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Medical Writing: Challenges in the Contemporary Era

Iqbal Hussain Udaipurwala

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Publication of a research article in medical journal is reflection of scholarly activity and academic credentials.¹ History of medical writing dates back to very ancient times but in the contemporary era, medical writing has been changed a lot and also changing continuously with each passing day. The time was not far in the past when the dictum “publish or perish” was popular but soon only “publish” was not enough. This noble statement is constantly changing its form to become “publish in a good journal or perish”, then “publish in impact factor journal or perish”, “publish in high impact factor or perish”, “continuously publish in high impact factor journal or perish” and so on. Medical writing also became important in our region when academic promotions were made dependent on number of scientific publications. Publication in a well reputed scientific research journal with high impact factor is not an easy task and this is near to impossible who is writing for the first time. Writing skills are developed with practice and reading and it takes enormous patience and dedication to produce a research article.²

Being the part of editorial team in different scientific journals for about three decades, I had witnessed the major changes in practice and attitude in medical writing. The competition in clinical research and medical writing is increasing at tremendous rate. The amount of research papers and journal have been almost doubled during the last decade.³ Although, I know undoubtedly that writing a manuscript about ‘writing’ is very difficult and challenging and the task becomes more problematic when it is about medical writing. At one end, number of articles and research journals have increased, on the other hand the length and volume of each article has also been enlarged with word count reaching upto 5,000 words per article in some journal. As a result it is too difficult for a researcher to go through each article on a specific topic in detail. Due to digitalization and development of many scientific search engines and databases, searching is improved much but again it is too time consuming to go through every article. Researchers are overwhelmed by the load of scientific data available through different indexing agencies. The scientific volume over-load is a double edged sword, which

is very beneficial for publicizing new research but may adversely affects the medical researcher in term of investing in time, resources, and funds etc. At this point, there is definitely a need to diminish excessive scientific volume load to increase the utility, efficiency and practicality and disseminating only the absolute essential information. The idea of decreasing volumes load bring the new concept of “lean and mean writing”. This concept is still in its evolution phase and lot of efforts are required for designing proper guidelines, to make it practical and acceptable. For a new emerging researcher in health and medical field, time is very important and precious aspect in the race to complete everything on its scheduled timeline. Therefore, unnecessary and futile elaboration of the data that can be otherwise presented in a simple and straightforward way, should be restricted in medical writing.

The ease of access to the research data on the websites has surely increased and improved medical writing but on the other side of the coin, it has promoted the culture of plagiarism.⁴ This word was derived from a latin word “*plagiarius*” meaning kidnapping, to denote stealing of someone’s else creative work as his own, which may be intentional or sometimes un-intentional.⁵ The plagiarism will result in unnecessary flooding of the research material with fabricated copy-pasted literature.⁶ It does not only involves stealing of words or phrases, but whole work and idea can be copied without giving due credit to the original worker. It is the basic requirement of contemporary era to cultivate zero-tolerance towards the plagiarism in medical writing.⁷ There can be different form of plagiarism depending upon the intent and extent of the copied material.^{8,9} The complete word to word work can be copied but sometimes words and sequence are changed by using synonyms and grammar, keeping the same meaning and idea as in the original work. There are many softwares available that are used by researchers, teachers, universities, journal editors to detect plagiarism in any work. Turnitin is among one of them and it is the most popular software in medical research and writing and was developed in the year 1997.¹⁰ The main drawback of these softwares is that it detect only similarity index depending upon the matching of words in any article and gives result in percentage. Even a 0% similarity index does not mean that the work is free from plagiarism, therefore human intervention is very important to rule out plagiarism after assessing the similarity index report. It is only the tip

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of the iceberg that we are visualizing in the sea of medical writing.

Another important concern related with the medical writing now a days is the issue of “ghost author” or “ghost writer”. This term refers to a person who has prepared the scientific manuscript or contributed significantly in preparing manuscript but is not included in the list of authors.¹¹ This problem was generated around two decades before when due to over-load in medical writing, professional medical writer turned-out and presently there are thousands of ghost authors around the world. They provide professional services related with all the aspect of medical writing and publishing in the scientific journals and charge their fees for this service. In addition, pharmaceutical companies promotes these ghost authors to publish research articles in good journals to enhance the growth of their products.¹² At one end is the ethical assistance in preparing a medical manuscript for publication while on the other hand there is an unethical and funded ghost author who prepares an article and publish it with the names of other researcher in the field. The line of demarcation between these two is very vague and unclear. Professional medical writer may help a clinician to publish his research in a proper way which otherwise is difficult to get published by a clinician who is busy with his/her practice, so this professional assistance will prevent loss of important data. Secondly quality of the published article will be much better if it is written by a professional medical writer. The International Committee of Medical Journal Editors (ICMJE) and World Association of Medical Editors (WAME) have established policies on specific criteria for scientific authorship. The contribution of each author during the preparation of a research article must be submitted and published along with the manuscript. If the services of a professional medical writer has been sought, it should be mentioned in the acknowledgment section properly. A lot of efforts are required by the international regulating agencies and medical journal editors to deal with this issue of ghostwriting.

Workshops on medical writing and medical research are being organized by different universities, medical societies and medical education departments and now, even at undergraduate level medical writing is being taught. New medical researchers and intended authors are advised to formally attend these workshops before writing an article. There is also need of standardized hand-on workshops at all levels including under-graduates, post-graduates and consultants, as medical writing is a science and art that has to be learned and practice.

Authors Contribution:

Iqbal Hussain Udaipurwala: Substantial contributions to the conception critically evaluation of intellectual content, final approval of the version to be published

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Effect of Anti-Emetic Combination of Sevoflurane / Propofol Anesthesia Technique in Laparoscopic Cholecystectomy

Muhammad Salman Maqbool, Muhammad Alam, Muhammad Umer Draz, Ayesha Shahid, Shumaila Ashfaq

ABSTRACT:

Objective: To assess symptoms of nausea and vomiting in laparoscopic cholecystectomy post-operatively, administered anesthesia by sevoflurane or propofol and to assess the effect of dexamethasone and ondansetron anti-emetic combination.

Study design & Setting: It was an experimental study design conducted from 08-Oct-2017 till 11-Jul-2018 at Rawal General & Dental Hospital.

