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CONTENTS

CONTENTS

Editorial **Open Access**

Landscape of Social Accountability in Health Professional Education:

Khadija Farrukh

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Social accountability of healthcare educational institutions is an emerging concept in healthcare professional education. World Health Organization defines social accountability as an obligation of medical colleges to direct teaching and research activities towards community health concerns. According to this it's a mandatory responsibility of healthcare institutions to focus on research and education aligned with key community healthcare issues. It obligates medical colleges to direct their teaching and learning activities to address health needs of the society and all stakeholders should define the basic community needs and concerns by mutual collaboration. It also mandates incorporation of four key values: quality, equity, relevance and cost effectiveness in healthcare education and healthcare practice[1]. The main challenge for healthcare educators is to implement community-based healthcare education. A global shift is required in curriculum to meet priority health concerns at national and international levels. Integration of social accountability framework at undergraduate healthcare education will resolve these concerns. Although literature research reveals that measuring social accountability is a global challenge but efforts should be made to develop an innovative framework for social accountability indicators aligned with our own national community issues[2,3,4]. The objective of this research article is to emphasize the importance of constructing an innovative framework of social accountability in health professional education of Pakistan, to shift the focus from input and process to outcome and impact in medical education program evaluation. Social accountability is most important norm for sustainable healthcare education and strategic healthcare management[5]. System-thinking framework is required for building evidence of socially accountable medical institutions. Current program evaluation standards of medical and dental colleges by accreditation body of Pakistan essentially focuses on input and process level while social accountability widens the scope to include processes occurring upstream by focusing on outcome and impact. Changing health needs of society should be considered in accreditation standards by mandating incorporation of social accountability for medical and dental colleges. Program evaluation and program monitoring should be focused on outcome and impact more than input and process. Program monitoring refers to routine collection of data to ensure that program is on track and data collection is done as a part of administrative procedure while program evaluation is systematic collection of data to judge the effectiveness, adequacy and efficiency of program. Program evaluation mandates reliable and valid methods of data collection as Kilpatrick model or CIPP model. It also requires systematic data analysis for the purpose of demonstrating that results are aligned with vision, mission, curriculum structure, educational outcomes and impact. Comprehensive program evaluation also requires proper systematic dissemination of evaluation finding to all stakeholders. Communication and dissemination are integral and essential for enhancing program evaluation experience. It is commonly seen that most important part of program evaluation that is dissemination of findings to all stakeholders and implementation of action plan based on evaluation findings are neglected during process of evaluation. There is need of inculcating evaluation thinking into the organizational culture of medical and dental institutions. Involvement of expert medical educationist and external reviewers will further validates the results and broaden the base of experience of quality management in medical education[6,7,8]. The second challenge is development of community need based curriculum in collaboration with all stakeholders. For this purpose, service learning and community-based participatory research should be promoted in undergraduate healthcare education. Service learning prepares students to work in communities of need. It implies thoughtfully organized learning experience with active participation and community coordination focusing on community needs. Medical students should understand how environment can affect patient's well-being[9]. Qualitative measures as written reflections, poster presentations, essays and journaling can be used to assess student's outcomes. Student's outcomes can be used to determine that the objectives of service learning are achieved. Community based participatory research is multidimensional process which supports collaboration and equitable partnership with stakeholders for co-learning and capacity building. It also mandates dissemination of research finding and knowledge gained by all stakeholders involved

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to facilitate ongoing reflection about the inevitable dilemmas which promotes mutually beneficial partnership. The purpose of this practice is to train a cohort of students on principle of community partnership who are well prepared to practice in rapidly changing healthcare community environment in all areas including rural and remote areas[10].

Authors Contribution:
Khadija Farrukh: Conception, Drafting Article

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Original Article **Open Access**

Unravelling the Influence of Demographic and Lifestyle Factors on Monocyte Chemoattractant Protein-1 in Diabetic Retinopathy Patients

Shabeer Ahmed, Hammad Raziq, Noman Sadiq, Sana Soomro, Rubina Amjad, Wazir Ahmed Baloch

ABSTRACT

Objectives: To determine the association of Monocyte chemoattractant protein-1 (MCP-1) level with Age, blood glucose level, Exercise, Gender and Smoking in diabetic retinopathy patients.

Study Design and settings: A case-control study was carried in the physiology department at the Jinnah Postgraduate Medical Centre in Karachi From April 2019 to October 2020.

Methodology: One hundred people were divided into four groups which were; Group D (n=25) were healthy normal individuals; Group C (n=25) diabetic patient's with moderate retinopathy; Group B (n=25) diabetic patient's with mild retinopathy while Group A (n=25) diabetic patients with no retinopathy. Every participant was checked for blood sugar level, retinoscopy through slit lamp examination and serum MCP-1 level. The association was made between diabetic retinopathy, MCP-1 protein levels, age, gender, smoking and exercise.

Results: MCP-1 levels are significantly greater in diabetic males with moderate retinopathy compared to diabetic females with moderate retinopathy (p-value 0.042). Similarly, smoking is associated with the elevation of MCP-1 levels in diabetic patients with moderate retinopathy (p-value 0.05). Exercise has no significant effect on MCP-1 levels in all groups. An increase in age, HbA1C, fasting and random blood glucose levels were significantly correlated with MCP-1 levels (p-value 0.000)

Conclusion: It is concluded from the study that an advance in age and an increase in blood glucose level are associated with an increased level of MCP-1 protein. Moreover, Male gender and smoking are also associated with enhanced MCP-1 levels in diabetic patients with moderate retinopathy.

Keywords: Diabetic Retinopathy, Exercise, Gender, Monocyte Chemoattractant Protein-1, Smoking.

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INTRODUCTION:

Diabetes mellitus, also known as simply diabetes, is a metabolic disorder that causes an increased level of glucose in the blood.[1] Diabetes mellitus could be caused by a dysfunction in insulin secretion (type I), a dysfunction in insulin action on receptors (type II), gestational diabetes, or secondarily by using drugs like steroids.[2] Diabetic retinopathy, also known simply as DR, is a common complication of diabetes that can result in permanent vision loss. Within the age range of 20 to 74 years old, it is one of the leading causes of blindness. There are 15.9 percent of people in the population who have diabetic retinopathy (DR).[3] Macular edema degeneration and the development of new blood vessels, which can lead to glaucoma, are both caused by hyperglycemia. Hyperglycemia also contributes to the pathology that occurs in the retinal microvasculature. There are two different varieties of diabetic retinopathy: proliferative retinopathy and non-proliferative retinopathy. The most common form of diabetic retinopathy is known as non-proliferative diabetic retinopathy, and one trait that distinguishes it from proliferative diabetic retinopathy is the absence of new blood vessel growth. A condition known as

proliferative diabetic retinopathy occurs when certain blood vessels in the eye become blocked due to persistently high blood sugar levels. At the same time, new blood vessels begin to emerge; if the blood vessels become blocked, fibrosis and retinal detachment may develop in the area where they are blocked.[4] A further complication of diabetic retinopathy is known as diabetic macular edema. In this condition, the macula swells and becomes thicker, which reduces one's field of vision.[5] The length of time a person has diabetes plays a significant role in how far along they are in their diabetic condition. The symptoms of DR include a blurred or distorted field of vision, a reduction in visual acuity, black spots, and visual impairment. All of these things happen due to microvascular destruction of the retina, atherosclerotic changes of the retinal vein, retinal haemorrhage, and retinal detachment.[6] Diabetic retinopathy starts to progress after five years in patients with type I diabetes, while in type II diabetes, many patients already have retinal modification at the time of diagnosis.[7] An annual examination of the retina is something that is advised for all diabetic patients. It is possible to postpone the onset of diabetic retinopathy as well as the progression of the condition by exercising stringent control over one's blood sugar levels.[8] Cytokines, which are also known as chemokines, are categorized according to their capacity to attract particular types of chemokine. MCP-1 is a type of chemokine that regulates the infiltration and migration of immune cells such as monocytes and macrophages. It plays an essential role in the maturation of immune and inflammatory responses.[9] It is believed that MCP-1 is an important indicator of diabetic retinopathy and that it could be used as a diagnostic marker of diabetes. MCP-1 is a pro-inflammatory cytokine that causes damage to the retina by inducing inflammation caused by the migration of leukocytes to the retina.[10] Different cells of the retina will overexpress themselves for MCP-1 if the diabetic condition is not under control. When this happens, a cascade of reactions will occur in the retina, and as a result, the retina's vascularity will increase, eventually leading to diabetic retinopathy (DR).[11]

Diabetic retinopathy must be detected in its earliest stages if one is to avoid irreversible vision loss and achieve better overall patient outcomes. Diabetic retinopathy can be managed more effectively and with less risk to the patient's vision if it is detected at a non-progressive stage when it first appears. In addition, diabetic retinopathy can be detected and treated early, which can result in lower overall healthcare costs and fewer complications over the long term. MCP-1 is a recently discovered marker that has the potential to be utilized in the process of determining the prognosis for diabetic retinopathy patients. Only a few studies have attempted to stratify risk variables for MCP-1 levels in diabetic retinopathy patients. The objective of this study is to investigate the influence of factors such as age, blood glucose levels, gender, smoking, and physical activity on the amount of monocyte chemoattractant protein 1 in diabetic individuals who have retinopathy.

METHODOLOGY

After the approval from the Ethical review board, this case-control study was conducted at the department of Physiology, Basic Medical Science Institute, Karachi from April 2019 to October 2020. In this study, 100 participants between forty to sixty-five years of age were selected from the Ophthalmology department JPMC Karachi. Open EPI was used to calculate the sample size. Anticipating the frequency of diabetic retinopathy as 6.7% and considering the population at the maximum value of 1 million, the estimated sample size came to 97. Diabetic patients were included on the basis of criteria of the American Diabetic association 18. After a detailed history, Patients were examined by a consultant ophthalmologist through slit lamp examination and fundoscopy. The patients were divided into four groups; Group A (n=25) comprised diabetic patients without retinopathy; Group B (n=25) comprised diabetic patients with mild retinopathy features; Group C (n=25) comprised diabetic patients with moderate retinopathy features while Group D (n=25) were normal healthy individuals. Patients with vitreous, macular detachment, cataract, severe diabetic retinopathy, myocardial disease stroke, renal or hepatic insufficiency and bleeding disorder were excluded from the study.

After taking informed written consent, overnight fasting blood samples of the patients were taken. Serum was taken from blood and then stored at -80^{o}c, and then blood sugar and MCP-1 levels were estimated with the help of the ELISA method. The basic demographic features of the study participants were calculated and presented in terms of frequencies. An Independent sample t-test was applied to determine the difference in MCP-1 levels in the male and female gender, smokers and non-smokers and exercise and lack of exercise group. Diabetic patients who were doing brisk walk for 30 minutes or performing any form of exercise were included in exercise group. or Pearson's correlation was used to determine the correlation of age, blood glucose level and HBA1C levels with MCP-1 level. Data were analyzed by using SPSS version 22.0.

RESULTS:

The study participants' mean age was 53.17 + 6.36 years. A total of 100 participants were included in the study. Among them 40 were female and 60 were male. In each group, 15 were male, and 10 were female participants. Basic demographic features of the study participants is shown in Table 1. It has been found that levels of MCP-1 in males and females of groups A (diabetics with no retinopathy) and group B (diabetics with mild retinopathy) are proportionally equal to each other. In group C (diabetics with moderate retinopathy) level of MCP-1 in male patients is significantly greater than in female patients, whose p-

value is 0.042, which is significant. It has been found that level of MCP-1 in smokers and in non-smokers of group A and B are comparably equal to each other. In group-C among smokers, the MCP-1 level is more significant when compared to non-smokers patients (p-value 0.05). No significant difference in MCP 1 level was found when we compared all four groups in association with exercise, as shown in Table 2. An increase in age, HbA1c, fasting and random blood glucose levels were significantly correlated with MCP-1 levels (p-value 0.000), as shown in Table 3.

DISCUSSION:

Diabetes mellitus is a very common metabolic disease that can transform into a metabolic syndrome involving different organs like kidneys, cardiovascular system, nervous system and eyes. Among these, diabetic retinopathy is a common consequence of DM that can progress toward visual loss and blindness. The likelihood of DR increases with duration and poor glycemic control of the disease. Patients of DM type I are more prone to develop DR as compared to those of DM type II[12]. This study has discussed the relationship between MCP-1 and diabetic retinopathy as a diagnostic indicator.

It has been found that there is an increased level of serum MCP-1 in patients of DR in all the three groups having diabetes and diabetic retinopathy due to overexpression of MCP-1 acting as inflammatory chemokine causing retinal impairment in DR. It is also evident from our results that in those patients who have a longer duration of DR have a greater value of serum MCP-1. In another study conducted by Reddy et al and Taghave et al it was found that MCP-1 serum level increases with the progression of severity and duration of DM and DR[13]. In another study by Urbancic et

Table 1: Basic demographic features of study participants

Variable	N %
Sex	
Male	60 (60%)
Female	40 (40%)
Living Area	
Rural	40 (40%)
Urban	60 (60%)
Maritial status	
Married	93 (93%)
Unmarried	7 (7%)
Socioeconomic status	
Poor	17 (17%)
Middle	71 (71%)
Upper	12 (12%)
Education	
Illiterate	11 (11%)
Till higher secondary school certificate	64 (64%)
Bachelor's or higher education	25 (25%)
Smoking status	
Smoker	43 (43%)
Non-smoker	57 (57%)
BMI	
Ideal	34 (34%)
Overweight	59 (59%)
Obese	7 (7%)

Table 2: Impact of gender, smoking and exercise on MCP-1 level in study participants distributed according to diabetic retinopathy stages.

Variable	Mean + SD	Mean + SD	P-value
Gender	**Male** N=60	**Female** N=40	
Diabetes without retinopathy	(n=15) 127.54+16.74	(n = 10) 122.72+10.01	.423
Diabetes with Mild retinopathy	(n=15) 344.09+21.56	(n = 10) 342.64+17.32	.860
Diabetes with Moderate retinopathy	(n=15) 517.44+50.8	(n = 10) 481.6+15.7	.042*
Healthy subjects	(n=15) 18.72+3.54	(n = 10) 18.28+6.30	.852
Smoking Status	**Smoker (N=43)**	**Non-smoker (N=57)**	
Diabetes without retinopathy	(n=12) 127.22+18.08	(n=13) 124.13+10.45	.602
Diabetes with Mild retinopathy	(n=12) 344.28	(n=13) 342.67	.843
Diabetes with Moderate retinopathy	(n=11) 522.13+39.5	(n=14) 488.14+42.47	.05*
Healthy subjects	(n=8) 18.16+2.23	(n=17) 18.72+5.57	.788
Exercise status	**Exercise**	**No exercise**	
Diabetes without retinopathy	(n=12) 121.65+11.95	(n=13) 129.27+15.89	.191
Diabetes with Mild retinopathy	(n=16) 345.95+21.92	(n=9) 339.16+14.78	.418
Diabetes with Moderate retinopathy	(n=19) 501.84+44.59	(n=6) 507.08+45.30	.805
Healthy subjects	(n=7) 17.77+4.40	(n=18) 18.84+4.92	.620

Table 3: Correlation of MCP-1 levels with Age, FBG, RBG & HBA1C

Variable	r-value	p-value
HbA1c	.865	.000
RBG	.920	.000
FBG	.899	.000
Age	.694	.000

al. and Behfar et al., they found increased MCP-1 as an early indicator of the onset of inflammation and progression of DR, which can be used as a tool to identify DR in its early phase of disease[14,15]. Mitra et al have suggested that DR is more common in uncontrolled hyperglycemic patients, which promotes cellular injury in retina.[16]

In our study, we have further divided these groups based on gender and then found that the male population has a greater value of serum MCP-1 than females, especially in those with a longer duration of diabetic retinopathy as in group C of our study. Another study conducted by James et al on MCP-1 comparison with parameters like gender and age found that the level of MCP-1 is found to be greater in the male population, which is consistent with our study[17].

In our other parameter, we have found that smokers have a greater value of MCP-1 in all the groups compared to non-smokers. A study conducted by Komiyama et al found a positive correlation between smokers and MCP-1 protein and in our study, we have also found results similar to the above study.[18] Another study conducted by feng et al found that there is an increased level of chemokines like MCP-1 and CRP compared to that of non-smokers which also supports our study[19].

In this study, exercise shows no significant difference in MCP-1 serum levels between different study groups. In another study conducted by Marloes et al found that there is no effect of exercise on serum MCP-1 and leptins levels in female population[20]. Marius et al conducted a study on the effect of exercise on the serum level of MCP-1 and interleukin in which they found that there is no increase in serum MCP-1 level in metabolic conditions like atherosclerosis and Diabetes[21].

Patients with diabetic retinopathy with uncontrolled diabetes and advanced age should be checked regularly. However, more studies should be conducted to ascertain the association of gender and smoking with increased MCP 1 levels in diabetic retinopathy patients.

CONCLUSION:

It is concluded from the study that there is an increased level of MCP-1 protein found in moderate diabetic retinopathy patients, especially among males and the smoker population. Exercise couldn't affect the level of MCP-1 protein. An advance in age and an increase in blood glucose level are associated with an increased level of MCP-1 protein.

Authors Contribution:
Shabeer Ahmed: Concept design, Data Collection
Hammad Raziq: Final Drafting
Noman Sadiq: Writeup
Sana Soomro: Concept design Data Collection
Rubina Amjad: Writeup
Wazir Ahmed Baloch: Writeup

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Original Article **Open Access**

Restoration of Germinal Epithelium with Usage of Antioxidant Oils in Phenytoin Induced Testicular Toxicity: A Comparative Study in Rats

Khalique-ur-Rehman, Syed Muhammad Masood Ali, Khalid Shehzad, Sonia Khan, Sarah Sughra, Hina Khan

ABSTRACT:

Objective: To evaluate antioxidant effect of Virgin Coconut Oil (VCO) and Corn Oil (CO) on germinal thickness (GT) in rats induced with phenytoin toxicity.

Study design and setting: An Experimental Longitudinal study was done at AL-Tibri Medical College and Hospital Isra University Karachi Campus.

Methodology: 28 male albino rats were selected and were divided into 4 groups each consisting of 7 rats. Group A received normal saline solution only, Group B received 10mg/kg/body weight of Phenytoin, Group C received VCO+ Phenytoin, and Group D received CO+ Phenytoin. Animals were euthanized on the 4th, 5th, & 6th week and tissue sample was acollected for measuring GT using stage micrometer. Data was analyzed using SPSS 20.0. All values were expressed as mean ± S.D., groups compared using One way ANOVA followed by Post hoc Tukey's test with p- value <0.05.

Results: on 4th, 5th, & 6th week significant difference in germinal thickness was seen in Group A comparing it against the phenytoin group B (P-value: <0.001, <0.001, & 0.001). On 4th, 5th, & 6th week significant difference in GT was seen in Group C (VCO + Phenytoin) comparing it against the phenytoin group B (P-value: <0.001, <0.001, &< 0.001). No significant difference in germinal thickness was seen on 4th, 5th, & 6th week was seen when Group D (CO + Phenytoin) was compared to Group B (p-value: 0.551, 0.954, & 0.931).

Conclusion: Virgin Coconut Oil can reduce the negative effect caused by phenytoin induced toxicity by preventing thinning of the germinal layer.

Keywords: Coconut Oil, Phenytoin, Corn Oil, Germinal Thickness

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INTRODUCTION:

Anti-seizure medications play a vital role in preventing seizures of different types. The choice of which seizure medication is to be given to the patient, mostly depends on the type of seizure the patient is suffering from such as tonic-clonic or myoclonic seizure, as well as the preexisting co-morbid conditions the patient already has. All of the anti-seizure medications work to reduce/inhibit the neuronal firing by working with various types of neurotransmitters and ionic channels. Most of the first line anti-seizure drugs work by reducing the metabolism of cytochrome P450 enzymes and also play a part in the induction or inhibition of the enzyme. Since its inception way back in 1908, phenytoin has become the go to drug for treating generalized seizures in populations comprehensively. Furthermore, it is the most studied drug of its class[1]. Phenytoin binds to the sodium voltage-gated channels while these ionic channels are in-active state to further increase the inactivity time of these voltage channels. This then consequently translates to a reduction in the frequency with which the nerves can propagate action potentials in the nervous system. It is important that this drug is well studied as it is the most widely used drug for treating anti-convulsants. However, there is a lot of potential for this drug; another more worrying

reason for so much research being placed into this drug is due to its multi-systemic side effects endured by the patients receiving this. The reason for phenytoin inducing so much toxicity in the body is mainly due to its narrow therapeutic index [2]. The toxic adverse effects cause by phenytoin included aplastic anemia, leukemia, agranulocytosis, leukemia, gingival hyperplasia, and other neurological deficits[3-5]. Studies have also shown that anti-epileptic medications such as phenytoin can also have a side effect on abnormal sperm morphology, redundant sperm count, and a reduction in testicular volume [6]. These issues can ultimately then result in infertility and impotence causing a significant negative impact on the social lives of many men. Fortunately, this potential life changing side effect can be navigated by providing an antioxidant effect which then reduces the number of Reactive Oxygen Species (ROS). ROS are free radical generated in the body due to accumulation of oxidative stresses. The buildup of oxidative stress lays the groundwork for many disorders including male impotence[7]. Antioxidants reduce the harmful effects caused by free radicals that will eventually diminish oxidative stress[8]. Antioxidants can be nutrients or in the form of enzymes. Antioxidants are said to play a role in preventing the onset of many chronic diseases such as stroke, cardiovascular diseases, cancer, diabetes, Alzheimer's diseases, cataracts and Rheumatoid arthritis[9]. Among the many antioxidants at our disposal, virgin coconut oil (VCO) and Corn Oil (CO) are some of the oils that exhibit antioxidant effects, with previous studies highlighting their potential benefits[10]. VCO and CO have shown good effect as antioxidant in many body systems and against other therapeutic agents. To see if it can have the same effect on the male reproductive system in the presence of phenytoin, a study was conducted to assess the germinal layer thickness in rats with phenytoin inducted toxicity and intervention using virgin coconut and corn antioxidant oils.

METHODOLOGY:

This experimental study was designed and conducted in the anatomy department of AL-Tibri Medical College and Hospital Isra University Karachi Campus. The study was approved by the respected institutional review board (IRB)(IERC/ATMC/21/78) for ethical approval which was granted. The span of the study lasted for a period 6 months. For this study we selected 48 Healthy Male Albino rats weighing 150-250 grams each which were acquired from the institution's animal house. No unhealthy Male albino rat or any rat that weight between below 150 or above 250 was included in this study. All the animals were weighted with an electronic weight machine and their health status evaluated by a Vet. Phenytoin was purchased from a nearby pharmacy. The acquired rats were then divided into 4 groups each consisting of 12 rats each. For the study 21 male albino rats were acquired from the Animal Housing of the institution randomly. The allocation of the 48 male albino rats into the 4 intervention groups were also done randomly. The sample size was calculated by using formula of "E" and the value of "E" lies between 10 and 20.

E= Total numbers of animals-total numbers of groups (One group is control and other 3 experimental groups with 7 numbers of rats/group)[11]. E= (8x4)-4 E= 32-4, E= 28 (seven numbers of rats/group).

The subjects were separated and the following intervention was carried out in each group:

Group A: The control group received one unit of normal saline solution through an intra-peritoneal injection including a normal daily diet.

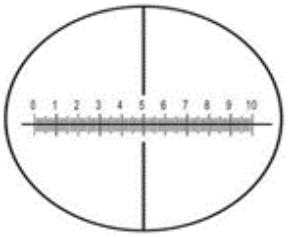
Group B: Received a dose of 10mg/kg/body weight of Phenytoin through an intra-peritoneal injection once every day.

Group C: Received 6.7ml of Virgin Coconut Oil along with a dose of 10mg/kg/body weight of Phenytoin through an intra-peritoneal injection once every day.

Group D: Received 2.5ml Corn Oil along with a dose of 10mg/kg/body weight of Phenytoin through an intra-peritoneal injection once every day.

All the subjects were kept under close observation, and separated into cages during which their diet was well regulated along with their light duration (12 hours dark and 12 hours light) also being kept constant. The animals were tagged and labeled so that they can be regularly identified. The animals were euthanized for the collection of the samples on the 4th, 5th, and 6th week of the study. This was done by first giving them anesthesia with ethanol and then producing a sterile incision using a scalpel blade sagitally in the abdominal wall from xiphisternum to pubic symphysis then both testes were removed. For measurement of the germinal layer thickness, tissue was then extracted from the testis and preserved in 10% formalin solution. The tissue was then process for slide preparation and staining. H&E stain were used for the tissue preparation. To measure the thickness of germinal epithelium, the stage micrometer along with a light microscope was used as shown in figure: 1. Data was analyzed by using the software statistical packages of social sciences (SPSS) version 20.0. All values were expressed as mean ± S.D. The groups were compared by using One-way

Figure: 1 shown the stage micrometer



935 Micrometer
1 DIV = 0.1mm
0.1x100=10mm

ANOVA followed by Post hoc Tukey's test and statistical significance was taken at p <0.05.

RESULTS:

Table 1: Shows the comparison of the thickness of the germinal layer among different groups (um). Significant difference is seen in the 4th, 5th, and 6th week when Group B was compared with Group A and C (p<0.001). Figure 2: Showing the mean thickness of germinal layer (um) among different groups.

DISCUSSION:

The aim of this study was to investigate whether antioxidant oils like virgin coconut oil and corn oil can provide a protective effect on the male reproductive system of rats by reducing the harmful effects caused by phenytoin, such as thinning of the germinal epithelium. The study aimed to assess whether the antioxidant properties of these oils can mitigate the detrimental impacts of phenytoin on the male reproductive system. The need for antioxidant agents that can reduce the free radical levels in various parts of the body is absolutely crucial and this effect can be seen in some oils. Corn Oil has been concluded to be a potent antioxidant agent from results of chemical assays [12]. Another study on the body weight, biochemical, and haematological parameters have also proved the capability of corn oil has on the liver and kidneys of rats, further highlighting its antioxidant prowess [13]. Otuechere et al (2014) in a study conducted by him showed that coconut oil had a protective effects against the toxic nature of Trimethoprim-sulfamethoxazole (TMP-SMX) a broad spectrum antibiotic used to treat gram-positive and gram-negative aerobic infections induced a positive effect on the livers of rats. He used biochemical parameters in his study and demonstrated the restoring levels of total bilirubin, lactate dehydrogenase, and alkaline phosphatase and a subsequent increase in these parameters by 192%, 41%, and 67% respectively compared to the control values [14]. In another randomized control clinical trials it was seen that coconut oil even though enriched in saturated fatty acids in comparison to sunflower oil did not cause any change in the cardiovascular related risk factors over a 2 year period with the study finding no statistically significant difference in terms of cardiovascular event, biochemical, anthropometric, and vascular function [15].

Infertility is a very serious issue not just in our society, but all around the world. It is very controversial and personal to a person and many individuals fail to discuss it openly or seek health care needs regarding this choosing to shy away from a problem which indeed does have competent medical management and treatment strategies. Seven percent of couples around the world are said to be infertile, and half of these couples are said to be infertile due to male related factors. The Pakistani population is unfortunately one in which the vast majority of them belong to a low-middle income background and aren't well advised to seek treatment for their infertility. It has been reported that the prevalence of infertility is significant in the country, with a reported 22% having infertility and with primary infertility accounting for 4% of the total cases. Infertility just doesn't have physical effects but as well as psychological trauma among women as the Pakistani society considers this as a failure on a social, emotional, and personal level. Awareness regarding the causes of infertility among the populations is inadequate, and emphasis need to be targeted towards fertility education, along with general public health campaigns to raise awareness regarding the causes, risk factors, and the general ways to overcome this issue and ultimately reducing the countrywide prevalence of the condition [16].

Figure 2: Showing the mean thickness of germinal layer (um) among different groups

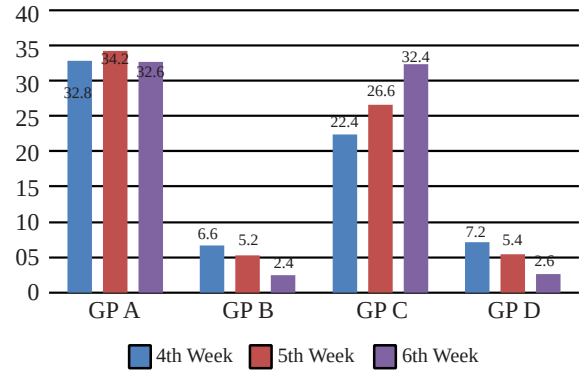


Table 1: Shows the thickness of the germinal epithelium layer being compared among different groups (um)

Weeks	Thickness of Germinal Layer (Experimental GP)	Groups	Thickness of Germinal Layer (Experimental GP)	Comparison of groups	P-Value
4th week	B 6.6 ± 0.83	A	32.8 ± 1.51	B vs A	<0.001
		C	22.4 ± 1.14	B vs C	<0.001
		D	7.2 ± 1.14	B vs D	0.551
5th week	B 5.2 ± 0.70	A	34.2 ± 1.51	B vs A	<0.001
		C	26.6 ± 1.30	B vs C	<0.001
		D	5.4 ± 0.83	B vs D	0.954
6th week	B 2.4 ± 1.67	A	32.6 ± 1.67	B vs A	<0.001
		C	32.4 ± 1.58	B vs C	<0.001
		D	2.6 ± 0.70	B vs D	0.937

The infertility mentioned before is associated with the development of ROS species which include superoxide anions, hydrogen peroxide (H_2O_2), hydroxyl (·OH) and proxyl (·ROO) [17-18]. Damage to the sperm by ROS is the number one cause of infertility in 30-80% of infertile male populations [19]. The role of antioxidant system is crucial in reducing and coping with the excess generation of ROS[20]. Anti-epileptic drugs are known for causing a negative effect on the sexual functions of male[21]. Our study was done to evaluate how the antioxidant effects of VCO and CO can reduce the toxicity induced by phenytoin. VCO showed significant difference in the germinal thickness when compared to the phenytoin induced group however CO wasn't an effective antioxidant agent, with the findings being similar to the phenytoin group in which there was a thinning of the germinal epithelium. Significant difference (P-value <0.05) was seen on the 4th, 5th, and 6th week when virgin coconut oil was compared to the group given phenytoin only with a germinal layer thickness of the virgin coconut oil group being

22.4 ± 1.14, 26.6 ± 1.30, and 32.4 ± 1.58 on the 4th, 5th, and 6th week respectively almost being equal to the control group A by the end of the study. This showed that with time surpassing VCO can actually increase the germinal layer thickness to almost normal levels even in the presence of phenytoin, a highly toxic substance to the reproductive system of the body. This shows the VCO has the potential to reduce harm to the male reproductive system that is caused by phenytoin. Ogedenbe et al (2016) conducted a study to show the mitigating effect of VCO extract on testicular injury following highly active anti-retroviral therapy (HAART), in this study he concludes that while there were derangements in parameters of testicular injury, adjunctive treatment of VCO following HAART did restore some function of the testes. Phenytoin induced group showed a reduction in the germinal layer thickness with the passage of time and so did the corn oil group. This finding was similar to another study that showed atrophy and massive thinning in the germinal layer of seminiferous tubules becoming more advance with the administration of phenytoin, furthermore also causing a percentage of total motile sperm decrease[22]. Studies have shown that men with epilepsy tend to experience greater amount of sexual dysfunction than men do in the general population[23]. Olufunke et al (2011) also induced oxidative stresses using alcohol and observed changes in male germinal cells. He used VCO and CO and concluded that the groups in which VCO was used there was significantly higher levels of germinal cells that can be correlated to our study which studied germinal thickness. Furthermore his study showed that the administration of virgin coconut oil improved that antioxidant state by decreasing the levels of malondialdehyde (MDA) and altered the lipid profile status by decreasing the levels to near normal while also increasing the levels of testosterone, sperm count, and motility[24]. We can say that VCO like conclude and shown by other previous studies on different organs can also reduce the harmful effects of phenytoin induced toxicity. Other parameters have been evaluated such as tubular dimensions in previous studies in which the mean value of seminiferous tubules was increased significantly in groups in which antioxidant oils (virgin coconut oil and corn oil) were administered compared to a drastic decreased in the tubular diameter in which only phenytoin was administered[25]. Other antioxidant agents can also be used to see how the potential restore function or how much they can reduce toxicity of phenytoin. Our study only demonstrated the effect of antioxidants on germinal thickness; however, other parameters could have been measured such as testicular weight, sperm motility, and sperm count. The study could have used other types of oils or antioxidant agents to assess the effects and urges others to do so in future studies to strengthen the literature. Other organs such as the liver should also be assessed on morphological, histological, and biochemical parameters thoroughly to assess how well antioxidant oils such as virgin coconut oil perform and if they can induce a hepatoprotective effect just like it did on the reproductive system of the male albino rats.

CONCLUSION:

Virgin Coconut oil and Coconut Oil were evaluated to assess their impact on the germinal layer thickness in the presence of phenytoin induced toxicity. Virgin coconut oil aided in reducing the toxic effect of phenytoin on the testes by preventing the thinning of the germinal layer in male albino rats by providing an antioxidant effect and reducing the free radical levels within the reproductive system.

Authors Contribution:
Khalique-ur-Rehman: Conception/ Data Analysis
Syed Muhammad Masood Ali: Drafting of Article
Khalid Shehzad: Interpretation of Data
Sonia Khan: Analysis
Sarah Sughra: Final Approval for Version
Hina Khan: Design

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Original Article **Open Access**

Relation of Intima Media Thickening of Carotid Arteries with Parameters of Lipid Profile in Chronic Hepatitis C Patients

Talat Samreen, Asma Aijaz, Shazia Fahmi, Hira Ahmed, Nasreen Naz, Erum Amir

ABSTRACT

Objective: To find out the relation between carotid intima media thickening (CIMT) and lipid profile in HCV seropositive patients.

Study Design & Setting: Descriptive, cross sectional study.

Methodology: Study was conducted in the Institute of Basic Medical Sciences of Dow University of Health Sciences. Duration of study wsd 13 months. After ethical approval, a total of ninety participants including thirty (n=30) control (Group A) and sixty (n=60) HCV sero-positive patients (Group B) were inducted in the study from the hepatitis clinic of Ruth Pfau Civil Hospital, Karachi, Those with history of smoking, hypertension, alcohol, pregnancy, ascities, coinfection with other hepatitis viruses and not willing to participate were excluded. After consent, demographic and anthropometric data were recorded. Blood samples were taken for fasting blood glucose and lipid profile estimation. CIMT was estimated by carotid doppler ultrasound. Data entered and analyzed by SPSS version 20.0. and presented as frequency (n; %) and mean ±SD. Student "t" test and Pearson's correlation test were applied where appropriate. A p-value of <0.05 was considered as statistically significant.

Results: Demographic and anthropometric characteristics of HCV sero-positive participants showed non-significant difference compared to control. FBG and CIMT were found to be significantly raised in HCV infected patients while lipid profile parameters showed insignificant difference. Pearson's correlation test revealed insignificant relation of lipid profile parameters with CIMT ($p > 0.000$).

Conclusion: HCV seropositive patients had significantly raised CIMT with non-significant relation with parameters of lipid profile.

Key Words: HCV: Hepatitis C Virus, CIMT: Carotid Intima Media hickening, FBG: Fasting blood glucose

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INTRODUCTION:

Hepatitis C is slowly progressive hepatotoxic disease which has affected nearly 150 million people globally**,** while about 1.5 million new cases are reported per year. Its prevalence in Pakistan has also reached up to an epidemic proportion with nearly 10 million people in the country living with this virus. According to an estimate of WHO, Pakistan stands at second position after Egypt according to number of people infected with this virus. Data suggested that almost one in every 20 Pakistanis is infected with it.[1]

HCV virus is a hepatotropic RNA virus causing progressive liver damage which might result in fibrosis, cirrhosis and hepatocellular carcinoma. Though hepatocytes are the major site of viral replication, a broad clinical spectrum of extra hepatic complication and disease are associated with HCV infection. Some of these conditions are well documented and more common while others are infrequent. L Kuna et al, revealed that almost 40-74% HCV infected patients present various extra hepatic complications.[2] A meta-analysis, including more than 32,000 patients suggested that only 16% patients with CHC infection developed cirrhosis and only a proportion of these individuals dying from their liver

disease.[3] A meta-analysis of Younnoss et al, (2019) documented that patient with chronic hepatitis C have higher cardiovascular risk compared to never infected people. The prevalence of cardiovascular diseases in hepatitis C infected patients in East Asia is found to be 8.6%.[4] Vascular diseases are now emerged as third leading cause of death in chronic hepatitis C patients. This conclusion was drawn on the basis of published epidemiological studies which analyzed population-based morbidity and mortality data. [5] Presence of atherosclerotic plaque in carotid arteries of HCV patients was first reported by Ishizaka et al, later number of studies confirmed the association of HCV with atherosclerosis.[6] Though earlier it was believed that HCV infection had a protective role for cardiovascular events, due to decreased total cholesterol and circulating low-density lipoproteins, low blood pressure and decreased vascular resistance.[7]

Studies linked this paradigm shift in association of HCV infection with atherosclerosis with several factors like availability of better treatment options, increased life expectancy and use of sophisticated instrument for evaluation of atherosclerotic plaques.

