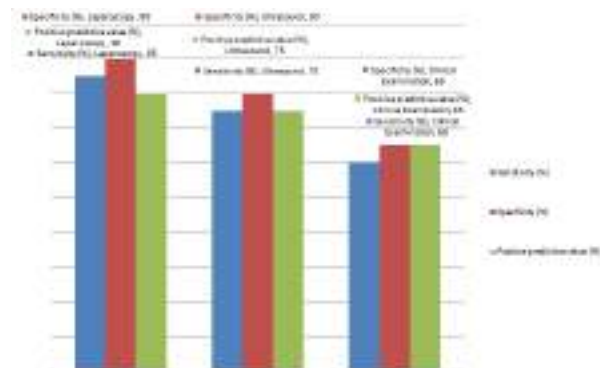
Sr.No.	Gynecological pathology	Location	Size (cm)	Severity (stages)
1	Endometriosis	Ovaries	1.5-5	1. Minimal 2. Mild 3. Moderate
		Uterus		

				4. Severe
2	Ovarian cysts	Ovaries	3-10	1. Single ovary 2. Affected both ovaries 3. Spread 4. Metastasized
3	Uterine fibroids	Uterus	2-50	1. Leiomyomas (90-100%) 2. Leiomyomas (50-90%) 3. Leiomyomas (0-49%)
4	Adenomyosis	Uterus	0.25 or more	1. Minimal 2. Mild 3. Moderate 4. Severe
5	Pelvic adhesions	Pelvic cavity	Few to dense	1. No adhesions 2. Few adhesions 3. Severe 4. Dense vascularized
6	Ovarian tumors	Ovaries	16-50	1. Single ovary 2. Affected both ovaries 3. Spread 4. Metastasized

\*indicated that the value is significant at p<0.05

**Table No.4: Surgical interventions for gynecological pathologies identified during diagnostic laparoscopy**

Sr. No.	Gynecological pathology	No. of cases (n=84)	Surgical intervention
1	Endometriosis	26	Excision
2	Ovarian cysts	13	Cystectomy
3	Uterine fibroids	10	Myomectomy
4	Adenomyosis	12	Hysterectomy
5	Pelvic adhesions	09	Adhesiolysis
6	Ovarian tumors	06	Oophorectomy
7	Others	08	Variable



**Figure No.1: Diagnostic accuracy of laparoscopy compared to other modalities**

## DISCUSSION

Diagnostic laparoscopy showed widespread gynecological disorders. This study examined gynecological diseases, patient demographics, and surgery. Diagnostic laparoscopy revealed various gynecological disorders. Endometriosis, ovarian cysts, uterine fibroids, adenomyosis, pelvic adhesions, ovarian tumors, and others predominated. Fibroids, endometriosis, and ovarian cysts are common. Without

fibroids, heavy menstrual blood, pelvic pressure, and discomfort might develop. Endometriosis produces cyclic pelvic discomfort. Diagnostics generally find ovarian nodules. Transvaginal ultrasound is excellent for structural gynecological disorders.<sup>22</sup>

The study examined gynecological pathology surgeries. Preferences, pathology, symptoms, and fertility preservation dictated the intervention. Endometriosis excision, cystectomy, myomectomy, and hysterectomy were most common. These results confirmed established illness therapies and underlined the necessity for personalized patient care.<sup>23</sup>

This study illuminated diagnostic laparoscopy-discovered gynecological disorders. The study population had endometriosis, ovarian cysts, uterine fibroids, adenomyosis, pelvic adhesions, and ovarian malignancies. The study emphasised demographic-based patient care.<sup>4,24</sup>

Another study verified laparoscopic treatment of 22 consecutive acute abdominal gynecologic crises. Laparoscopically treating 22 acute abdominal gynecologic crises between March 1997 and October 1998. Preoperative transvaginal ultrasonography diagnosed all patients. Surgery duration, complications,

and hospital stay comparing preoperative and laparoscopic diagnostic. Laparoscopic diagnosis differed in 31.8% of cases. Laparoscopic treatment helped 81.8% of patients. None died. These data show that laparoscopy is safe and effective for gynecological emergencies.<sup>13</sup> Laparoscopic diagnosis is reliable and equivalent to laparotomy. Another study found laparoscopic cholecystectomy's rapid popularity unexpected in modern surgery. Most surgical specialities use therapeutic and diagnostic laparoscopy. However, minimally invasive surgery will continue to rule this decade. Laparoscopic equipment, optical devices, and video imaging will also improve laparoscopic surgery. Video-assisted laparoscopy replaces laparotomy for endometriosis diagnosis and treatment. Imaging may aid histologic diagnosis. Endometriosis testing is limited to blood markers, genetic tests, and endometrial tissues. This difficult condition, which typically needs interdisciplinary therapy, requires high suspicion to diagnose. Pre-operative assessment of suspected endometriosis patients, surgical procedures for safe and complete laparoscopic diagnosis, and postoperative care were explored.<sup>15</sup> Another research found that MRI maps myomas better than ultrasonography for surgical treatment planning. Transvaginal ultrasound and saline infusion hysterosonography outline the endometrial cavity, although hysteroscopy and laparoscopy are the gold standard<sup>17</sup>.

## CONCLUSION

This study offered significant insights into the prevalence and characteristics of gynecological pathologies identified during diagnostic laparoscopy. Endometriosis, ovarian cysts, uterine fibroids, adenomyosis, pelvic adhesions, ovarian tumors, and various other pathologies were identified as frequently encountered conditions in the study. The prevalence rates were influenced by demographic factors such as education, socioeconomic status, and geographic location. On the basis of pathology-specific characteristics and patient preferences, surgical interventions were tailored to each patient. In gynecological practice, the study emphasized the significance of personalized care and patient-centered approaches. To improve patient care, additional research is required to validate the findings in larger and more diverse populations, establish long-term treatment outcomes, and increase our understanding of these pathologies.

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