Methodology: Patients were recruited in interventional groups by lottery method as n=160, with 80 cases allocated in each group. The patients with gallstones planned for laparoscopic cholecystectomy after preoperative assessment were classified to American Society of Anesthesiologist (ASA) physical status class I-II. All the patients placed in a particular ASA physical status class were (exposed to both induction methods) either anesthetic induction by propofol 1-2 mg/kg (group-A) or by employing sevoflurane 4-8% (group-B) in combination with oxygen, while maintenance was done in both study groups with 2% sevoflurane and 50% nitrous oxide in oxygen. After procedure patients stayed in post-anesthesia care unit where intra-operative monitoring was evaluated. The primary end point of the study was to note the rate of nausea and vomiting in 24 hours interval after surgery.

Results: Both sevoflurane and propofol are equally effective anesthetic induction agents. The same combination of dexamethasone and ondansetron was given to both groups and so the actual effect of both anesthesia drugs in terms of side effects were nullified.

Conclusion: In laparoscopic cholecystectomy, both sevoflurane and propofol are good enough when administered with dexamethasone and ondansetron anti-emetic combination, for post-operative nausea and vomiting up to 24 hours observation time in study.

Keywords: Propofol, Nausea, Laparoscopic cholecystectomy, Sevoflurane.

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INTRODUCTION:

This is an era of modern surgery and laparoscopic cholecystectomy has become the preferred method for gall stones disease.¹ As the relative risk of cholelithiasis is around 10-15%, while relapse rate of symptoms and its complications is around 35% while major advantage with laparoscopic technique is reduce length of hospital stay, early recovery and better cosmetic results.² Nausea and vomiting post-operatively remains the most frequent complication and estimated that approximately 20-30% of patients suffer from this issue after surgical procedures done under general anesthesia.³ Factors contributing to postoperative nausea and vomiting are patient factors (previous history of motion sickness, obesity, female gender), surgical factors like surgeries causing peritoneal irritation such as laparoscopic procedures, anesthetic factors (use of volatile agents, duration of anesthesia and narcotic analgesics).^{4,5} It can be troublesome to the patient, sometimes more than the surgery itself and may lead to complications like dehydration, acid base disorders, gastric aspiration and wound disruption.⁶

The two commonly administered corticosteroids (dexam-

ethasone and methyl-prednisolone) are consumed as anti-emetics and effect is particularly enhanced when dexamethasone with ondansetron combination is used.⁴ Dexamethasone 4-10mg given by intra-venous route at induction of anesthesia and there is no convincing data that it causes delayed wound healing or adrenocortical suppression after one dose pre-operatively. Nausea and vomiting are physiological phenomenon and needs co-ordination of various organ systems ranging central nervous system to gastro-intestinal system and serotonin 5-hydroxy tryptamine receptors (5HT3) located in chemoreceptor trigger zone, vomiting center in medulla and peripherally in nerves conducting impulses from vagus and spinal nerves to brain.⁴ The 5HT3 receptor blockers used prophylactically as well as in treatment of post-operative nausea and vomiting. Ondansetron is frequently administered 5HT3 receptor blocker and mostly given as 4-16mg intra-venously prophylactically at induction of anesthesia, however studies show it to be more effective if given after surgery before shifting of patient from operating room as the doses used in this study. Some studies show dose of 4mg to be effective as prophylactic treatment of post-anesthesia nausea and vomiting, whereas other studies demonstrated 8mg dosage.^{4,7}

Sevoflurane has fast onset and smooth on induction and also used in maintenance phase of anesthesia as part of balanced technique, preferably used for inhalational induction in adults as well as children.⁴ It is sweet smelling volatile anesthetic, non-irritant with rapid onset, delivers optimal hemodynamic stability.^{4,8,9} Propofol is also a frequently employed intravenous anesthetic induction agent.^{8,9}

Fredman B¹⁰, et al. did a study comparing three different anesthetic techniques in day-case surgery including sevoflurane, propofol, they stated that sevoflurane is a appropriate substitute to propofol as part of balanced anesthesia agent in ambulatory surgery cases. Keeping in view above consideration this study was configured to assess frequency of nausea and vomiting post-operatively (at 24 hours interval) employing diverse anesthesia induction modalities (propofol and sevoflurane⁹) in laparoscopic cholecystectomy keeping anesthesia maintenance methods same and employing anti-emetic regimen combination (dexamethasone and ondansetron) can address the issue of post-operative nausea and vomiting. Hence, the primary objective was to assess symptoms of nausea and vomiting in laparoscopic cholecystectomy post-operatively in 24 hours interval after surgery by administering anesthesia of sevoflurane or propofol and to assess the effect of dexamethasone and ondansetron as an anti-emetic combination.

METHODOLOGY:

The study was conducted at Rawal General Hospital (Rawal Institute of Health Sciences) main laparoscopic surgical theatre, Islamabad from 8-Oct-2017 till 11-July-2021 after

ethical board approval from Dean Ethical Board, ref vide RIHS-REC/003/17. The sampling technique was purposive. The sample size was calculated employing 5% margin of error with 80% level of confidence and using Rao-soft sample size calculator and came out to be 80 cases in each group.⁸ Patients were recruited in interventional groups by lottery method as n=160, with 80 cases allocated in each group. The patients with gallstones planned for laparoscopic cholecystectomy had a standard pre-operative assessment in outdoor anesthesia clinic and placed in American Society of Anesthesiologist¹¹(ASA) physical status class I-II. Informed consent was taken off for the study. All the patients placed in a particular ASA physical status class were (exposed to both induction methods) either anesthetic induction by propofol 1-2 mg/kg (group-A) or by employing sevoflurane 4-8% (group-B) in combination with oxygen, while maintenance was done in both study groups with 2% sevoflurane and 50% nitrous oxide in oxygen.^{12,13} Inclusion criteria was patients with gall stones and in ASA physical status class I-II. Exclusion criteria was patients with acute viral hepatitis, morbid obesity and ASA class III and IV.¹² In operating room large bore intravenous cannula was placed, electrocardiograph, pulse oximetry, end-tidal CO₂ and blood pressure monitoring was initiated. General anesthesia was begun with co-induction^{14,15} by injection nalbuphine 10mg plus midazolam in dose of 0.01mg/kg in all cases. This was followed by either propofol (group-A) or by sevoflurane(group-B). All patients in study received ondansetron 4 mg at time of induction of anesthesia and before extubation, in addition dexamethasone 8mg used at induction of anesthesia. Endotracheal intubation was done by giving atracurium injection 0.5mg/kg. At induction and anesthetic recovery time along with dexamethasone 8mg at start as anesthetic adjunct whereas tracheal intubation was facilitated by 0.5mg/kg atracurium. At the end of procedure patients were kept under observation in post-anesthesia care unit. Patients were shifted later to respective ward as per clinical evaluation. SPSS version 23 was used for data analysis. Primary outcome parameter investigated was frequency of nausea and vomiting in 24 hours interval post-surgery. The secondary end points included use of analgesics, duration of surgery, and any complications. Mean \pm S.D, frequencies and percentages are presented for variables e.g., age and gender.