Atherosclerosis was traditionally evaluated, by luminographic techniques, such as x-ray Angiography, Magnetic Resonance Angiography (MRA), Computed Tomographic Angiography (CTA). But due to invasive nature of angiography and exposure to radiation and iodinated contrast agent in MRA and CTA, these procedures have less acceptability and low patients compliance. Furthermore, luminographic technique was unable to image vessel wall adequately. It was identified that in early stage of atherosclerosis lumen of vessels are preserved, thus significant atherosclerotic burden could be underestimated or missed entirely with lumnographic technique. B- mode ultrasonography is now recommended by American Heart Association (AHA) for identification of preclinical cardiovascular diseases. It is non-invasive, inexpensive and cost-effective tool and recommended for the measurement of intima media thickening of carotid arteries (CIMT) for assessment of CVD risk.[8]

Changed in assessment methodology of atherosclerosis and recent evidences of propensity of HCV patients for development of atherosclerosis demands to revisit the relation of lipids with atherosclerosis as measured by intima media thickening of carotid arteries. Thus, present study has two-fold scope, first to evaluate the IMT of carotid arteries of CHC patients by B mode ultrasonography and second to find out the relation of lipid profile with intima media thickening of carotid arteries in HCV seropositive patients.

METHODOLOGY:

This descriptive, cross sectional study was conducted in the Institute of Basic Medical Sciences of Dow University of Health Sciences. Patients were selected from the Hepatitis Clinic and medical ward of Ruth Pfau Civil Hospital, Karachi, by nonprobability convenient sampling technique, after ethical approval from the IRB of DUHS. Duration of study was 13 months. With reference to the article[9] sample size was calculated through PASS version II sample size calculator taking confidence interval 99%, power 99%. A total of ninety subjects of both genders with 30-60 years of age were included in the study. Among them 60 participants were HCV related chronic liver disease patients (Group B) while 30 participants were age and sex matched healthy subjects (Group A). History was taken by principal investigator on the pre-approved proforma to avoid person to person bias. Subjects with history of smoking, hypertension, alcohol, pregnancy, ascites, co-infections with other types of hepatitis viruses and not willing to participate in the study were excluded. After taking consent, height and weight of patients were noted to calculate BMI. Blood samples after 12 hours of fasting were collected from patients for blood CP, fasting blood glucose level, lipid profile. Carotid imaging (CIMT) by Doppler ultrasound was performed by Supersonic imaging Aixplorer® multiwave (Paris, France) ultrasound system which is a high-resolution B-mode system equipped with a linear array transducer >7 MHz. Patients were laid down in supine position with hyperextended head, rotated in 45^0 away from side being examined. After applying gel, probe was placed in the mid of neck and lateral probe position was preferred to get best resolution for image acquisition for CIMT measurement. In order to get accurate and successive measurements of CIMT, bifurcation of carotid artery was considered as a land mark in the image plane. Straight, far wall of arterial segment 10 mm in length was measured by auto setting of machine. Three readings of CIMT of both common carotid arteries (right and left) were taken. Statistical analysis was done using SPSS VERSION 23.0. Qualitative and quantitative variables were assessed as frequencies, percentages, and with mean and standard deviation (SD). Chi- square test and independent sample t test were used to know the significance between variable at $p<0.05$ significant level. CIMT values were averaged. Mean CIMT values were preferred.

RESULTS:

A total of ninety participants including thirty (n=30) controls (Group A) and sixty (n=60) HCV related chronic liver disease patients (Group B) were inducted in the study.

More males compared to females were present in patient's group compared to healthy ones. Among study participants, frequency of males was high in HCV positive patients as compared to control. However male- female distribution between groups was found to be non-significant (Table 1).

Fasting blood sugar, BMI and LDL level were increased, while serum cholesterol, TG and HDL were decreased in HCV infected patients as compared to healthy participants. However, no statistically significant difference between patients and control was found as shown in Table 2.

Mean (±SD) CIMT in group A was found to be 0.46 ± 0.06

mm whereas mean (±SD) CIMT value in group B was found to be 0.64 ± 0.17 mm. Intima media thickness of carotid arteries(CIMT) of HCV patients was found to be significantly increased compared to control with p-value = 0.001, as shown in Figure 1.

Table 1: Comparison of cardio metabolic risk factors among study participants

Variables	Group A Healthy (n=30)	Group B patients (n=60)	p- value
Male (n ;%)	14 (30.4%)	33 (69.6%)	0.511
Female (n; %)	16 (37.2%)	27 (62.8%)	
BMI (kg/m^2)	25.5±0.8	26.1±0.6	0.501
FBS mg/dl	88.18±21.6102	102.02±31.2	0.032

p-value < 0.05 is significant

Table 2: Comparison of lipid profile among study participants

Variables	Group A Healthy (n=30)	Group B patients (n=60)	p-value
Serum Cholesterol mg/dl	146.0±29.1	144.1±44.3	0.838
Triglyceride mg/dl	102.46±25.1	100.2±31.7	0.745
LDL mg/dl	83.8±10.4	86.6±32.6	0.641
HDL mg/dl	44.2±9.3	39.1±16.3	0.115

p-value < 0.05 is significant

Figure 1: Comparison of Carotid Intima Media Thickening (mean ±SD) between control and case

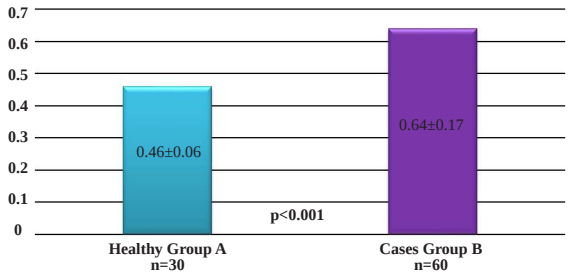

Figure 2. Age wise categorization and comparison of mean (±SD) CIMT values between control and patients

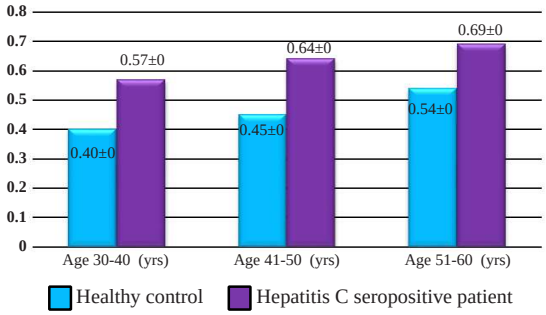

Table 3: Correlation of CIMT with parameters of lipid profile in hepatitis C patients

Lipid profile	CIMT (mm) r^{2}value	p-value
LDL(mg/dl)	-0.067	0.533
HDL(mg/dl)	-0.119	0.264
Cholesterol(mg/dl)	-0.085	0.426
Triglyceride(mg/dl)	-0.093	0.383

Even, participants of both groups were stratified into three groups on the basis of their age 30-40years, 40-50years and 50-60years. Comparison of mean (±SD) CIMT values between controls and HCV infected patients revealed that patients with Hepatitis C had higher mean (±SD) CIMT values when compared with age matched healthy individuals as shown in Figure 2.

When correlation between fragment of lipid profile like serum cholesterol, TG, HDL and LDL and CIMT were analyzed by Pearson's correlation, it showed negative weak relation with insignificant p-value as shown in Table 3

DISCUSSION:

Hepatitis C is a chronic, progressive hepatic disease, associated with increased risk of atherosclerosis eventually triggering cardiovascular events. Atherosclerosis is one of the leading cause of mortality and morbidity throughout the world. It is slowly progressive disease with long asymptomatic course. Atherosclerosis passes two phase pre-clinical (early stage) and clinical stage. A variety of imaging modalities have been used to assess subclinical atherosclerosis. Studies identified CIMT as simple, inexpensive and noninvasive tool to predict early phase of atherosclerosis. Now ultrasound based measurement of CIMT has become a standard for assessing atherosclerosis and also recommended by British Heart Association for noninvasive evaluation of cardiovascular risk.[9]

Present study revealed significantly increased intima media thickening of carotid arteries in HCV infected patients with non-significant relation with lipid profile. Role of lipids in pathogenesis of atherosclerosis was suggested more than 100 years ago after discovery of presence of yellow substance in atheroma by Virchow and later on this substance was identified as cholesterol by Windaus. Early observations suggested that cholesterol is a key component of arterial plaques which gave rise to the cholesterol hypothesis for the pathogenesis of atherosclerosis. Later on, after several decades multiple studies revealed relation between elevated blood cholesterol levels and increased risk of cardiovascular events. [10, 11]

Although some of the earlier studies did not identify an association between HCV and CVD morbidity, it was suggested that HCV viron circulates in the blood stream as hybrid lipoviral particle that consists of lipoprotein tightly adherent with HCV viral particle. These complex lipovral particles resemble with low density lipoprotein (LDL) and very low density lipoprotein (VLDL). It promotes the entrance of HCV in to hepatocyte by binding it with LDL receptor and prevents it from antibody neutralization. HCV infection interferes the intrahepatic cholesterol synthesis due to its utilization in viral replication and compromise the

delivery of available cholesterol in peripheral circulation. This ultimately results in up regulation of LDL receptors and more uptake of LDL in hepatocyte. Besides, up regulation of LDL receptor expression, and interference by HCV in Mevalonate pathway of cholesterol synthesis, inactivation of genes essential for fatty acid and lipid biosynthesis was the other suggested mechanisms in HCV infected patients.[12]

Study conducted in CHC infected Nigerian patients reported significantly lower level of all variables of lipid profile as compared to healthy control subjects.[13] Similarly, significant reduction in TC and LDL level were observed when pre and post infected acute HCV patients were analyzed.[14] Moreover, the observed hypolipidemia resolved with HCV viral eradication; either with spontaneous or treatment-induced sustained virological response and LDL and TC levels had rebound in to levels at or above their pre-infection baseline.[15] Thus, owing to favorable lipid profile, it was assumed that patients with chronic hepatitis C are protected from atherosclerotic cardiovascular diseases.

Conversely, literatures pronounced contradictory results despite findings of protective levels of lipid in HCV infected patients with atherosclerosis. First time a study conducted by Ishizaka et al, in 2002, found a link between HCV infection and carotid atherosclerosis.[16] Later on multiple studies proved the evidence that HCV infection is independently related with carotid plaques and an independent predictor of increased carotid intimal medial thickness (IMT). A study by Butt et al, reported higher risk of CAD in HCV infected patients despite favorable risk factors and low lipid levels.[17] In a treatment based study conducted by MA Mohamed et al, in Egyptian population reported significantly raised CIMT in HCV infected patients and negative correlation with lipid profile was observed. [18] In another study similar relation between lipid profile and CIMT was also reported. Abir Zakaria et al, compared 60 treatment naïve HCV patients with 20 healthy control and found that CIMT of HCV infected patients were significantly higher with insignificant difference in lipid profile.[19] Findings of our study with significantly raised CIMT in chronic hepatitis C patients and non-significant difference in lipid profile compared to controls bolsters the findings of previous studies.

Like others, our study findings also supported that atheroma formation in CHC patients is not per se the role of lipids that via classical cholesterol hypothesis promote atheroma formation. But rather other mechanisms are involved in this process. Studies reported various mechanisms through which atherosclerosis in CHC patients is promoted. It has been reported that HCV directly colonizes and replicates in the arterial walls. Apart from this direct effect, Arvind and his colleagues found increased HCV endocytosis by LDL receptors, induction of oxidative stress, systemic vasculitides and presence of anti-endothelial antibodies in CHC patients, all are promoters of atherosclerosis. Besides, liver steatosis and fibrosis also through insulin resistance indirectly accelerate atherosclerosis. Molecular mechanisms that causes metabolic derangement is associated with alteration in apoliprotein metabolism which triggers the level of apolipoprotein B, C reactive protein, and phospholipase A2 but decreases the level of apolipoprotein A1,which ultimately results in progression of increased CIMT leading to the atherosclerosis. Similarly, it is also assumed that inflammation linked with the hyper activation of cytokines, such as IL-1â, IL-6, IL-10, and TNF-á are responsible for pathogenesis of coronary heart disease and atherosclerosis.[20]

Furthermore, in the past, atherosclerosis was considered as disease of aging, such that advancing age is independent risk factor for development of atherosclerosis. A large Chinese population based cross sectional study found that age is also positively related with hyperlipidemia.[21] Contrary to this, our study revealed increased CIMT in HCV infected patients even when age wise stratified HCV patients suffering from hypolipidemia were compared with match control. Therefore, growing wealth of knowledge now favor to consider HCV infection as a risk factor for atherosclerosis despite promising lipid profile.

But these findings of lipid profile were in contrast to published study by Bozdar K (2020), who found significant difference of lipid profile variables (serum cholesterol, TG, HDL and LDL) associated with raised CIMT.[2] Possible reason of insignificant findings is, inclusion of all chronic hepatitis C patients in the present study regardless of selection of patients on the basis of severity of liver disease.

Thus, after availability of new and efficacious drugs for treatment, those with advance fibrosis, and suffering with HCV related liver disease, morbidity and mortality due to extra hepatic complications of HCV is gaining paramount significance. This may be particularly true for life expectancy of HCV treated patients that may scrum victims to extra hepatic complications. Therefore, it is suggested that ultrasonography screening for carotid atherosclerotic disease should be carried out in HCV patients even in the absence of cardiometabolic risk factors.

CONCLUSION:

Increased intima media thickening of carotid arteries with no significant relation with parameters of lipid profile in HCV infected patients was observed. Findings demand careful evaluation of atherosclerosis in HCV infected patients inspite of presence of normal lipid profile.

Authors Contribution:
Talat Samreen: Study Design
Asma Aijaz: Study Design and Setting
Shazia Fahmi: Drafting of Work
Hira Ahmed: Data Collection
Nasreen Naz: Analysis of Data
Erum Amir: Data collection

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Original Article **Open Access**

Visual Outcomes of Cataract Surgery with Foldable Lens

Ateeq Ur Rehman Channa, Ataullah Bukhari, Abdul Haleem Mirani, Tehmina Imdad, Maqbool Ahmed Jamali, Sikandar Azeem Mirza

ABSTRACT:

Objective: To determine the visual outcomes of cataract surgery with foldable lens at tertiary care eye hospital Sindh-Pakistan.

Study design and setting: An observational cross-sectional study carried out at Ghulam Muhammad Maher Medical College (GMMMC) Sukkur from February 2020 to January 2022.

Methodology: A Non-probability purposive sampling was used. Inclusion were all individuals attending eye OPD with complaint of cloudy vision and diagnosed with cataract. Patients suffering from corneal diseases, chronic anterior uveitis intraocular pressure >22 mmHg, high ametropia and Diabetes Mellitus were excluded from the study. SPSS was used to analyze data.

Results: Total of 153 patients were selected for this study. Age of the patients was from 40 to 72 years. 60% of patients were between 40-60 years age whereas 40% were above 60 years. Gender differences observed 73 (48%) female and 80(52%) male. On 1st postoperative day Best Corrected Visual acuity (BCVA) was 6/9 in 90 patients, 6/12 in 40 patients and 6/6 in 23 patients. After 1 week follow-up, BCVA was 6/6 in 100 patients, 6/9 in 33 patients and 6/12 in 20 patients. After 1 month, BCVA was recorded as 6/6 in 130 patients, 6/9 in 20 and 6/12 in 3 patients.

Conclusion: Visual acuity outcome with foldable lens after Phacoemulsification was found excellent within one month. Implantation of foldable lens with phacoemulsification gives better results in terms of visual acuity.

Keywords: Cataract, Foldable lens, Phacoemulsification, Visual Acuity

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INTRODUCTION:

Cataract is cloudiness of lens in the eye. It is the most common cause of blindness that is reversible globally. Epidemiology showed that nearly 50% of blindness is due to cataract. In South Asia, Pakistan is the third most top country in context of vision impairment and blindness. This burden has been increasing since last decade of 20th century.[1]

Non Foldable Intra Ocular Lens (IOL) was initially inserted through 5 mm to 7 mm incisions after extra capsular surgery. Large fraction of the population in from 4th decade of life develops a loss of vision due to cataract.[2] It is a condition in which natural lens of eye becomes cloudy affecting the vision of the patient. The surgery involves making incision in eye to remove opaque fibers which are developed in the natural lens. Natural lens is removed while the lens membrane (capsule) is kept intact and IOL implanted at the site of natural lens for restoration of vision.[3]

Though it is a common procedure but it involves the meticulous handling. Foldable IOL is the latest development for the cataract surgery that is made up of silicone or acrylic.[4] Foldable IOL have proved to be effective and having good results as compared to rigid lens. Healing has improved dramatically and complications have reduced drastically. It

made phacoemulsification as a standard tool in cataract surgery. According to an estimate by Richard L, 90% of lenses implanted in United States are foldable acrylic/silicone and Phacoemulsification is performed in 95% of patients of Cataract.[5,6]

Small size of incision is advantage of phaco surgery and not IOL implant surgery. The incision is only eighth of an inch (3mm or smaller) and there is no need of sutures and it heals by itself.[7] Foldable implants inserted are flexible and can be maneuvered. This lens can also be used to correct astigmatism and short sight undergone for cataract surgery.[8,9]

The rationale was to check visual outcomes of foldable lens in cataract surgery with least complication, rapid healing and better visual outcomes.

METHODOLOGY:

This was a cross-sectional study with non-probability convenience sampling done at Ghulam Muhammad Maher Medical College (GMMMC) Sukkur from February 2020 to January 2022. Ethical approval was taken from the institutional review board of the institute prior to the study with protocol # RP/04-2020. Sample size was calculated from World Health Organization (WHO) online calculator by taking 95% confidence interval and 5% error margin. Prevalence of cataract in a hospital study done in Karachi was considered as 15.7%. Memon AF, Mahar PS, Memon MS, Mumtaz SN, Shaikh SA, Fahim MF. Age-related cataract and its types in patients with and without type 2 diabetes mellitus: A Hospital-based comparative study. J Pak Med Assoc. 2016; 66(10): 1272-1276. PMID: 27686302. It was derived to be 153.

History wos taken from all the patient and was followed by slit lamp examination with cloudy vision and diagnosed as Cataract were included in study. Patients suffering from corneal disease, chronic anterior uveitis intraocular pressure >22 mmHg, high ametropia and Diabetes Mellitus, any other ocular pathology, complicated cases and non-consenting patients were excluded from the study. A written informed consent was taken from all patients. Preoperatively, blood sugar apart from other routine investigations and visual profile were done of all patients. Blood pressure was also checked of each patient. Examination of eye was done with slit lamp and patients were categorized into three categories 6/18 vision of cataract patients were labeled as immature, 6/>18 were diagnosed as mature and 4/60 were labeled as hyper mature.

Surgical Procedure: A single Surgeon performed all surgeries. After aseptic measures, topical anesthesia was given to all patients. Two ports were made main port was made 11 O Clock and side port was made at 3 O clock then visco elastic was applied. Capsulorhexis was done along with hydro dissection. Nucleus was separated from posterior capsule then rotation of nucleus was done. Phacoemulsification was done. Irrigation/aspiration of remaining cortical material was done. Foldable lens was injected and viscoelastic was removed by irrigation.

Data analysis was performed using Statistical Package for Social Sciences (SPSS) version 23.0. Continuous variables like age was presented as Mean± SD. Categorical variables were shown as frequency and percentages. Significance level was checked through Chi-square test. P-value = 0.05 was considered as statistically significant.

RESULTS:

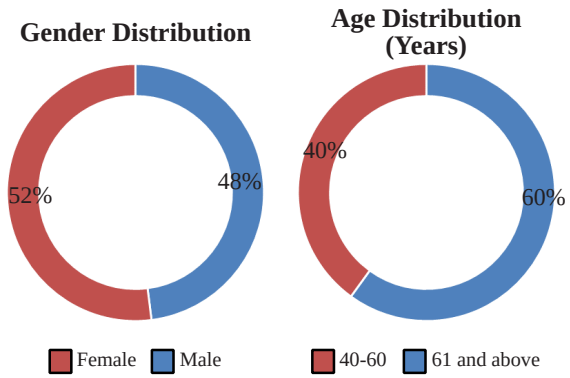
A total of 153 patients were enrolled in this study. Mean age of participants was 50.23±5.5 with a range of 40 to 72 years. There were 40% of participants in 40-60 years of age group and 60% were in 61 and above age group. Gender distribution was 73 (48%) females and 80 (52%) males. (Figure 1)

Unilateral cataract was seen in 141 (92%) patients and bilateral was seen in 12 (8%) patients. Post-operatively visual acuity was assessed at different follow-ups with respect to age groups. On first post-operative day, there were 12 (13.0%) respondents with 6/6 best corrected visual acuity, at first week 49 (53.3%) respondents and at first-month follow-up 69 (75.0%) respondents presented with age group 40-60 years. However, 61 and above year age group also increased number of respondents at different follow-ups as 11 (18.0%) at first post-operative day, 51 (83.6%) at first week and 61 (100%) achieved 6/6 vision. Statistically significant P-value <0.0001 was seen at first week and first month post-operative day (Table 1). Females achieved 6/6 visual acuity more rapidly at different follow-ups. There were 23 (31.5%) at first post-operative day, 73 (100%) at first week, 73 (100%) at first-month follow-up. However, males achieved 6/6 visual acuity at first week 27 (33.8%) and 57 (71.3%) at first month follow-up with a statistically significant P-value <0.0001. (Table 2)

DISCUSSION:

Cataract is a disease in which a natural lens is replaced by an artificial one aimed at restoring the loss of vision.[11] Phacoemulsification with Foldable IOL is the latest development in surgical techniques of cataract. Incision is smaller and a foldable lens can be implanted through it. It

Figure 1: Age and Gender Distribution



is the procedure of choice in developed countries but nowadays it has been becoming the gold standard[12] method for cataract surgery throughout the world. Its smaller incision produces less astigmatism and better visual results after surgery. In multiple trials, phacoemulsification has superseded in results as compared to extracapsular cataract surgery.[13]

In present study visual outcomes were improved after foldable lens implant with respect to age and gender with significant P-value of <0.001. In comparison, Thevi T et al[14] reported that use of different type of IOL found significant results on the basis of visual acuity. Foldable lenses had good visual outcomes as compared to non-foldable lenses. However, a study[15] had contradictory results. Similarly, the American Academy of Ophthalmology showed no difference in outcomes related to visual acuity after applying foldable or non-foldable lenses in patients with cataract surgery.[16]

Narian Das et al[17] reported age of the patients operated for phacoemulsification with foldable lens was from 35 to 70 years

Mahesar ML et al[18] reported gender distribution in cataract surgery patients was 48% of males and 39% of females. A study reported[19] prevalence of cataract surgery was higher in women than men with ratio of 1.8% and 1.67% respectively. In the present study, 60% patients were of age between 40-60 years where as 40% were above 60 years and the prevalence was reverse 48% women presented with cataract and 52% male patients had complained of cataract.

According to vision loss burden in Pakistan (1990-2025)[20] 61.9% had bilateral and 38.1% had unilateral cataract. They also reported crude prevalence of bilateral cataract as 1.75%. Another study done by Khoramnia R et al[21] reported crude prevalence of 8.0% (95% CI 7.6%, 8.4%). However, present study showed 80% had unilateral cataract and 20% had bilateral cataract.

Ahsan S et al[22] stated in their article that post-operative visual acuity was 6/6 in 90.4% patients who were operated for Phacoemulsification with Foldable lens and poor outcome was reported in 1.0%. However in present study, visual acuity on 1st postoperative day was 6/6 in 15%, 6/9 in 59% and 6/12 in 23% of patients. After one week, visual acuity of 6/6 was in 65%, 6/9 in 22% and 6/12 in 13% of patients. After one month, visual acuity was reported 6/6 in 85%, 6/9 in 13% and 6/12 in 2% patients only. Present study had more visibility and improvement in Post-operative visual acuity at each follow-up.

CONCLUSION:

Visual acuity outcome with foldable lens after phacoemulsification was found excellent within one month. Implantation of foldable lens with phacoemulsific ation gives better results in terms of visual acuity. This procedure is safe and affordable to all patients undergoing phacoemulsification.

Table 1: Comparative analysis of Age and Post-operative Visual Acuity

	1st Post Operative day age			1st Week Post Operative day age			1st Month Post Operative day age		
Visual Acuity	40-60 (n=92)	61 and above (n=61)	P-value	40-60 (n=92)	61 and above (n=61)	P-value	40-60 (n=92)	61 and above (n=61)	P-value
6/6	12	11	0.079	49	51	0.000	69	61	0.000
	13.0%	18.0%		53.3%	83.6%		75.0%	100.0%	
6/9	50	40		23	10		20	0	
	54.3%	65.6%		25.0%	16.4%		21.7%	0.0%	
6/12	30	10		20	0		3	0	
	32.6%	16.4%		21.7%	0.0%		3.3%	0.0%	

Table 2: Comparative analysis of Gender and Post-operative Visual Acuity

	1st Post Operative day gender			1st Week Post Operative day gender			1st Month Post Operative day gender		
Visual Acuity	Female (n=73)	Male (n=80)	P-value	Female (n=73)	Male (n=80)	P-value	Female (n=73)	Male (n=80)	P-value
6/6	23	0	0.000	73	27	0.000	73	57	0.000
	31.5%	0.0%		100.0%	33.8%		100.0%	71.3%	
6/9	50	40		0	33		0	20	
	68.5%	50.0%		0.0%	41.3%		0.0%	25.0%	
6/12	0	40		0	20		0	3	
	0.0%	50.0%		0.0%	25.0%		0.0%	3.8%	

Authors Contribution:
Ateeq Ur Rehman Channa: Conceived the study, Manuscript writing, Design of study, Literature review
Ataullah Bukhari: Study design & Methodology writing
Abdul Haleem Mirani: Manuscript writing, Clinical work and data collection
Tehmina Imdad: Statistical Analysis and Results
Maqbool Ahmed Jamali: Supervised the work and final review
Sikandar Azeem Mirza: Discussion writing and Final Review

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Original Article **Open Access**

Outcome of Early Weight Bearing Cast for the Treatment of Jones Fracture

Faaiz Ali Shah, Mian Amjad Ali, Naeemullah Dawar, Mian Javed Iqbal

ABSTRACT

Objective: To determine the radiological and functional outcome of acute Jones fracture treated conservatively in early weight bearing cast.

Study Design and Setting: This study was conducted in Orthopaedic Division Lady Reading Hospital Peshawar. The duration of study extended from 25th August 2018 to 13th November 2022.

Methodology: All patients of both gender and age 18 years and above with isolated Jones fracture fulfilling the inclusion criteria were treated in below knee early weight bearing cast. Radiological union was assessed by noting callus and obliteration of fracture line. The functional outcome was determined using American Orthopaedic Foot and Ankle Score(AOFAS) after cast removal.

Results: This study included a total of 319 patients of Jones fractures who were treated in early weight bearing cast, the mean age was 34.41±4.29 years. Female patients were 245(76.80%) while male were 74(23.19%). Right foot was involved in 211(66.14%) patients and left in 108(33.85%). The average union time was 6.2±1.2 weeks. Majority(99.0%,n=316) of our patients achieved union. Non union was reported in only 3(0.94%) patients. Excellent functional outcome was documented in our patients as indicated by mean AOFAS score 99.1±1.1. Comparison of AOFAS score for gender, side and type of fracture did not reveal any significant difference.($p>0.05$)

Conclusion: Early weight bearing cast is an effective modality of conservatively treating acute Jones fractures as shown by higher union rate and excellent functional outcome in majority of our patients

Keywords: Bone, Bony Callus, Conservative Treatment, Fracture Healing, Metatarsal, Surgical Casts, Weight-Bearing

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INTRODUCTION:

Fractures of the base of fifth metatarsal of the foot at metaphyseal diaphyseal junction and 0.75 inches from the base of fifth metatarsal is called " Jones" fracture, first reported by Sir Robert Jones in 1902 in four patients.[1] Lawrence[2] denoted Jones fractures as distinct zone II fractures of the metaphysical diaphyseal junction of the fifth metatarsal extending to the fourth and fifth inter metatarsal articulation but distal to cuboid and base of fifth metatarsal articulation. Lawrence was of the opinion that stress fracture of the 5th metatarsal diaphysis should not be confused with Jones fracture and treatment should be individualized. These fractures are transverse or oblique fractures sustained due to forceful foot abduction with ankle in plantar flexed position.[3] Jones fractures have less healing potential and greater risk of delayed union and non union because of presence of vascular watershed area between the metaphysial blood supply proximally and diaphysial blood supply of the nutrient artery distally.[4] Fractures of the base of 5th metatarsal accounts for about 30% of all metatarsal fractures and the estimated prevalence of Jones fracture is 26.3%.[5] Although fractures of the fifth metatarsal fractures are one of the commonest fractures of the foot, the term Jones fractures have been used inconsistently in the literature and no consensus has been achieved yet regarding the exact terminology or uniform nomenclature, classification and optimum treatment of Jones fractures.[6] Lack of uniform and agreed terminology has resulted in reporting of different results for the same fracture.[5] Various treatment options exist for Jones fractures but location of the fracture, anatomy and general health of the patient are the most important factors in decision making.[7] Undisplaced or minimally displaced Jones fractures can be treated with non operative treatment modalities like non weight bearing cast, posterior splint,

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elastic bandage, below knee walking cast, hard sole shoe and cam walker-boot.[8] Prolonged non weight bearing cast for Jones fractures has adverse effects and poor functional outcome while operative treatment has variable risks.[9] Nerve damage, infection, tendon rupture, impingement by hardware, delayed union and non union has been reported with surgical fixation of Jones fracture.[7] Although no definite principles exist for the type and duration of weight bearing cast,[10] studies have documented fracture union rate of 82.4% in patients treated with non weight bearing cast in contrast to union rate of 96% to 100% in patients treated with early weight bearing cast.[9,10] Furthermore conservatively treated Jones fractures had prompt and full functional recovery with comparable American Orthopaedic Foot and Ankle Score(AOFAS) than surgically treated Jones fractures.[5]

Keeping in mind the reported issues of traditional treatment of Jones fractures conservatively with prolonged non weight bearing we conducted this study by applying below knee plaster cast to acute Jones fractures and permitted the patients to early weight bearing as tolerated. The purpose of our study was to determine the radiological and functional outcome of this treatment protocol. Our hypothesis was that early weight bearing cast for Jones fracture would result in excellent radiological and functional outcome and less complication rates. This will be the first study on this topic from our institution and from Pakistan. We believed that our study will help to overcome the controversy and misconception of treating Jones fractures conservatively with early weight bearing cast.

METHODOLOGY:

This cross sectional study was conducted in Orthopaedic Division Lady Reading Hospital Peshawar. The duration of study extended from 25th August 2018 to 13th November 2022. Patients of both gender and age 18 years and above with isolated undisplaced or minimally displaced(<2mm) closed Jones fracture(fracture in Zone II)[2] presenting within seven days to Out Patient Department (OPD) and Accident and Emergency Department(A&E) were included in this study. All patients of Jones fracture non union, delayed union, surgically treated Jones fractures and Jones fractures associated with poly trauma requiring intervention or admission for other injuries were excluded. This research study was approved by Institutional Review Board(IRB) Lady Reading Hospital Peshawar (Ref: No. 528/LRH/MTI). Informed written consent was taken from all the study participants for treatment and publication of results. Our study sample size was **298** calculated with the help of Naing and Winn formula. [11] Adding the possible drop out or lost to follow up in our study (10%,n=30) the total sample size was adjusted to **328**. In the included subjects complete history, physical examination and radiographs(AP, Lateral and 30 degrees internal oblique) were taken. Below knee, plaster of paris cast(Gypsona BSN®) reinforced with Dynacast Plaster(BSN®) was applied and the patient was instructed to start weight bearing as tolerated. The follow up visits were scheduled every fortnightly till 12th weeks initially and then monthly for six months. In each visit radiographs were used for radiological union by noting callus and obliteration of fracture line. The clinical union was assessed by patient ability to bear weight without any pain or discomfort. The functional outcome was determined using American Orthopaedic Foot and Ankle Score(AOFAS) after plaster cast removal when radiological and clinical union of the fracture was ensured.[12] The American Orthopaedic Foot and Ankle Score(AOFAS) is a 100 point scoring system consisting of nine questions in three categories for assessing pain(40 points),functions(50 points) and alignment(10 points).The higher score(range 0 to 100) indicates better functional outcome.

The data was analyzed with SPSS version 23.Frequencies and percentages was calculated for qualitative variables like fracture side while mean and standard deviation was calculated for quantitative variables like patient age and union time. Chi square test and independent sample-t test was used for statistical significance between important study variables. *P* value <0.05 will be considered significant. Data was presented in table where appropriate.

RESULTS:

A total of 328 patients were enrolled in this study. The final analysis however included 319 patients because 9(2.74%) patients were lost to follow up and excluded from analysis. The mean age was 34.41±4.29 years. Female patients were 245(76.80%) while male were 74(23.19%). Right foot was involved in 211(66.14%) patients and left in 108(33.85%). Majority(56.11%,n=179) of our patients had minimally displaced Jones fracture while undisplaced Jones fracture was present in 140(43.88%) patients. The mean follow up was 7.3±4 months(range 6.1 to 10.3 months).The average union time was 6.2±1.2 weeks(range 5.2 to 8.1 weeks).We achieved union in 316(99.0%) patients. Non union was reported in only 3(0.94%) patients as shown in pie chart I. The mean American Orthopaedic Foot and Ankle Score(AOFAS) score was 99.1±1.1(range 92.3 to 100). No other complication was noted in our series. No significant difference was noted in AOFAS score when comparison was made for gender, side and type of Jones fracture(P>0.05)

Pie Chart I: The frequency and percentage of fracture union and non union in our study

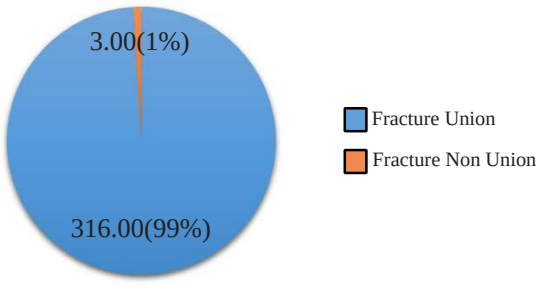

Table 1: Lawrence and Botte classification of fractures of the 5th metatarsal

Fracture Zone	Anatomical location	Chronicity	Radiographic Features
Zone I	Avulsion of the tuberosity (Styloid process fracture)	Acute fracture	Extra-articular fracture may extend into Cuboid and 5th Metatarsal articulation
Zone II (Jones)	Metaphysis-Diaphysis Junction	Acute fracture	Metaphysis Diaphysis Junction with extension into the 4th and 5th Intermetatarsal articulation
Zone III	Proximal Diaphysis (Stress Fractures)	Chronic fracture	Proximal Diaphysis of the 5th metatarsal

Table 2: Literature review showing comparison of union rates of acute Jones fractures treated with early weight bearing casts

Primary author	Year of publication	Number of Jones fractures	Average Follow up(months)	Union rate (%)
Monteban P[14]	2018	49	37.5	100
Biz C *et al*[16]	2018	42	15	100
Baumbach SF[17]	2017	16	22	100
Marecek GS[9]	2016	27	--	89
Choi YN[15]	2011	13	13.5	100
Konkel KF[18]	2005	10	32.4	100
Our study	**2022**	**319**	**7.3**	**99.05**

DISCUSSION:

Fractures of the base of 5th metatarsal have been classified by Lawrence and Botte[2] into three types as shown in Table 1. Lawrence proposed that majority of these fractures can be treated non operatively and surgical intervention is only indicated in intra-articular fractures, displaced fractures, delayed union and non union.