RESULTS:

The age, induction with operative time, was shown in table-1. Both sevoflurane and propofol are equally effective anesthetic induction agents. Hence, both groups had same with no symptoms of post-operative nausea and vomiting after surgery in the twenty-four-hour observation time period at all. Pearson correlation determines the affiliation between two variables, value of correlation co-efficient ($r = 0.492$) and was significant at 0.01 level. The same combination of dexamethasone and ondansetron was given to both groups

and so the actual effect of both anesthesia drugs in terms of side effects were nullified. Two cases were diagnosed as Mirizzi syndrome (as depicted in figure-1 and 2 respectively) and one had to be switched to open technique as there were anatomical difficulty in continuing laparoscopic approach and excluded from study. Gender ratio is shown in table-2. In 8 cases (5%) post-operative analgesics were needed and in 172 cases (95.55%) of study no analgesics were needed. The ASA¹¹ grades are depicted in table-3.

DISCUSSION:

Sevoflurane utilization for induction is often times linked with a higher risk of post-surgical nausea / vomiting than propofol based out-patient anesthetic technique but use of antiemetic medications can decrease its incidence.¹⁶ Another

Figure 2: Gall bladder with stones Mirrizi syndrome



Table - 1; Age and operative data. (n=80)

	Age(years)	Induction to loss of consciousness (minute)	Surgery time (minutes)
	Group -A / Group -B		
Mean	44.38/44.73	1.13/1.29	55/60.77
Std. Deviation	13.81/14.36	0.33/0.60	30.90/39.71

Figure 1: Mirizzi Syndrome. (Diagrammatic view A & B)

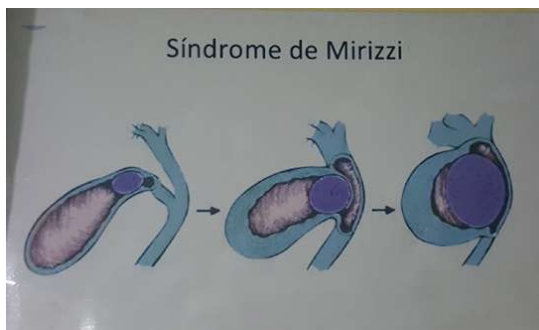


Table 2: Gender distribution(n=80)

	Males	Females
	Group-A / Group-B	
Number	16 / 13	64 / 67
Percent (%)	20 / 16.25	80 / 83.75

Table 3: ASA grades. (n=80)

	Group-A	Group-B
	Number / percent	
ASA-grade-I	48 / 60%	51 / 63.75%
ASA-grade-II	32 / 40%	29 / 36.25%

study stated that various anesthetic practices (depending on anesthetic facilities and expertise) are being used in day case and in-patient(elective) laparoscopic gallstone surgery, with insufficient information to configure ideal one¹⁷, in this study various induction methods were used. In another study it was stated that dexamethasone given at time of anesthesia induction significantly reduces prevalence of vomiting at laparoscopic procedures.¹⁸

Keeping intra-abdominal pressure (kept below 10 cm H₂O in all cases of study) is stated as an important factor in reducing frequency of post-operative nausea.⁹ In study done by Gautam B¹⁹ and colleagues they pointed out that combination of ondansetron with dexamethasone was more effective (regimen used in our study) as a prophylactic against nausea / vomiting in laparoscopically removal of gallbladder as compared to both drugs alone. Yu WY²⁰ and colleagues in their study concluded that ondansetron is effective in prevention and cure of post-operative nausea and vomiting associated with laparoscopic

cholecystectomy procedure with late administration of ondansetron at anesthetic recovery time to be significantly more effective, a regimen followed in this study. In a single case in study on shifting in post anesthesia care area low pulse oximeter saturation of 73% was noted, which immediately improved by administering 60% venturi mask oxygen with patient in head-up, position and by injection hydrocortisone 100mg intravenously. In this study various anesthesia induction techniques were adopted while keeping balanced anesthetic and antiemetic combination uniform and notable that no significant difference existed employing propofol vs sevoflurane induction technique groups, as regard to symptoms nausea and vomiting after laparoscopic cholecystectomy. Another study fully elucidated various available modalities including acupuncture, single versus multi-modal anti-emetic prophylaxis, however they stated that effectiveness of various therapeutic technique will need further studies.^{21,22} In another study, comparing single anti-emetic use(ondansetron) with combination therapy (ondansetron with dexamethasone) for efficacy against post-op nausea and vomiting, in laparoscopic gall stones surgery, they reported dual anti-emetic showing better results, in this study two combination medications were will come utilized with promising results²³. Another study, employed balanced anesthesia technique gallstones laparoscopic surgery in patients with co-morbid diseases²⁴ along with anti-emetic combination (regimen used in this study) with good effect. In another study, it was depicted that for antiemetic prophylaxis in laparoscopic cholecystectomy, dexamethasone in combination with other agent was superior than single anti-emetic administration²⁵.The study had limitation that it was not on a large scale, as multiple factors are implicated as cause of nausea and vomiting, secondly ASA grade III and IV, morbid obesity cases were not extrapolated in our study.

CONCLUSION:

In laparoscopic cholecystectomy, both sevoflurane and propofol are good enough when administered with dexamethasone and ondansetron anti-emetic combination, for post-operative nausea and vomiting up to 24 hours observation time in study.

Authors Contribution:

Muhammad Salman Maqbool: Concept & Design of Study, Drafting, Revisiting Critically, Data Analysis, Final Approval of version.

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Muhammad Umer Draz: Concept & Design of Study, Drafting, Data Analysis

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Comparison of Oral Stereognostic Proficiency Between New and Previous Complete Denture Wearers

Saira Ibrahim, Moiza Ijaz, Ammara Sharafat, Samina Younis, Nida Mukhtar, Abdul Mueed Zaigham

ABSTRACT:

Objective: To compare oral stereognostic proficiency scores between new and previous complete denture wearers.

Study design and study settings: This cross-sectional study design was conducted at Armed Forces Institute of Dentistry, Rawalpindi.

Methodology: Total 60 patients belonging to age group of 45–75 years were selected from the study setting. Oral stereognostic proficiency was recorded by using different oral stereognostic intra oral testing tools and scores were noted. Data analysis was done using SPSS (version 20) software. Independent sample t-test was used to compare the scores of new and old previous complete denture wearers. Effect modifier like gender was rectified by method of stratification. Post stratification independent sample t-test was applied and p value of 0.05 or less was considered to be significant.

Results: The mean age of patients was 59.8+7.85 years. Previous complete denture wearers were found to have a higher value as compared to the new complete denture wearers. Significant difference between both groups according to age was found with older individuals having a lower stereognostic value than younger individuals.

Conclusions: Oral stereognostic test is a dependable test to measure patients' oral stereognostic perception which can help the dentist in better educating the patient in terms of his/her expectations regarding the prosthesis and in better understanding the limitations of the prosthesis.

Key words: Complete denture, Proprioception, Stereognosis.

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INTRODUCTION:

Stereognosis, also known as tactile gnosis, is the ability to perceive and identify the shape of an object in the absence of any auditory or visual aid.¹ The form of an object can be appreciated by palpation and by sensory mechanisms without any visual aid. Exploration of shape or form of an object within the oral cavity is termed as oral stereognosis.²

Human brain being a highly specialized tissue has a special area called primary somatosensory cortex, which receives information from the orofacial region via peripheral sensory nerves.³ This area is involved in oral stereognostic coordination and has a wide representation in the classical sensory homunculus in comparison to the rest of the body. This wide representation in the classic sensory homunculus depicts its great importance for oral sensation and function in humans.⁴ Ideal stereognosis can only be achieved if there is an optimal balance between the sensory and motor coordination of the nerves. Sensory stimuli from the tongue, cheek, palate, floor of mouth and surrounding intra oral tissues are transmitted by the trigeminal nerve⁵ which stimulates or inhibits the postsynaptic potentials in nucleus of the hypoglossal nerve, that results in production of motor stimulation to the muscles of tongue.⁶ Any anomaly or

disruption in this sensory information transmission to the nucleus hypoglossal nerve can thus lead to disrupted stereognosis and hence can adversely affect oral physiological activities for example speech and mastication. Oral stereognostic tests have been frequently employed to assess the integrity and balance of this sensory and motor feedback and are used in neurological evaluation resulting in collection of valuable information helping to determine the factors affecting it.⁷

Natural teeth have mechanoreceptors present in the periodontal ligament around tooth roots which provide a precisely sensitive feedback system. Any tooth loss can thus lead to significant deterioration in stereognostic proficiency of oral cavity. Studies have shown that use of complete denture, however can improve this ability to some extent.⁸ This increase in stereognostic proficiency is attributed to the increased ability of individuals to manipulate the objects due to presence of well-fitting upper and lower complete dentures.⁹

In a study conducted by Meenakshi, oral stereognostic proficiency scores were calculated 30 minutes and 1 month after complete denture insertion. The scores were found to have a mean value of 11.33 ± 0.92 in new complete denture wearers (after 30 min of insertion), and 11.86 ± 0.92 in previous complete denture wearer (after one month of insertion). P value was found to be significant as 0.013.¹⁰

Numerous studies have been conducted on evaluation of oral stereognostic proficiency but there is a scarcity in studies comparing the oral stereognostic proficiency between new and previous complete denture wearers. The rationale of this study was to evaluate any significant difference in the stereognostic proficiency between the new and previous complete denture wearers. This study may provide the dentists with a better understanding of oral stereognosis, which can help them in better treatment planning as well as in educating the patients as what to expect during and after wearing of complete dentures with the passage of time.

METHODOLOGY:

This cross sectional study was conducted at the Armed Forces Institute of Dentistry, Rawalpindi, Pakistan. Research was approved by ethical committee of Armed Forces Institute of Dentistry with reference to ERC reference number 905/Trg-ABP1K2/019. Total 60 patients were selected for the study by using WHO calculator. The variables used in sample size calculation included 95% confidence level, 11.33 population mean with 0.92 standard deviation¹¹ and absolute precision of 0.45¹¹. Sampling technique was non-probability quota sampling. Total n=30 males and n=30 females were selected in order to remove gender as an effect modifier. Furthermore, in each gender group, equal divisions of new and previous denture wearers were selected. Inclusion criteria further consisted of selecting patients of age between 45-75years. Patients with existing neurologic deficit, psychiatric disorders

craniofacial anomalies, local disorders/pathologies, and hearing or visual impairments were excluded from the study. Individuals wearing complete denture for the first time or for less than or equal to 1 month were considered as **new complete denture wearer**, and individuals wearing complete denture for more than once month were considered to be **existing complete denture wearers**. Consent from the patients was taken prior to commencement of the study.

Data was collected on a performa which was filled after conducting the oral stereognostic test on each patient. Oral stereognostic test consisted of testing tools made up of autopolymerizing resin in six different shapes i.e. cube, ovoid, cuboid, triangle, sphere and star shaped as shown in Figure 1. Pictures of these testing tools were shown to the patients on a laminated sheet. Afterwards, the patients were asked to keep their eyes closed while the testing tool was placed on the dorsum surface of tongue. Stop watch was started as soon as the testing tool had made contact with the tongue. Patients were allowed freely to manipulate the testing tool in mouth and then were asked to point out the shape which they thought were in their mouth on the laminated sheet. For each of the individual, the six shapes were placed one by one in random order. Time limitation for identification was 60sec. Stereognostic scores were recorded and entered in the data collection proforma. Maximum score of 12 (6 x 2) and minimum score of 0 was possible for one patient. Shape correctly identified was given a score of 2, incorrect identification with closest shape was given a score of 1, and incorrect identification was given 0 score. Mean score was calculated for each patient with the formula. Scores in the range of 0-3 were considered as poor, 4-7 as moderate and 8-12 as excellent. After recording the stereognostic scores, testing tools were taken out of the mouth with the help of tweezers and were disinfected to make it ready for the next person.