Our thorough literature search revealed that no consensus or established guidelines exists regarding the ideal method of immobilization, optimum duration of immobilization and effective load bearing protocols for conservatively treated Jones fractures when treated conservatively.[10,11-13] We treated acute Jones fractures with early weight bearing casts and documented union in 316(99.05%) patients. Our results are consistent with previous studies reported in the literature(table 2) but our study had shorter follow up period. The longer follow up period in other studies can be attributed for detecting any re fracture after conservatively treating Jones fractures. Furthermore majority of the studies in the literature included all fractures of the fifth metatarsal including Jones fracture. The strength of our study however is the larger sample size than any of these studies and with the inclusion of Jones fracture(zone II fractures) exclusively.

Contrary to the above studies Look and Reisnauer[19] treated 47 Jones fractures in early weight bearing walking boot and 8 were treated in non weight bearing cast. The mean follow up period of both groups was 6.4 months and 15.5 months respectively. In weight bearing group 3(6.4%) patients developed nonunion and required surgery. Similarly in non weight bearing cast group 3(37.5%) patients were operated because of nonunion.These authors concluded that best treatment of Jones fracture is still controversial as similar outcome can be achieved by treating acute Jones fractures with early weight bearing boot or non weight bearing cast.

We determined functional outcome of our patients with American Orthopaedic Foot and Ankle Score(AOFAS) and noted the mean score of 99.1±1.1(range 92.3 to 100) after plaster removal. Choi[15] reported AOFAS score of 99.7 and Biz C *et al*[16] 97.5. Bernardino[20] treated 25 Jones fractures with below knee cast and 17 with functional elastic bandage without any weight bearing restriction. At 15 months follow up all fractures achieved union with AOFAS score of 97.5 in cast group and 92.5($p>0.05$) in functional bandage group. This author concluded that weight bearing restrictions and follow up are not mandatory for treating Jones fractures conservatively. Park *et al*[21] treated 3(12.5%) patients of zone II fractures with early weight bearing protocol(3 days after cast immobilization) and 2(10%) patients of zone II fractures conservatively with late weight bearing(after 6 weeks). Clinical union was noted in 6.8 months and 7.9 months in early and late weight bearing patients respectively. The mean AOFAS score at 6 months was 97.8 in early weight bearing patients and 94.7 in late weight bearing patients. The VAS score was 0.6 and 0.3 at six months follow up in early and late weight bearing patients respectively. Delayed union was noted in one patient in each group. These authors concluded that although no significant difference was noted in AOFAS and VAS score at final follow up, early weight bearing patients had faster fracture healing than delayed weight bearing patients. All patients of Jones fractures with underlying diseases should be treated with early weight bearing cast. Rikken[22] reviewed 32 relevant articles including

one randomized controlled trial, seven perspective studies and twenty four retrospective studies and documented that out of 518 Jones fractures 318(61.4%) were treated non operatively and 200(38.6%) were treated operatively. The rate of union was 77.4% in conservative versus 96.3% in surgically treated Jones fractures. The average union time was 11 weeks in conservative and 9.4 weeks in operative group while refracture rate was in 2.4% in conservative and 2.1% in operative group. The overall mean AOFAS score was 95.5(range 92.5 to 97.5) in the conservative group and 92.5(range 90 to 94.2). The non weight bearing cast group(n=64) had mean AOFAS score 7.5 while weight bearing boot or shoe(n=35) had mean AOFAS 92.5.

Other studies reported functional outcome using different scores. Baumbach[23] treated 43 patients of Zone I and Zone II fractures conservatively. The mean follow up was five years. This author treated all patients without immobilization and permitted early weight bearing. Excellent outcome was noted as assessed with Visual Analog scale for Foot and Ankle(VAS FA) and Quality of Life Score SF-12.This author concluded that excellent patient reported functional outcome can be achieved with early weight bearing irrespective of fracture types and characteristics. Vorlat[24] treated six Jones fractures with non weight bearing cast for 17 days and noted union in 3 patients.

The global ankle score was 82/100 with 2 patients having mild shoe wearing problems and one had big problem in shoe wearing. Vorlat concluded that non weight bearing was the most significant predictor of poor functional outcome and should be minimized to avoid complications. Ruta DJ[25] was of the opinion that sedentary patients with Jones fractures can be managed non operatively while Jones fractures in professional athletes should be offered surgery because superior results have been reported with surgical fixation in terms of higher union rates and early return to sports than with conservative treatment. According Ruta polytrauma can be a relative indication of surgery for Jones fracture aiming to early mobilize the patient and enhance recovery. In our study however, no professional athlete was included and polytrauma with Jones fractures were excluded.

Our study had few limitations. Our follow up period was short. Further studies are recommended to verify the efficacy of early weight bearing cast for treating acute Jones fractures.

CONCLUSION:

Early weight bearing cast is an effective modality of conservatively treating acute Jones fractures as shown by higher union rate and excellent functional outcome in majority of our patients. This technique has higher patient satisfaction and compliance with minimal complications. We therefore recommend early weight bearing cast as treatment of choice for un displaced or minimally displaced acute Jones fractures (zone II fractures).

Authors Contribution:
Faaiz Ali Shah: conception and design, or acquisition of data, or analysis and interpretation of data;
Mian Amjad Ali: Final approval of the version to be published.
Naeemullah Dawar: Drafting the article or revising it critically for important intellectual content;
Mian Javed Iqbal: Data Collection

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Original Article **Open Access**

Trends of Patients Admitted to Pediatric Surgery Department Due to Unintentional Trauma at A Tertiary Care Hospital, Karachi

Sadia Abdul Qayyum, Hina Yousuf, Syed Mukkaram Ali, Lubna Faisal, Fatima Rehman

ABSTRACT:

Objective: To determine the frequency and factors associated with unintentional trauma and its management in children under 14 years of age.

Study Design and Setting: This study is retrospective, descriptive and was conducted at the Pediatric Surgery Department and Emergency Room at Liaquat National Hospital and Medical College, Karachi.

Methodology: Total duration of the study was from 1st January 2020 to 31st December 2020 and all the unintentional trauma cases in children below 14 years of age were included. Details of history, examination, and any procedure done were recorded through a predesigned proforma in regard to their age, gender, day of presentation and, factors related to trauma like the anatomical site, place, mode and type of injury along with their treatment outcomes. Descriptive statistics were run using SPSS version 26.

Results: Out of 103 children, (66%) were males in the age group of 2-4 years. The surge of injuries was on weekdays (71.8%). Domestic injuries were 68.9% which is significantly higher. The most affected region was the head/ neck (28.2%) with lacerations (40.0%) and bruises (90.0%). Amongst the management outcomes, the invasive procedures were frequent (48.5 %) for laceration (48.0%).

Conclusion: Amongst the (6.4%) of unintentional trauma cases, the majority of these injuries were blunt trauma in children under four years of age on the head/ neck region. We conclude that the majority of these pediatric injuries were moderate in nature and required invasive treatment strategies but these injuries are preventable.

Keywords: Injury, Intentional injuries, Mode of injury, Pediatric trauma, Un-intentional injuries

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INTRODUCTION:

Trauma incorporates 12% of the entire disease burden with the increasing mortality percentage around the globe.[1] Injury is the bodily defacement that occurs as a result when a body is instantaneously put through towards an intolerable amount of vitality.[2] Children are susceptible to injuries of different types. Medico-legally injury is divided into two types; intentional and unintentional injuries which are established on the basis of intention. Unintentional injuries include road traffic accidents, falls, burns, poisoning, drowning, occupational injuries, sports injuries, falls of objects, and injuries in disaster situations whereas intentional ones include suicide, assault, child maltreatment, homicides, bias-related violence, and firearms.[3] Pediatric injuries are observed to be avoidable, the emphasis should be on the recognition of factors which include age, gender, family practices, and circumstances. Age and gender are the most paramount aspect of modifying the patterns of injuries like children under the 5 years age group are more susceptible to injuries related to the head due to their start of wandering abilities. Unintentional injuries can also cause disability, which can have an impact on the lives of children. In the 0-14 year age group, the leading cause of mortal or severe traumatic injuries

is unintentional injury.[4] Simple or grievous nature of the injury can have an impact on the emotional aspect as well as the financial aspects of families.

The circumstances in Pakistan are substandard resulting in an escalating number of pediatric trauma victims due to road traffic accidents and with increasing ferocity also there is lack of timely services of appropriate pre-hospital and hospital-based medical awareness. The initial help to the trauma victims is usually provided by relatives or people at the scene of the accident. It demands the capacity to acquire care, swift and secure movement of patients.[5] Exigency awareness depends on the identification of grievous injury or illness and prompt action by the paramedics who should be competent in handling emergency and intensive care of children with vital trauma. This can be accomplished by regular training and advanced skills of resuscitation by all health care professionals which may have a great effect on pediatric trauma outcomes. The trauma teams which comprise surgical subspecialties especially pediatric surgery, neurosurgery, orthopedic surgery, and cardiothoracic surgery, etc. should always be accessible for gravely injured children with a maximal reaction time from the first contact of 30 min to circumvent mortality and severe morbidity.[6] Neonatal, infant, and under-five mortality rates in 2019 were 40, 54, and 65 per 1000 live births, which gives Pakistan the world's highest neonatal mortality rate, the 11th highest infant, and 20th highest under-five mortality rates.[7]

The frequency and pattern of pediatric trauma-associated cases in the population may vary from one country to another based on different variables. As in National health survey, Pakistan has a significant result of estimated injury rate which is 35.2 per 1000 children under 15 years of age.[8] Trauma is perhaps an extreme bodily offense caused by an extrinsic source like fall, accident, misadventure from knife or firearm, etc. that requires emergency intervention to impede loss of entity or limb or substantial, irreversible physical impairment. It does not include heart attacks, strokes, chronic contagious or infectious diseases, or mentalillness not caused by an acute bodily injury. For the potential pediatric-specific trauma triage criteria, the connection linking type and mode of injury and outcome in injured children needs to be determined. Therefore, this study is set out to report the frequency, management, and associated factors with un-intentional trauma in the pediatric age group.

METHODOLOGY:

This retrospective study was conducted between 1st January 2020 to 31st December 2020 at the Pediatric Surgery outpatient and emergency department of Liaquat National Hospital and Medical College, Karachi after obtaining approval from the institutional review committee via letter (Ref: App# 0630-2021 LNH-ERC). Inclusion criteria was all cases with a history and examination of unintentional trauma in children under 14 years of age. Exclusion criteria was patients who were declared dead on arrival in emergency room (ER) as their detailed history and examination were not found, intentional trauma (homicide , suicide, drowning, sexual assault or abuse) cases were excluded from the study.

A detailed evaluation of patient medical files was done through a pre-designed proforma which included their age, gender, day of presentation, anatomical site, injury type, mechanism, place, and management of the injury. All cases included in this study were tabulated in Microsoft Excel 2013 and analysed using SPSS version 26. Categorical measurements of the obtained data were stated in numbers (n) and percentages (%). Inferential statistics were explored using Chi-square/Fisher exact test. The p-value of <0.05 was considered statistically significant.

Patient privacy and confidentiality were maintained by using distinctive prefixes and password-protected data entry software with minimal users.

RESULT:

During the course of the study period, overall 1606 children were admitted through ED and OPD of pediatric surgery out of which 103 (6.4%) children were identified as being exposed to unintentional trauma. Most children presenting with injuries were Male 68 (66%) and they outnumbered females 35 (33.9%) having mean age 4.0 ± 3.1 years. We found major injuries occurring in the age group of 2-4 years 44 (42.7%), Males 31 (30.0%), and females 12 (11.26%). The least common age group for both genders were 10-14 years with males around 5 (5.8%) and females 3 (3.0%) respectively. The notable spikes in un-intentional injury volume were found mostly on weekdays 74 (71.8 %). Injuries which were frequently sustained were domestic in nature 72 (69.9%). The maximum duration of hospital stay was 17 days having a mean [SD] 2.7 [2.8] mainly in penetrating firearm injury. (Table 1).

Our study depicts the comparison between anatomical site factors and the type of injury seen on it. The most affected site of the body was head/ neck 29 (28.2%) with laceration 10 (40.0%) the leading mode of injury observed closely followed by the region of abdomen 25 (24.3%) in which stricture 14 (100%) due to caustic ingestion was the chief type of injury noted and the least affected area was pelvis/ perineum 5 (4.9%). (Table 2).

The frequent mode of unintentional childhood injuries was from asphyxia 12 (50.0%) and blunt objects 12 (38.7%) followed by chemical burns 7 (50.0%) seen in 2-4 years age group and the least reported cases was observed in 10-14 years age 9 (8.7%). The overall burden of the route of pediatric trauma admission was from accident and emergency department (ER) 55 (53.4 %) with the dominant mode of injury by asphyxia 22 (91.7%). These patients were triage as level 1: injured children with airway, breathing, or circulation (ABCs) disarrangement and Glasgow Coma

Scale (GCS) <8 (1.9%), Level 2: Children with steady ABCs, long bone injuries, dislocations, stable abdominothoracic injuries, and head injury with GCS 9-12 (6.8 %), Level 3: Hemodynamically steady patient with minor trauma (44.7%) with the recurrent mode of injury seen was asphyxia 22 (91.7%) and fall from height 14 (100%) respectively. The tally of outpatient department (OPD) admission were 48 (46.6%) these were by blunt objects 21 (67.7%) (Table 3).

Amongst the traumatized children who were admitted they were managed successfully through invasive treatment modalities 50 (48.5%) with the highest indication 18 (36.0%) in 2-4 year age group. Laceration 24 (48.0%) was the leading type of injury in which invasive methods were used. The frequency of minimally invasive procedures was 39 (37.9%) primarily in the age group of 2-4 years 20 (51.3%) being employed in foreign body ingestion cases 24 (61.5%) and post chemical burn stricture formation 14 (35.9%) while 5.8 % were those children who left against the medical advice (LAMA) (Table 4)

Table 1: Distribution of characteristics of pediatric trauma (n=103)

Characteristics	Total (%)
Gender distribution	
Male	68 (66%)
Female	35 (33.9%)
Age distribution (years)	
0-1	24 (23.3%)
2-4	44 (42.7%)
5-9	26 (25.2%)
10-14	9 (8.7 %)
Days of Injury	
Week days	74 (71.8%)
Weekend	29 (28.1%)
Place of Injury	
Highway (RTA)	3 (2.9 %)
Home	72 (69.9%)
Hospital (Injection trauma)	4 (3.9%)
Play area	24 (23.3 %)
Length of hospital stay (Days)	
Minimum duration	1 (0.97%)
Maximum duration	17 (16.5%)

DISCUSSION:

Injury is the leading cause of demise and infirmity in children throughout the globe. More than a million children less than 14 years of age expire each year from unintentional injuries globally.[9]

Our study highlights the burden of unintentional pediatric trauma cases admitted before, during, and after the lockdown of the COVID-19 pandemic period at a tertiary care hospital located in the center of the busy and crowded metropolitan city of Pakistan. The Pediatric surgery department managed 103 (6.4%) unintentional trauma cases, which were triaged, observed, managed, and are encompassed in this study.

The majority of children were males (66 %) as compared to females (33.9 %) with a ratio of 1.9:1. This is in agreement with many studies in which male children are more exposed than females.[10] Guardians are more apprehensive about girls playing outside that's why they are not bared to likely risk factors and habitat fitting for trauma such as playing on roads, rooftops, on trees, or near construction sites, etc. Predominance was noted amongst the age group (pre-school) between 2-4 years (42.7%) mostly in males (45.5%). After the age of one, children walk, which allows them to discover the world around them, play outside, and more easily escape the supervision of their parents.[11] We also found out the percentage of injuries that had taken place during the weekends (28.1 %) in relation to weekdays (71.8 %) which is in accordant with an analysis study done in Morocco.[12] In opposition to this a study conducted in Karachi mentions weekends bearing more reported cases.[13] Domestic injuries (69.9%) were observed to be in majority, which is similar to a compelling study conducted in Nepal and Saudi Arabia.[14,

Table 2: Pediatric trauma distribution on anatomical site and type of injury (n=103)

Variable Site	Type of Injury									
	Abscess	Bruise	FB	Fracture	Incised wound	Laceration	Stricture	Penetrating	Total	p-value
Abdomen	1 7.1%	1 10.0%	8 33.3%	0 0.0%	0 0.0%	0 0.0%	14 100.0%	1 20.0%	25 24.3%	0.000
Head/ Neck	6 42.9%	9 90.0%	3 12.5%	1 12.5%	0 0.0%	10 40.0%	0 0.0%	0 0.0%	29 28.2%	
Limbs	6 42.9%	0 0.0%	0 0.0%	2 25.0%	3 100%	7 28.0%	0 0.0%	3 60.0%	21 20.4%	
Pelvis/ Perineum	0 0.0%	0 0.0%	0 0.0%	0 0.0%	0 0.0%	5 20.0%	0 0.0%	0 0.0%	5 4.9%	
Thorax	1 7.1%	0 0.0%	13 54.2%	5 62.5%	0 0.0%	3 12.0%	0 0.0%	1 20.0%	23 22.3%	

Chi-square/ Fisher's Exact Test applied,*p-value < 0.05 considered significant

[15] This is noteworthy in the preschool group who pass a considerable amount of their time at home.

With regard to anatomical site, preponderance was of head/neck trauma (28.2%) resulting in lacerations (40.0%) and bruises (90.0%). Our findings corroborate with a report from Germany,[16] which showed head injuries to be the most commonly injured body area, followed by Abdomen (24.3%). This may be due to the fact that children have unrestrained attitudes and recently started to walk resulting in compression, crushing, or deceleration forces being exerted on the head and abdominal cavity. Lacerations and bruises are repeatedly seen in children because fringed bony prominence hit against resistant targets namely floors, stairs, or furniture proceeding towards the common display of this type of injuries on the chin, cheek, nose, occipital region, head, and forehead.[17] Foreign body ingestion (coin, battery, peanuts, buttons, needles, magnets, etc.) and stricture formation was the leading type of injury found in the abdomen.[18, 19] Young children are clearly eccentric of blunt objects of diverse shapes, sizes, and colorful liquids of variegated smell, and one of the ways they inspect new target is to put them in their oral cavity to savor and feel them. The type of injury

Table 3: Comparison of pediatric trauma age group and place of admission with mode of injury (n=103)

Variable	Mode of injury								
	Asphyxia	Blunt object	Chemical burn	Fall	RTA	Sharp object	Others	Total	p-value
Age Group									
0-1 (years)	7 29.2%	9 29.0%	2 14.3%	1 7.1%	1 12.5%	2 25.0%	2 50.0%	24 23.3%	0.647
2-4 (years)	12 50.0%	12 38.7%	7 50.0%	6 42.9%	3 37.5%	3 37.5%	1 25.0%	44 42.7%	
5-9 (years)	4 16.7%	8 25.8%	5 35.7%	5 35.7%	2 25.0%	2 25.0%	0 0.0%	26 25.2%	
10-14 (years)	1 4.2%	2 6.5%	0 0.0%	2 14.3%	2 25.0%	1 12.5%	1 25.0%	9 8.7%	
Place									
OPD	2 8.3%	21 67.7%	13 92.9%	0 0.0%	4 50.0%	6 75.0%	2 50.0%	48 46.6%	0.000
ER	22 91.7%	10 32.3%	1 7.1%	14 100%	4 50.0%	2 25.0%	2 50.0%	55 53.4%	

Chi-square/ Fisher's Exact Test applied,*p-value < 0.05 considered significant

Table 4: Comparison of pediatric trauma age group and type of injury with the outcome. (n=103)

Variable	Outcome					
	Conservative	Invasive	Minimal Invasive	LAMA	Total	p-value
Age Group (years)						
0-1	1 (12.5%)	12 (24.0%)	9 (23.1%)	2 (33.3%)	24 (23.3%)	0.515
2-4	4 (50.0%)	18 (36.0%)	20 (51.3%)	2 (33.3%)	44 (42.7%)	
5-9	1 (12.5%)	14 (28.0%)	9 (23.1%)	2 (33.3%)	26 (25.2%)	
10-14	2 (25.0%)	6 (12.0%)	1 (2.6%)	0 (0.0%)	9 (8.7%)	
Type of Injury						
Abscess	0 (0.0%)	14 (28.0%)	0 (0.0%)	0 (0.0%)	14 (13.6%)	0.000
Bruise	4 (50.0%)	2 (4.0%)	0 (0.0%)	4 (66.7%)	10 (9.7%)	
Foreign body	0 (0.0%)	0 (0.0%)	24 (61.5%)	0 (0.0%)	24 (23.3%)	
Fracture	3 (37.5%)	4 (8.0%)	0 (0.0%)	1 (16.7%)	8 (7.8%)	
Incised wound	0 (0.0%)	2 (4.0%)	1 (2.6%)	0 (0.0%)	3 (2.9%)	
Laceration	0 (0.0%)	24 (48.0%)	0 (0.0%)	1 (16.7%)	25 (24.3%)	
Stricture	0 (0.0%)	0 (0.0%)	14 (35.9%)	0 (0.0%)	14 (13.6%)	
Penetrating wound	1 (12.5%)	4 (8.0%)	0 (0.0%)	0 (0.0%)	5 (4.9%)	

Chi-square/ Fisher's Exact Test applied,*p-value < 0.05 considered significant

is the anticipated injuries established on whether they occur as a consequence of a blunt trauma e.g., fall, vehicle collision, and blunt-edged objects, or sharp trauma e.g., firearms, stabbing, and incised wounds. Mode or mechanism of injury cites the method by which destruction to skin, muscles, organs, and bones takes place.[20]

Following the comparison of pediatric age group and mode of injury, we found a significant injury burden was by asphyxia (50.0%) and blunt objects (38.7%) respectively, which was mainly seen in 2-4 years age group, [21] these children are choked by edibles or any small blunt object while in motion or talking relatively resembles the situation of café coronary in the older age group. Youngsters are known for their bodily venture, this may either derange their attentiveness and causes a surge both in the respiratory process and drop causing the food or object into the region of respiratory passages or can result in close or open injury proceeding to concussion, contusion, abrasion or lacerations, etc. Regarding pediatric emergency admissions and mode of injury, a considerable proportion of these admissions was by asphyxia (91.7%) in which young children aspirate foreign objects accidentally and fall from height (100%) similar findings are from a study in Oman.[22] Blunt object trauma (67.7%) was the chief mode of injury admission from the outpatient department (46.6%), interestingly none of the local studies have commented on this. In contrast to this, a study from the US commented on the burden of outpatient cases which encompassed (51%) of traumatic brain injuries.[23]

For all the affected children that were admitted the management was mainly through invasive treatment 50 (48.5 %) frequently between the age group of 2-4 years, which was carried out to a large extent for laceration 24 (48.0%) on head /face. Similar findings are seen from a study in Morocco, [24] where surgery was performed in the majority of traumatized children. The minimally invasive treatment 39 (37.8 %) was done chiefly in foreign body ingestion/ aspiration and post-chemical burn stricture formation cases in which bronchoscopy, esophagoscopy, esophageal dilation, etc were done. [25]

Limitations include, firstly our study retrospectively evaluated the unintentional trauma cases we relied on the available data from the medical files in which factors like patients' socioeconomic status, delay in pursuing and accessing medical attentiveness, gaps in identifying the trauma, and education of the guardians were not available. In this regard, more supplementary studies are required to additionally distinguish these factors.

CONCLUSION:

It was revealed that most of the affected age group were children under four years with the head/ neck being the major affected anatomical site, mode of injury was blunt trauma with laceration being the leading type of injury for which the outcome was invasive treatment modalities. In this regard, parents must take precautions and a preventive approach particularly when children begin to walk or wander. We observed that the majority of pediatric injuries were moderate in nature and preventable hence policy should be embraced by caregivers on the basis of these trends.

Authors Contribution:
Sadia Abdul Qayyum: Conceived the study, Manuscript writing, Design of study, Literature review
Hina Yousuf: Supervised the work and final review
Syed Mukkaram Ali: Study design & Methodology writing
Lubna Faisal: Statistical Analysis and Results
Fatima Rehman: Clinical work and data collection

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Original Article **Open Access**

Medical Students' Attitudes towards Profession of Psychiatry- A Cross-Sectional Survey from Medical Colleges of Sindh, Pakistan

Rakesh Kumar, Riaz-ul-Haque, Haresh Kumar, Khalid Mustafa

ABSTRACT

Objectives: To Evaluate Students' Attitudes Towards the Profession of Psychiatry.

Study Design And Setting: This cross-sectional study was conducted at the Department of Psychiatry, Hamdard College of Medicine and Dentistry, Hamdard University, Karachi, Pakistan, from March 2020 to August 2020. All undergraduate students of different medical colleges and universities in Sindh were included in the study

Methodology: A total of 512 undergraduate students were registered in the study. Multiple email invitations with links to Google Forms were sent to all undergraduate participants. The study comprised 2 sections: (1) The Demographics Questionnaire and (2) Mental Illness Clinicians Attitude Scale (MICA), version-2 specific for medical students, a self-administered scale, requiring about 5 minutes to complete it. Data was analyzed using SPSS Version 20.

Results: Out of 512 medical students surveyed from various medical colleges in the Sindh province of Pakistan, 279(54.5%) were male and 233(45.5%) were female. According to the survey, 65% of students learn psychiatry because it is in exams. Dow University of Health Sciences students had the lowest MICA score (41.06), indicating a positive attitude. whereas students from Hamdard College of Medicine & Dentistry had the highest MICA score (57.12), indicating a negative stigmatizing attitude.

Conclusion: Our findings suggest that undergraduates have a negative attitude toward mental health. In Pakistan, the subject of psychiatry is not tested as an individual subject, so students pay little attention. It is necessary that this subject be examined separately like medicine and surgery.

Keywords: Attitude, Medical Students, Psychiatry

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INTRODUCTION:

According to the Diagnostic and Statistical Manual of Mental Disorders, Version 5, a mental disorder is defined as "a syndrome characterized by clinically significant disturbance in an individual's cognition, emotion regulation, or behavior that reflects a dysfunction in the psychological, biological, or developmental processes underlying mental functioning".[1] There is significant impairment in social, occupational, or other important activities. There are various types of mental disorders like depressive disorder, anxiety disorder, bipolar disorder, and schizophrenia, dementia, substance use disorder.[2] In 2018, Hannah Ritchie and Max Roser published a paper that estimated that 792 million people had a mental disorder by the year 2017. 264 million people were having depression, 284 million persons having an anxiety disorder, 46 million people having bipolar disorder, 20 million having schizophrenia, 107 million people having alcohol use disorder, and 71 million had substance use disorder other than alcohol.[3] According to Goffman in 1963, stigma means "an attribute that is deeply discrediting" and that reduces the bearer "from a whole and usual person to a tainted discounted one".[4] Mental health-related stigma is a lack of awareness and prejudiced behavior towards people with mental health problems. A person with a mental disorder pays a heavy price because of stigma, which is the sum of ignorance, prejudice, and discrimination.[5] Our society due to lack of knowledge, negative attitudes and avoidant behaviour creates a stigma for people with mental disorders.[6] This lack of knowledge and biased behaviour is present among health

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professionals.[7] Even medical students are deprived of correct knowledge about the mental health field. Criticism about the field of psychiatry and mental health experts is common among health professionals.[8] There are orthodox views about doctors belonging to different subjects like pediatricians have always friendly and warm smiles on their faces. Surgeons keep dynamic and dominant personalities, and psychiatrists with awkward appearances remain deeply absorbed in their thoughts. These stereotypes affect the minds of medical students.[9] The common misconceptions about psychiatry as a specialty held by culture influences family members. They then discourage students to pursue psychiatry as a profession. In Pakistan, there are around four hundred certified psychiatrists. The majority of people do not consult psychiatrists. In the medical curriculum, students do not pay importance to psychiatry as it is integrated with medicine paper in the final year professional examination and there is no isolated examination like pediatrics, surgery, obstetrics and gynecology, etc.[10] Rather than addressing stigma with graduated doctors in primary care, it is best to start educating undergraduate students earlier in medical schools or colleges. There is limited research on the attitudes of medical students towards psychiatry in Pakistan compared to other countries. Studies are specific to colleges in urban cities only. This study determined the attitude of medical students toward mental health in various medical colleges in the Province of Sindh. In Pakistan, the subject of psychiatry is not tested as an individual subject, so students pay little attention. It is a need of hour that this subject is examined separately like medicine, surgery, pediatrics, and ophthalmology.

METHODOLOGY :

A cross-sectional study was designed at Hamdard College of Medicine & Dentistry in March 2020. Google forms were developed and disseminated to medical students of different colleges in the Sindh province of Pakistan through the social network. The online survey was fully confidential and anonymous. Consent to participate in the study was taken. All details of the survey including purpose, methodology, and time to complete the survey were explained. The study was approved by the Ethical Review Committee of Hamdard College of Medicine & Dentistry (ERC/MBBS/013/2020). The study comprised two sections: (1) Demographics; (2) Mental Illness Clinicians Attitude Scale Version- 2 (medical students' version). House Officers, Post Graduate trainees, Consultants, and General Public were excluded. The demographic section included information about medical students' age, gender, marital status, medical college or university, medical year, currently living, and birthplace. Aliya Kassam developed Mental Illness Clinician's Attitudes Scale as part of her Ph.D. work at the Institute of Psychiatry, Kings College London. It is a self-administered and psychometrically validated scale. It takes 5 minutes to complete. It is used after the approval of the Institutional Review Board. Modifications in scale cannot be done without the author's permission. There are four versions of the scale. Version 2 is recommended for medical students, trainee psychiatrists, and psychiatrists. There are 16 items on scale and questions are based on a 6-point Likert scale. Items 3,9,10, 11, and 12 are scored as: Strongly agree = 1, Agree = 2, Somewhat agree = 3, Somewhat disagree = 4, Disagree = 5, Strongly disagree = 6. All other items (1, 2, 4, 5, 6, 7, 8, 13, 14, 15) are reverse scored as: Strongly agree = 6, Agree = 5, Somewhat agree = 4, Somewhat disagree = 3, Disagree = 2, Strongly disagree = 1. Scores from all items are added to yield a final score. There is no cut-off in scale. There are 16 items based on a 6-point Likert scale, so the score range ranges from sixteen to ninety-six. An upper score shows a more negatively inclined attitude towards the mental health field and mentally ill patients.

Data were analyzed using IBM SPSS Statistics v20. Continuous and categorical variables were presented as frequencies (%). The independent t-test and one-way ANOVA were used to correlate between scale and different continuous and categorical variables. The Chi-square test was used to correlate different variables with scale. The significance level was set at $p<0.05$.

RESULTS:

Out of 512 medical students surveyed from various medical colleges in Sindh province of Pakistan, 279(54.5%) were male and 233(45.5%) were female. Among them, 306(59.8%) were aged between 17 to 22 years whereas 206(40.2%) were aged between 22 to 25 years. The majority of students; 501(97.9%) were single. 386(75.4%) students belonged to Hamdard College of Medicine & Dentistry, 48(9.4%) to Jinnah Sindh Medical University, 33(6.4%) to Dow University of Health Sciences, 25(4.9%) to Chandka Medical College, 14(2.7%) to Khairpur Medical College and 6(1.2%) to Ziauddin University. Medical students from third year 125(24.4%), fourth-year 124(24.2%), second-year 120(23.4%), first-year 91(17.8%), and fifth-year 52(10.2%) participated respectively in the study. 236(46.1%) medical students were living with family, 232(45.3%) with friends, and 33(6.4%) lived individually. See Table 1

Item-wise details of the MICA-2 scale are shown in Table 2. According to it, 65% of students learn psychiatry because it is in exam. 60.8% think that mentally ill persons can never recover enough to live a qualitative life. 65.6% of students would never disclose their mental illness to friends if they had suffered due to stigma. 62.7 % of students think psychiatric patients are violent. 64.7% of students thought of never disclosing their mental illness to colleagues had they suffered due to fear of being treated differently. 46.9% of students think that being a psychiatrist is not like being a genuine doctor. 47.9% of students thought to use words like crazy for people with severe mental illnesses.

According to descriptive analysis, the mean MICA-2 score

surveyed in all 512 medical students was 54.22 (min. 16 and max. 86; SD 8.94). The significant correlation of MICA score was seen with gender, medical college to which students belonged and with whom they were living. Female students had significantly lower mean MICA score than male students (51.72 vs 56.32). Throughout the world, same results have been obtained that is female students had higher levels of stigmatization than their male counterparts.[11-15]

Students from Dow University of Health Sciences had lowest MICA score (41.06) whereas students from Hamdard College of Medicine & Dentistry had highest MICA score (57.12), indicating highest stigmatizing attitude. Mean MICA score of Khyber Medical College (52.00), Chandka Medical College (49.52), Ziauddin University (48.33) and Jinnah Sindh Medical University (43.77) revealed different stigmatizing attitudes across medical universities. Students living with family had lower MICA score (50.61) as compared to those who were living alone (58.30).

DISCUSSION

The present study evaluated students' attitudes towards field of mental health in Sindh, which is one of five provinces of Pakistan. Students from six medical colleges participated, which has never been done before. This study indicated different results as obtained across the world. In our study, we obtained mean MICA score of 54.22, which is higher than studies done in Poland (41.05)[11], Spain (38.16)[12], Egypt (42.16)[13], Thailand (43.16)[14] and India (46.56).[14] On the other hand, our students' score (54.22) was lower as compared to the study done in the US state of Georgia (68.44)[15]. Poland, Spain, Egypt and Thailand are advanced countries, so it is obvious that they had low stigmatization rate. On the contrary, study done in US state of Georgia displayed high stigmatization score. It is notable that studies done in Poland, Spain, Egypt and Thailand were done on greater number of students where as study conducted in US state of Georgia was done on sample of only 62 students and study examined the attitude towards people with mental illness and people who were homeless. So, it is clear cut that results from US state of Georgia cannot be generalized and the study aim was not specific. Pakistan is country in which health system, knowledge and practice are not as advanced as countries like Poland, Spain, Egypt and Thailand, therefore, it can be said that a lot of knowledge and awareness among medical students of Pakistan regarding mental health is needed.

Students from Dow University of Health Sciences (MICA score= 41.06) had the least negative attitude towards the field of mental health followed by Jinnah Sindh Medical University (MICA score= 43.77). On the other hand, students from Hamdard College of Medicine & Dentistry (MICA score= 57.12), Khairpur Medical College (MICA score= 52.00) and Chandka Medical College (MICA score= 49.52) showed more negative attitudes towards field of mental health. This can be concluded that students from two of top medical universities in province of Sindh had better knowledge and attitudes towards psychiatry. It should be noted that Dow University of Health Sciences and Jinnah Sindh Medical University are top two public sector medical colleges in Sindh. Students with higher score and knowledge are selected in these colleges, so it can be concluded that they had better basic knowledge about medical field and more motivated to learn and grow in the scientific field related to mental health. However, the greater number of faculty can be another factor in these public sector universities. Private Medical College and Universities do not hire greater number of employees in psychiatry profession owing to factor that these universities had to pay more.

It was found from MICA score that student living with family had better view of mental health profession as those living alone. It is possible that the students had any family member who would be suffering from mental disorder. But this cannot be concluded here from this study.

It is not surprising to see from results obtained that 65% of students learn psychiatry because it is in exam. It is therefore need of hour to consider psychiatry as separate subject not only by teaching but by taking its exam separately like Pediatrics, Medicine, Surgery, etc. By implementing this policy, we will be able to motivate students to learn psychiatry and advance in profession ahead by being a psychiatrist. There are already few psychiatrists working in Pakistan.