Data analysis was performed using IBM SPSS software (version 20). Basis analysis included descriptive statistics of qualitative and quantitative variables. Frequency and percentage was calculated for qualitative variable i.e. gender. Mean and standard deviation was calculated for quantitative variables including age and oral stereognostic score. Independent samples t-test was used to compare the scores of new and old previous complete denture wearers. Effect modifier like age was controlled through stratification. Post stratification independent sample t-test was applied and p value of 0.05 or less was considered to be significant.

RESULTS:

Sixty participants were included in this study with a Mean \pm SD age of 59.8 ± 7.85 respectively. The baseline characteristics of participants are shown in Table-1. The frequency distribution of age of the participants is illustrated in Figure-2.

Mean oral stereognostic proficiency score in complete

denture wearers was found to be moderate i.e. 7.35 ± 2.276 . The oral stereognostic proficiency score was compared between new and previous complete denture wearers using independent samples T-test which showed a significant difference between both the groups. Increased oral stereognostic proficiency was found in previous complete denture wearers as compared to the new complete denture wearers with a p value of <0.001 (Table 2).

Independent samples t-test was used to compare the difference in oral stereognostic proficiency scores between same gender in both the groups. The scores were found to be higher in both males and females previous complete denture wearers as compared to the new complete denture wearers (Table 2). According to age groups, significant difference was found in stereognostic proficiency between aged 45-59 and 60-75 years patients with higher scores reported in younger 45-59 years old age group participants (Table 3). However, no statistically significant difference was noted in scores when both the genders were compared with each other as shown in Table 4

Figure 1 Shapes of Oral Stereognostic

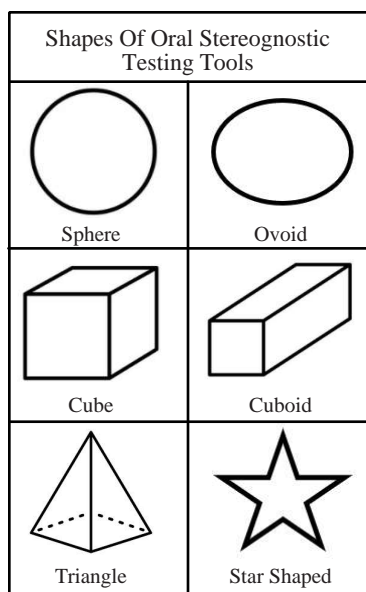


Table 1: Summary of baseline characteristics of study participants (n=60)

Characteristics	Frequency (n)	Percentage (%)
Age in years (mean±SD)	59.8±7.85	
Age range	46-74	
Age groups		
45-59 years	31	51.7%
60-75 years	29	48.3%
Gender		
Male	30	50.0%
Female	30	50.0%

Figure 2: Frequency of age distribution of patients (Age in years)

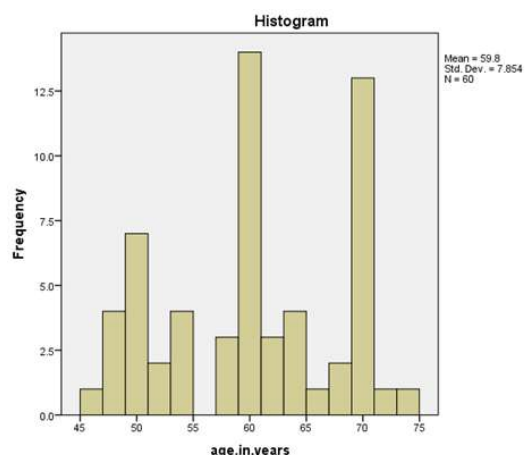


Table 2: Mean Stereognostic proficiency score among study group and comparison of mean score with respect to previous denture experience and gender

		n	Stereognostic proficiency score		p
			Mean	SD	
Overall score		60	7.35	2.276	
Previous denture Experience	Yes	30	9.43	1.63	<0.001
	No	30	5.36	1.84	
Female gender	Old Previous wearer	15	9.33	1.58	<0.001
	New wearer	15	4.93	1.70	
Male gender	Old Previous wearer	15	9.53	1.72	<0.001
	New wearer	15	5.80	1.93	

Table 3: Comparison of Mean Stereognostic Proficiency score between Age Groups in each Gender group

Stereognostic proficiency score		n	Stereognostic proficiency score		p
			Mean	SD	
Female gender	45-59 years	19	8.10	2.42	<0.001
	60-75 years	11	5.45	2.58	
Male gender	45-59 years	12	9.08	2.64	<0.001
	60-75 years	18	6.72	2.19	

Table 4: Comparison of Mean Stereognostic Proficiency score between Male and Females

		n	Stereognostic proficiency score		p
			Mean	SD	
Females	30	7.13	2.76	0.446	
Males	30	7.66	2.61		

DISCUSSION:

In the last two decades there has been an immense improvement regarding materials, methods and advancements in the field of fixed prosthodontics but unfortunately little has changed in the field of removable prosthodontics.¹¹ In regard to complete dentures, the outcome of the treatment is highly unpredictable and patients acceptance of the dentures plays an important role in the success of the dentures. Revisits, readjustments and follow up complaints are frequently encountered. Primary reason for these revisits and complaints are due to the fact of total loss of primary organs i.e. teeth along with their periodontal fibers that are the main proprioceptive units, resorption of alveolar ridge and changes in neuromuscular coordination. Adaptability is a major factor that can improve the neuromuscular coordination and can improve patient satisfaction. This adaptation requires a delicate balance between sensory and motor neurons which is highly variable in different individuals and is affected by a lot of variables.¹² A substantial problem of sensory motor function along with interest in oral perception in general led the researchers to extend the investigation of tactile perception of form intra orally.¹³⁻¹⁵ Majority of the studies conducted focused on determination and comparison of oral stereognostic proficiency of dentate, edentate and comparison between dentate and edentate patients.¹⁶⁻¹⁸ This study was done to compare the result of new and previous complete denture wearers. In this study primarily focused on the manipulation of oral stereognostic testing tools inside oral cavity and assessment of their shape using oral mucosal receptors. Results of this study may help in better understanding of the neuromuscular coordination system in individuals and its relation with better adaptation and success in complete denture treatment.

In the present study, moderate oral stereognostic proficiency value was found in complete denture wearers with a Mean \pm SD value of 7.35 ± 2.276 . This indicates that palatal coverage by the use of complete denture has a positive impact on oral stereognostic proficiency of an individual. These results are in accordance with a study conducted by Bhandari et al who also suggested that stereognostic proficiency increases in edentate individuals after wearing complete denture due to better manipulation of objects and adaptability with time²⁰. Similar results were found in studies conducted by Aken et al and Paulo in which they concluded that the use of complete dentures during the rehabilitation of edentate individuals enhances the oral sensation.^{19,21}

In this study, when results of oral stereognostic proficiency were compared between new and previous complete denture wearers, a significant statistical difference was found with a p value <0.001 . Previous complete denture wearers were found to have a higher value (Mean \pm SD value of 9.43 ± 1.63) as compared to the new complete denture wearers (Mean \pm SD value of 5.36 ± 1.84). This finding is contradictory

with the study conducted by Qureshi AW²² which concludes that there is no statistical difference between new and previous denture wearers. However, findings in this study are in accordance with other studies^{11,14} in which the oral stereognostic proficiency was found to be higher for previous denture wearers¹¹. In a study conducted by Sarapuk V, after one month of wearing of complete dentures, stereognostic assessment was noted to increase by 18.3% and rate of correct identification was increase by 31.5%. These findings may be attributed to the fact that the previous denture wearers had more training and denture wearing time, which in turn resulted in better stereognostic proficiency.^{11,23}

In the present study, patients of a broad age group ranging from 45-75 years were intentionally selected in the study to get more measurable oral stereognostic responses which are in accordance to most of the studies conducted on stereognosis.^{9,11,14,17,18} Significant difference between both groups (45-59 years and 60-75 years) according to age was found with older individuals having a lower stereognostic value than younger individuals. Similar study was performed by Park JH et al to investigate the effect of age on oral stereognosis in 184 healthy adults. Subjects with age in twenties had highest scores (37.42 ± 1.74) whereas those with higher age i.e. eighty plus had lowest scores (20.37 ± 2.99).²⁴ Study by Dr. Divya Dahiya is also suggestive of the fact that as the age increases, OSA tends to decrease significantly.²⁵ Above findings are indicative of the fact that oral stereognostic proficiency diminishes with age. The reason for this finding can be attributed to the fact that there is a decrease in speed of nerve impulse conduction in the sensory fibers with progression in age.²⁶

In the present study, no statistical differences were found when scores of both genders were compared. This finding is in accordance with a study conducted by Leung KC et al study on 45 individuals to find the oral stereognosis level in which no significant differences were reported between males and females ($p=0.614$).²⁷

Results of this study may help in better understanding of the neuromuscular coordination system in individuals and its relation with better adaptation and success in complete denture treatment. Participants with higher oral stereognostic proficiency presumably received more specific sensorial data about objects placed intraorally in comparison to those participants with lesser stereognostic proficiency which can result in better patient satisfaction. Therefore, oral stereognostic test is a valid aid in predicting the adaptability and acceptability of an individual to complete removable dentures. The clinician must pay keen attention and notice the learning skill and capability of the patient to wear the complete dentures. If required, patients should be given certain training to enhance the learning ability of the patient to wear complete denture. Training provided to the patient will improve his oral perceptive skills and the patient will become more responsive to clinical procedures and will

improve patient satisfaction with the prosthesis.

CONCLUSION:

Keeping in view the limitations, it is concluded that the oral stereognostic test is a dependable test which can be used to measure patients' oral stereognostic perception helping the dentist to educate the patient about the future prognosis of the denture and also regarding the prosthesis limitations. Another important finding of this study is that oral stereognostic proficiency of an edentate individual wearing complete denture increases with time which can help the dentists to reassure patients about improvement in oral stereognosis with time.

Authors Contribution:

Saira Ibrahim: Concept, Design, Literature Review, Final Approver

Moiza Ijaz: Literature Review and Collection of Data

Ammara Sharafat: Assembly and Analysis of Data

Samina Younis: Data Interpretation

Nida Mukhtar: Data Analysis

Abdul Mueed Zaigham: Critical Revision of Article for Intellectual Content

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Incidence, Awareness and Association of Lifestyle Modification with Symptoms of Polycystic Ovaries (PCOs)

Zara Sami, Dania Farah, Hajra Naz

ABSTRACT

Objective: To determine incidence, awareness and association of Lifestyle modalities with symptoms of Polycystic Ovaries (PCOS) among females of two institutes

Study design and setting: It was a Pilot study based survey at University of Karachi and Bahria University, Pakistan.

Methodology: Following ethical approval, structured questionnaire was designed, validated and distributed as per convenient sampling.

Results: SPSS analysis for 196 responses revealed that 4.6% were PCOS afflicted while 26% of non-PCOS were vulnerable cases on account of suffering any two of the three criterion symptoms of PCOS namely: menstrual irregularities, hirsutism and acne. Chi-square based cross tabulations revealed that PCOS females were predominantly between 21-25 years and were lean singles who exhibited a tendency to exercise, consumed poultry, slept late at night and used plastics by large in daily routine. Females susceptible to PCOS significantly exhibited the criterion symptoms when associated to consumption of poultry chicken, passive smoking and plastic usage on regular basis. Significantly larger proportion (70%) of non-PCOS females were aware about this disease but symptomatic, diagnostic and treatment based knowledge was significantly less prevalent. A significant percentage of females (61.5%) associated PCOS to the occurrence of infertility.

Conclusion: Thus, concluding that imparting awareness about etiological factors, symptomatology and lifestyle triggers can enable females to ensure self-check and curb the chances of being prone to PCOS by avoiding plastics and smoking environment and incorporating weight management in their lifestyle.

Keywords: Life Style, Menstruation Disturbances, Polycystic Ovary Syndrome, Pilot Project, Pakistan, Questionnaires, Surveys, Universities.

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INTRODUCTION:

Polycystic ovarian syndrome (PCOS) occurs when the female hypothalamic pituitary ovarian axis is deregulated thus bestowing detrimental consequences on the life of 6-20% of women in their reproductive period¹ thus featuring infertility derangements in androgen and estrogen leading to diabetes mellitus, depression², anxiety, dyslipidemia cardiovascular complications and cancer.²

Guidelines published for the diagnosis of PCOS as indicated by Rotterdam criteria (2003) is the presence of 2 out of 3 findings such as hyperandrogenism, oligo or anovulation, multiple cyst on the ovaries; hyperandrogenism being the most prevalent. Various animal models ranging from rodents, sheep and nonhuman primates have been established³, keeping in view this criteria to explore the pathogenesis of PCOS and the role of interventions in these PCOS induced models.