Table 1. Socio-demographic characteristics

Variables	Frequency N=512	Percentage
Age		
17-21 years	306	59.8
22-25 years	206	40.2
Gender		
Male	279	54.5
Female	233	45.5
Marital Status		
Single	501	97.9
Married	11	2.1
Medical College/University		
Chandka Medical College	25	4.9
Dow University of Health Sciences	33	6.4
Hamdard College of M&D	386	75.4
Jinnah Sindh Medical University	48	9.4
Khairpur Medical College	14	2.7
Ziauddin University	6	1.2
Medical Year		
1st Year	91	17.8
2nd Year	120	23.4
3rd Year	125	24.4
4th Year	124	24.2
5th Year	52	10.2
Current Living		
Alone	33	6.4
With Family	236	46.1
With Friends	232	45.3
Others	11	2.1

Table 2. Item wise details of MICA Scale (N=512)

Variables	Strongly agree	Agree	Somewhat agree	Somewhat disagree	Disagree	Strongly disagree
I just learn about psychiatry because it is in the exam and would not bother reading additional material on it.	40 (7.8)	161 (31.4)	133 (26)	84 (16.4)	62 (12.1)	32 (6.3)
People with a severe mental illness can never recover enough to have a good quality of life.	45 (8.8)	129 (25.2)	137 (26.8)	69 (13.5)	79 (15.4)	53 (10.4)
If I had a mental illness, I would never admit this to any of my FRIENDS because I would fear being treated differently	45 (8.8)	128 (25)	163 (31.8)	83 (16.2)	64 (12.5)	29 (5.7)
People with a severe mental illness are dangerous more often than not.	31 (6.1)	118 (23)	172 (33.6)	96 (18.8)	77 (15)	18 (3.5)
Being a psychiatrist is NOT like being a real doctor	19 (3.7)	89 (17.4)	132 (25.8)	112 (21.9)	90 (17.6)	70 (13.7)
The public does NOT need to be protected from people with a severe mental illness.	27 (5.3)	111 (21.7)	158 (30.9)	113 (22.1)	76 (14.8)	27 (5.3)
I would use the terms 'crazy','nutter', 'mad' etc. to describe people with a mental illness who I have seen in my work	26 (5.1)	85 (16.6)	134 (26.2)	82 (16)	92 (18)	93 (18.2)

Table 3. Significance of Socio-demographic details with MICA Scale overall Score

Variables	N=512	Mean	Std. Deviation	P Value
Age				
17-21 years	306	53.93	9.128	0.375
22-25 years	206	54.65	8.677	
Gender				
Male	279	56.32	7.857	< 0.001
Female	233	51.72	9.527	
Marital Status				
Single	501	54.20	8.934	0.745
Married	11	55.09	9.964	
Medical College/University				
Chandka Medical College	25	49.52	7.478	< 0.001
Dow University of HS	33	41.06	8.503	
Hamdard College of M&D	386	57.12	6.715	
Jinnah Sindh MU	48	43.77	7.896	
Khairpur Medical College	14	52.00	9.654	
Ziauddin University	06	48.33	11.237	
Medical Year				
1st Year	91	53.10	8.951	0.071
2nd Year	120	55.34	9.893	
3rd Year	125	53.27	8.495	
4th Year	124	55.52	8.057	
5th Year	52	52.81	9.316	
Current Living				
Alone	33	58.30	7.011	< 0.001
With Family	236	50.61	10.062	
With Friends	232	57.50	6.138	
Others	11	50.36	7.420	
Birth Place				
Sindh	274	51.85	9.739	< 0.001
Punjab	134	57.73	6.174	
Balochistan	34	57.03	6.603	
KPK	48	55.98	5.629	
Kashmir	9	60.33	4.873	
Gilgit	6	58.17	5.913	
Others	7	42.86	16.896	

Majority of students refrained from disclosing mental illness to friends and family members if they had due to stigma. This needs to be addressed; mental disorders are as prevalent as physical disorders and even because of greater burden in medical students as compared to general population, the results will be devastating on their overall well-being.

Most of psychiatric patients are not violent and majority of students (62.7%) thought oppositely. It is need of hour to oust this myth that psychiatric patients are dangerous. It is opposite to this. In reality, they are victims of violence. This in turn will create empathy, understanding and love for patients with mental health problem rather than exclusion and stigma.

46.9% of students think that being a psychiatrist is not like being an actual doctor. This is not fact. Psychiatrist go to medical college and then after getting basic medical degree, they choose to do specialization in the field of Psychiatry. So, they have all necessary basic skills, knowledge and attitude which is important for being real professional and this is achieved after a lot of hardworking to get specialization in psychiatry. This reveals the negative attitude towards the profession even by health professionals.[16-20] Psychiatrists are already in shortage in Pakistan and this attitude will bring negativity towards the profession itself.

47.9% of students considered using words like crazy for people with severe mental illnesses. These disrespectful words by medical students shows the stigmatization. The words like crazy and nut do not reveal how much mental health problems can be complex. This reveals the biased attitudes of not the general public but medical students, who will then treat them in the future.

CONCLUSION:

The stigma surrounding mental disorders can have an impact

on how medical students perceive psychiatry as a career choice. Proper education plays a vital role in diminishing the extent of stigma within medical students. This stigma is present not in the general public but even among various health professionals. Professionals related to the field of medicine transfer their biased attitudes towards medical students about psychiatrists and the profession of psychiatry. They must be very careful while transferring their own ill knowledge about the profession. Since lack of knowledge is the main reason behind this stigma, it is highly recommended to educate the health professionals and society at the same time as students in medical colleges about the subject of Psychiatry.In Pakistan, subject of psychiatry is taught in final year or fourth year in most of medical colleges and since it is not tested as individual subject, so students pay little attention. It is need of time that this subject be tested individually like medicine, surgery, pediatrics, and ophthalmology.

Authors Contribution:
Rakesh Kumar: Conceived the study, Manuscript writing, Design of study, Literature review
Riaz-ul-Haque: Supervised the work and final review
Haresh Kumar: Study design & Methodology writing
Khalid Mustafa: Statistical Analysis and Results

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Original Article **Open Access**

Efficacy of Hematoma Block VS Conscious Sedation in Terms of Pain Relief for Manipulation and Reduction of Distal Radius Fracture

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ABSTRACT

Objective: To compare the efficacy of hematoma block versus conscious sedation for closed reduction of distal radius fractures.

Study Design and Setting: This was a Randomized Control Trial was conducted at Dr. Ziauddin University Hospital between 1st July 2018 and 31st July 2020.

Methodology: A total of 158 patients underwent closed reduction of distal radius fractures in emergency department; these patients were divided in two groups of 79 each. Hematoma block was used as an analgesic in group A whereas conscious sedation was used on the patients in group B. Both groups were then compared for effectiveness in terms of pain reduction and SPSS software version 25 was used for data analysis.

Results: Median age in group A was 44 years (IQR=37-48.5 years) and 40 years (IQR=30-47.50 years) in group B. The median pain score in group A [3 (IQR=2-5)] was significantly lesser than group B [5 (IQR=3-6)] with p=0.001. In group A effectiveness was achieved in patients was 69.6% and in group B effectiveness was achieved in patients was 35.44%. Statistically there was significant difference observed in proportion of efficacy between groups with p=0.001.

Conclusion: This study show that hematoma block is more effective than conscious sedation in closed manual reduction of distal radius fractures in terms of pain relief.

Keywords: Conscious sedation, distal forearm fractures, Hematoma block, Visual Analogue Scale

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INTRODUCTION:

Distal radius fractures (DRF) are one of the most commonly encountered upper limb fracture with peak incidence in pediatric and geriatric group and is common in both genders.[1,2] With recent advancements, research and understanding of biomechanics, reduction DRF has been acknowledged as the first line management, regardless of requirement of surgical intervention in future or not.[3] However, pain during manual reduction not only leads to uneasiness and strain on the patients leading to restriction of effective fracture reduction.[4]

Treatment protocols for DRF are undergoing changes, which are ranging from conservative (closed manual reduction and cast splint) to surgical methods (open reduction and internal fixation).[5] Conservative method, that is closed reduction, necessitates the patient to be sedated or given strong analgesics.[6] Opioids are used as analgesics which is given in combination with a sedative and muscle relaxant, most commonly used is a short acting benzodiazepine. They have decent response but they carry with them, risk of respiratory depression and seizures.[7,8]

One of the effective method during upper limb surgery is regional anesthesia (Bier block).[1] However, it brings along with it complications like, tourniquet site pain, local anesthetic toxicity, and immediate surgical site pain ensuing tourniquet deflation and risk of anesthetic leakage due to accidental tourniquet deflation.[9] For DRF reduction, PSA an alternative effective method of analgesia.[10] PSA is widely used in the ED as a part of daily practice in tertiary care hospitals, but

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these patients are under the risk of respiratory depression and need close monitoring. On the other hand, HB provides a safe alternate for pain relief during DRF reduction procedure.[2,11]

Use of conscious sedation has its own risks of cardiorespiratory distress and may need continuous monitoring. Hematoma block (HB) is a method in which a local anesthetic preferably 1.5% xylocaine is injected into the hematoma between the fractured bone fragments. It is an effective method for pain relief during manual reduction for DRF minus the additional risks from IV anesthetic injection.[2,10,12,13] Teng et al. found that the effect of HB on post-reduction pain severity was better than that of PSA with significant heterogeneity (Hedges' *g* - 0.600, 95% CI - 1.170 to - 0.029, $p = 0.039$).[10]

The rationale for comparing the effectiveness of HB and PSA in close reduction of DRF in terms of pain relief, is the need to identify the most effective and patient-friendly approach to alleviate pain during this procedure. By evaluating the pain-relieving efficacy of these two approaches, healthcare professionals can make informed decisions to optimize patient comfort, minimize complications, and enhance the overall experience of fracture reduction procedures.

METHODOLOGY:

This Randomized Control Trial was conducted at Dr. Ziauddin University Hospital, Karachi from 1 July 2019 and 30 July 2020. Ethical approval was obtained before starting the study (ERC Ref#: 301-2019). Sample size of 46 in each group was estimated in group, by using Open Epi sample size calculator and taking efficacy of heamatoma block as 68% and conscious cases as 28%, power of test as 90% and 99% confidence level. However, for increasing the generalizability of results we included 79 patients in both groups. All patients with DRF who underwent manual reduction in ED of age 30 to 70 years of either gender were inducted our study after taking informed consent. Patients having multiple or pathological fractures necessitating general anesthesia, neurovascular injury, skin infection at wrist, blood disorders, comorbid conditions like hypertension and diabetes, and allergies to medicines were excluded from this study. Non-probability consecutive sampling technique was employed.

Patients were divided in two groups by a lottery method, group A and group B. A total of 158 patients were placed in two groups of 79. All patients underwent a thorough general physical examination, vitals, weight, duration which had lapsed since the time of injury along with radiological assessment.

Hematoma block was used as a method of analgesia in one group (A) and conscious sedation in the other group (B). In Group A, patient's skin was first scrubbed with pyodine (Povidone-iodine) and monorapid (ethanol), the fracture was identified dorsally, and a 22-gauge needle was inserted in the fracture hematoma. Aspiration of minimal blood into the syringe, led to confirmation of hematoma, after which (5-10) ml of 1.5% xylocaine was injected into the hematoma. After 5 minutes, effectiveness of the block was confirmed by observing an obvious decrease in pain on movement of the patient's wrist. If at any time before or during the procedure, the patient's pain was not well tolerated, HB was abandoned, and converted to PSA. In group B, patients were given a combination of intravenous short acting benzodiazepines and analgesia. A combination of injection Diazepam 10 mg and injection tramadol 50mg was used diluted in 10 ml distilled water. After giving 5 minutes for pain to settle, manual reduction of fracture was done, after reducing the fracture, application of plaster of Paris slab was done to stabilize and immobilize the fracture in reduced position. Pain was recorded on VAS before and after the procedure. Effectiveness of both groups was considered successful if pain on VAS scale was equal to or less than 4 (i.e. reduction in pain score on VAS after procedure). Radiograph images was taken after reducing the fracture to assess the accuracy, which was considered to be successful if it met the criteria given in the table below. Before getting discharged, the patients or their attendants were asked to fill a survey, in absence of attending doctor, regarding severity of pain perception during the procedure, satisfaction with mode of anesthesia and post-operative pain (VAS was also incorporated in the survey to get better evaluation of pain perception). It was in both languages, English, and Urdu.

The SPSS software (version 25) was used for data analysis. Quantitative variables, such as age, duration of fracture and pain score were presented in the form of median and interquartile (distribution of age, duration of fracture and pain score was non-parametric). Qualitative variables such as gender, mode of injuries, type of DRF, and efficacy were presented in the form of frequency and percentage. Mann-Whitney U test was used to compare pain score between both groups. Chi-square test was used to compare efficacy between both groups. A p-value=0.05 was considered as statistically significant.

RESULTS:

Total number of patients included in this study were 158, all of whom came with displaced DRF. Patients having multiple or pathological fracture necessitating general anesthesia were excluded from the study.

Median age in group A was 44 years (IQR=37-48.5 years) and 40 years (IQR=30-47.50 years) in group B. In group A, 64 (81.08%) patients were males while 15 (19%) were females. In group B, 61 (77.2%) were males while 18 (22.8%) were females. There were different modes of injuries causing DRF in our study population, some of the most common were fall (n=103, 65.2%), followed by road traffic

accidents (RTA) (n=47, 29.7%) and sports (n=8, 5.1%), respectively. Colles' fracture was the most common (85%) type of DRF seen in this study.

Median duration of fracture after injury was significantly lower in group A as compared to group B (7 vs 11 hours) with p=0.0001. Before reduction, patients who received analgesia at least 8 hours' prior, were excluded from the study.

The median pain score in group A [3 (IQR=2-5)] was significantly lesser than group B [5 (IQR=3-6)] with p=0.001. (Fig 1)

In group A effectiveness was achieved in patients was 69.6% while in 30.3% patients it was ineffective. In group B effectiveness was achieved in patients was 35.44% while in 64.55% patients it was ineffective. Statistically there was significant difference observed in proportion of efficacy between groups with p=0.001. (Fig 2)

DISCUSSION:

DRF are one of the most commonly encountered fractures of the upper limb that are seen and managed in ED all over the world.[10] Regarding background diseases, general anesthesia has its own side effects. Evaluation and association between numerous methods has been done earlier in studies on patients with DRF, but elderly population are of special importance as they require methods which are effective with fewer side effects and requires short hospitalization holds importance in the elderly group.[14]

In recent years, certain randomized controlled trials have established the efficacy of HB as a satisfactory method for manual reduction of DRF in all age groups.[2,10,15] Kendall studied the increasing acceptance of the HB in reduction of Colles' fracture, and revealed increasing popularity of the HB (7% in 1989 vs. 33% in 1994), when compared with general anesthesia (44% in 1989 vs. 24% in 1994).[16] Ogunlade studied sample size of 35 patients and result showed a significant reduction in pain following HB with attainment of satisfactory reduction in all cases.[12]

Handoll in 2002 reviewed Cochrane Database in which he involved 18 studies that included a total of 1200 patients, comparing HB to anesthesia for DRF reduction in adult patients. Although general anesthesia provides superior analgesia during manipulation but leads to longer hospital stay and greater expenses compared with HB.[17] These studies also pointed out the complaints of increased post procedure pain in patients receiving general anesthesia.[2,6,10,13,18]

Singh conducted a double blind RCT between HB and conventional sedation. As a method of analgesia for reduction of Colles' fracture. It showed that pain scores during fracture reduction in the HB Group were low, which were < 3 (median = 1.8) when compared with sedation group, it was >3 pain

Figure 1: Comparison of pain score b/w group A and group B

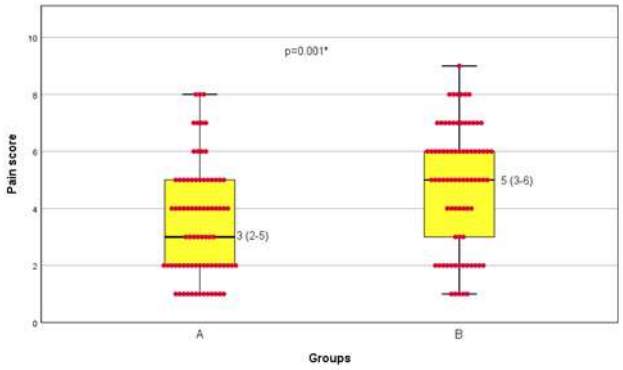

Figure 2: Comparison of efficacy between both groups

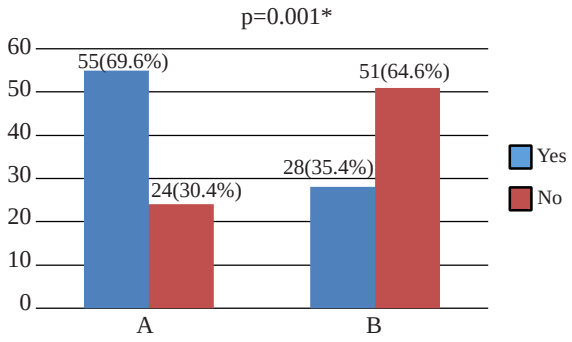

Table 1: Criteria for accurate reduction of the fracture

Results	Criteria		Modified criteria
Excellent	No deformity	Dorsal angulation <0 degree Shortening <3mm Loss of radial deviation <4 degree	Perfect reduction
Good	Slight deformity	Dorsal angulation 1-10 degree Shortening 3-6mm Loss of radial deviation 5-9 degree	
Fair	Moderate deformity	Dorsal angulation 11-14 degree Shortening 7-11 mm Loss of radial deviation 10-14 degree	Acceptable reduction
Poor	Severe deformity	Dorsal angulation >15 degree Shortening >12 mm Loss of radial deviation >15 degree	Unacceptable reduction

scores (median = 8.7).[19] In the study of Fathi et al. regarding pain control during DRF reduction, ultrasound guided HB was established as a safe and effective method when compared with PSA.[20] In the study conducted by Myderrizi and Mema in 2011 on patients with DRF, HB was safer and more effective than general anesthesia and PSA for closed reduction of the DRF, although treatment failure was equal in patients in both methods.[13]

In the latest study by Tseng et al in 2018 result revealed, that in adult population, post-reduction pain relief achieved by HB is more adequate than PSA. However, no significant variance in severity of pain was observed during DRF reduction in both groups. This implies that anesthesia with HB, instead of PSA, is beneficial in sustaining analgesic effect post-reduction. In pediatric population, HB led to reduced pain when compared to PSA. Additionally, more adverse effects were observed in adult patients given PSA, including nausea, vomiting, and respiratory distress. However, the rate of adverse effects was similar in both pediatric groups receiving HB and PSA, reduction failure amongst both groups of adult and pediatric population were also indifferent.[10]

Total number of patients included in this study were 158, all of whom came with displaced DRF. Patients having multiple or pathological fracture necessitating general anesthesia were excluded from the study. These patients were divided and randomly placed in two groups of 79 patients each. Colles' fracture was the most common (85%) type of DRF seen in this study. The comparison of pain was determined by VAS during and post fracture reduction. Pain reduction was considered effective if score on VAS scale was equal or less than 4. If it was greater than 4 then it was considered ineffective. In group A, effectiveness was achieved in patients was 69.6% while in 30.3% patients it was ineffective. In group B effectiveness was achieved in patients was 35.44% while in 64.55% patients it was ineffective. This study show that HB has more efficacy than PSA in closed manual DRF reduction in terms of pain relief.

Our study has few limitations. The study was conducted at a single center, which may limit the generalizability of the findings to other healthcare settings and patient populations. Multi-center studies involving larger sample sizes are needed to confirm the results. The study focused on pain relief and efficacy of hematoma block versus conscious sedation, without considering other factors such as cost-effectiveness, patient satisfaction, and complications. Future studies should explore these additional outcome measures. The study included patients within a specific age range (30 to 70 years) and excluded those with certain comorbidities and conditions. The findings may not be applicable to younger or older age groups or patients with specific medical conditions. The study did not evaluate long-term outcomes, such as functional recovery, range of motion, or radiological parameters of fracture healing. Future research could investigate these aspects to provide a more comprehensive understanding of the benefits and limitations of hematoma block versus conscious sedation in distal radius fracture management.

CONCLUSION:

In group A, effectiveness was achieved in patients was 69.6% while in 30.3% patients it was ineffective. In group B effectiveness was achieved in patients was 35.44% while in 64.55% patients it was ineffective. This study show that hematoma block is more effective than conscious sedation in closed manual reduction of distal radius fracture in terms of pain reduction

Authors Contribution:
Naseem Munshi: Conception and design of study, Literature review, Final approval of manuscript
Muhammad Khalid Arain: Conception and design of study, Drafting, Final approval of manuscript
Athar Muniruddin Siddiqui: Data cleaning, Methodology, editing and drafting, final review
Muhammad Naseem: Accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved
Khadija Abid: Analysis and interpretation of data, wrote the manuscript, final approval

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Original Article **Open Access**

Association between Intraocular Pressure and Myopia Among Children Aged 7 to 16 years

Arooshia Shahzadi, Maryam Firdous, Fareeha Ayyub, Sadaf Qayyum, Saif Ullah, Rabeeah Zafar

ABSTRACT

Objectives: To investigate the association between high intraocular pressure and myopia in children and compare it to emmetropia, and to determine the relationship between elevated intraocular pressure and varying degrees of myopia.

Study design and Setting: Comparative cross-sectional study was performed at the tertiary eye care hospital, Rawalpindi for six months from July 2021 to December 2021.

Methodology: Patients with myopia of greater than 0.5Ds and emmetropes with visual acuity of 6/6 were included. All patients underwent visual acuity, cycloplegic refraction, and fundus examination in order to exclude the myopic patientswith other systemic and ocular disorders. Intraocular pressure and central corneal thickness were measured using a Tonopen tonometer and Pachymeter respectively.Data was entered on SPSS version 26 for analysis. Independent sample T-test and one-way ANOVA was utilized for inferential statistics.

Results: A total of 218 subjects were included with a mean age of 11.38 ± 2.602 ranging from 7 to 16 years. Females 50.9% (n=111) were outnumbered by male participants 49.1% (n=107). The mean IOP in emmetropes was 13.35 ± 2.433 mmHg and in myopes was 15.22 ± 3 mmHg and there is a statistically significant mean difference between these groups (P-value <0.05). There is also a statistically significant mean difference between IOP and varying degrees of myopia, that is; low(13.46 ±2.797), moderate(16.62 ± 2.981), and high(19.215 ± 2.184).

Conclusions: The IOP was higher in high and moderate myopic eyes as compared to emmetropes. Moreover, a strong association was found between myopia and elevated IOP in children.

Keywords: Emmetropia, Glaucoma, Intra-ocular pressure, Myopia

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INTRODUCTION:

Myopia is the most common form of refractive error and a risk factor for Primary Open Angle Glaucoma (POAG). Myopia is a worldwide public health concern that can cause visual impairment and blindness. Myopia risk has been linked to an increase in time spent performing near work, a decrease in outdoor activities, an increase in educational level, and a family history of myopia. Outdoor activities have been found to lessen myopia prevalence.[1]

Myopia is a refractive error in which light rays entering the eye parallel to the optical axis are focused in front of the retina when accommodation is relaxed.[2] Myopia is uncommon in young children, but its prevalence gradually grows to 25-80% in young adults. The prevalence of myopia was estimated to be 22.9% worldwide in 2001, and it is anticipated that by 2050, over 50% of the world's population will be myopic, and nearly 10% will have extreme myopia.[3]

The prevalence of myopia varies among people from various nations and races. When it comes to adult populations over 40 years old, the regional and racial differences are less pronounced. The prevalence of myopia in some urbanized areas of Asia has reached epidemic proportions; however, the prevalence varies with age. The age-specific prevalence

of myopia in Asia is not well evaluated and summarized. In Nepal, 10.9% of children aged 10 years, 16.5% of children aged 12 years, and 27.3% of children aged 15 years were myopic. [4] The prevalence of Myopia among children aged 5, 10, and 15 in India was 4.7%, 7.0%, and 10.8%, respectively. [5] The prevalence of myopia (SE<-0.5 D) among Pakistani individuals over 30 years old was found to be 33.5% (n=487). [6]

Population-based research indicates that the risk of developing Glaucoma rises as myopia increases. According to research, moderate to severe myopia is related to an elevated risk of POAG. [7] Glaucoma is the progressive Optic Neuro-retinopathy distinguished by the loss of Retinal Nerve Fiber (RNFL) tissues, resulting in visual field defect and loss of the Neuro-retinal rim of the Optic Nerve Head, also known as Glaucomatous Optic Neuropathy (GON). [8] In 2020, the global prevalence of glaucoma was estimated to be 52.68 million and is projected to reach 79.76 million by 2040. [9] Multiple investigations have demonstrated a correlation between myopia and POAG. IOP is the pressure produced by the constant replacement of fluids within the eye. [10]

This study is based on the association of myopia with raised IOP, while considering the raised IOP as a risk factor for the development of POAG. The patient with raised IOP should be screened by other modalities of glaucoma screening tests such as visual fields exam and fundus exam to rule out the presence of glaucoma. Such patients are counselled for biannual ophthalmic examination because of the risk of developing glaucoma.

This research aims to investigate the association between high intraocular pressure and myopia in children and compare it to emmetropia, and to determine the relationship between elevated intraocular pressure and varying degrees of myopia.

METHODOLOGY:

This Comparative Cross-sectional study study included patients of both genders ages ranging from 7-16 years, with a myopia of >0.5D or emmetropia visited the children's outpatient department at Al-Shifa Trust Eye Hospital in Rawalpindi. The total sample size was 218 subjects and the sample size was calculated by using OPENEPI, online software, at a confidence interval of 95% and anticipated prevalence of 22.9%. [3] By using the universal non-probability sampling technique, data was collected from the participants during six months from July 2021 to December 2021. After obtaining written informed consent from the representative subset and ethical approval from the corresponding department, the researcher collected data from already labeled myopic patients or newly diagnosed myopic patients and normal patients with no refractive defect visiting hospital (who fit the inclusion criteria). Four patient classifications were defined according to their refractive condition. Group 0: Emmetropia (+0.5 to -0.5D); Group 1: Low Myopia (-0.75 to -3.00D); Group 2: Moderate Myopia (-3.25 to -5.00D); Group 3: High Myopia (>-5.00D).

After the patient was presented to OPD, visual acuity was recorded using the Snellen chart. Cycloplegic refraction was done to find out the refractive status of the patient. Myopes and emmetropes were then taken for further assessment. Then patient's detailed examination was held by an ophthalmologist to rule out any pathology of the posterior segment which was included in the exclusion criteria. To ensure the inclusion of only healthy eyes, patients with Astigmatism and Hyperopia >+0.5 DS, ocular medications such as anti glaucoma medications and steroids, a family history of Glaucoma, the presence of Pseudoexfoliation, a history of previous ocular surgeries, and ocular trauma were excluded from the study. Myopia related to other systemic and ocular illnesses was excluded from the study.

Then demographic data was taken from the patient. Intraocular pressure was measured using a tono pen tonometer. Pachymetry was also performed for the correction factor for the Applanation tonometer for central corneal thickness. All the findings were recorded on a structured proforma. SPSS (version 26) was used for data analysis. The descriptive analysis was done on the categorical and continuous variables. Percentages and frequencies were reported for categorical variables and mean and standard deviation were reported for continuous variables. An independent sample t-test was used to compare between high intraocular pressure and myopia and compare it to emmetropia, and a one-way ANOVA test was utilized to determine the relationship between elevated intraocular pressure and varying degrees of myopia.

RESULTS:

In this study, 218 eyes were examined. The mean age of respondents was (11.38±2.602), with a range between 7 and 16 years. 49.1% (n= 107) of the sample were male, while 50.9% (n = 111) were female. Among the participants, 21.2% (n= 46) eyes were Emmetropic, and 78.8% (n= 171) eyes were Myopic. In a sample of 218 eyes, 21.1% (n= 46) were Emmetropes (Group 0), 42.2% (n= 92) were mild Myopes (Group 1), 13.3% (n=29) were moderate Myopes (Group 3) and 23.4% (n=51) were having high Myopia (Group 3).

To compare the relationship between IOP in emmetropes and myopes, an independent sample T-test was applied. It was observed that the mean IOP in emmetropes was less (13.35 ± 2.433) than the mean IOP in Myopes which was 15.22 ± 3.516. The mean difference was -1.874, which was statistically significant (P value <0.05). Table: 1 To compare the association of IOP with the three different categories of Myopia, that is, mild, moderate, and severe, a one-way ANOVA test was conducted and the mean IOP was a statistically significant different with a P-value of less than 0.001. Table: 2

Figure 1: Refractive Status

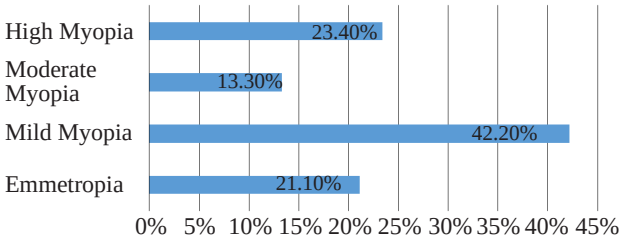

Table 1: Association of IOP with emmetropes and Myopes

Values	N	Mean	SD	T-test		
				t- value	d.f	Sig.
Emmetropes	46	13.35	2.433	-4.18	101.28	0.001
Myopes	171	15.22	3.516	-4.18		

Table 2: Association of IOP with different categories of Myopia

Variables	N	Mean IOP	S.D	F-value (df)	P-value
Mild myopia	91	13.46	2.7978	59.456 (2)	0.001
Moderate Myopia	29	16.620	2.9810		
Severe myopia	51	19.215	2.1846		

DISCUSSION:

According to a study, the most prevalent type of refractive error is myopia(52%), followed by astigmatism (38.1%) and hypermetropia (9.8%).[11] For health authorities around the world, the existence of a growing myopia pandemic is an undeniable truth. The use of medications, surgical procedures, optometric correction techniques, and increased time spent outside are just a few of the potential remedies being researched by scientists to help youngsters who suffer from it.[12]

According to studies, as myopia grows, so does the risk of developing glaucoma. In the vast majority of research, moderate to severe myopia is related to an elevated risk of POAG. Globally, glaucoma is among the main causes of irreversible blindness in adult populations. Intraocular pressure is a crucial diagnostic and monitoring measure for glaucoma. IOP measurement accuracy is a defining characteristic of glaucoma patient care. Intraocular pressure is the only modifiable risk factor known to decrease the progression of this potentially blinding disease. [13] In the current study, 218 eyes were evaluated from the children OPD of Al-Shifa Trust Eye Hospital. 49.1% were female and 50.9% were male. Moreover, the current study included 46 emmetropic eyes and 171 myopic eyes. There is a moderate association between Intraocular pressure (IOP) and myopia; however, no association was found between IOP and emmetropic eyes, as proven by the current study.

According to the current investigation, this association between higher IOP and myopia in children was statistically significant (P value < 0.05). Comparing the mean IOP values of the various myopia groups demonstrated a positive association between myopic patients and intraocular pressure in Groups 2 and 3. High myopia and moderate myopia had significantly higher intraocular pressure than emmetropia and low myopia. These results were consistent with those of other studies conducted in our region and in other countries, such as a study conducted in India by Acharlu, which found that the mean IOP was higher in high and moderate myopic eyes than in emmetropic and low myopic eyes. In this study, IOP was measured using a Perkins tonometer on 150 eyes from 120 participants, and the mean IOP was compared. It was found that the mean IOP in high myopes was 18.30±3.24 and the mean IOP in moderate myopes was 15.07 ±3.21 which was higher as compared to the mean IOP in low myopes and emmetropes which was 12.27±2.22 and 12.65±2.10 respectively. Mean IOP was higher in high and moderate myopes, this difference was statistically significant and this supported our study. [14]

Some studies reported no variation in intraocular pressure (IOP) based on refractive status. [15] The employment of diverse procedures and samples may account for variations in study outcomes. One of the possibilities explaining the association between myopia and raised IOP is the increased stress on the global wall and decreased ocular stiffness in myopic eyes. In a study, a model was suggested that the myopic eye is subject to greater stress than the emmetropic eye with the same intraocular pressure. The increased risk of Open Angle Glaucoma in myopia may be thought that the axial length increase leads to the tilting of the optic disc, which causes damage to the axons in the lamina cribrosa. [16] In a study conducted by Bhagashree Sharma, the intraocular pressure variations of 35 patients with moderate to severe myopia were studied. The average IOP was calculated to be 16.98±2.68mm Hg. There was no statistically significant difference between the two groups (p=0.231). After controlling for factors, high myopes exhibited a somewhat higher intraocular pressure than moderate myopes. Other studies by Bonomi[17] and Sanaa Yasin (Saudi) also could not find any relation between IOP changes and refractive error. [18]

Our study findings are in contrast with it. Nonetheless, in a cohort Chinese study including 2653 participants, it was found that myopic progression is likely to have elevation of IOP with time. [19] The cornea in myopia is thinner than in emmetropia, according to Shukla, and this is likely true for the sclera.

Dini Sunny Joseph discovered a statistically significant (p<0.05) association between intraocular pressure (IOP) and myopia in groups with moderate and high myopia. Based on their refractive state, 178 eyes from 100 patients were divided into four groups for this study. Group 1 consisted of 74 eyes with a mean IOP of 12.32 (SD = 2.44), Group 2 consisted of 14 eyes with a mean IOP of 15.00 (SD =

2.25), and Group 3 consisted of 6 eyes with a mean IOP of 18.5. (SD=0.7). Low myopia and emmetropia exhibited no statistically significant difference in intraocular pressure, however moderate and severe myopia was related to greater IOP than emmetropia. [20]This study supported our conclusions.

It was a hospital based study in which only those patients were included who visited general department of hospital, so, further community based study shouldbe conducted in future.

CONCLUSION:

Those with moderate or high myopia have a higher risk of developing Primary Open Angle Glaucoma; therefore, glaucoma screening is crucial. The key to stopping the progression of glaucoma and preventing blindness is an early diagnosis. Therefore, myopes with elevated IOP should be advised to undergo biannual ophthalmic examinations to rule out glaucoma.

Authors Contribution:
Arooshia Shahzadi: Data Collection, Drafting
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Original Article **Open Access**

Prevention of Pressor response to Laryngoscopy: A Comparison of Lignocaine with Dexmedetomidine

Ayesha Shahid, Muhammad Salman Maqbool, Sidra Shabbir, Fahd Mudassar Hameed, Nargis Shabana, Fareeha Tayyab

ABSTRACT:

Objective: To compare intravenous Lignocaine with Dexmedetomidine for prevention of pressor response to laryngoscopy.

Study design and setting: Randomized Clinical Trial at Anesthesia Department, RIHS Islamabad. (1st May2019 To 30th October 2019)

Methodology: 68 patients with age 20-60 years, ASA status(I or II), planned for elective surgeries under GA were included in this study and randomly divided into groups A and B by lottery method. Patients with history of hypertension, heart blocks, beta-blockers were excluded from study. Group-A patients were given injection Lignocaine 2% 1mg/kg 1min before induction and Group-B patients were given injection Dexmedetomidine 1ug/kg 15 min before induction of anesthesia. After premedication with injection Midazolam, Nalbuphine, and Ondansetron, Induction of anesthesia was done with injection Propofol and Cisatracurium. Patients were intubated. Use of stylet,BURP maneuver, incidence of laryngospasm was noted. Vitals before and after intubation were noted.

Results: There was no significant difference in demographic profile,use of a stylet, BURP maneuver and laryngospasm in both groups. ANOVA test shows significant decrease in change in Systolic BP in Dexmedetomidine group at 2 and 3 minutes after intubation as compared to Lignocaine group however Diastolic BP and Heart rate was comparable in both groups. Paired t test showed a significant decrease in Systolic and Diastolic BP in both groups(more in Dexmedetomidine group).Regarding heart rate paired t test showed insignificant difference in Lignocaine group and significant difference in Dexmedetomidine group.

Conclusion: Intravenous Dexmedetomidine is superior to Lignocaine to prevent pressor response to laryngoscopy.

Keywords: Dexmedetomidine, Laryngoscopy, Lignocaine, Pressor response

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INTRODUCTION:

Pressor response to laryngoscopy was first described by Reid and Brace in 1940. Both laryngoscopy and intubation are essential part of general anesthesia[1]. Intubation not only helps us to maintain patency of airway, it also assures that adequate ventilation is being delivered to patient. It reduces risk of aspiration of gastric contents and facilitates delivery of anesthetic gases to patient. During laryngoscopy, extension of head at the atlantooccipital joint not only brings oral, laryngeal and pharyngeal axes into alignment, but also improves glottic view. The stretching of oropharyngeal tissues during laryngoscopy result in activation of sympathetic nervous system.[2] The reflex tachycardia and hypertensive effects of laryngoscopy are greater than that of tracheal intubation.[2] During laryngoscopy and intubation, afferent signals from glottis and epiglottis are carried by vagus and glossopharyngeal nerves to vasomotor centers in brain stem .Activation of vasomotor centers cause intense sympathetic discharge in the body.[3] Elevated catecholamines levels in the body results in 20-27% increase in heart rate and 30-50% increase in blood pressure.[4]

This hemodynamic response is directly proportional to duration of laryngoscopy and intubation. This response begins in 15 seconds, reaches its peak at 45 seconds and

may last for 5 minutes after intubation.[5] Although this pressor response is transient in most of the patients, it can be detrimental to those having history of hypertension, ischemic heart disease and cerebrovascular accidents.[6] The underlying mechanism involves vasoconstriction due to sympathetic stimulation. This results in increase in myocardial work and demand for coronary blood flow also increases. If coronary arteries are already narrowed, than they can't accommodate increase in blood flow and some parts of myocardium may get under perfused.[2] Perioperative myocardial infarctions have been reported after laryngoscopy and intubation that increases the mortality and morbidity by 12-40%.[7] Light anesthesia, prolonged laryngoscopy, anatomically difficult airway, multiple intubation attempts, use of miller blade causing more pressure on posterior part of tongue, excessive force applied during intubation are the various factors that affect hemodynamics at time of intubation.[8]

Lignocaine belongs to amide group of local anesthetic and have been widely used to blunt pressor response to laryngoscopy. Bromage reported that an intravenous dose of Lignocaine given 3 minutes before intubation effectively blunts pressor response.[9] Dexmedetomidine is highly selective α-2 adrenoceptor agonist, having sedative, analgesic, anxiolytic, sympatholytic, and opioid-sparing properties. Dexmedetomidine has got unique sedative ability that allows patient to be cooperative and communicative when stimulated, hence it allows slow and easy transition from sleep to wakefulness. It has got sympatholytic properties that help to achieve stable hemodynamic in perioperative period. It not only decrease myocardial oxygen consumption but also decreases heart rate. All these effects help to reduce cardiac complications perioperatively.[10]

The rationale of this study was to compare intravenous Lignocaine with Dexmedetomidine for prevention of pressor response to laryngoscopy so that better management plans can be improvised to avoid detrimental effects of sympathetic discharge at the time of laryngoscopy and intubation. This study would be helpful to improve anesthesia plans in patients with history of hypertension and ischemic heart diseases.

METHODOLOGY:

The study approval was given by Institutional Dean and Head Research Ethical Committee, Rawal Institute of Health Sciences, vide letter No. RIHS-REC/039/19 dated 15.04.2019. Non probability consecutive sampling technique was well-thought-out for this prospective interventional study. This study was done at Anesthesia Department of Rawal Institute of Health Sciences Islamabad from 1st May 2019 to 30th October 2019. 68 patients with age 20-60 years, ASA[11] physical status class I or II, planned for elective surgeries under general anesthesia were included in this study. Patients with history of hypertension, heart blocks or taking beta blockers were excluded from study. Informed written consent was taken from all the patients included in the study. Sample size was calculated by using WHO sample size calculator with assumptions (confidence level=95%, alpha error=5%, mean heart rate in Lignocaine group=82.2[12], mean heart rate in Dexmedetomidine group=71.9[12], common sigma= 15) the sample size came out to be 68 (34 cases placed by lottery method into each group). Group A patients were given injection Lignocaine plain 2% 1mg/kg 1min before induction of anesthesia. Group B patients were given injection Dexmedetomidine 1ug/kg 15 min before induction of anesthesia. Informed written consent was taken from all the patients included in this study. Patients fasted and pre-medicated according to ASA guidelines. Electrocardiograph, pulse oximetry, end-tidal CO_2, blood pressure monitors attached and baseline readings noted. Patients were divided in group A and B by lottery method. All patients were premedicated with injection Midazolam 2 mg intravenously, injection Nalbuphine 0.1 mg/kg and inj Ondensetron 4mg. Induction of anesthesia was done with injection Propofol 2mg/kg and Cisatracurium 0.15 mg/kg. Patients were ventilated for 3 minutes and intubated with ETT of appropriate size. Vitals were noted on arrival in OT, before induction and 5 minutes after intubation (1 minute interval). Anesthesia was maintained by mixture of 50% N_2O, 50% O_2 and 0.8% Isoflurane. Injection Cisatracuium was used for maintenance during procedure. Use of stylet or BURP maneuver was noted during intubation. Any incidence of laryngospasm was also noted. At the end of surgery, on return of muscle power, residual neuromuscular blockade was reversed by injection Neostigmine 30µg/kg along with Atropine 15µg/kg intravenously. Patients were extubated and after complete recovery from anesthesia patients were shifted to recovery room. All the data was recorded on forms and confidentiality of patients was maintained.

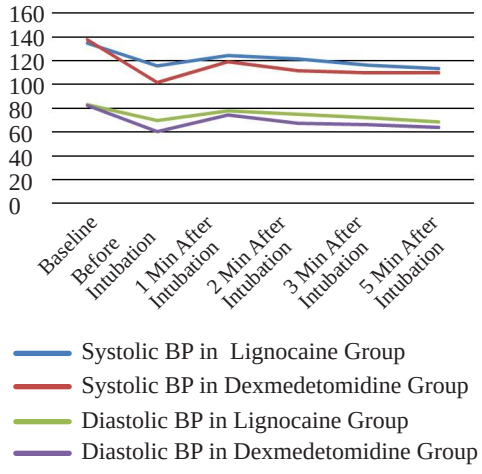
RESULTS:

Data was entered and analyzed in SPSS 22. Demographic profile is shown in table-1. There was no significant difference in demographic profile in both groups. Factors that can effect pressor response like use of stylet, BURP maneuver and evidence of laryngospasm was also compared among both groups and was found to be insignificant. Systolic BP, diastolic BP in two groups are shown in graph 1 and heart rate are shown in graph 2.

Table-1: Demographic data (n=68)

	Group-A (Lignocaine plain)	Group-B (Dexmedeto-midine)	P value
Age(mean in years)	37.70± 12.97	37.32 ±13.36	0.90
Male(percentage)	14	9	0.20
Female(percentage)	20	25	
Bronchospasm (%)	0(0)	2(5.9)	0.151
Stylet (%)	3(8.8)	4(11.8)	0.69
Burp (%)	11(32.4)	12(35.3)	0.79

Graph 1: Systolic and Diastolic BP in Two Groups



Graph 2: Heart Rate in Two Groups

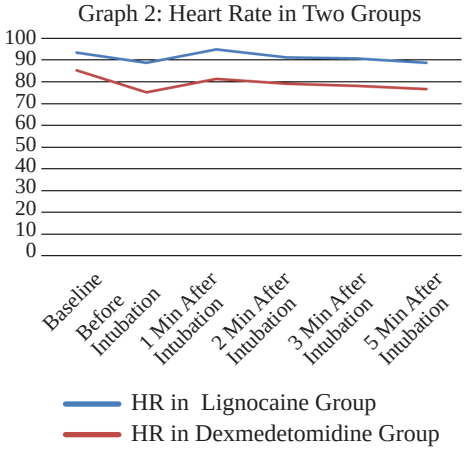


Table 2: ANOVA test to compare % of change in Systolic BP, Diastolic BP and Heart Rate in both groups

	A	B	p-value
% of Change in systolic BP at 1 min	-6.74 ±17.8	-12.44 ±18.4	0.199
% of Change in systolic BP at 2 min	-9.44 ± 14.5	-17.9 ± 16.4	0.028
% of Change in systolic BP at 3 min	-13.54 ± 14.4	-19.9 ± 11.9	0.049
% of Change in systolic BP at 5 min	-15.7± 14.5	-19.4± 13.3	0.278
% of change in diastolic BP at 1 min	-7.73± 18.89	-8.83± 19.30	0.813
% of change in diastolic BP at 2 min	-10.66 ± 20.18	-17.40± 17.45	0.145
% of change in diastolic BP at 3 min	-14.09 ± 22.65	-18.91 ± 16.47	0.320
% of change in diastolic BP at 5 min	-18.8 ± 22.46	-21.5 ± 18.18	0.579
% of change in heart rate after I min	2.31± 12.23	-3.76 ± 17.55	0.102
% of change in heart rate after 2 min	-1.71 ± 11.27	-6.37 ± 16.02	0.173
% of change in heart rate after 3 min	-2.4± 11.80	-7.02 ± 19.07	0.233
% of change in heart rate after 5 min	-3.91 ± 14.47	-8.63± 18.1	0.240

ANOVA test was applied to compare change in systolic BP, diastolic BP and heart rate at 1, 2, 3 and 5 minutes after intubation among two groups keeping baseline value as reference.

Table 3: Paired T test to compare mean of Systolic BP, Diastolic BP and Heart Rateamong same groups.

Systolic BP in Lignocaine group		p-value
Systolic BP at baseline	134.97	
Systolic BP at 1 min after intubation	124.44	0.014
SystolicBP at 2 min after intubation	121.38	0.000
SystolicBP at 3 min after intubation	116.32	0.000
SystolicBP at 5 min after intubation	113.18	0.000
SystolicBP in Dexmedetomidine group		
SystolicBP at baseline	137.85	
SystolicBP at 1 min after intubation	119.32	0.000
SystolicBP at 2 min after intubation	111.71	0.000
SystolicBP at 3 min after intubation	109.53	0.000
SystolicBP at 5 min after intubation	109.85	0.000
Diastolic BP in Lignocaine group		
Diastolic BP at baseline	82.29	
Diastolic BP at 1 min after intubation	74.18	0.006
Diastolic BP at 2 min after intubation	67.44	0.00
Diastolic BP at 3 min after intubation	66.12	0.000
Diastolic BP at 5 min after intubation	63.76	0.000
Diastolic BP in Dexmedetomidine group		
Diastolic BP at baseline	85.15	
Diastolic BP at 1 min after intubation	77.79	0.014
Diastolic BP at 2 min after intubation	75.06	0.005
Diastolic BP at 3 min after intubation	72.24	0.001
Diastolic BP at 5 min after intubation	68.53	0.000
Heart Rate in Lignocaine group		
Heart Rate at baseline	93.53	
Heart Rate at 1 min after intubation	94.97	0.453
Heart Rate at 2 min after intubation	91.15	0.205
Heart Rate at 3 min after intubation	90.74	0.174
Heart Rate at 5 min after intubation	88.82	0.054
Heart Rate in Dexmedetomidine group		
HR at baseline	85.32	
Heart Rate at 1 min after intubation	81.24	0.123
Heart Rate at 2 min after intubation	79.09	0.016
Heart Rate at 3 min after intubation	78.26	0.021
Heart Rate at 5 min after intubation	76.74	0.004

When % of change in systolic BP was compared among two groups, there was a significant difference at 2 and 3 minutes after intubation (p value less than 0.05) with more drop in systolic BP in Dexmedetomidine group. However this difference was not significant at 1 and 5 minutes after intubation. As shown in table 2.

When % of change in diastolic BP and heart rate was compared among both groups, no significant difference was observed at 1, 2 3 and 5 minutes after intubation. As shown in table 2. Paired t test was applied to compare systolic BP, diastolic BP and heart rate in same groups keeping baseline value as referenced value. When systolic BP was compared

in Lignocaine group, there was significant decrease in systolic BP after intubation (p value less than 0.05) but this decrease was not significant at 1 minute after intubation. In Dexmedetomidine group there was significant decrease in systolic BP after intubation (more than Lignocaine group) as shown in table 3. When paired t test was applied to diastolic BP, there was significant reduction in both groups except at 1 minute after intubation in Dexmedetomidine group.

When paired t test was applied to heart rate, there was no significant difference in Lignocaine group, however in Dexmedetomidine group there was significant decrease in heart rate at 2, 3 and 5 minutes, but no significant difference was observed at 1 minute after intubation as shown in table3.

DISCUSSION:

Review of literature showed various drugs that can be used to blunt pressor response to laryngoscopy. These include Opioids, Beta blockers, Calcium channel blockers, Local anesthetics, Benzodiazepines, Barbiturates, Alpha adrenergic antagonists, Angiotensin converting enzyme inhibitors, Pregabalin, nerve blocks and inhalational anesthetics. [13]

In last few years Dexmedetomidine has been used through various routes as an adjuvant. [14]It causes suppression of neuronal activation at locus coeruleus. This leads to blunting of sympathetic discharge, and thus it stabilizes hemodynamics during laryngoscopy and intubation. [15]In addition to its use as intravenous route.[16] Dexmedetomidine has also been used as nebulization to prevent hemodynamic response to laryngoscopy.[17]

Gulabani M [12] conducted a study to compare Lignocaine 1.5mg/kg with Dexmedetomidine 0.5 ug/kg and 1 ug/kg for attenuation of hemodynamic pressor response to laryngoscopy and intubation. When Systolic BP was compared among three groups, Paired t test showed significant reduction in SBP after intubation in all three groups however maximum reduction was observed in Dexmedetomidine1 ug/kg group, as noted in our study.

When DBP was compared in three groups, paired t test showed that in Lignocaine there was no significant reduction in Diastolic BP at 1 minute after intubation however there was significant reduction in DBP at 2 and 5 minutes after intubation. However both Dexmedetomidine groups showed significant reduction in DBP after intubation with maximum reduction seen in Dexmedetomidine 1 ug/kg group. In our study there was significant reduction in Diastolic BP in both groups (almost equal) after intubation.

When heart rate was compared in three groups, paired t test showed that in lignocaine group there was no significant change in heart rate at 1 minute after intubation, however at 3 and 5 minutes there was significant reduction in heart rate. While in both Dexmedetomidine groups there was significant reduction in heart rate at 1, 3 and 5 minutes after intubation with maximum decrease noted in Dexmedetomidine 1 ug/kg group. This is in contrast to our study where we didn't noticed any significant decrease in heart rate in Lignocaine group, however in Dexmedetomidine group except at 1 min after intubation significant decrease in heart rate was noted.

Boksh SZ compared Lignocaine with Dexmedetomidine for prevention of sympathetic response to laryngoscopy. He observed that changes in Systolic BP , diastolic BP and heart rate was more smooth in Dexmedetomidine group as compared to Lignocaine group however statistically the difference in two groups were not significant. This is in contrast to our study where significant decrease in Systolic BP and Diastolic BP was observed before intubation in Dexmedetomidine group. However when two groups were compared than a statistically significant difference was observed in SBP at 2 and 3 minutes after intubation in Dexmedetomidine group, however Diastolic BP and Heart rate showed no significant difference when ANOVA test was applied.[18]

Rattaphol Seangrung compared Dexmedetomidine with Lignocaine to blunt hemodynamic response to laryngoscopy and found that there was decrease in SBP, DBP and HR after intubation that was more pronounced in Dexmedetomidine group, so findings of this study were similar to our trial.[19]

Chauhan Et al compared Dexmedetomidine, Fentanyl and Lignocaine to prevent pressor response to laryngoscopy. When systolic BP was compared in Dexmedetomidine group there was decrease in Systolic BP after intubation, while in Lignocaine group a rise in Systolic BP was observed after intubation.When Diastolic BP was compared, there was increase in Diastolic BP in both Dexmedetomidine and Lignocaine group , however this increase was more marked in Lignocaine group than in Dexmedetomidine group. Heart rate was increased in both Dexmedetomidine and Lignocaine group, however this increase was more significant in Lignocaine group than in Dexmedetomidine group. The results of this study vary from our trial that may be explained by fact that dose of Dexmedetomidine was 0.6mic/kg that was much less our dose 1mic/kg.[20]

Silpa AR, compared Dexmedetomidine 5ug versus 1ug/kg for prevention of hemodynamic response to laryngoscopy. He found that although there was no difference in sedation score in two groups, there was significant hypertensive response in 5ug/kg group as compared to 1ug/kg Dexmedetomidine group. so results of this study comply with our trial regarding dose of Dexmedetomidine.[21]

CONCLUSION :

Dexmedetomidine is superior to Lignocaine for prevention of pressor response to laryngoscopy.

Authors Contribution:
Ayesha Shahid: Concept & Design of Study, Drafting, Revisiting Critically, Data Analysis, Final Approval of version.
Muhammad Salman Maqbool: Concept & Design of Study, Drafting, Revisiting Critically, Final Approval of version.
Sidra Shabbir: Concept & Design of Study, Revisiting Critically, Final Approval of version.
Fahd Mudassar Hameed: Drafting,
Revisiting Critically, Final Approval of version.
Nargis Shabana: Revisiting Critically, Data Analysis, Final Approval of version
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Original Article **Open Access**

An Investigation into Implications of Tuberculosis Control Efforts in Pakistan: A Comparative Approach

Farhan Muhammad Qureshi, Samira Faiz, Ayesha Khalid

ABSTRACT

Objective: To investigate the difference of Tuberculosis (TB) related information in diagnosed TB patients and healthy individuals in relation to the implications of National Tuberculosis Program (NTP) control efforts.

Study Design and Setting: This comparative case-control study was conducted from May to December 2022 in public sector tertiary care setups of Karachi.

Methodology: In this case control study, 100 hospitalized diagnosed patients of TB were compared with 155 healthy individuals from May to December 2022. We analyzed sociodemographic characteristics of both groups related to the information for transmission and prevention of TB, as a basic element for the disease control.

Result: TB patients were more likely to be uneducated, have low household income and positive family history of TB as compared to non-TB (OR 0.52, 0.30, 0.40). 18% of TB patients believed that TB infected person cannot be a source of spread to cause TB disease (OR=4.7; P=0.006). There was a statistically significant association among both the groups deemed to malnutrition and multiple households as the risk factors of tuberculosis (P=0.002 and <0.001 respectively

Conclusion: TB related information with respect to its cause, preventive and treatment was insufficient in both study groups leading to delay in TB treatment and increase mortality from the disease. Health education interventional strategies, focused on primitive and advanced TB related information are needed in general population with special attention on low socioeconomic groups of community, and the population living in isolated and remote areas.

Key words: Perceptions, TB control, patients, treatment, Tuberculosis

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INTRODUCTION:

Tuberculosis remains a global health challenge especially in developing part of the world, despite its incidence decreased worldwide. In Pakistan, the National Tuberculosis Control Program (NTP) has been working under the Ministry of Health since 2001 and is now operating parallel with the National Institute of Health (NIH) of Pakistan. NTP aims to reduce tuberculosis (TB) prevalence up to 50% and succeeding to attain no TB deaths by 2025 through appropriate TB care.[1] To develop a strategic program, NTP has been working on a multi-sectoral approach through engaging public and private sector, in collaboration with community-based organizations and the civil society for early detection and control of tuberculosis.[2,3]

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Despite the continuous efforts, Pakistan still endeavors and struggling towards a TB free country.[1,2] Presently, Pakistan shares sixty one percent of TB burden in the Eastern Mediterranean Region and ranks fifth in worldwide prevalence of TB with more than five hundred thousand new cases of tuberculosis every year.[3] Besides, the worldwide prevalence reached to fourth highest place for the cases of multidrug-resistance TB (MDR-TB).[2]

Literature revealed that early diagnosis and adherence to prompt treatment of tuberculosis patients reduces the transmission of disease and thus a practiced strategy to reduce the occurrence of TB.[4,5] It is evident that reduction in an incidence of TB can happen when patient's knowledge is increased regarding the consequences, communicability and non-adherence to the treatment regime of the disease.[6]

Suboptimal TB care due to poor health-seeking behaviors among Pakistani population is manifested by several factors comprising at both societal and individual levels.[7] Despite the provision of free of cost TB treatment facilities in Pakistan, patients especially belong to low socio-economic

group seek advice and get treatment from private doctors and hospitals because of lack of awareness about free government-based TB care centers in the country.[8] Consequently, these patients faced a huge financial loss ultimately leading to non-adherence or even, discontinuation of treatment.[8] Also, substance abuse was another reason of treatment default as around 36% of the TB patients discontinued the treatment due to injectable drug usage.[9]

Similarly, isolation of TB patients by their family produces untoward outcome. Awareness and behaviors of the family members of TB patients regarding patient handling techniques and being on a high risk of TB, simultaneously taking care of themselves, was associated with close contacts TB patients.[3,10] Therefore, in-time identification and adequate treatment of TB and MDR-TB cases is imperial to cut the chain of transmission of this disease but, education plays a major role to reduce the risk of developing TB.[3,7,11] However, responsibility for the provision of delivery of TB related education for an underprivileged people is still questionable. Various studies have been published regarding the evaluation of the National TB Control Program in Pakistan examining the implementation of universal DOTS coverage, the laboratory system, operational drug management systems, involvement of the public and private sector.[6] There is lack of evidence deemed to the "communication strategies" apprehended by NTP for the disease control. The main aim of this study was to investigate the difference of information regarding TB disease among healthy and TB diagnosed patients to find out the implications of the NTP in the realm of "communication strategies" which is the backbone to this program.

METHODOLOGY

This comparative case-control study was conducted from May to December 2022 in public sector tertiary care setups of Karachi. Two groups (n=255) were divided based on the history of TB; 155 with no history of TB ever and 100 individuals with history of Pulmonary TB through consecutive sampling method. Participants with history of TB were diagnosed patients of active pulmonary TB admitted in tertiary care hospitals for anti-tuberculosis therapy. Comparative group were defined as people not having tuberculosis on self-report and were attendants of indoor and outdoor patients matched on the bases of age and gender. Age group for both groups was above 18 years.

A structured and pretested questionnaire was developed to observe the perception of participants deemed to the causative and risk factors and the treatment outcome of pulmonary tuberculosis. At first, participants were explained about the purpose, data collection procedure, interview duration and possible risks and benefits of the study verbally. Those who volunteered to participate were asked to sign/give thumb impression on a written informed consent. Afterwards, participants were interviewed for basic demographic traits and the study questionnaire.

Data was compiled and analyzed through SPSS Version 23 while MS Excel was used for graphical presentation of the data. Continuous data was explained as mean ± standard deviation while categorical data was analyzed as frequencies, percentages and p-value for significance. To understand the association regarding perception of tuberculosis among cases and controls, binary logistic regression analysis was performed expressed in odds ratio at 95% confidence intervals for all the variables.

Ethical Consideration: Ethical consideration (ERC-KIMS/006/22) was obtained from the Ethical Review Committee (ERC) of Karachi Institute of Medical Sciences, Karachi.

RESULTS:

Among the 255 total participants of both comparison groups, there was no significant difference among regarding age (categorical) and gender (P= 0.119 and 0.716 respectively). However, TB patients were more likely to be uneducated, have low household income and positive family history of TB as compared to their healthy counterparts (OR 0.52, 0.30, 0.40) (Table 1).

The logistic regression model in Table 2 describes the participants' perception regarding the causative and risk factors of TB. The Nagelkerke R^2 Model accounted for 37% of the total variance. About 71% was the correct prediction rate.

93.5% of non-TB group and 82% of TB patients believed that TB infected person can be a source of spread and cause TB disease (OR=4.7; P=0.006). Similarly, results generated had a statistically significant association among both the groups deemed to malnutrition and multiple households as the risk factors of tuberculosis (P=0.002 and <0.001 respectively). 72% TB patients had the concept that malnutrition is a risk factor of TB as compared to 31% non-TB group (OR=0.30). However, only 2% TB patients took multiple households as a risk factor in comparison to the no-TB group (35%) [OR=20.52]

In case of spread through air, smoking, substance abuse, indoor air pollution and overcrowding at work place, the results were not statistically significant. Nevertheless, non-TB group were 49% more likely to believe that "TB can spread through air" than TB patients (non-TB group=17.4%; TB patients=10%). Similarly, the odds were higher in non-TB group to take substance abuse as a risk factor of TB (OR=1.25). Taking diabetes as a risk factor of TB, the healthy group was 41% more likely to answer positively than TB patients (OR=1.41) however, the difference was not statistically significant (P=0.260). When both TB patients and non-TB were asked "Is TB curable?" results generated were statistically significant (P=<0.0001). 78% cases said that TB was curable that was more than the positive responses

by the controls (58%). However, about the question "is TB preventable?" the results remained consistent between the groups (OR=1.00). Regarding the cost of TB treatment only 5% cases claimed that the treatment was costly in comparison to the healthy participants that is 17%. (P=0.003). However, only 11% of each of the TB and non-TB groups knew that the government provide free of cost TB treatment (Table 3). In case of symptoms of pulmonary tuberculosis most of the participants among both the groups the most frequent answer was cough and weight loss followed by night sweats, fever and breathlessness.

Figure 1 presents the information gathered from both the groups, the source of knowledge regarding TB stood statistically significant (P = <0.001). About half of the participants from TB patients got the information from other TB patients (51%) while main source among non-TB group was media followed by friends and relative. Information given by health care workers was only 7% among TB patients and in 3.9% in non-TB group. 49% of healthy respondents had no definite knowledge about Tuberculosis.

DISCUSSION:

Virtually all nations across the globe have a National Tuberculosis Program that takes a prime responsibility to control TB. Though information related to TB transmission and its prevention is a basic element for the disease control, it is not clear that how much Pakistani population have correct information about TB.Prior studies have been conducted published regarding the evaluation of the National TB Control Program in Pakistan analyzing different parameters.[12-14] This Case Control study aimed to find out the gap in information regarding tuberculosis infection despite the implications of National TB control efforts in Pakistan. 100 TB cases and 155 non-TB healthy participants were interviewed to observe the difference of information regarding tuberculosis infection. Non-TB group were matched in terms of age and gender however, most of the TB Group patients had low monthly household income and were uneducated as compared to the non-TB group. Monthly household income and educational status worked as a proxy for the socio-demographic status as poverty deprives people from the basic social determinants of health like nutrition, housing, education and so on.[15] It is an established fact now that tuberculosis and poverty are mutually related[15-17] and our results came out to be parallel to this fact. Moreover, 38% of cases and 20% controls had a positive family history of tuberculosis. Shamu et al. in 2019 reported that participants having a TB patient in the family had better understanding of TB infection and treatment.[18] To some extent our findings were analogous as more than half participants from the TB group reported that their source of information are TB patients.

Significant number in non-TB group knew that TB infected person can spread the disease than the cases, however, very few believed that TB can spread through air. The difference was insignificant among both groups. On the contrary, a recent study done in Khyber Pakhtunkhwa (KPK)-Pakistan, widely held responses were in affirmation that TB is spread through "the air," followed by "coughing or sneezing by TB patients".[6] This revealed the fact that our study population had inadequate knowledge regarding the mode of transmission of pulmonary TB. Myths and falls believe raised as a result of such inadequate information often cradle complications in fighting TB stigma.[19] Moreover, having a contagious ailment, TB patients suffer social isolation at the time when they need more care and support of their family.[20]

Pakistan, being a developing nation, is fighting against malnutrition which is a complex, multisectoral issue and has a bidirectional relationship with tuberculosis.[21,22] Khalid et al. reported that TB patients in Pakistan were twice as likely to be malnourished than the healthy group.[23] TB group patients of the current study belonged to low socio-economic

Table 1: Descriptive of the participants (N=255)

Variables		Non-TB Group? (n, %) (n = 155)	TB Group (n, %) (n = 100)	AORΦ	95% C.I. for AOR		P- Value
					Lower	Upper	
Age in Years	> 30	21 (13.5)	15 (15.0)	0.534	0.242	1.176	0.119
	< 30	134 (86.5)	85 (85.0)				
Gender	Male	79 (51.0)	49 (49.0)	1.110	0.633	1.947	0.716
	Female	76 (49.0)	51 (51.0)				
Education	No education	36 (23.2)	37 (37.0)	0.520	0.281	0.947	0.038
	Educated*	119 (76.8)	63 (63.0)				
Household Income	<30,000	104 (67.1)	86 (86.0)	0.301	0.149	0.608	0.001
	>30,000	51 (32.9)	14 (14.0)				
Family history of TB	Yes	31 (20.0)	38 (38.0)	0.402	0.223	0.725	0.002
	No	124 (80.0)	62 (62.0)				

*Taken as the reference category; ΦAdjusted Odds Ratio; *Any level of formal education*
Mean SD controls = 41.58 11.44 years, Mean SD Cases 43.61 13.45 years (P = 0.198

Table 2: Perception about TB disease

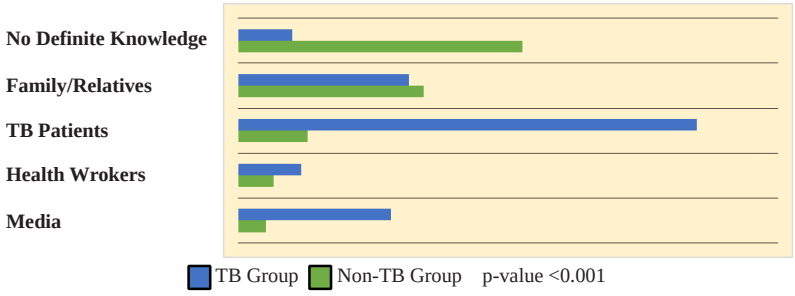
Variables	Non-TB Group? (n, %) (n = 155)	TB Group (n, %) (n = 100)	AORΦ	95% C.I. for EXP (B) Lower	Upper	P- Value
Do you think TB is caused by an Infective Person?						
Yes	145 (93.5)	82 (82.0)	4.776	1.575	14.428	0.006
No	10 (6.5)	18 (18.0)				
Do you think TB can spread through air?						
Yes	27 (17.4)	10 (10.0)	1.498	0.550	4.082	0.429
No	128 (82.6)	90 (90.0)				
Is malnourishment a risk factor of TB?						
Yes	48 (31.0)	72 (72.0)	0.301	0.140	0.646	0.002
No	107 (69.0)	28 (28.0)				
Do you think cigarette smoking is a risk factor?						
Yes	29 (18.7)	16 (16.0)	0.776	0.326	1.846	0.566
No	126 (81.3)	84 (84.0)				
Is substance abuse a risk factor of TB?						
Yes	9 (5.8)	7 (7.0)	1.256	0.322	4.899	0.742
No	146 (94.2)	93 (93.0)				
Do you think indoor air pollution is a risk factor of TB?						
Yes	28 (18.1)	20 (20.0)	0.750	0.335	1.677	0.483
No	127 (81.9)	80 (80.0)				
Do you think overcrowding is a risk factor of TB?						
Yes	55 (35.5)	32 (32.0)	0.805	0.412	1.575	0.527
No	100 (64.5)	68 (68.0)				
Do you think multiple households is a risk factor of TB?						

Taken as reference category; ?Adjusted Odds Ratio

Table 3: Perception about TB treatment

Variables		Non-TB Group? (n, %)	TB Group (n, %)	P- Value
Is TB curable?	Yes	90 (58.1)	78 (78.0)	<0.001
	No	65 (41.9)	22 (22.0)	
Is TB preventable?	Yes	26 (16.8)	16 (16.0)	1.00
	No	129 (83.2)	84 (84.0)	
Does TB infection need a prolong treatment?	Yes	82 (52.9)	55 (55.0)	0.797
	No	73 (47.1)	45 (45.0)	
Is TB treatment costly?	Yes	27 (17.4)	5 (5.0)	0.003
	No	128 (82.6)	95 (95.0)	
Do you know about government based free of cost TB centers?	Yes	17 (11.0)	11 (11.0)	1.00
	No	138 (89.0)	89 (89.0)	

Figure 1: Source of knowledge about TB Disease N=255



status and therefore might be malnourished as well as, we did not evaluate the physical status of the participants. This may explain our result that TB patients were more aware than the healthy respondents that malnutrition is a risk factor of TB.

Whether substance abuse and cigarette smoking are risk factors of pulmonary tuberculosis-the results produced were analogous. Very few of the respondents agreed - explaining the lack of information among both the groups. Wang et al. identified smoking as an important risk factor to develop pulmonary TB.[24] A meta-analysis also concluded that cigarette smoking had a detrimental effect on TB eradication efforts.[25] It has also been reported earlier that injectable drug use, alcohol addiction and cigarette smoking lead to missed doses and treatment default.[9]

Social determinants of tuberculosis like increasing age, poverty, cigarette smoking and crowded houses are major contributing factors to TB infection. [24] When this study participants were asked whether multiple house hold is risk factor of TB, there was huge information deficit among the cohorts. Only 35% among the non-TB group were aware while 98% of cases did not see multiple households as a risk factor of TB. Moreover, respondents were uncertain regarding the effects of diabetes on TB occurrence and treatment nonetheless, diabetes had been reported to be highly associated with tuberculosis previously.[23]

On the one hand, pulmonary tuberculosis was recognized as a curable disease by majority of cases which was significantly different from non-TB group of this study. On the other hand, results showed that about 31% from non-TB group and 6% from TB group had poor knowledge regarding this aliment and not having any definite knowledge about TB prevention. On the contrary, 96% participants of a recent study in Khyber Pakhtunkhwa believed that TB is curable. This study also reported various responses regarding prevention from Pulmonary Tuberculosis and that only 14% had no or very little knowledge of TB.[6] Similarly, vast majority among both of our study groups did not know about government based free TB treatment centers. They relied on tertiary care public hospitals and therefore did not take the treatment costly. This may not only elevate hospital workload but also the risk of disease infectivity. TB treatment drugs do not impose any fiscal burden on patients however, losing job due to TB though being the only breadwinner of the house are the factors that leads to treatment default.[8]

TB centers are not supposed to provide diagnostic and treatment services only but, they are bound to deliver appropriate information to TB cases about the disease infectivity, progression and outcome. They have to keep the patient motivated for treatment continuation as well.[1,2] Unfortunately, more than half among TB group gained knowledge from other TB patients rather than the health care providers followed by friends/family and then media. On the other hand, 36% from non-TB group reported media was the main source of information, however, 31% among 36% from non-TB group while the 31% had no certain TB related knowledge and information. This explains the poor and inadequate understanding of the disease.

"Advocacy, Communication and Social Mobilization to fight TB (ACSM)" is a framework that focuses on the key barriers deemed to TB care and treatment completion. This framework raised the number of sputum examination and early detection of TB in India.[16] NTP has been working in collaboration with the community-based organizations and the civil society for which a strong group effort is needed in the domain of communication network. Evidence suggest that progress has been made deemed to the Stop TB Strategy Program in Pakistan on national and provincial level.[11] However, study findings revealed the gap in communication strategies and there is a need to do a lot in the realm of communication through which health care providers might play an imperial role to defeat the deeply rooted false believes, enhance public awareness regarding TB infectivity, associated risk factors, occurrence and treatment outcome, availability of TB centers, hazards of non-adherence and treatment default and so on. Simultaneously, NTP shall utilize all forms media for general and proper information as advocacy and communication have all the potentials to close the gap in this disease cascade. Moreover, TB related stigma in community can also be reduced, since patients of TB are usually unseen as deviating from any social norms that may single them out for stigmatization.

The limitations of study has the potential of selection bias as both TB and non-TB groups were recruited exclusively from the hospital. Diversity among interviewers for different participants of both groups might have influenced the interviewer's questioning consistency. Also, truthfulness of the participants' responses remains difficult due to recall bias, especially for the perceptions related questions. However, these issues were considered to our best by increasing the number of participants of non-TB (control) group to increase the statistical power of the study. Besides, strict supervision of the data collection process, extensive training of the data collectors was done and instructed them not to ask leading questions.

CONCLUSION:

The overall elementary information of TB remained low and appeared to significantly vary by socio-demographic status among both groups. It has been observed that health care workers had least role in providing general information especially to TB patients.

Authors Contribution:
Farhan Muhammad Qureshi: Conceived, designed and responsible for integrity and accuracy of the work. Did data collection and editing and final approval of the manuscript
Samira Faiz: Conceived, designed and responsible for integrity and accuracy of the work. Did data collection and editing and final approval of the manuscript
Ayesha Khalid: Manuscript writing, data collection, statistical analysis and interpretation of data

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Original Article **Open Access**

Knowledge of Self-Monitoring of Blood Glucose and the Degree of Self Titration of Anti-Diabetic Drugs in Rawalakot Azad Jammu and Kashmir

Mehwish Fayaz, Abid Hussain, Izhar Ullah, Imran Ahmad, Imran Rabbani

ABSTRACT

Objectives: In the context of managing diabetes mellitus, self-blood glucose monitoring is crucial. While self-blood glucose monitoring, all instructions must be followed, and keeping record is crucial to help the doctor titrate the medications and dosages of anti-diabetes medicines. Furthermore, it is important to prevent patients from self-titrating after self-monitoring of blood glucose.

The aim of the study is to evaluate the knowledge and practice of self-blood glucose monitoring among diabetes patients as well as the level of self-titration of anti-diabetic medications among diabetes patients.