A study conducted in China has elucidated the role of brain monoamines in DHEA- induced PCOS mice thus exhibiting depression like behavior.³ Other androgen-induced PCOS models have demonstrated modulated reproductive, endocrine and metabolic traits. A preclinical quest into the intersection of PCOS and gut microbiome, which initiated in 2016, was subsequently followed by clinical studies.⁴

Preclinical trials have also endorsed that environmental modulation can instill PCOS. Continuous prolonged exposure to light⁵ and chronic cold stress can exhibit PCOS like features and morphology. Authors have demonstrated that consumer products such as monosodium glutamate (a flavor enhancer) when administered to neonatal rodents, PCOS

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like morphology was exhibited in late adult period.⁶ Bisphenol A (BPA) found in plastics and nipples of bottles of babies could precipitate PCOS like phenotypes in neonatal rats.⁷

Clinical studies from Chinese women with PCOS have illustrated a 6 fold greater vulnerability of developing type 2 diabetes mellitus (T2DM) compared to non PCOS.⁸ Meta-analysis has revealed that PCOS inflicted women exhibited 2 fold increase in impaired glucose tolerance (IGT), T2DM, and metabolic syndrome (MetS). A follow-up of PCOS inflicted populations have demonstrated a rapid rise in T2DM.

Having discussed the aforementioned studies, it thus implies that PCOS induced heavy burdens are thus incurred on health care resources.⁹ The prevalence of PCOS is higher in Pakistani women (52%) than among Western Caucasian women.¹⁰ Unawareness might be one of the reasons of its high prevalence in Pakistan. It's prudent to estimate the prevalence of PCOS which in turn is connected to knowledge and awareness. Hence, the pilot survey is an effort to determine the occurrence of PCOS, its awareness and possible influence of lifestyle triggers, which include exercise, sleeping routine, poultry consumption, active/passive smoking and use of plastic containers, in inducing PCOS at two post graduate institutes of Karachi via a validated questionnaire.

METHODOLOGY:

It was a Pilot study based survey at University of Karachi and Bahria University, Pakistan.

The research proposal was approved by the Institutional Bioethical Committee of University of Karachi and IBCKU-147-2020 was assigned by the authorities. Questionnaire was formulated using the variables from literature. Its face validity¹¹ was established beginning with the completion of the questionnaire by one known case of PCOS with enough knowledge. She was also asked for suggestions of missing questions that were subsequently incorporated. A newly modified questionnaire was handed over to another participant with sound knowledge of PCOS for comprehension of the questions. Suggested propositions were also incorporated. This process was repeated with two new participants having sufficient knowledge of PCOS, contrary to the earlier evaluators. Thus, the face validity was established and the finalized questionnaire was then floated in the two institutes: University of Karachi and Bahria University. Convenient sampling considering the rule of thumb of sample size proposed by Browne¹² was adopted. Total 38 students from University of Karachi and 162 students from Bahria University voluntarily participated in the study. Investigator obtained permission from the students prior to data collection, assured confidentiality to the participants and explained the purpose of study. Along with demographics, variables used in the survey included hirsutism, a condition of unwanted male-pattern hair growth in women; Acne also known as *acne vulgaris*, a skin disease that occurs when hair follicles

are clogged with dead skin cells and oil from the skin and *Obesity*, a medical condition in which excess body fat has accumulated to the extent that it may have an adverse effect on health. Lifestyle variables, diet, chicken consumption, passive smoking, sleeping time, exercise and use of plastics were also examined.

Single and married females from puberty to menopause (categorized for analyses) were included in the pilot study and postmenopausal women, girls below puberty and females not willing to volunteer were excluded from the study.^{13,14}

Statistical analysis of survey was performed by SPSS version 23 for descriptive statistics and chi square based cross tabulations for categorical variables were obtained to assess the relationship between determining factors and existence of PCOS at significance level $p < 0.05$.

RESULTS:

The findings from the pilot study of 200 participants from University of Karachi and Bahria University, Pakistan have been classified into PCOS afflicted and probable PCOS cases based on Rotterdam criteria. Chi square based cross tabulations from 196 valid responses revealed that 4.6% females were PCOS as diagnosed by their personal doctors. It's interesting to note that only 33% of PCOS afflicted females exhibited the two out of the three Rotterdam criterion symptoms namely: irregularity of menses, hirsutism and/or acne. Whereas, approximately 26% of non-PCOS cases reported that they were facing at least 2 of the above stated symptoms of PCOS. Thus, they might be the probable cases of PCOS.

The relationship of diagnosis of PCOS and age was significant ($p < 0.01$) suggesting maximum (44.4%) cases in age group of 21-25 years. From the data of 6 PCOS females 5 were lean (BMI = 18.54-24.9) whereas, only one was overweight (BMI = 28.47). Total 8 females who responded to the variable of marital status in the questionnaire were single. From the available options of doctors in the questionnaire, all PCOS sufferers were consulting gynecologists and 3 reported a family history of PCOS.

Majority of PCOS sufferers had a regular exercise routine (77.8%) and were involved in some kind of household work like sweeping (66.7%). The diet composition of PCOS sufferers was a combination of vegetable and meat. All females with PCOS were consuming chicken at least once a week with majority consuming thrice or on daily basis. Total 88.9% of PCOS inflicted consumed poultry and ate at least one piece of chicken daily ($p < 0.05$). Total 22.2% of PCOS females tended to eat 4 pieces/ day. Chicken breast was the most liked (55.67%) amongst the PCOS afflicted. All PCOS sufferers did not exhibit a healthy lifestyle by sleeping late at night that is beyond 9pm. Coffee consumption was not a significant characteristic of PCOS females as 44.4% were using coffee occasionally and only 1 PCOS participant consumed 3 cups of coffee on daily basis. Usage

of plastic in daily life was a popular feature in PCOS cases, though not statistically significant.

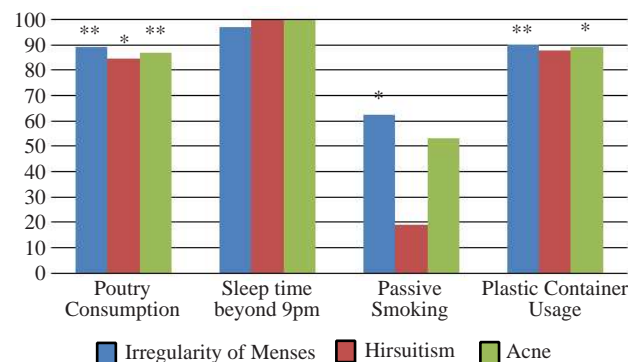
Demographic And Lifestyle Characteristics With Respect To Symptomatology Of Pcos In Vulnerable Cases

In the present pilot study, 68.4% of females suffering from irregularity of menses ($p < 0.0001$) and 73.6% of acne sufferers ($p < 0.05$) belonged to the age bracket of 15-20 years as per likelihood ratio test. 66% PCOS vulnerable females had normal BMI ranging between 18.5-24.9. 93.75% of these probable PCOS females reported single marital status.