Study design and setting: This cross-sectional community based research was conducted in Rawalakot (Azad Jammu & Kashmir) from December 2021 to June 2022.

Methodology: A validated questionnaire was filled by 171 adult male and female diabetes patients who self-monitored their blood sugar levels at home. Patients with diabetic complications and those with juvenile diabetes were excluded from the study.

Results: Only 46 (26.9%) of the 171 patients reported knowing about and correctly implementing self-blood glucose monitoring. 125 patients (73.1%) lacked the necessary information and did not accurately monitor self-blood glucose. On the basis of self-monitoring, 111 people (64.9 percent) acknowledged that they self-titrate their anti-diabetic medications.

Conclusion: Blood glucose self-monitoring should be promoted, and patients should be instructed by a doctor or diabetes educator on the significance of following the correct procedures of doing the self-monitoring of glucose.

Keywords: Blood Glucose Self-Monitoring, Diabetes Complications, Diabetes Mellitus, Hypoglycemia

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INTRODUCTION:

The rise in the prevalence of metabolic syndrome, which includes diabetes, dyslipidemia, and hypertension, is the result of the epidemiologic shift, urbanization, and changes in lifestyle and dietary habits.[1] In another ten years, Pakistan is expected to have the highest diabetes prevalence in the world. By 2025, it is predicted that Pakistan would have over 70 million diabetics. The South East Asian continent has a higher rate of diabetes morbidity and death than the rest of the globe.[2] According to current World Health Organization (WHO) research, this kind of diabetes, which was previously exclusively seen in adults, is now increasingly showing up in children. The incidence of diabetes has been steadily increasing over the last 30 years, with the fastest increase occurring in low- and middle-income nations. T2DM is said to manifest early in children, perhaps as a result of contemporary lifestyle changes.[3] According to estimates from the International Diabetes Federation (IDF), there will be 425 million adults worldwide who have diabetes in 2017. (IDF). With a 9.2 percent prevalence, diabetes is the second most common disease in the MENA region of the IDF. Between 2017 and 2045, the number of persons with diabetes is predicted to increase by 110 percent in the MENA region, reaching 629 million worldwide.[4] In 2017, 10.7% of adult patients died from diabetes-related causes (20-79 years). Managing diabetes in our community is

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difficult due to a number of problems, including insufficient self-care in diabetes, periodic follow-up, adherence to medication, foot care, and frequent monitoring of patient glycemic level.[5] An essential component of diabetic self-care is glucose self-monitoring. Self-monitoring for diabetes and hypertension is increasing in Pakistan as a result of broad media advisories. Self-blood glucose monitoring must be carried out with great care. Patients must carefully execute it under the direction of doctors.[5] Every time self-monitoring is done, all the suggested stages for blood glucose monitoring must be followed. Self-blood glucose monitoring errors occur when it is not done carefully.[6] Since the only information on the understanding and use of self-blood glucose monitoring by diabetic patients comes from the west, it is necessary to evaluate SBGM usage among our community. Additionally, it is very unusual for patients to alter their medication dosage by missing or taking extra tablets in accordance with SBGM, which may cause disrupted glycemic control and potentially have life-threatening consequences like hypoglycemia.[7]

One of the key factors cited for the aforementioned statement is that our population is less aware of and less likely to practice self-care for diabetes than the west. This is significant for diabetes management because self-care is a personal tool for managing diabetes and achieving a high quality of life.[8]

METHODOLOGY:

The aim of the study was to evaluate the level of self-titration of anti-diabetic medications among diabetes patients based on self-blood glucose monitoring as well as the knowledge and practice of self-blood glucose monitoring among diabetes patients. This cross-sectional community-based research randomly sampled 171 adult male and female diabetes patients in Rawalakot, Azad Jammu & Kashmir, from December 2021 to June 2022.

Data was collected by using a well-designed questionnaire that was approved by experts in pharmacology, general medicine, and biostatistics. To validate the questionnaire, Cronbach's alpha was determined, which was 0.81. Diabetes patients who choose to take part in the study completed an informed consent form upon reading the information page and obtaining additional explanation after gaining IRB permission. Their demographic information and diabetes history were documented. The procedure included the patient responding to a series of questions about independently monitoring their blood glucose that was posed by the investigator, with their responses being logged. Consequently, our patients received accurate information on self-blood glucose monitoring as well as the side effects of insulin and self-adjusting anti-diabetic medications.

Inclusion Criteria are Type II diabetes mellitus patients in their adult years, both male and female, who self-monitor their blood sugar levels at home and are ready and willing to provide us with information. Exclusion Criteria are Diabetics with type I diabetes and acute complications in diabetic individuals.

The research approval was taken from The Faculty of Medical and Health Sciences, Department of D-Pharmacy's Review Board (No. UPR/o3/421/2021) On 7 Nov 2021.

Statistical Analysis: MS Excel was used to tabulate the data, and Statistical analysis was done using SPSS 17. Percentage and frequency were calculated for all variables. Cronbach's alpha test was run for statistical analysis.

RESULTS:

Our study included 171 patients with diabetes, of which only 46 (25.7%) demonstrated a sufficient understanding of self-monitoring of blood sugar and were practicing it correctly. The remaining 125 (73.1%) were not properly self-monitoring their blood sugar levels. Out of the 80 patients who received instruction on self-monitoring from their healthcare provider, 111 (64.9%) admitted to skipping doses or adjusting their insulin dosage without medical supervision. Despite this, a total of 145 patients (84.8%) reported being able to recognize the symptoms of hypoglycemia. However, only 46 patients (26.9%) consistently tracked their blood sugar readings through self-monitoring. The percentages of other responses from the participants are listed in Table/Figure 1.

DISCUSSION:

The purpose of this study was to assess the extent to which individuals with diabetes are knowledgeable about self-monitoring of blood glucose (SMBG) and are implementing proper precautions related to SMBG. In addition, we sought to determine the extent to which patients with diabetes self-adjust their anti-diabetic medications based on their own SMBG results. By evaluating these factors, we aimed to improve the self-management skills of diabetic patients and ultimately improve their glycemic control.

In order to effectively self-monitor blood glucose (SBGM), it is important that patients are properly trained and equipped with a validated instrument. However, our research found that approximately half of the patients in our study received education on SBGM from sources other than healthcare providers, such as paramedics, acquaintances, and family members. It is crucial that patients receive proper instruction from doctors or other qualified healthcare professionals to ensure accurate and safe SBGM practices. In addition, it is important to store SBGM equipment away from direct sunlight and to thoroughly clean and dry hands before performing the procedure. Our research also revealed that a significant proportion of the study population did not follow these guidelines, similar to the findings of a previous study conducted in the eastern region of India by Choudhury et al.[12] To ensure accuracy, it is recommended to use a different finger or location for each SBGM measurement and to avoid using the index and thumb. While the outer

Table 1: Responses were provided by a total of 171 participants about blood glucose self-monitoring.

Questions Asked	YES	NO
Do you regularly monitor yourself for diabetes?	99 57.9%	64 42.1%
Did you follow your doctor's advise and purchase a monitoring instrument?	103 60.3%	68 39.7%
Have you ever had a doctor explain how to self-monitor at least once?	80 46.8%	91 53.2%
Do you wash and dry your hands before taking measurements?	63 36.8%	108 63.2%
Do you blow air on your hand to dry it before taking a measurement?	104 60.8%	67 39.2%
Do you consistently prick the same finger?	75 43.9%	96 56.1%
Do you gauge the level using the first fingertip blood drop?	111 64.9 %	60 35.1%
After one use, do you discard the lancet away?	108 63.2%	63 36.8%
Do you routinely keep track of your blood sugar readings till you see a doctor?	46 26.9%	125 73.1%
After checking your blood sugar on your own, do you skip or take additional medication before seeing a doctor?	104 60.4%	67 39.2%
Do you modify the dosage of your insulin or medications after conducting your own blood sugar checks before consulting a doctor?	111 64.9%	60 35.1%
Are you familiar with the name and dosage of your diabetic medication?	116 74.3%	44 25.7%
Do you know the common side effects of your diabetes medications?	120 70.2%	51 29.8%
Can you identify hypoglycemic symptoms?	145 84.8%	26 15.2%
Have You ever had symptoms of hypoglycemia?	98 57.3%	73 42.7%

palm can also be a suitable site for measurement, locations such as the thighs should be avoided. It is important to use a new lancet for each prick and to retain the second drop of blood in the canister, applying gentle pressure to the sides. Lancets should be properly disposed of using a hard plastic cover.[13]

One of the main findings of our study was that, while many diabetic patients self-adjust their regular insulin or oral anti-diabetic medications, a significant proportion are able to recognize the symptoms of hypoglycemia and are familiar with the brand names and common side effects of their medications. However, patients often cited difficulty in reaching a healthcare provider and busy schedules as reasons for self-titration. It is important to note that self-monitoring of blood glucose (SBGM) using venous blood may not always be accurate and can result in significant variations in results. While a 20% difference may be acceptable for monitoring purposes, it is never appropriate to adjust medication without first consulting a healthcare provider. Patients with diabetes should be made aware of the potential risks of hypoglycemia associated with self-titration. It is essential that patients receive proper education and support to ensure safe and effective management of their diabetes.[14,15,16]

It is well-known that a significant proportion of individuals with diabetes are asymptomatic and may go undiagnosed for a prolonged period of time before receiving treatment. Regular self-monitoring of blood glucose (SMBG) and proper management of diabetes can help prevent the development of microvascular and macrovascular complications.[9,10] Serial monitoring of blood glucose levels can also aid in the adjustment of anti-diabetic medications

and alert patients and healthcare providers to dangerous fluctuations in blood sugar levels.[8] However, our research found that only 24.1% of patients fully adhere to all key stages of SMBG, with the remaining individuals skipping one or more important steps. This rate of adherence is lower than that observed in Western populations, where over 60% of patients typically adhere to SMBG guidelines. These findings suggest that there is a need for increased education and understanding of the importance of SMBG in our study population.[11]

Another significant finding of our study was the low number of patients who regularly track their blood sugar levels and the lack of a consistent practice of doing so. Many patients do not start monitoring their blood sugar until they meet with a healthcare provider, and very few bring their self-monitoring of blood glucose (SMBG) instrument to their doctor or diabetes counselor for evaluation and calibration. [17] It is important for healthcare institutions to have dedicated diabetes counselors on staff who can provide education and support on SMBG to patients, as well as promote self-care for diabetes management. These counselors can play a crucial role in helping patients develop the skills and habits necessary for effective self-management of their diabetes. [18,19]

In Rawalakot, Azad Jammu and Kashmir, knowledge of SMBG and the degree of self-titration of anti-diabetic drugs may vary among individuals with diabetes. Some may have a good understanding of their condition and how to manage it, while others may be less knowledgeable. It is important for healthcare professionals in Rawalakot to provide education and support to individuals with diabetes to help them better understand their condition and how to effectively manage it through SMBG and self-titration of medications. This can help improve outcomes and quality of life for people with diabetes in Rawalakot and the surrounding area.

The American Diabetes Association and the Canadian Diabetes Society both have established guidelines for self-monitoring of blood glucose, which doctors should impart to their patients. It is essential that doctors educate their patients on these guidelines to ensure proper self-monitoring of blood sugar and effective diabetes management. These guidelines provide important recommendations for both healthcare providers and patients, which are mentioned below.[17,20]

Recommendations: As a physician, it's important to provide clear guidelines to your patients who are engaging in self-blood-glucose monitoring. First and foremost, encourage your patient to invest in a validated self-testing device. This will ensure that their results are accurate and reliable. Additionally, it's crucial to give your patient a hands-on demonstration of the self-monitoring procedures, so they understand how to properly use the device. It's important to specify the frequency and timing of self-monitoring as these may vary depending on the patient's diabetes profile. Encourage your patients to keep track of their glucose readings and bring these records to their next appointment. However, it's also important to caution them about the potential negative consequences of self-adjusting their diabetic medication without consulting a healthcare professional.

As a patient, it's important to follow certain recommendations when self-checking your blood glucose levels. Firstly, it's advisable to purchase a validated instrument only after consulting with your doctor, who will also provide instruction on how to perform self-blood-glucose monitoring (SBGM). Your doctor can also advise you on the frequency and timing of SBGM that is best suited to your needs. To ensure accurate results, it's important to wash your hands with plain water before self-monitoring and let them air dry. Each time you perform SBGM, use a sterile lancet and make sure to puncture your fingertip or outer palm. Use the second drop of blood for testing and avoid the first drop. After capping the lancet, dispose of it gently. It's also important to keep a journal to record your blood sugar levels after each puncture, and to bring this journal with you when you visit your doctor. However, it's important to note that instruments may sometimes produce inaccurate results. If you notice any aberrant numbers, speak with your doctor as soon as possible to determine if an instrumental mistake has occurred. Finally, it's crucial to never adjust your medication without consulting your doctor and to always bring your SBGM machine with you when travelling.

CONCLUSION:

Self-monitoring of blood glucose (SMBG) is a crucial aspect of diabetes management. It involves regularly measuring and recording the concentration of glucose in the blood using a portable device called a glucose meter. SMBG is important for individuals with diabetes because it allows them to make adjustments to their diet, physical activity, and medication regimen in order to maintain optimal blood glucose control and prevent short-term and long-term complications. Proper education and instruction on SMBG is essential for individuals with diabetes. Effective self-monitoring of blood glucose can help individuals with diabetes to better understand their condition and make informed decisions about their care. It is also an important component of self-titration, which refers to the process of adjusting the dosage of medication based on the results of SMBG. By adjusting their medication dosage as needed, individuals with diabetes can maintain optimal blood glucose control and improve their overall outcomes and quality of life.

List of abbreviations:

IDF: International Diabetes Federation
MENA: Middle East and North Africa
SBMG: Self-blood glucose monitoring
T2DM: Type 2 diabetes mellitus
WHO: World Health Organization

Authors Contribution:
Mehwish Fayaz: Conduct the whole research (including research design, data collection, data analysis and paper writing)
Abid Hussain: Data drafting
Izhar Ullah: Data Interpretation
Imran Ahmad: Data Collection
Imran Rabbani: Data Collection

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Original Article **Open Access**

Anxiety and Depression among Medical Students of Karachi During the Covid-19 Pandemic

Sannia Perwaiz Iqbal, Navaid Siddiqui, Faryal Gul, Sajid Abbass Jaffri

ABSTRACT

Objective: To determine the prevalence of anxiety and depression among medical students of Bahria University Health Sciences (BUHS)

Study Design and Setting: Cross-Sectional survey conducted from January to June 2021 at BUHS, Karachi

Methodology: Two hundred and sixty one medical students (79 male and 182 female), were assessed for anxiety and depression using Generalised Anxiety Disorder 7 (GAD-7) and Patient Health Questionnaire 9 (PHQ-9) respectively. Chi Square test was used to check the association of anxiety and depression with gender and year of study. P-value =0.05 was considered significant.

Results: Out of 261 participants, 76.8% of medical students had anxiety. Among them 21.1% had mild, 24.5% had moderate and 27.2% had severe anxiety. 83.5% of students had depression, of which 24.9% met the criteria for mild, 20.7% for moderate, 21.1% for moderate-severe and 16.9% students for severe depression. Chi Square test indicated significant associations between anxiety and gender, with 29.7% of female students having severe anxiety as compared to 21.5% of male students; and between depression and gender, with 24.1% male students having moderate depression as compared to 19.2% of female students.

Both depression and anxiety were more prevalent among first year students with 31.7% students having depression and 27.5% having anxiety.

Conclusion: Anxiety and depression were more prevalent among first year students with anxiety being more prevalent in female and depression being more prevalent in male students.

Keywords: Anxiety, COVID-19, depression, medical students, pandemic,

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INTRODUCTION:

The COVID-19 pandemic has had a profound impact on healthcare systems. During the COVID-19 pandemic, psychiatric symptoms such as anxiety and depression have afflicted many people worldwide. A meta-analysis found the prevalence of anxiety in the general population to be 31.9 % and of depression to be 33.7% as a result of the COVID-19 pandemic.[1] Apart from the general public, certain populations are more susceptible to mental health problems during the pandemic which include the healthcare workers, college/ university students, people having suffered financial loss or loss of loved one due to the pandemic, and people with pre-existing mental health conditions.[2]

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Evidence emerged from all over the world, suggesting that the pandemic has triggered a wave of mental health issues among the younger population, with anxiety and depression becoming increasingly more prevalent among university students.

Studies show that the prevalence of stress, anxiety and depression among the student population was especially high during the pandemic. Medical students are particularly more prone to developing mental health disorders, the commonest of which are anxiety and depression. Quek et al reported a 33.8% global prevalence of anxiety among medical students.[3] In another meta-analysis, the overall prevalence of depression among medical students was estimated to be 27.2%.[4]

Anxiety and depression are significant mental health

conditions, common among medical students in Pakistan. However, very few students seek treatment, owing to the stigma related to mental health illness. A study from Pakistan found depression to be present in 37.46% among medical students with 14% of the students having with moderate to severe depression and 19% with haveing moderate to severe anxiety.[5] Another study conducted in Pakistan to assess the impact of COVID-19 on the mental health of university students, reported that around 34% of the students were suffering from anxiety whereas 45% were suffering from depression.[6]

Study from Bangladesh reported 44% of university students were suffering from severe anxiety while 48% suffered from moderate anxiety during the pandemic.[7] According to a study from the USA, during the COVID-19 pandemic major depressive disorder was prevalent among 35% of university students while generalized anxiety disorder was prevalent among 39% of university students.[8] A study conducted in China reported that 24.9% of the medical college students (aged 19–25 years) were experiencing heightened anxiety during the COVID-19 pandemic.[9]

During the recent pandemic, it can be expected that the mental health of our medical students has also been adversely affected. The first step to take here is to recognize these illnesses among our student population so that timely mental health support interventions can be offered. As the pandemic continues, it is imperative to recognize its impact on the mental health of our students and offer early interventions. The purpose of this study was to screen our medical students for depression and anxiety during the COVID-19 pandemic, so that these disorders could be promptly recognized and appropriate treatment could be offered along with ongoing strengthened mental and psychosocial support.

METHODOLOGY:

This study was conducted at the Bahria University Health Sciences, Karachi from January 2021 to July 2021 after obtaining ethical approval from the institutional review board committee. (Ref: ERC 37/2021).

The study design was a cross-sectional survey. Sample size was determined by the WHO software for sample size calculation. From literature review, we found that the prevalence of anxiety among university students during the COVID-19 pandemic was 34%.[7] Therefore, with 5% margin of error at 95% confidence level the sample size came out to be 261 participants. Our inclusion criteria was both male and female medical students (MBBS), from 1st, 2nd, 3rd, 4th and 5th year, who gave their consent to participate in the study. Students from dental and physical therapy department were excluded from the study. We approached 261 medical students through non-probability convenience sampling to participate in the study after explaining the purpose of this study and obtaining their informed consent. The questionnaire of the study was self-administered and comprised of three sections. The student's demographic details and questions regarding their experience of the COVID-19 pandemic were included in section one. Section two included the Generalized anxiety disorder scale (GAD-7)[10] and Section three included the Patient health questionnaire (PHQ-9).[11] Both GAD-7 and PHQ-9 are validated screening tools for anxiety and depression, respectively. Anxiety symptoms in our study were assessed using the seven-item Generalized Anxiety Disorder (GAD-7; range 0–21). The severity of symptoms of anxiety is interpreted as normal (0–4), mild (5–9), moderate (10–14), and severe (15–21) anxiety.[10] Depressive symptoms were assessed using the nine-item Patient Health Questionnaire (PHQ-9).[11] The total score range is 0–27 and is interpreted as normal (0–4), mild (5–9), moderate (10–14), moderately severe (15–21) and severe (22-27) depression. Data were entered and analyzed in SPSS@ version 23. Frequencies with percentages were reported for baseline characteristics of students, while means with standard deviation were the parameters provided for age, GAD-7 and PHQ-9 scores. Pearson Chi Square test was used to check the association of anxiety and depression with gender and year of study. P-values less than 0.05 were considered statistically significant. Bar diagram and pie chart were also used to give graphical presentation of GAD-7 and PHQ-9 outcomes respectively.

RESULTS:

In the present study there were two hundred and sixty-one (261) students of which 69.7% were females. On average, 46% students participated from first year of medicine. Mean age of students was 21.02 (SD=±`2.1) years. Out of all the recruited students, 77.4% students agreed that the COVID-19 pandemic had affected their mental health, 5% had suffered from COVID-19 symptoms, 10.7% had history of testing positive for COVID-19. Moreover, 4.2% had tested positive for COVID-19 antibodies, 58.2% reported that someone close to them had been infected with COVID-19, 27.2% of the students reported that someone close to them had died due to the COVID-19 illness, and 8.4% reported having had direct contact with someone who became infected with COVID-19. Regarding prior history, 21.1% said they had history of being diagnosed with depression or anxiety disorder, while 5% had prior history of smoking. (Table-1)

In the present study, 76.8% students were diagnosed with anxiety, and among them 21.1% (n= 55) had mild, 24.5% had moderate and 27.2% were found to have severe level of anxiety. The mean score of GAD-7 was 10.0 (SD=±6.47) units on average.

Graphical representation GAD-7 outcomes is indicated by the Pie chart diagram given below.

Figure 1. Pie chart given below indicates the graphical representation. In our study, 83.5% students were diagnosed with depression and among them 24.9% were suffering from mild depression, 20.7% were suffering from moderate

depression, 21.1% suffered from moderate to severe depression while 16.9% students were found to have severe depression. The mean PHQ-9 score of students was 11.98 (SD=±6.95) units on average.

Figure 2. Bar chart diagram given below indicates the outcomes of PHQ-9. The association of anxiety and depression with respect to gender is reported in Table-2.

In our study, among male students, 21.5% were found to have severe anxiety, 13.9% had moderate anxiety and 19.1% had had mild anxiety. With regards to depression, mild depression was found in 21.5%, moderate depression in 24.1%,moderately severe depression in 8.9% and severe depression in 13.9% of male students respectively.

Among female students, 29.7% were suffering from severe anxiety, 29.1% were suffering from moderate, while 22% had mild anxiety. Regarding depression among female students, 26.4% had mild depression, 19.2% had moderate depression, 26.4% had moderately-severe, while 18.1% had severe depression. Pearson Chi Square test showed significant association of anxiety and depression with gender with $p<0.01$

The association of anxiety and depression with respect to students' year of study is reported in Table-3. According to the findings, 27.5% students from 1st year, 19.2% of students from 2nd year, 11.8% from 3rd year, 17.6% from 4th year and 14.1% from 5th year were suffering from mild anxiety. 21.7% students from 1st year, 38.5% of students from 2nd year, 17.6% from 3rd year, 17.6% from 4th year and 20.6% from 5th year were suffering from mild anxiety, 27.5% students from 1st year, 19.2% of students from 2nd year, 11.8% from 3rd year, 17.6% from 4th year and 28.1% from 5th year were suffering from moderate anxiety, whereas 15.8% from 1st year , 34.6% from 2nd year, 17.6% from 3rd year, 20.6% from 4th year, and 28.1% from 5th year were found to have severe anxiety. A significant association was observed between anxiety and year of study. (p=0.008).

Similarly, in the first year of medicine, there were 31.7% students whereas 7.7% students from 2nd year, 29.4% from 3rd year, 23.5% from 4th year and 18.8% students from 5th year suffering from mild depression. 17.5% students from 1st year, 26.9% of students from 2nd year, 23.5% from 3rd year, 17.6% from 4th year and 23.4% from 5th year were suffering from moderate depression. Moderate-severe depression was found in 13.3% students from 1st year, 42.3% from 2nd year, 23.5% from 3rd year, 20.6% from 4th year, and 26.6% from 5th year were found to have severe anxiety. 13.3% students from 1st year, 19.2% of students from 2nd year, 11.8% from 3rd year, 20.6% from 4th year and 28.1% from 5th year were suffering from severe depression. 13.3% from 1st year , 15.4% from 2nd year, 5.9% from 3rd year, 20.6% from 4th year, and 21.9% from 5th year were found to have severe depression. Pearson Chi Square test showed a significant association of depression with year of study (p=0.012).

DISCUSSION:

The COVID-19 pandemic affected millions of people across the globe, especially healthcare workers and doctors in training, bearing the burden of affected patients and sustaining themselves during these difficult times. Our study sheds light on how the COVID-19 pandemic has negatively

Table 1: Baseline Characteristics of Studied Samples (n=261)

Characteristics		n	%
Gender	Male	79	30.3
	Female	182	69.7
Year of Study	1st year	120	46.0
	2nd year	26	10.0
	3rd year	17	6.5
	4th year	34	13.0
	5th year	64	24.5
Age (years)	Mean (±SD)	21.02	SD= ±2.1
Has your mental health been affected by the COVID-19 pandemic?	Yes	202	77.4
Do you currently suffer from any COVID-19 symptoms?	Yes	13	5.0
Have you ever tested positive for COVID-19?	Yes	28	10.7
Have you ever tested positive for COVID-19 antibodies?	Yes	11	4.2
Has someone close to you been infected with COVID- 19?	Yes	152	58.2
Has a person close to you died in the course of a COVID-19 disease?	Yes	71	27.2
Have any of the people with whom you had direct contact in the past two weeks become infected with COVID-19?	Yes	22	8.4
Have you ever been diagnosed by a doctor or therapist with depression or anxiety disorder?	Yes	55	21.1
Do you smoke?	Yes	13	5.0

Figure 1: Anxiety Using GAD-7

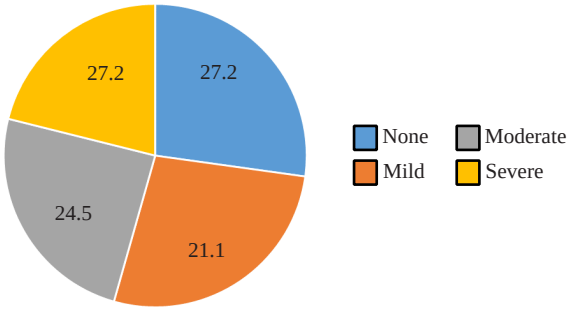

Figure 2: Depression using PHQ-9

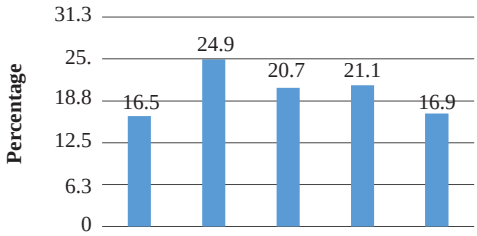

Table 2: Association of Depression and Anxiety with Gender

Outcomes		Male		Female		p-value
Anxiety	None	36	(45.6)	35	(19.2)	<0.01*
	Mild	15	(19.0)	40	(22.0)	
	Moderate	11	(13.9)	53	(29.1)	
	Severe	17	(21.5)	54	(29.7)	
Depression	None (0 - 4)	25	(31.6)	18	(9.9)	<0.01*
	Mild (5 - 9)	17	(21.5)	48	(26.4)	
	Moderate (10 -1 4)	19	(24.1)	35	(19.2)	
	Moderately severe (15 - 19)	7	(8.9)	48	(26.4)	
	Severe (20 - 27)	11	(13.9)	33	(18.1)	

*p<0.05 was considered significant using Pearson Chi Square test

Table 3: Association of Anxiety and Depression with year of Study

Outcomes		Year of Study										p-value
		1st Year		2nd Year		3rd Year		4th Year		5th Year		
		n	%	n	%	n	%	n	%	n	%	
Anxiety	None	42	35.0	2	7.7	6	35.3	7	20.6	14	21.9	0.008*
	Mild	33	27.5	5	19.2	2	11.8	6	17.6	9	14.1	
	Moderate	26	21.7	10	38.5	3	17.6	7	20.6	18	28.1	
	Severe	19	15.8	9	34.6	6	35.3	14	41.2	23	35.9	
Depression	None (score 0 - 4)	29	24.2	2	7.7	3	17.6	3	8.8	6	9.4	0.012*
	Mild (5 - 9)	38	31.7	2	7.7	5	29.4	8	23.5	12	18.8	
	Moderate (10 -1 4)	21	17.5	7	26.9	4	23.5	7	20.6	15	23.4	
	Moderate-severe (15 - 19)	16	13.3	11	42.3	4	23.5	7	20.6	17	26.6	
	Severe (20 - 27)	16	13.3	4	15.4	1	5.9	9	26.5	14	21.9	

*p<0.05 was considered significant using Pearson Chi Square test

impacted the mental health of our medical student population.

The reported prevalence of anxiety and depression in our study was 76.8% and 83.5%, respectively. Similar studies carried out in Pakistan and all over the world also reported high prevalence of anxiety and depression during the COVID-19 pandemic among medical students. [11-15]

Imran N et al, conducted a study among medical students of Pakistan and reported that 48.6% and 48.1%, were suffering from anxiety and depression, respectively. Alarmingly, 8% of students had even thought of committing suicide. Female medical students, and those with a prior history of anxiety and depression were found to be more at risk.[12]

Halperin et al conducted a study across 40 US medical colleges and found that during the initial wave of the pandemic, 30.6% students suffered from anxiety while 24.3 % were suffering from depression. They also concluded that these results were significantly higher for anxiety and depression during the pandemic when compared to earlier studies carried out among medical students.[13]

In an Iranian study, 38.1% prevalence of mild to severe anxiety and 27.6% prevalence of depression among medical students was reported. Female gender, lower grade point average (GPA) and having a past history of COVID-19 illness were related to higher rates of anxiety and depression among the student population.[14]

In a Jordanian study, the most concerning scenario for majority of medical students (66%) was the fear of infecting their family members as a result of higher risk of exposure of medical students to the disease. Students also expressed

significant distress regarding their tuition fee payment, owing to the reduction of income sources as a result of the financial impact of the pandemic. Others had found adapting to new online teaching methods to be quite challenging, thus expressed significant worry and felt lacking behind their peers, an additional contributor to their stress and worry. A vast majority of students (73.1%) reported that they could not exercise or attend any physical fitness sessions during the pandemic, which has long been considered the most effective non-pharmacological therapy among students to alleviate negative emotions. Students reported to practicing their hobbies, using social media apps, video chats, and cooking as ways to possibly counter their stress and worry.[15]

Saddik et al, found heightened anxiety among medical students and non-medical university female students of United Arab Emirates during the COVID-19 pandemic which significantly decreased for both groups after switching to online learning.[16]

Our study results showed that anxiety was more prevalent among female students as 29.7% of female students had severe anxiety as compared to 21.5% of male students with severe anxiety (P<0.01).

These findings are in agreement with many studies in which female gender was associated with higher anxiety rates. [15]

On the other hand, depression was found to be more prevalent among male students with 24.1% male students suffering from moderate depression compared opposed to 19.2% of female students (P<0.01). These findings are in agreement with Gao et al [17], but opposing results have also been reported in some studies who reported female students to be more depressed. [12-15.]

Higher anxiety and depression rates was seen among first year medical students in our study.

These findings are in line with the results of similar studies, who also reported pre-clinical students to be more anxious and depressed during the pandemic. [12-15]

In another study conducted in Pakistan, excessive social media usage was associated with higher prevalence of depression reporting that more than three-fourths (69%) of medical students were suffering from depression. Medical students belonging to middle and lower socioeconomic class had higher odds of screening positive for depression. Physical inactivity, obesity, comorbidities and multiple chronic diseases, disturbed sleeping and dietary habits, female gender, smoking, substance abuse, inability to cope with online learning and to social restrictions imposed by higher authorities, fear and uncertainty during the lockdown, were factors positively related to greater depression among students. [18]

According to a recent meta-analysis, the major risk factors of depression in medical students during the pandemic were young age, being female, being junior or preclinical student, having experienced COVID-19, academic stress, poor social support, loneliness, past history of psychiatric or physical disorders, financial distress, low physical activity, and problematic internet or smartphone use. [19]

Evidence suggests that medical students are already at higher risk of developing short- and long-term mental health problems as compared to the general public. However, this psycho-social impact is vastly under-reported [20]

The mental health consequences of the COVID-19 pandemic are a cause of great concern and require timely intervention to prevent any adverse long-lasting effects on the mental health of our medical students. Psychologically distressing symptoms such as anxiety and depression can adversely affect the thinking capacity and the clinical decision making process among medical students who are our future health care professionals. Moreover, extensive scrutiny and speculations by social media platforms impose further pressure upon the healthcare workers. Strengthened mental health support should be provided to all students, staff healthcare workers to better cater to their own, their family and professional needs. Health policy-makers also need to take effective measures to control and prevent mental health problems among those involved in diagnosing and treating patients with COVID-19.

The present study is among the few studies that have been carried out to assess depression and anxiety during the COVID-19 pandemic among medical students in Pakistan. After the study, small group sessions were carried out for medical students during their clinical rotation to discuss various strategies in combating anxiety and depression during this pandemic. In the session students shared their own experience of the COVID-19 pandemic, the difficulties they faced during the lockdown, and how it drastically affected their mental health. Mental health of students who had tested positive or had family members afflicted with COVID-19 were found to be most severely affected during this period. Many students shared that they had turned to religion and found it comforting with their measures they took and how it changed their lives. Students were asked to give feedback after the session. Majority of the students found the session to have a beneficial impact on their knowledge and attitudes regarding good mental health. However, our study has some limitations. The study is limited to only one medical university in Karachi so the findings may not be truly representative of all medical students in Pakistan. Another limitation is the small sample size of the study.

CONCLUSION:

The prevalence of anxiety (76%) and depression (83%) amid the pandemic were high among medical students. Both were more prevalent among first year students with anxiety being more prevalent in female students and depression being more prevalent in male students. This warrants the

consideration of easily accessible low-intensity mental health interventions during and beyond this pandemic.

Authors Contribution:
Sannia Perwaiz Iqbal: Conceived the research project and designed the manuscript. Also helped in data collection and prepared the manuscript for publication
Navaid Siddiqui: Helped design the questionnaire, assisted in data collection and analysis
Faryal Gul: Assisted in data collection
Sajid Abbass Jaffri: Helped guide the research proposal and approved the final manuscript.

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Original Article **Open Access**

Relationship of Occlusal Planes with Sella-Nasion and Frankfort Horizontal Planes in Different Skeletal Malocclusion. A Cephalometric Study

Hana Pervez, Anam Sattar, Sadia Shabbir, Marium Iqbal, Faiza Malik, Filza Gul

ABSTRACT

Objective: The objective of this study is to assess the relationship of anterior and posterior occlusal planes (AOP & POP) with Sella-Nasion (SN) and Frankfort Horizontal (FH) planes in different skeletal malocclusion.

Study Design and Setting: It was a cross-sectional study carried on 202 (40 males and 190 females) pretreatment lateral cephalogram of orthodontic patients of Jinnah Medical and Dental College, Karachi from June to September 2021.

Methodology: The sample was divided into different skeletal pattern using ANB angle (Class I ANB 0-4°, Class II ANB>4° and ANB Class III <0°). The AOP and POP measured with respect to SN and FH planes in each class. Two way ANOVA was used to determine the relationship of occlusal planes among skeletal malocclusions.

Results: 202 cephalogram, 40 males and 190 females were included in this study, out of which 102 (28 males and 102 females) were of class I, 88 (12 males and 76 females) were class II and 12 females were class III. Class II showed steeper SN-AOP and FH-POP than both Class I and Class III. There was statistically significant relationship between SN and AOP among all the three skeletal malocclusions ($p<0.005$) and FH-AOP in class I and II ($p>0.025$).While SN-POP and FH-POP were not statistically significant in all the three classes.

Conclusions: Class II malocculsion showed steeper SN-AOP and FH-POP than Class I and Class III. POP to SN and FH were flatter in Class III.

Keywords: Frankfort Horizontal plane, Occlusal plane, Sella-Nasion, Skeletal malocclusion.

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INTRODUCTION:

As the social norms have changed over the past decades, the number of people seeking orthodontic treatment has increased considerably. Camouflage orthodontic treatment is developing quickly, along with technology. As a result, the paradigm has changed, and instead of some disorders requiring surgical orthodontics, they can now be treated using camouflage orthodontics.

A more thorough investigation of the occlusal plane inclination as a diagnostic characteristic is required for more effective and efficient therapies as a result, making the strategy for determining the diagnosis, prognosis, and treatment plan more difficult. The aim of orthodontic treatment is not limited to aesthetics only but also aims to improve and maintain functional occlusion.

A thorough diagnosis of all stomatognathic system components is the cornerstone of an effective treatment for skeletal and Dentoalveolar defects, including achieving stable results over time.

In the stomatognathic and aesthetic dentofacial system, the occlusal plane is extremely important. The occlusal plane's shape and inclination are unique to each person. In both static and dynamic occlusion, the slope of the occlusal plane in relation to masticatory movements is a significant element.[1]

The identification of patients at risk of having functional complaints brought on by dental treatment and the development of an individualized treatment plan for each patient depend heavily on the determination of the upper posterior and anterior occlusal planes for a thorough diagnosis. The incisal smile arch of the maxillary incisors and the tip of the canine are both affected by the occlusal plane angle. The slope of the occlusal plane becomes a crucial factor in developing harmonious orofacial functions.[2]

The relationship between the inclination of the occlusal plane and the various skeletal profiles is well documented. Studies have found that Class II malocclusions presented with steeper occlusal planes while Class III malocclusions displayed flatter occlusal planes.[3-4]

The inclination of the occlusal plane is also associated with vertical divergence pattern.[5] Steeper occlusal plane inclinations are found in hyperdivergent (long-face) individuals and flatter occlusal plane inclinations are in hypo-divergent (short-face) individuals.[6] The cusp tip of the maxillary second premolar was used to split maxillary occlusal plane into anterior occlusal plane AOP and posterior occlusal plane POP by Fushima et al.[7] and determined the association between inclinations of AOP and POP with Frankfort horizontal (FH) and found steeper POP in skeletal class II. However, FH plane was constructed by joining the inferior most point in bony orbit called orbitale (Or) with the superior most point on external auditory meatus called porion (Po), and both these cephalometric landmarks showed high variability in their identification in comparison to sella-nasion plane SN drawn by joining the mid-point of sella tursica (S) with nasion (N).[8]

From a clinical standpoint it is important to understand that orthodontic treatment of malocclusions with anteroposterior components may attempt to alter the occlusal plane's inclination, potentially aiding the mandible's adaptation to a therapeutic position, this will lead to better aesthetic and functional results. Majority of previous studies showed relationship of AOP and POP with the Angle classification which does not differentiate between dental and skeletal malocclusion. One of the aims of this study was to explore the association of AOP and POP with skeletal malocccclusion.[9,10]

Therefore the objective of this study is to investigate the relationship between occlusal planes and the Sella-Nasion (SN) and Frankfort Horizontal (FH) planes in individuals with different skeletal malocclusions.

METHODOLOGY:

This cross sectional study was conducted from June to September 2021 on 202 pretreatment lateral cephalograms (40 males and 190 females) of orthodontic patients at Jinnah Medical and Dental College, Karachi after acquiring their consent. Ethical approval was obtained from the ERC ethical review committee, JMDC Approval Number (000105/21).

The sample size was calculated from a previous study[16] using open epi online calculator keeping 95% confidence interval and 80% power of test, was 200. Non-probability (convenience) sampling technique was followed. Both males and females between ages 15-35 years who had all permanent dentition except third molar with radiographs of adequate diagnostic quality present were included in the study. Individuals with syndromes like cleft lip and palate, aged below 15years and above 35 years who had previous orthodontic and/ or orthognathic surgery treatment, any TMJ abnormality or had hypodontia were excluded from the study.

Each patient's lateral cephalometric radiograph was taken with a single Cephalometer, ASAHI at 80 kvp, 10 mA, and 0.8 s exposure duration on 8 x 10 inch Kodak green film by the same operator. A single investigator traced and measured the cephalometric radiograph using a 0.5mm lead pencil on acetate paper in a dark room. The landmarks and planes used in this investigation located were: (Figure 1),

SN (sella-nasion plane) from sella to nasion

FH (Frankfurt horizontal plane) from porion to orbitale

PP (palatal plane) from anterior nasal spine to posterior nasal spine

AOP (anterior occlusal plane) from maxillary incisal edge and the cusp tip of the maxillary second premolar.

POP (posterior occlusal plane) from cusp tip of the maxillary second premolar and the midpoint between the cusp tips of the maxillary second molar

MP (mandibular plane) from tangential gonion to menton

The following angular measurements were done with help of protractor:

SN-AOP <: angle between SN and AOP planes

SN-POP <: angle between SN and POP planes

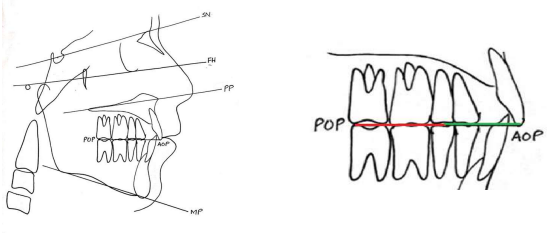
FH-AOP <: angle between FH and AOP planes

FH-POP <: angle between FH and POP planes

ANB<: angle between NA and NB planes

After 15 days, the same investigator retraced and analyzed 15 random cephalometric radiographs and a second investigator traced and analyzed15 randomly selected radiographs to check intraexaminer and interexaminer reliability respectively.

Figure 1: Cephalometric tracing showing landmarks and planes used in this study.



Statistical Analysis: Statistical analysis was done using the Statistical package for the social sciences (SPSS for windows version 21). The Shapiro-Wilk test was used to determine that the data were normal; it was found that the data had a normal distribution, hence parametric tests were applied. Two-way (ANOVA) test was applied to determine the relationship of AOP and POP to SN and FH between all classes of malocclusion. p-value of less than 0.05 and equal to was considered statistically significant.

SN sella-nasion, FH Frankfort horizontal, PP palatal plane, AOP anterior occlusal plane, POP posterior occlusal plane, MP mandibular plane

RESULTS:

202 cephalograms, 40 males and 190 females were included in this study, out of which 102 (28 males and 102 females) were of class I, 88 (12 males and 76 females) were class II and 12 females were class III as shown in Table 1. Table 2 showed the descriptive stats of different variables in all three skeletal classes. Class II showed steeper SN-AOP and FH-POP than both Class I and Class III. There was statistically significant relationship between SN and AOP among all the three skeletal malocclusion ($p<0.005$) and FH-AOP in class I and II ($p>0.025$). While SN-POP and FH-POP were not statistically significant in all the three classes. Table 3

DISCUSSION:

Tracing and analyzing lateral cephalogram is an essential part of orthodontic diagnosis and is a key factor in reaching a treatment plan. There are multiple analysis in different planes to aid the clinician and several researches have been done over planes, anatomical landmarks, angulation and their relationship to each other. Thorough review of the literature suggests that there was a need to correlate occlusal plane to skeletal form as it has shown high degree of variation in relation to skeletal form.[11-14]

In the present study, there was a significant relationship of SN-AOP in all three skeletal malocclusion with Class II demonstrating steeper anterior occlusal plane to SN in comparison to Class I and III which is in accordance with the previous studies done by Hassouna et al. and Celar et al. [15,16] FH-AOP was statistically significant only between class I and class II in this study while FH-POP was significant between I and II and between I and III in a study conducted by Hassouna et al. [15]

In our study, FH-AOP showed almost the same steepness in Class II and III skeletal malocclusion. SN-POP and FH-POP were statistically insignificant in all three skeletal malocclusion in our study, which contradicts some of the previous studies [15] in which SN-POP was found to be statistically significant between class I and class III. While POP to SN and FH were flatter in Class III as compared to class II and class I malocclusion.

FH-POP showed the same steepness in Class I and II, which is in contrast to Celar et al.[16] and Tanka and Sato[17] in which Class II had steeper POP. This contradicts the results between our study and other studies and this may be due to the identification of certain anatomical landmarks, such as the porion (Po), condylion (Co), orbitale (Or), basion, gonion (Go), anterior nasal spine (ANS), posterior nasal spine (PNS), and lower inferior apex (LIA), may be more prone to error due to overlapping structures superimposed on the landmark and its location. Likewise, the quality of radiographic images can interfere with the identification of some landmarks, such as Po, Co, Or, ANS, point B, the pogonion (Pog), Go, and the glabella.[18,19] Moreover, some authors have argued that the level of an observer's knowledge and his or her professional background play an important role in landmark identification, but this also coincides with the findings of Ishikawa [20] that AOP inclination is an of importance when it comes to skeletal malocclusion. The occlusal plane angle also affects the smile especially on the incisal smile arch of the maxillary incisors and the tip of the canine.[21] Inclination in the occlusal plane becomes an important parameter for obtaining harmonious orofacial relations.[22]

Celar et al [16] concluded that AOP inclinations did not differ significantly for both reference planes whereas POP inclinations were significantly different. Tanaka and Sato [17] only employed the FH plane in their analysis, and found no significant difference between AOP-FH, as well as the fact that Class II has the steepest POP-FH and Class III has the flattest. Ardani et al [23] found a substantial difference between classes I and III when SN-AOP and FH-AOP were included.

This discrepancy in results between this study and others is related to ethnical group differences, less reliability of SH

Table1: Descriptive statistics based on gender and angles classification

	MALE	FEMALE	TOTAL
CLASS 1	28	102	102
CLASS 2	12	76	88
CLASS 3	0	12	12

Table 2: Descriptive statistics of different variables in Class I, II and III malocclusion

	ANB	SN AOP	FH AOP	SN POP	FH POP
CLASS I	3.07 ± 0.9	14.6 ± 4.84	8.85 ± 3.99	13.62 ± 7	8.1 ± 4.62
CLASS II	6.2 ± 1.62	16.81 ± 5.93	10.52 ± 5.98	14.63 ± 5.57	8.65 ± 4.47
CLASS III	-1.83 ± 1.64	10.83 ± 5.47	10.25 ± 6.48	10.33 ± 5.53	6.08 ± 3.77

Table 3: Difference in relationship of variables between all 3 groups

ANOVA			
VARIABLES	p1	p2	p3
SN-AOP	0.032*	>0.001**	0.021*
FH-AOP	>0.025*	0.747	0.295
SN-POP	0.095	0.16	0.126
FH-POP	0.997	0.206	0.180

p1: BETWEEN CLASS I AND CLASS 2
p2: BETWEEN CLASS 2 AND CLASS 3
p3: BETWEEN CLASS 1 AND CLASS 3

*: Statistically significant at p = 0.05, ** Highly significant at p = 0.001

plane to true horizontal[24] as well as the fact that the sample size utilized in the previous studies was not evenly distributed across all groups. One of the limitations of this study is small sample size and unequal distribution of individuals among groups. Future studies are needed with much larger sample size to address this shortcoming.

It is advisable to consider the occlusal plane, while treating the anteroposterior component of malocclusion by modifying the OP inclination to adapt the mandible into a therapeutic posture.

Further studies are required for the change of occlusal plane inclination of patients in extraction-based therapy as well as surgical cases. It has been proposed that in class II patients, those cases exhibiting the greatest growth during treatment exhibited the least change in the inclination of the occlusal plane while showed the greatest tendency to return to the original inclination; conversely, those cases exhibiting the least growth during treatment exhibited the greatest change in the occlusal plane and showed less tendency to return to the original inclination.[25] It would be of interest to study the influence of occlusal plane inclination changes on the relapse of orthodontically treated patients in the long term.

CONCLUSION:

This study concluded that Class II malocculsion showed steeper SN-AOP and FH-POP than Class I and Class III. POP to SN and FH were flatter in Class III.

Authors Contribution:
Hana Pervez: Conceived the study, Manuscript writing, Design of study, Literature review
Anam Sattar: Supervised the work and final review
Sadia Shabbir: Study design & Methodology writing
Marium Iqbal: Statistical Analysis and Results
Faiza Malik: Clinical work and data collection
Filza Gul: Clinical work and data collection

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Medical Education - Original Article **Open Access**

Discontents and Blessings of Emergency Distance Learning During Covid-19: A Qualitative Study in Two Universities of Karachi, Pakistan

Nusrat Shah, Nighat Shah, Mehjabeen Musharaf, Lubna Ansari Baig

ABSTRACT

Objective: The purpose of this research was to investigate the perceptions of undergraduate medical students, faculty and administrators, regarding their experience of emergency distance online teaching, the challenges faced, and future opportunities digital learning.

Study Design and Setting: A qualitative study design was used with a phenomenology approach. This study was conducted in two public sector universities in Karachi in November and December 2021.

Methodology: In-depth-interviews (IDIs) were used to assess the perceptions of administrators and faculty, and focus group discussions (FGDs) for perceptions of medical students. Qualitative data was analyzed by thematic analysis.

Results: Participants reported unpreparedness of institutions, internet connectivity and technological expertise issues, lack of student-teacher engagement, untrained faculty, lack of practical and clinical exposure, loss of learning environment and infrastructure issues, as the barriers, while appreciating the convenience, flexibility, time-efficiency, accessibility and continuity of medical education as the advantages of distance learning.

Conclusion: The new dictum of education is digital learning and it is here to stay. The consensus opinion seems to be for blended learning, with theoretical component of curriculum being delivered online and practical and clinical, face-to-face.

Key words: Covid-19, medical education, Online learning

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INTRODUCTION:

As the World Health organization (WHO) declared Covid-19 as a pandemic on March 11, 2020, the world came to a standstill and educational institutions closed down in most countries, including Pakistan.[1] Continuing medical education was a challenge. In Pakistan, face-to-face traditional lecture was the dominant mode for teaching.[2] In developing countries, the cost of technology, such as computers, IT equipment and internet access are a major barrier to online teaching.[3] Most faculty members were not trained in digital technology and distance learning strategies.[4] It was difficult and stressful to implement the change in view of inadequate human and financial resources.[4]

Distance online education (both synchronous and asynchronous) was implemented as per directives of Higher Education Commission (HEC) of Pakistan.[5] This resulted in exposing lack of preparedness for the distance online teaching.[6] A systematic review and meta-analysis by He L et al showed that synchronous distance education is effective as it provides an opportunity for real-time student-teacher interaction.[7]

As the world witnessed disruption of healthcare systems and health professionals' education during the pandemic,[8,9] academic institutions initiated online remote teaching for continuity. In terms of achieving educational outcomes, this type of emergency remote teaching cannot be compared to a well-planned system of high-quality online education where technological expertise and infrastructure are already in place.[10]

A systematic review has showed use of virtual reality e.g. virtual ward rounds can allow students to interact with patients without any risk of infection. Virtual web-based platforms for case discussions, journal clubs, cadavers for learning anatomy, patient interviews, can help in enhancing student engagement.[11] Tabatabai S has reported the Virtual University of medical Sciences (VUMS) in Iran provides educational content and resources, free of cost, in the form

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of Massive Open Online Courses (MOOCS) through the national LMS to all medical schools of the country.[12] De Ponti R et al also highlight the effectiveness of using simulated clinical scenarios and virtual reality (VR) during DL.[12] VR is a broad concept that has many different tools and applications. VR simulators can be classified into surgical VR simulators, 3D anatomical models, virtual dissection tables, virtual worlds or environments, and mobile VR. Surgical VR simulators consist of an interface connected to mechanical devices or haptic units and can be displayed on any screen but most commonly using a desktop.[13]

Following the HEC directives, the Dow University of Health Sciences (DUHS) and Jinnah Sindh Medical University (JSMU) started converting teaching programs to distance learning (DL) programs. A new department of distance learning was established, faculty training started and simultaneously synchronous and asynchronous online lectures were started. The aim of this research is to identify the challenges faced in two medical universities of Karachi, posed by sudden implementation of distance learning strategies. This study explored the perceptions of faculty, administration and students, their experiences of online teaching, the problems faced, and its advantages, so that we can inform stakeholders about the challenges and opportunities of DL in medical education. During lockdown, HEC advised all universities for online education and provided technical support for learning management system (LMS), internet connectivity, and arranged Coursera MOOC courses for training the faculty in online teaching. So, the objectives of this study were to know about, what are the perceptions of faculty, administration and students regarding the challenges faced during emergency online distance learning, implemented during Covid-19 at DUHS and JSMU.

METHODOLOGY:

A qualitative study design with a phenomenology approach was used. Data collection was done by means of In-Depth Interviews (IDIs) for perceptions of faculty and administrators, and Focus Group Discussions (FGDs) for perceptions of medical students.

The study was conducted at two medical colleges of Dow University, i.e., Dow Medical College (DMC) and Dow International Medical College (DIMC), and one medical college of JSMU, Sindh Medical College (SMC). Ten IDIs were conducted with administrators and faculty members and five FGDs with groups of students from all three medical colleges.

A semi-structured interview guide was developed after searching the literature and discussion with experts. The same interview guide was used for both IDIs and FGDs. The questions on the interview guide are given below:

1) How was your experience with distance learning during Covid-19? (advantages/disadvantages)

2) How do you compare it with traditional face-to-face teaching?

3) What do you think is the future applicability of distance learning?

4) What would be your recommendations to improve distance learning?

Informed verbal consent was obtained from participants of all IDIs and FGDs after telling them the purpose of the research. Participation was voluntary and students could leave at any time. Ethical approval was taken from IRB of JSMU (JSMU/IRB/2021/581) and DUHS (IRB-2362/DUHS/Approval/2022/674).

Data was collected and analyzed by two researchers (1st & 2nd author) in November and December 2021. We conducted semi-structured interviews with open-ended questions from participants of both IDIs and FGDs. Over all 10 IDIs and 5 FGDs were conducted in both universities.

In-Depth Interviews (IDIs): Five interviews were conducted by each researcher. The participants of IDIs were approached through phone calls to explain the purpose of study and take consent for the interview. Five IDIs were conducted online over zoom and five, face-to-face, with an average duration of 25 minutes (between 15 and 35 minutes). The online IDIs were both audio and video-recorded whereas face-to-face IDIs were only audio-recorded.

Participants of IDIs were experienced faculty members as well as administrators, like Principal/Vice Principal, Director DL program, Director quality enhancement, Director professional development, and Manager student affairs.

Focus-Group Discussions (FGDs): The participants of FGDs were approached through the manager of student affairs. Two FGDs were conducted via Zoom and three face-to-face with number of participants ranging from 6 to 9. The face-to-face FGDs were conducted in one of the researcher's office, each with first year, second year and third year students respectively. The two online FGDs were conducted one each by the two researchers and these consisted of mix of students from the three clinical years i.e. third year, fourth year and final year. Duration of each FGD varied from 31 to 60 minutes and all FGDs were both audio and video-recorded. Students were asked to address themselves as 1,2,3 etc to maintain confidentiality.

All audio and video-recordings were transcribed verbatim by the concerned researcher who had conducted that particular IDI or FGD. Transcriptions were done manually by two researchers to achieve familiarization with data. The data analysis was performed in two consecutive phases to ensure the conformability. A Qualitative reflexive thematic analysis[11] was undertaken. The transcriptions were read and discussed for initial codes. These preliminary codes were developed inductively from the ideas raised by the participants as manifest codes (i.e., actual words) so that we remain close

to participants' lived experiences. In the next step, the similar and overlapping codes were merged to form subthemes and grouped together according to their conceptual similarities. In this step, the codes were interpreted and reviewed to identify recurring themes. Themes were then discussed with the third and fourth author and finalized with consensus. In the final step, new themes were generated for each conceptual category after discussion between all four authors.

A total of seven themes were initially generated which were later reviewed and merged into 4 broad themes; Discontents of distance learning, Blessings of distance learning, Tug of war, battle of nerves, Future prospects.

Triangulation between responses of IDIs and FGDs was performed for each theme and sub-theme. This was done first independently, and then together, to ensure rigor of study and reliability of data.

RESULTS:

Results are presented in four sections according to the four broad themes. Triangulation has been shown between FGDs and IDIs in Tables 3.

1. Discontents of distance learning:

   This theme highlights the disadvantages of DL and has three sub-themes: a) one-way communication, b) cognitive overload and no hands-on, c) Lost environment (Table 3)

a) One-way communication:

   Most participants of IDIs and FGDs felt, the teachers were not able to engage the students.

   "….the faculty tried to adapt but the faculty was not trained, reading slides …." (FGD 5, Student 2).

   "….Some people joined from outside, played obscene videos, set some audios and texts, so they disabled our chat box…." (FGD 1, Student 6)

   "…..I'm a visual learner and an auditory person, so I cannot learn online. I literally missed the classes so much, it was the most terrible two years of my life…." (FGD 3, Student 4)

   "….In distance learning we cannot utilize all our expressions, everything is disturbed…." (IDI 2, Faculty member + Administrator)

   On the other hand, a few students actually enjoyed online classes

   "….I really like online classes. Yes, initially teething issues and teachers were struggling but later everything became very smooth. …." (FGD 4, Student 3)

b) Cognitive overload and no hands-on:

   Participants of IDIs and FGDs agreed that patient interaction cannot be taught effectively through online teaching.

   "….Knowledge was good, but skills and attitudes were not up to the mark, no hands on, motivation…." (FGD 5, Student 5)

   "….. the patient interaction, body language you cannot learn that in online education, no matter what…." (IDI 3, 36-37, Faculty member + Administrator)

c) Lost environment:

   Students missed their friends, colleagues, group mates, and the whole academic and social environment of the campus.

   "……I felt the learning environment where there is collective learning as groups, and as adults.…that was lacking ….." (FGD 4, Student 6)

   "……It ruined our social life. There was no way of interacting with friends," (FGD 3, Student 4)

2. Blessings of distance learning:
3. This theme is about the reported advantages of DL and consists of 3 sub-themes: a) Convenience, feasibility, time-efficiency, b) Accessibility, and c) Continuity of education (Table 3)

a) Convenience, feasibility, time-efficiency:

   Most participants agreed that convenience, feasibility and time saving are the most positive aspects of DL.

b) Accessibility:

   "…it is perfect that you can access your class from anywhere. I'm in my car right now and I'm a part of this meeting….." (FGD 4, Student 9)

c) Continuity of education:

   As the lock downs of covid-19 became prolonged, the option of distance learning was seen as a blessing for continuing education.

   "…..we were able to deliver ¾ of the course, and students were able to sit in exams, …" (IDI 4, Administrator)

4. Tug of war, battle of nerves:

Table-1 Breakdown of IDIs and FDGs by university and position

In Depth Interviews n=10		
DUHS n=7		
Faculty Members n=3	Administrators n=2	Faculty Members + Administrators n=2
JSMU n= 3		
Faculty Members + Administrators n=3		

Focus Groups Discussions n=5	
DUHS Students n=4	JSMU Students n=1

Table-2 Themes and sub-themes

Theme	Sub-themes
Discontents of distance learning	One-way communication Cognitive overload and no hands-on Lost environment
Blessings of distance learning	Convenience, feasibility, and time efficiency Accessibility Continuity of education
Tug of war, battle of nerves	Infrastructure and policies Faculty development
Future prospects	Blended learning Advancement of technology

Table-3 Discontents (Theme 1) and Blessings of distance learning (Theme 2) with themes of Tug of war, battle of nerves (Theme 3) and future prospects (Theme 4

Theme 1: Discontents of distance learning	
One-way communication/ Cognitive overload and no hands-on	
Students' perceptions FGDs	Examples: • technical knowhow is low (FGD 4, Student 4) • not favorable because we cannot ask questions (FGD 5, student 4) • clinical teaching cannot be imparted online. You cannot feel liver border online (FGD 4, Student 1)
Administrators/faculty's perceptions IDIs	• student-teacher interaction was missing.' (IDI 5, Faculty member + Administrator) • patient interaction could not be addressed (IDI 1, Faculty member + Administrator)
Theme 2: Blessings of distance learning	
Convenience, flexibility and time-efficiency/ Accessibility/ Continuity of education	
Students' perceptions FGDs	Examples: • recorded lecture you can do at your own pace/time and place (FGD 5, Student 2) • we can pursue other things like prepare for USMLE (FGD 4, Student 4)
Administrators / faculty's perceptions IDIs	• distance online teaching is convenient as it saves time, money and energy (IDI 5, faculty member + administrator) • the course was covered and students were able to take exam (IDI 4, Administrator)
Theme 3: Tug of war, battle of nerves	
Infrastructure and policies	
Students' perceptions FGDs	Examples: • LMS is a very good resource, however, it is not maintained properly" (FGD 1, Student 1) • Students leave meeting because teachers were unable to start zoom. (FGD 4, student 2)
Administrators/faculty's perceptions IDIs	• lectures postponed / cancelled due to connectivity issues (IDI 6, Faculty member + Administrator) • Some students didn't have internet or smart phones (IDI 4, administrator)
Theme 4: Future prospects	
Blended learning/ Technological resources & expertise	
Students' perceptions FGDs	Examples: • Blended system is the way forward, lecture-based classes online and skill labs and practical in-person" (FGD 2, Student 6) • 6 days a week gets exhausting, so the hybrid system was better (FGD 1, Student 2) • we should keep quizzes and questions, polls for effective learning (FGD 4, Student 1)
Administrators/faculty's perceptions IDIs	• blended learning has advantage, transfer of knowledge through online and patient interaction, physical. (IDI 3, faculty member + administrator) • effective platforms, software like AI, for skills, special software for simulation (IDI 4, Administrator)

This is about issues of institutional systems and policies for DL. It includes development of infrastructure, virtual learning platforms, information technology (IT) and faculty expertise (Table 3)

a) Infrastructure and policies:

"…..We had barriers at all levels, students were not prepared, faculty was not prepared, administration didn't know what to do. …." (IDI 1, Faculty member + Administrator)

Faculty development:

"……*We have learned a lot from those MOOC courses; they also provided us online resources for the interactive sessions. …..*" (IDI 10, Faculty member)

5. Future prospects:

a) Blended learning:

"….. blended learning has advantage, for lecturing, for transfer of knowledge, also small group discussion, it can save time, …." (IDI 3, Faculty member + Administrator)

b) Advancement of technology:

6. The participants agreed that continuity will require reliable internet connection, a better software portal for LMS, a strong IT department and continuous teacher training (Table 3)

DISCUSSION:

During the lockdowns of pandemic, distance e-learning emerged as the only option for continuity[15].The results revealed that student-teacher engagement, technological expertise, internet connectivity, clinical exposure, and learning environment were the major issues of online teaching. Other studies have also highlighted similar issues with virtual teaching.[16, 17] A literature review by Aboagye E et al argued that the main issues with e-learning i.e., accessibility, teacher and student readiness, social support and learners' intrinsic motivation were all related to unpreparedness of institutions.[18]

The student-teacher non-engagement was highlighted very strongly in our study by the students. Kala PS et al from India also reported lack of student-teacher interaction and peer-interaction as a major concern of students.[16] In contrast, Tayem et al reported positive interaction during their DL program, due to effective technical management of virtual learning management system (LMS).[19]Otaki F et al also showed a higher satisfaction among students and faculty, but there was same limitation of clinical component of medical education.[20]

Most of students felt it was passive learning as teachers just read their power point slides, with no interaction allowed. There is evidence that use of discussion forums, quizzes, wikis, debates, and peer to peer interactions can be instrumental for deep learning and conceptualization.[21,] Zalat MM et al suggested improving technological skills of faculty by online teaching courses.[22] Other suggested techniques for improving student-teacher engagement include case-based learning (CBL), keeping videos and audios on, technology-enhanced learning (TEL) student response systems eg Mentimeter, Quizlet, Kahoot, Padlet, and polls.[22]

Some of our students had positive perception of online teaching as they felt it helped them to become focused and take responsibility for their own learning. This may be due to personality differences due to internal motivation.[23]

The major concern shown by students was the compromised learning environment in online teaching. Students experienced loneliness and social isolation. Peer learning has been reported to be an effective strategy to overcome the stressful times of Covid-19 and to stay in touch with friends and colleagues for motivation.[24] Social media and its learning strategies like discussion forums could improve peer collaboration as shown by studies. [25]

The faculty and students in our study were struggling with technology. Faculty should be encouraged to improve their online teaching skills and technical expertise in order to improve interaction. AI, quizzes, polls, and gaming apps such as Kahoot to promote student motivation.

Our study provides in-depth exploration of perceptions of students, faculty and administrators about the emergency distance learning intervention in two universities during Covid-19. Triangulation was done to provide insight into the phenomenon of distance learning. Further, this research was carried out during Covid-19, while everyone had fresh memory and were able to accurately reminisce about their lived experiences. The limitation of this study is that our results cannot be generalized as we report data from only two public sector medical universities. The sample size for faculty members was small as majority of our IDIs were with faculty members who were also performing duties of administration. The representation of students was not uniform for the three medical colleges.

CONCLUSION:

The new dictum of education is digital learning and it is here to stay. This digital boom was bound to be, but Covid just delivered it faster. Our study shows the transition from traditional face-to-face teaching to emergency distance learning was not smooth, with major barriers in educational, technological and infrastructural areas. In spite of initial reluctance, the institution, faculty and students adapted to change, realizing the benefits of distance online learning. The consensus opinion seems to be for blended learning, with theory being taught online and practical and clinical component as face-to-face teaching.

Authors Contribution:
Nusrat Shah: Concept & Design of Study, Drafting, Revisiting Critically, Data Analysis, Final Approval of version.
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Review Article **Open Access**

Beyond the Digestive System: Understanding Gut-Brain-Microbiome Axis in Irritable Bowel Syndrome

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ABSTRACT

IBS affects a significant number of people worldwide, particularly those under the age of 50, with women being twice as likely to be affected than men. Although the underlying pathophysiology of IBS is not yet fully comprehended, current research indicates that it could be related to the Gut-Brain Axis (GBA). This communication is vital to the intricate balance of the gastrointestinal system. Through this axis intestinal motility, secretion, and sensation are harmoniously regulated, resulting in efficient digestion and optimal nutrient absorption. Disturbance in the Gut-Brain Axis is linked to a broad spectrum of psychiatric and gastrointestinal disorders, including IBS. Managing IBS effectively requires a multidisciplinary approach, including dietary modifications, stress management techniques, medications, and psychological therapies. Proper management of IBS can lead to a healthy and fulfilling life for individuals affected by the disorder. Further studies are required to clarify the causes and development of most effective treatments for IBS.

Keywords: Functional Disorders, Gut-Brain-Axis, Irritable Bowel Syndrome, Microbiota

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INTRODUCTION:

IBS is a common functional disorder that has a significant impact on individuals and society. It is a widespread and burdensome disorder that impacts both individuals and society at large. With a high personal and socio-economic impact, it emphasizes the need for effective management and treatment of this condition. It affects millions of people worldwide with global prevalence of 9.2%.[1] The condition is prevalent in individuals under the age of 50, with women being twice as likely to be affected than men.[2] It is challenging to treat due to the wide range of symptoms and underlying physiological factors.[3] Experts believe that genetics, environmental factors, psychological factors, and changes in the gut microbiome contribute to the development of IBS. Despite the vast majority of studies being conducted, the precise mechanism that results in the development of IBS remains unknown, with much still to be learned about the factors contributing to its development. However, recent studies have suggested that IBS may be a disease of the Gut-Brain Axis (GBA), which is the mutual communication between the brain and the gut.[4] The axis has a vital role in the normal functioning of the gastrointestinal tract. It is involved in regulating intestinal motility as factors which are responsible for intestinal secretion and sensations. Disruptions in the GBA have been linked to a wide range of gastrointestinal and psychiatric disorders, including IBS.[5] In IBS, the gut-brain axis is thought to be dysregulated, leading to alterations in motility, secretion, and sensation within the GI tract, as well as contributing to the development of psychological symptoms and comorbidities. The complex and chronic nature of the disorders has debilitating effect on the quality of life of an individual. It is associated with psychological comorbidities such as anxiety, depression, and migraines.[6] The enteric nervous system (ENS) is responsible for regulating GI functions. The ENS communicates with the CNS through the vagus nerve and spinal afferent pathways. In IBS, there is evidence of increased visceral hypersensitivity, which may result from alterations in the processing of sensory information at both the peripheral and central levels.[7] Various hormones, such as cortisol, serotonin, and ghrelin, act as messengers between the gut and the brain. In IBS, alterations in the levels of these hormones have been reported. Serotonin is involved in the regulation of GI motility, secretion, and sensation,

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and dysregulation of serotonin signaling has been implicated in the pathophysiology of IBS. The gut microbes play an essential role in maintaining immune homeostasis and have been shown to influence the gut-brain axis. In IBS, there is growing evidence to suggest that disruptions in the gut microbiota, or dysbiosis, may contribute to the development and persistence of symptoms. Furthermore, increased intestinal permeability, or "leaky gut," has been observed in some IBS patients, which can lead to the translocation of bacteria and their metabolites, ultimately activating the immune system and triggering an inflammatory response. Given the complex nature of the disorder, managing IBS effectively requires a multidisciplinary approach. Treatment options may include dietary modifications, stress management techniques, medications, and psychological therapies. With proper management, people with IBS can lead a healthy and fulfilling life.[8] This literature review aims to summarize the current understanding of IBS as a gut-brain-axis disease, and to identify potential implications for the diagnosis, treatment, and management of this complex disorder.

METHODOLOGY:

A comprehensive literature search was conducted using electronic databases such as Google Scholar, PubMed, Scopus, SpringerLink, ScienceDirect and MEDLINE, using the keywords: “irritable bowel syndrome’’, “gut-brain axis”, “functional disorders”, “pathophysiology”, “gut-microbiota”, “dysbiosis”, “psychological-disorders”. To find related articles, we Boolean operators were used to combine the terms. For the review, only English-language articles published between 2018-2023 were included, allowing for an up-to-date and thorough examination of the latest research findings in the field. Studies were selected based on specific inclusion and exclusion criteria. There was no restriction on age, color, gender, or location in the selection of articles. Observational, clinical trial, cross-sectional, systematic, and conventional reviews were all included. Publications that were not written in English or used animals as study subjects were not considered for this analysis. The data extracted from the selected studies were synthesized using a narrative synthesis approach and were reported according to the PRISMA guidelines.

Pathophysiology of Irritable Bowel Syndrome

The underlying pathophysiology of IBS is complex and multifactorial. The precise mechanism that leads to the development of IBS is not yet fully understood.[9] The condition is likely to arise from a combination of genetic, environmental, and psychological factors. Additionally, there may be multiple subtypes of IBS, each with their own unique set of contributing factors.[10] Genetics is thought to be one of the contributing factors to the development of IBS. Research has shown that certain genetic variations may make individuals more susceptible to developing IBS.[11] Studies have identified several genes that may increase the risk of developing IBS. Genetic variations, such as those in the HLA-DQ and SCN5A genes, have been linked to an increased risk of IBS.[12] Genetic architecture of IBS appears to have commonalities with psychological disorder. Recent large-scale genome-wide association studies have discovered several risk loci that contain genes relevant to motor neuron function and nervous system activities.[13] Environmental factors, such as stress and gastrointestinal infections, may trigger the onset of IBS in those who are genetically predisposed to the condition.[14] Genetics may also play a role in determining the subtype of IBS that an individual develops, such as IBS with diarrhea or constipation. However, genetics alone is unlikely to be the sole cause of IBS, and it is likely that multiple factors contribute to the development of the condition.[15] Dysregulated gastrointestinal motility is thought to be one of the key factors contributing to the development of IBS, highlighting the intricate interplay between various physiological processes in the pathogenesis of this condition. Individuals with IBS may experience more frequent or forceful contractions of the muscles in the digestive tract, resulting in altered bowel movements and abdominal pain.[16] Studies have shown that individuals with a history of Psychiatric comorbidities, such as depression, anxiety, and other conditions may be at a higher risk of developing IBS.[17] Additionally, stress and other emotional factors may trigger or exacerbate IBS symptoms in some individuals.[18] Individuals with IBS may have altered intestinal permeability which allows toxins or bacteria to enter the bloodstream and cause inflammation and other symptoms.[19] SIBO and dysbiosis may contribute to the development of IBS.[20] Chronic infection, post-infectious autoimmunity, sensitivity to specific food items, alteration of gut flora, abnormal brain-gut interface, malabsorption of ingested food, food intolerance, increased reactivity after an infection, bile acid malabsorption, microcolitis, celiac disease, and inflammation of the intestinal mucosa are also potential factors that could contribute to the development of IBS.[9]

Gut Brain Microbiome Axis

The complex communication between gut microbiota and central nervous system through neuronal, endocrine, and immune signaling constitutes gut-brain-microbiome axis.[21] The first five years of an individual are vital for the development and establishment of gut microbiota, the immune system, and psychological changes. Alteration in gut microbiota can compromise the immune system. It plays a crucial role in the pathophysiology and symptomatology of the IBS. Alterations in gut microbiota, intestinal permeability, immune activation, and neurotransmitter production can significantly impact the gut-brain axis, thereby influencing the development and severity of IBS symptoms. Studies have demonstrated that individuals with IBS exhibit altered gut microbiota composition, which is associated with increased abdominal pain and altered bowel habits.[5] Certain factors like stress and gene activation in susceptible individuals will allow the nervous system to

alter the gut microbiome by modifying gut motility and enteric nervous system response. Studies have shown that the alteration of gut microbiota plays a crucial role in the development of IBS.[22]

Dysbiosis and Small Intestinal Bacterial Overgrowth (SIBO) have emerged as complex and multifaceted contributors to the pathogenesis of IBS, with potential links to a range of factors such as increased intestinal permeability, dysmotility, chronic inflammation, autoimmune disorders, and altered neuronal activity in the enteric and central nervous systems. Disruption of the gut flora is linked to certain neuropsychological symptoms. SIBO is highly prevalent in IBS. Diagnosis of SIBO is done through a small bowel aspirate culture or a positive hydrogen lactulose or glucose breath test. Constipation-predominant IBS has been associated to the organism found in a positive methane breath test.[23] Metabolites such as short-chain fatty acids (SCFAs) regulate the gut-brain-microbiome axis.[24] Inflammatory cytokine synthesis and T-cell and neutrophil migration are facilitated by SCFAs which leads to neuroinflammation. Butyrate is a gut microbiota derivative SCFAs responsible for nerve plasticity and memory. Enteroendocrine cells of the gut epithelium are stimulated by SCFAs, which then have impact on the ENS and vagal innervation.[25] The gut microbiota, a community of diverse microorganisms that resides in the gastrointestinal tract, is now recognized as a key player in the intricate interplay between the brain and the gut. When the gut microbiota is out of balance, it can interfere with the proper functioning of the hypothalamic-pituitary-adrenal (HPA) axis and the autonomic nervous system (ANS), leading to a host of issues such as maladaptive coping, comorbid anxiety and depression, and changes in pain signaling by neurons. The growing body of evidence supporting the gut-brain-microbiome axis underscores the critical role of the gut microbiota in IBS pathogenesis.[26] Several bacteria have been identified as the culprits in studies linking increased cytokine production to the intestinal mucosa. IBS individuals who have elevated cytokine levels, especially IL6, have an increased risk of developing new-onset depression.[27] Patients with IBS exhibit a gut microbiota that differs from that of healthy individuals, with higher alpha diversity indices observed in IBS patients. Studies have found a positive association between dietary fiber intake and alpha diversity indices in individuals with IBS. This highlights the importance of a high-fiber diet in promoting a healthy gut microbiota and potentially alleviating symptoms of IBS.[28]

Patients with IBS have a low density of enteroendocrine cells in their intestines. These cells play a significant role in regulating gastrointestinal motility, secretion, absorption, and visceral sensitivity. The low density of these cells in patients with IBS is believed to contribute to gastrointestinal dysmotility, abnormal absorption/secretion, and visceral hypersensitivity, which are common symptoms of IBS. Understanding the role of enteroendocrine cells in IBS may help in developing new treatment approaches for this condition.[29]

Association of Psychological Disorders with IBS

Gaining valuable insights into IBS may involve analyzing patients based on factors other than stool form and frequency. Studies have found that subgroups with high psychological comorbidity had a greater percentage of participants with severe IBS symptoms, perceived stress, and gastrointestinal symptom-specific anxiety.[30] Studies have reported that around one third of IBS patients exhibit psycho-social comorbidities, with approximately 30% to 50% experiencing anxiety and feelings of hopelessness, thirty percent presenting with mood disorders, and rest experiencing suicidal ideation.[31] Dysregulation of the brain-gut axis is mediated by various neurotransmitters which are responsible for pathophysiology of IBS. These chemical messengers facilitate communication between the CNS and the ENS to modulate gastrointestinal motility, secretion, and sensation, which are all implicated in IBS. Norepinephrine, Dopamine, GABA and Glutamate are involved in the regulation of GI motility, blood flow as well as in visceral pain. Alteration in neurotransmitters signaling have been implicated in the development of symptoms of IBS. Studies have found that there is a strong link between gastrointestinal symptom-specific anxiety, somatization, and symptom severity in patients with irritable bowel syndrome (IBS). It is crucial to assess both gastrointestinal and extra-intestinal symptoms to better understand the severity of symptoms in IBS patients.[32] Patients with IBS commonly exhibit psychological changes. The severity of GI symptoms is significantly linked to multiple factors, including physical exhaustion, anxiety related to gastrointestinal problems, perceived stress, pain catastrophizing, and trait anxiety. The greater the number of psychological alterations experienced by an IBS patient, the more intense their GI symptoms are expected to be.[33] The number of psychological comorbidities has a strong correlation with the severity of IBS symptoms at baseline. People with more psychological comorbidities tend to consult gastroenterologists more frequently, try more treatments, and experience more severe IBS symptoms, including persistent abdominal pain and interference with daily activities. With each incremental increase in psychological comorbidity, individuals diagnosed with IBS based on Rome IV criteria are more likely to experience a worsening prognosis.[34]

IBS patients are more susceptible to psychological co-morbidities than the general population. Patients with two or three psychological co-morbidities are at a significantly higher risk of experiencing negative outcomes, such as flare-ups, hospitalization, or surgery. The cumulative impact of psychological factors on IBS can worsen disease progression, regardless of the patient's biochemical state. Therefore, addressing both physiological and psychological aspects of

the disease is crucial for managing and improving patient outcomes.[35]

The relationship between stress and IBS flares is complex and multifactorial. One proposed mechanism is that stress can activate the HPA axis, leading to the release of stress hormones such as cortisol, which can affect gut motility, secretion, and sensitivity. Additionally, stress can lead to changes in the gut microbiota composition and function, which in turn can influence the gut-brain axis and contribute to IBS symptoms. Interestingly, recent research has suggested that the gut microbiota may play a role in modulating the stress response, highlighting the intricate interplay between stress, the gut microbiota, and IBS.[36]

There is a correlation between psychological stress, depression, and dysbiosis, which can lead to the development of IBS.[37] Research studies have reported reduction of certain microbes in individuals experiencing chronic psychological stress. Similarly, patients with depression have been found to exhibit an overproduction of specific microbes. Moreover, individuals with major depressive disorder have been shown to have an elevated presence of specific species of gram-negative microbes as well as an altered ratio of Bacteroidetes.[38]

The neurotransmitter serotonin has an important role in a wide variety of physiological activities, including gastrointestinal secretion and peristalsis, vasoconstriction, behavior, and brain processes. It is a vital neurotransmitter in the regulation of GI motility, secretion, and sensation. A major percentage of the body's serotonin is found in the GI tract. In IBS, there is altered serotonin signaling, leading to changes in gut motility and sensation. As compared to healthy persons, those who suffer from irritable bowel syndrome have been reported to have lower mucosal levels of 5-HT (5-hydroxytryptamine) and greater systemic levels of kynurenic acid (KYNA). It's thought that the high prevalence of mental health issues in IBS patients is connected to the high diversity of gut flora.[39] Large amount of pyruvate produced by certain gut microbes has toxic effects on gut epithelium.[25]

Treatment Modalities of IBS

To manage IBS, a combination of lifestyle changes, psychological counseling, and medication adherence is necessary. Effective strategies include modifying dietary habits, avoiding trigger foods, and using stress management techniques like cognitive-behavioral therapy, hypnotherapy, and relaxation methods. Various therapeutic approaches, including probiotics, prebiotics, antibiotics, and fecal microbiota transplantation (FMT) for the treatment of IBS.[5]

Medications like antibiotics, antispasmodics, laxatives, and antidepressants can also be helpful. The neurotransmitters like noradrenaline, serotonin, and dopamine can play a role in pain relief mechanisms and psychopharmacology. Both primary and secondary neuromodulator treatment options are available for managing abdominal pain associated with IBS.[17] Additionally, complementary, and alternative medicine treatments like herbal remedies, and acupuncture may be beneficial, but it's crucial to keep in mind that their effectiveness varies depending on the individual and cannot be generalized.[40] The management of IBS has made progress in recent times with the emergence of new medications such as serotonin synthesis inhibitors LX-1031, ramosetron, spherical carbon adsorbent, benzodiazepine receptor modulators, and peripheral k-agonists. These advances have the capability to alleviate symptoms and enhance the well-being of individuals who suffer from IBS.[41]

CONCLUSION:

The majority of individuals suffering from IBS complain of chronic and debilitating gastrointestinal symptoms. Although it is not a fatal disorder, it has a negative impact on the quality of life of the patients suffering from it. The chronic nature of the disorder creates a great economic burden on the health system. Multiple hereditary and environmental factors have been identified which contribute to the development of this complex disorder. In terms of its precise pathophysiology, IBS is still not very well understood; however, recent studies show that it may be a dysregulation of the Gut-Brain-Microbiome Axis. In patient with IBS, the communication between gut microbe and central nervous system is disrupted by either a genetic triggering mechanism or through an environmental factor leading to development of gastrointestinal symptoms by affecting the motility, secretion, and sensation of GI tract. In addition, mental comorbidities such as depression and anxiety, as well as emotional factors, may either be the cause of IBS in the first place or may exacerbate symptoms in susceptible individuals. Management of IBS with conventional therapies is either not effective or has very low effect in improving the symptoms. There is a need for development of innovative therapeutic techniques which may entail targeting the gut microbiome. Better understanding of the gut-brain axis and its mechanisms will help in developing targeted therapeutic interventions that address the root causes of IBS. Manipulating gut microbiota through the use of prebiotics, probiotics, and dietary modifications has shown promising results in alleviating IBS symptoms. Additionally, treatments targeting the central nervous system have been found to improve the psychological well-being and overall quality of life in individuals with IBS. The use of antidepressants is a potential treatment option which makes use of knowledge of gut-brain-microbiome axis. Considering multifaceted nature of IBS, further studies are required to get a better knowledge of pathophysiology as well as to develop treatment option for disorder so that people who suffer IBS have a better chance of leading a life that is both healthy and satisfying. A better understanding of the gut-brain axis is crucial for the improved management of IBS disease. Furthermore, elucidating the role of the gut-brain axis in IBS may pave the way for the discovery of novel biomarkers

that can aid in the diagnosis and monitoring of the disease. This would enable clinicians to provide more personalized and effective treatment plans for patients suffering from IBS. By unravelling the intricate communication between the GI tract and the CNS, we can develop targeted therapeutic interventions, identify novel biomarkers, and ultimately enhance the quality of life for individuals living with IBS.

Authors Contribution:
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Syed Ijaz Hussain Zaidi: Abstract Writing, Methodology
Muhammad Sajid Abbas Jaffri: Pathophysiology, Clinical Diagnosis
Shahid Mehmood: Treatment Modalities
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Case Report

Open Access

Unusual Presentation of Hepatocellular Carcinoma with Peritoneal Carcinomatosis: Importance of Abdominal Distension as a Clinical Indicator

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ABSTRACT:

Hepatocellular carcinoma (HCC) is a common malignancy of the liver. It is frequently diagnosed in the male gender with a racial predilection towards Asian and African populations. In addition to distant metastasis, large tumors can result in direct extrahepatic metastasis to the peritoneum and diaphragm through rupture of exophytic tumor hepatocellular carcinoma in peritoneal cavity. We report a case of a 55-year-old male having hepatocellular carcinoma secondary to hepatitis C with peritoneal metastasis. The CT abdomen with contrast triphasic study was suggestive of alarming features of chronic liver disease with multicentric hepatoma formation predominantly in segment VIII with the localized subcapsular collection. Additionally, an extensive omental thickening and nodularity were also seen in subhepatic space. Multiple nodules were seen in right cardiophrenic angle, right lower abdomen, and rectovesical pouch. In contrast to conventional chemotherapy with sorafenib, cytoreduction surgery with hyperthermic intraperitoneal chemotherapy has been shown to dramatically improve survival in patients.

Keywords: MeSH: Hepatocellular carcinoma, Liver, Metastasis

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INTRODUCTION:

Hepatocellular Carcinoma (HCC) is the most frequently diagnosed malignancy of the liver and is one of the leading causes of cancer-related death globally. HCC is often diagnosed in the male gender with a high incidence in the Asian and African populations. The most significant risk factor for HCC is cirrhosis and chronic liver disease which are mostly caused by excessive alcohol and viral hepatitis. It classically presents as a localized tumor in the liver but can metastasize to distant sites. Imaging detects 13-36% of patients with metastases at the time of diagnosis. Imaging is prone to underestimate the metastases as according to autopsy it can be as high as 68%.[1] There are several mechanisms which promote metastasis such as aggressive tumor biology and molecular alterations. In the case of HCC factors such as the larger size of the tumor, infiltration, satellite nodules and high alpha-fetoprotein levels have been shown to correlate with metastatic potential.[2] Large tumors can result in direct extrahepatic invasion and commonly abdominal wall diaphragm and peritoneum are involved. Peritoneal carcinomatosis can occur through the rupture of exophytic HCC into the peritoneal cavity resulting in a massive seeding of cancer. The prevalence of peritoneal carcinomatosis secondary to hepatocellular carcinoma has reported incidence of 2-6%, however the exact incidence in Pakistan is not known.[3] Spontaneous rupture of HCC is a dreadful complication having an incidence of 5-26% and mortality ranging from 25% to as high as 75%.[4] Hepatectomy is considered as a feasible option for spontaneous HCC ruptures which offers long-term survival in a selected group of patients with 1 and 3-year survival rates being 60%-77% and 42%-54% respectively. Despite favorable outcomes, the relationship between surgery timing in patients with HCC rupture and peritoneal carcinomatosis is a matter of debate. Herein, we report a case of a 55-year-old patient with HCC, secondary to hepatitis C with peritoneal carcinomatosis.

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CASE PRESENTATION:

A 55- year old male, known case of Hepatitis C reported to the emergency department with the complaints of worsening abdominal pain and indigestion. At the time of presentation to the emergency department, the patient's vital signs were within normal limits, with a blood pressure of 130/80 mmHg, a heart rate of 90 beats per minute, a respiratory rate of 18 breaths per minute and temperature of 37°C (98.6°F), which was also within the normal range. Initial assessment included a through medical history followed by physical examination The abdominal examination revealed a tender right upper quadrant with abdominal distension and dullness to percussion. The initial management included the administration of intravenous fluids and analgesics to relieve the patient's pain and maintain hydration. The patient was also advised to fast and was started on proton pump inhibitors to manage the indigestion.

The initial blood workup included a complete blood count (CBC), liver function tests (LFTs), and other relevant laboratory investigations. The CBC showed a hemoglobin level of 12.2 g/dL (reference range: 13.5-17.5 g/dL), a total white blood cell count of 9.4 × 10^3/ìL (reference range: 4.0-11.0 × 10^3/ìL), and a platelet count of 200 × 10^3/ìL (reference range: 150-450 × 10^3/ìL). The LFTs revealed slightly deranged liver enzymes, with an alanine aminotransferase (ALT) level of 68 U/L (reference range: 7-56 U/L) and an aspartate aminotransferase (AST) level of 80 U/L (reference range: 10-40 U/L). The patient's anti-HCV test was positive, indicating a previous or ongoing hepatitis C infection. The current HCV viral load was also elevated at 150,000 IU/ml, which suggested ongoing viral replication. Moreover, the alpha-fetoprotein level was markedly raised, indicating a potential malignancy. These findings prompted the need for further investigation, which included a CT abdomen with contrast triphasic study that showed features of chronic liver disease with multicentric hepatoma formation predominantly in segment VIII with the localized subcapsular collection (Figure 1). Extensive omental thickening and nodularity were also seen in subhepatic space. Multiple nodules were seen in the right cardiophrenic angle, right lower abdomen, and rectovesical pouch. Mesenteric and retroperitoneal lymphadenopathy (Figure 2) along with splenomegaly and varices formation was also identified. The patient was advised of urgent surgical and oncological review.

A 55-year-old male with known hepatitis C came to the emergency department with worsening abdominal pain & indigestion. The physical examination revealed a tender right upper quadrant, initial blood workup showed slightly deranged liver enzymes. His anti- HCV test was positive and his current HCV viral load was 150, 000 IU/ml. Alpha-fetoprotein level was markedly raised**.** CT abdomen with contrast triphasic study showed features of chronic liver disease with multicentric hepatoma formation predominantly in segment VIII with the localized subcapsular collection (Figure 1). Extensive omental thickening and nodularity were also seen in subhepatic space. Multiple nodules were seen in the right cardiophrenic angle (Figure 3), right lower abdomen, and rectovesical pouch. Mesenteric and retroperitoneal lymphadenopathy (Figure 2) along with splenomegaly and varices formation was also identified. The patient was advised of an urgent oncological and surgical consultation**.**

Figure 1: Axial and coronal CECT abdomen shows arterially enhancing tumor in a cirrhotic liver with multiple peritoneal deposits and portal hypertension.

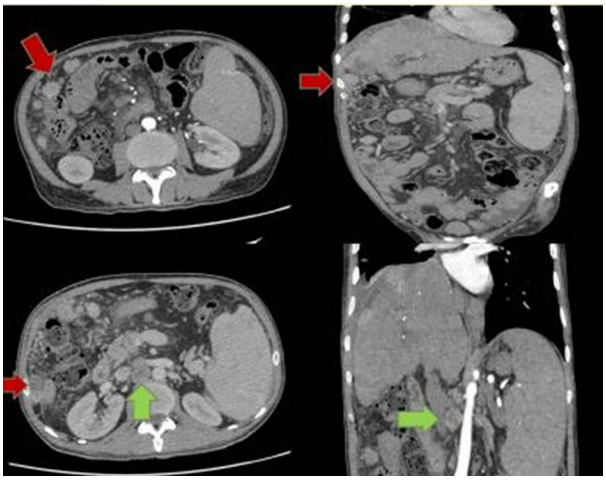
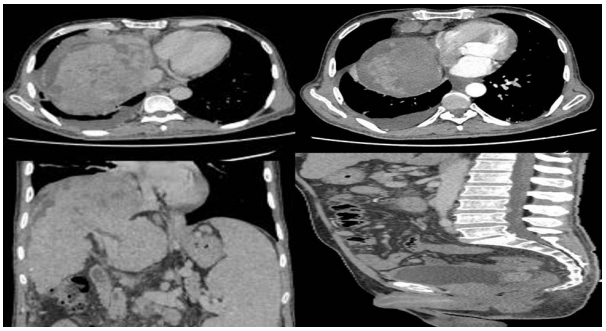


Figure 2: CECT abdomen with reformatted images. Note a collection in right perihepatic space secondary to tumor rupture and multiple cardio phrenic and peritoneal deposits



DISCUSSION:

Peritoneal carcinomatosis is a manifestation of several gastrointestinal malignancies. It is characterized by the deposition of tumors in the peritoneum. It has a variable presentation and can present from asymptomatic to as severe as debilitating pain, diarrhea, bloating, and weight loss. Colorectal cancer, the third most common cancer in the world is usually diagnosed with synchronous peritoneal carcinomatosis and provides a good case study for it. The peritoneal manifestation in tumors is rare. Its incidence is reported in 12% of the ruptured hepatocellular carcinoma cases in a large French cohort.[5] Mostly the patients with HCC rupture subsequently present with intrahepatic

recurrence, the treatment options then are repeated hepatectomy and transarterial chemoembolization. Primary cancer of the peritoneum is even rarer. The usual imaging such as CT and MRI lack sensitivity to detect and assess for disease burden in peritoneal carcinomatosis. The usual CT scan findings such as omental caking, thickening of omentum, and nodules are not common, especially in the earlier stages of the disease. Several studies have determined that a CT scan can underestimate the disease present in the peritoneal cavity and is not reliable for estimating the tumor burden. Compared to CT, MRI and especially diffusion-weighted images have been shown to have better detection accuracy. However, in resource-deficient settings, it comes with the challenge of high cost, motion artifacts, and radiologists not being adequately trained with sophisticated imaging. Peritoneal carcinomatosis was considered to be a lethal disease with limited surgical acceptance until the advent of cytoreductive surgery with hyperthermic intraperitoneal chemotherapy (HIPEC) which has dramatically improved survival in patients. In cytoreduction surgery (CRS), the gross viable tumor is removed, followed by heated cytotoxic chemotherapy for unresectable residual disease. This method has the remarkable capability to not only limit systemic toxicities but also increase the exposure of tumors to chemotherapy. [6] In one of the largest cohorts investigating aggressive surgical management of peritoneal metastasis of HCC, it was found that the overall survival from surgery is 46.7 months. This result is highly variable to the medical management which includes Sorafenib and/or systemic chemotherapy, where overall survival is 6 and 14 months. [7] Despite advantages there is a significant morbidity and mortality burden attached to CRS/HIPEC treatment modality and this option is also limited to a highly specific group of patients with favorable tumor characteristics and a low burden of co-morbidities. Pressurized intraperitoneal aerosol chemotherapy (PIPAC) is a newer novel and minimally invasive therapeutic option for patients having peritoneal carcinomatosis. PIPAC is mostly effective in military peritoneal carcinomatosis as drug penetrates more into small nodules rather than bulky tumor mass. [8] In a pooled analysis of 16 studies it was concluded that PIPAC resulted in a 69% tumor regression rate as assessed by peritoneal sampling during repeated PIPACs. It is worth mentioning that several studies have investigated a combination of systemic chemotherapy and PIPAC and in another study, CRS was also concomitantly performed. The burden of side effects was low even when PIPAC was combined with systemic therapy which had a positive effect on the quality of life. The data suggests there is no significant hepatic or renal toxicity involved allowing the inclusion of patients with an extraperitoneal disease or who might be at significant risk of developing it. Further studies are still required before it can be a treatment of choice. In patients with peritoneal carcinomatosis, the evidence is limited for the benefit of chemotherapy and according to trials, the benefit is minimal to none when going further than third-line chemotherapy. Considering the side-effect profile and quality of life, alternative therapies are an essential need of patients. PIPAC is indeed an option for such patient groups.

CONCLUSION:

Hepatocellular carcinoma is the most common primary malignancy of the liver. It has a gender predilection for males and is frequently linked to alcohol and hepatitis B and C viruses. We report a case of a 55-year-old patient with peritoneal metastasis of HCC. The peritoneum is a rare location of HCC metastasis with only 12% incidence. Proper imaging is crucial to detect peritoneal carcinomatosis. The advent of CRS with HIPEC has dramatically changed the course of the disease with an improved overall survival rate as compared to systemic/ palliative chemotherapy based on sorafenib and other chemotherapeutic agents. A significant burden of mortality and morbidity is associated with CRS/ HIPEC treatment. A newer modality of PIPAC which is minimally invasive is emerging to be another option for patients who may not qualify for HIPEC. PIPAC has been shown to cause significant tumor regression. The side-effect profile of PIPAC is also favorable, having a positive effect on the quality of life. More clinical trials are required to investigate PIPAC further to consider it as a gold standard treatment.

Authors Contribution:
Mariam Shahid: Data Collection, Drafting
Marya Hameed: Study Concept
Syed Maaz Tariq: Statistical Analysis
Ameet Kumar Jesrani: Drafting, Study Design
Ashok Kumar: Critical Review
Saneeta Bansari: Proof Reading

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Case Report **Open Access**

Unmasking the Mystery of A Hidden Syrinx: Case Report of Progressive Paralysis in A 20-Year-Old Male with Intact Pain and Temperature Sensations

Muhammad Sohail Ajmal Ghoauri, Nauman Ismat Butt, Mutahra Khaliq, Muhammad Bilal Rasheed, Muhammad Umair Javed, Dur-e-Sabeh

ABSTRACT

Syringomyelia is a progressive neurological disorder in which a fluid-filled cyst known as syrinx forms within the spinal cord. The case of a 20-year of adult is presented with lower limb stiffness and difficulty in walking for last 3 years. For the last 1 year, he also developed stiffness of upper limbs. Upon examination, he had a spastic gait with no ataxia. There was muscle wasting of both upper and lower limbs, with fasciculation. Tone was increased with reduced power and hyperreflexia bilaterally in all four limbs with positive ankle clonus and upgoing plantars bilaterally. Sensory system, cerebellum and higher motor functions were intact. MRI scan revealed an abnormal intramedullary multifocal T2WI hyper intense signal in cervical and thoracic spinal cord consistent with syrinx and he was diagnosed with Syringomyelia. This case is an uncommon presentation of Syringomyelia presenting with predominantly upper motor neuron lesion without sensory involvement.

Keywords: MRI Scan, Syringomyelia, Syrinx in Spinal Cord.

How to cite this Article:

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INTRODUCTION:

Cerebrospinal fluid (CSF) normally surrounds and protects the brain and spinal cord. However the CSF may build up within the tissue of the spinal cord to expand the central canal forming a syrinx. Syringomyelia is a progressive neurological disorder in which a fluid-filled cyst known as syrinx forms within the spinal cord.[1] When the syrinx affects the brain stem, it is called syringobulbia.[1] The syrinx can get big enough to damage the spinal cord and cause compression injury of various spinal nerve tracks. Clinical features of syringomyelia are various depending on the site, size and spinal extension of the syrinx.[2] Clinical features are usually slow to develop, progress with time and can affect one or both sides of the body. Symptoms may include loss of pain and temperature sensations, chronic pain, stiffness and motor weakness of upper limbs, headaches, loss of balance, urinary and fecal incontinence, sexual dysfunction and/or scoliosis of the spine.[1,2]

There are two main forms of syringomyelia i.e; Congenital and Acquired. Congenital syringomyelia is usually caused by Arnold-Chiari malformation, an abnormal condition in which brain tissue extends through the foramen magnum into the spinal canal obstructing the flow of CSF to result in syrinx formation in the cervical spine.[3,4] Symptoms commonly start between ages 25 and 40 years. People with congenital syringomyelia may also have hydrocephalus, hence it is also called communicating syringomyelia. Acquired syringomyelia (primary spinal syringomyelia or non-communicating syringomyelia) may be caused by spinal cord injuries, hemorrhage, spinal cord tumors, meningitis, arachanoiditis and tethered cord syndrome or it may be idiopathic.[3,5]

CASE:

The case of a previously-healthy 20-years adult presented with insidious onset, gradually worsening lower limb stiffness and difficulty in walking for last 3 years. He was able to walk but required assistance. For the last 1 year, he also developed insidious onset, gradually worsening stiffness of

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upper limbs causing him difficulties to do vocational, avocational and self-care activities. He had stopped working as a mechanic 3 months previously due to his illness. Upon probing; there was no history of numbness or tingling of limbs, spinal trauma, fits, psychiatric symptoms, weight loss, night sweats, urinary or fecal incontinence, altered bowel habits, joint pains or any palpable lumps. He was unmarried and denied sexual contact. He did not smoke or use illicit drugs. Although his parents were first cousins, there was no family history of any similar disorder.

Upon examination, the patient had a spastic gait with no ataxia. There was muscle wasting of both upper and lower limbs, with fasciculation present. In the upper limbs, tone was increased, power 4/5 with Grade III hyperreflexia bilaterally. In lower limbs, tone was increased, power 3/5 with Grade IV hyerprflexia, positive ankle clonus and up going plantars bilaterally. There was no loss of sensation of lateral (pain, temperature) or posterior (propiroception, vibration) spinothalamic tracts. Cerebellum and higher motor functions were intact. There was no tenderness, gibbus or deformity of the spinal vertebrae on back examination. On MRI scan, abnormal intramedullary multifocal T2WI hyperintense signals were seen in cervical and thoracic spinal cord consistent with syrinx as shown in Figures 1 and 2. Based on history, examination and radiographic findings, he was diagnosed with Idiopathic Acquired Syringomyelia. This case is an uncommon presentation of Syringomyelia presenting with predominantly upper motor neuron lesion without sensory involvement.

Figure 1: Abnormal intramedullary multifocal T2WI hyperintense signals seen in the cervical spinal cord on MRI scan

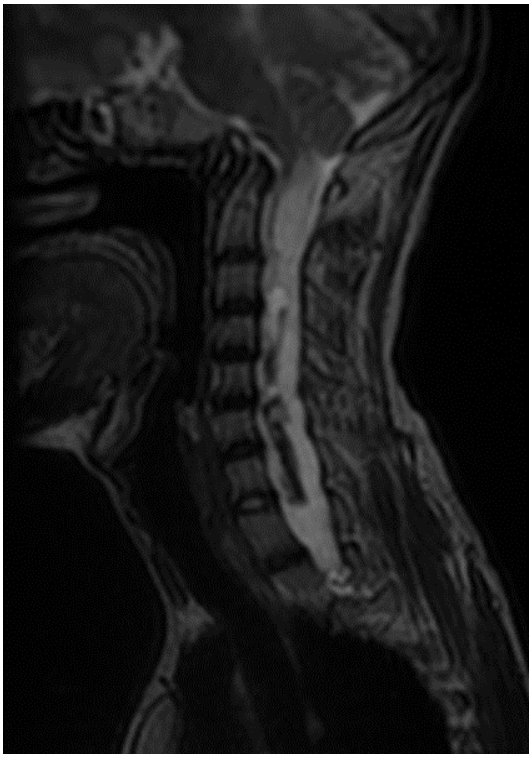
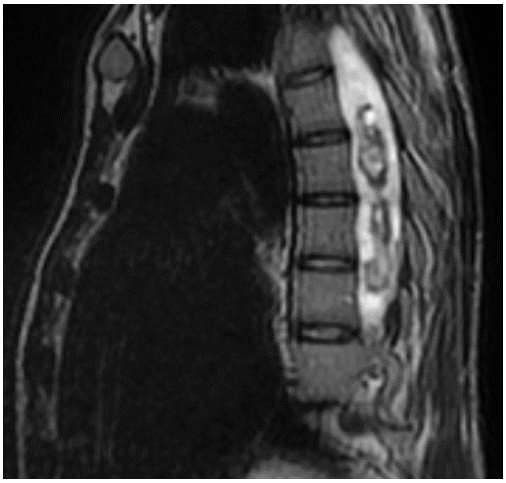


Figure 2: Abnormal intramedullary multifocal T2WI hyperintense signals seen in the thoracic spinal cord on MRI scan



DISCUSSION:

Motor weakness, muscle wasting, and decreased reflexes may develop in the upper extremities due to damage to the anterior horn cells and the corticospinal tract in the cervical spinal cord.[6] Involvement of the lower extremities is usually rare but can occur if the syrinx extends down the spinal cord results in spasticity, hyperreflexia, and positive Babinski sign.[7] This case had muscle wasting of both upper and lower limbs, increased tone with reduced power and hyperreflexia bilaterally in all four limbs with positive ankle clonus and upgoing plantars bilaterally. MRI scan discovered the syrinx extending from the cervical to thoracic spine which helps to explain his examination findings. Loss of pain and temperature sensation, bilaterally and symmetrically in the upper limbs, upper trunk and neck, is usually the first symptom of syringomyelia and is due to the involvement of the lateral spinothalamic tract.[6,7] Proprioception, vibration sense, and fine touch are preserved, as these sensory pathways are located more dorsally in the spinal cord and usually remain preserved in syringomyelia.[6] Autonomic symptoms such as sweating abnormalities, vasomotor changes, bladder and bowel dysfunction may occur due to involvement of the sympathetic and parasympathetic pathways within the spinal cord.[7] However, this patient did not have sensory loss or autonomic abnormalities.

Magnetic resonance imaging (MRI) of the spinal cord is the most reliable way to diagnose syringomyelia.[8] MRI not only helps to determine the presence, size and extent of syrinx in the spinal cord but also aids in ruling out other causes such as spinal cord injury/compression, tumor, meningitis, hemorrhage and Arnold-Chiari malformation.[7,8] Treatment for syringomyelia depends on the severity and progression of symptoms.[9] In aymptomatic and mild cases, a conservative management plan focused on physiotherapy, avoidance of activities that cause strain on spine and close observation is usually employed.[10] In more severe symptomatic or

progressive disease, the solution is surgery aimed to eliminate the syrinx and prevent further spinal cord injury.[9,10] There are two general forms of surgical treatment: restoration of normal CSF flow around the spinal cord, and directly draining the syrinx depending on the symptoms and severity of the disease.[11]

Osama et al.[12] reported a case of C6-C7 level syrinx presenting as neck pain, radiating to his right arm, associated with paresthesia involving Index and Middle finger and a positive spurling test with postural deviation and associated disability. The patient received physical therapy management consisting of pain management, cervical traction, joint mobilization and soft tissue manual therapy aimed at postural and biomechanical correction in combination with medications resulting in marked improvement.[12] Butt et al.[13] reported 2 cases of syringomyelia, first was the result of craniocervical meningioma and the second was due to gunshot wound leading to spinal injury. Both cases required surgical intervention and reported improvements afterwards.[13] Ihsanullah et al.[14] assessed the post-operative outcome after Posterior Fossa Decompression (PFD) with duraplasty in 28 patients with Chiari-1 malformations to report good outcome in 22 patients and fair outcome in 6 cases. Furthermore, syringomyelia cases are recovered well with syringe-subarachnoid shunt.[14]

In conclusion, bilateral upper and lower limb weakness of upper motor neuron type is a rare presentation of syringomyelia and it can be challenging to diagnose. The presence of a syrinx within the spinal cord can cause damage to different sensory and motor pathways leading to a wide range of symptoms. This patient has uncommon presentation of Syringomyelia presenting with predominantly upper motor neuron lesion without sensory involvement. The diagnosis of syringomyelia was confirmed by MRI scan which showed the characteristic features of the disease.

Authors Contribution:
Muhammad Sohail Ajmal Ghoauri: Conception and design, data collection, assembly and patient assessment, manuscript writing
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Mutahra Khaliq: Data collection, assembly and patient assessment, critical review and correction
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Muhammad Umair Javed: Data collection, assembly and patient assessment, critical review and correction
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Letter to Editor **Open Access**

Acrylamide in Fried Foods: A Link to Depression and Anxiety

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Dear Editor, Recent news that has been circulating about fries or fried foods causing depression and anxiety, I believe it is important to clarify that it is not the fries or fried food itself that is causing depression, but rather a compound called Acrylamide, an intriguing and reactive molecule, is naturally produced when Asparagine, an amino acid found in plant-based foods like potatoes and cereal grains, undergoes a chemical reaction with sugars to naturally produce an intriguing and reactive molecule.. Surprisingly, this molecule is not deliberately added to our food, but rather is a by-product of high-temperature cooking methods such as roasting, frying, and baking. Acrylamide has been present in our food for as long as humans have been cooking, making it an integral part of our culinary history.[1] French fries and potato chips have been found to contain significant amounts of acrylamide, with concentrations ranging from 30 to 2300 µg/kg, 306 to 775 µg/kg, and occasionally exceeding 4000 µg/kg in crisps.[2]

Recently, a study found that acrylamide induced a "depression-like" phenotype with anxiety behavior in animals. The study also found that acrylamide altered the expression of genes involved in presynaptic vesicle cycling, affecting the levels of monoamine neurotransmitters such as serotonin, norepinephrine, and dopamine that are associated with depression and anxiety. These findings highlight the need for further investigation into the potential of acrylamide to induce psychological disorders.[3]

Considering these findings, a study was conducted on 140,728 participants to investigate any links between eating fried food and experiencing anxiety or depression. The study revealed that individuals consuming over one serving of fried food per day had a 12% increased risk of anxiety and a 7% increased risk of depression compared to those who did not consume fried food Thus, it can be deduced that habitual consumption of fried food, which harbors acrylamide, could potentially be correlated with heightened levels of anxiety and depression in people. According to the Commission Regulation (EU) 2017/2158 and the International Agency for Research on Cancer (IARC), ACR is a well-known toxin that exhibits powerful mutagenic, teratogenic, and neurotoxic characteristics. The intake of ACR through the mother's diet impacts the metabolism and overall physiology of the developing embryo or fetus. Different doses of ACR have been found to cause disruptions in neural tube formation and developmental effects, which can vary depending on whether the effects are localized or systemic. It is important to note that the research conducted does not prove that fried foods directly cause depression, but rather that they may be associated with it due to the presence of acrylamide. Additional investigation is required to fully comprehend the connection between acrylamide and psychological well-being.[4-5]

In conclusion, we urge readers to be mindful of their consumption of fried foods and to consider alternative cooking methods that do not produce acrylamide. It is important to prioritize our mental health and well-being, and taking small steps such as changing our cooking habits can make a significant difference.

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