The findings for type of diet in vulnerable cases were similar to the diagnosed cases as 93.75% consumed a combination of vegetarian and non-vegetarian. Consumption of poultry chicken was significantly prevalent in more than 80% of females having the three individual criterion symptoms of PCOS though not diagnosed with the disease (figure 1). Amongst the non-PCOS; 77.9% females having irregularity of menses, 85.2% hirsutism and 83% acne sufferers were consuming chicken more than once in a week. 43.2% of non-PCOS females having irregularity of menses and 37% of hirsutism sufferers liked breast piece ($p > 0.05$). Whereas, 47.2% of non-PCOS acne afflicted females expressed likeness of leg piece. The highest frequency of chicken consumption was thrice a week (43.75%) with majority consuming one piece per meal and showing greater likeness for leg piece 45.6%.

Passive smoking was significantly associated to occurrence of irregularity of menses and acne as compared to hirsutism. 62.5% of females belonging to the family having chain smokers suffered from irregularity of menses ($p < 0.05$). Similarly 53.1% female passive smokers reported the problem of acne ($p < 0.05$) with 50% identifying father/brother/husband as smoking family members. Hirsutism was not associated to the chain smoking in the family as only 18.8% passive smoking females reported this characteristic feature of PCOS ($p > 0.05$). A significant majority of females suffering from irregularity of menses (90.3%, $p < 0.01$) and acne (85.7%, $p < 0.05$) were users of plastic bottles in daily routine.

Figure 1 shows the occurrence of symptoms of PCOS with respect to lifestyle variables in non-PCOS females such that $p < 0.01$ and $p < 0.05$



Knowledge About PCOS Amongst Non-PCOS In Pilot Study.

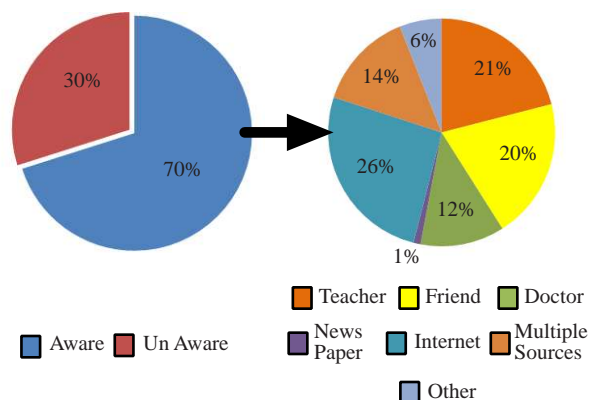
A significant majority (70%, $p < 0.01$) of non-PCOS females were aware about this disease and internet was the popular source of information (26%, $p < 0.01$) as evident from figure 2. From 30% of those who were unaware, age-wise comparison showed that majority of unaware females belonged to age group of 15 to 20 years (63.2% of 30%).

Lack of exercise was reported by 49% vulnerable PCOS females. Similarly, 36.17% of them reported lack of performance of household work like sweeping. With respect to symptoms of PCOS; 41.6% females with irregularity of menses, 38.5% hirsutism sufferers and 36.5% acne sufferers reported that they never performed exercise but there was a likelihood to perform household work like sweeping very often in females with irregularity of menses (45.3%), hirsutism (44.9%) and acne (49.1%) though the associations were not significant ($p > 0.05$) as asked in a separate question.

The unhealthy sleeping routine of females exhibiting symptoms of PCOS was comparable to the diagnosed cases as 97.3% females with irregular menses slept after 9 pm whereas, all females suffering from hirsutism and acne slept beyond 9 pm (figure 1).

Knowledge in terms of symptoms was significantly less prevalent (table 1) as 26.4% of non-PCOS reported that menstrual problem was a symptom of PCOS ($p < 0.001$). Similarly 7.1% ($p < 0.001$), 24.2% ($p < 0.01$) and 20.9% ($p < 0.05$) were aware about obesity, acne and depression as symptoms of PCOS respectively. Knowledge was also gauged by asking about the diagnostic tests and treatments for PCOS and infertility as prominent consequence of PCOS. Probing into the diagnostic and treatment relevant knowledge revealed that Pelvic Ultrasound (44.3%) was most popularly and significantly ($p < 0.01$) known diagnostic test in undiagnosed PCOS (table 2). Similarly, very few reported weight loss and diet adjustment (37%, $p < 0.01$) and Glucophage (12%, $p < 0.05$) as treatments for PCOS (table 2). Awareness about infertility as a consequence of PCOS

Figure 2: Shows the awareness in non-PCOS females and sources of knowledge



DISCUSSION:

Approximately 100% of diagnosed PCOS cases in the conducted survey reported irregularity of menses ($p < 0.001$) which can be supported by a survey conducted in Tamil Nadu where the student exhibited PCOS induced oligomenorrhea.¹³ In addition to this the PCOS afflicted, 88.9% reported acne ($p < 0.001$) and 55.5% reported hirsutism ($p < 0.01$) in the current study. Previous researches have also shed light to such findings where survey conducted in India, showed that 70% students had oligomenorrhea and polycystic ovaries, 13.3% had hirsutism and polycystic ovaries, 3.3% had oligomenorrhea and hirsutism and 13.3% had all the three features.¹³ Hirsutism, acne and irregularity of menses can lead to poor self-confidence; thus, precipitating psychological stress. Studies have reported that nearly 50% women in the previous studies and 63.3% (irrespective of whether they were PCO sufferers or not) in the current study significantly ($p < 0.05$ as per likely hood ratio) believed that PCOS is a known cause of infertility and miscarriage which in turn can lead to psychological problems¹⁴ as also evident from the present study where concurrence of depression and occurrence of PCOS as per the knowledge of participants was also significant ($p < 0.05$), though reported by only 22.5%.

This study showed that 33.3% of subjects suffering from PCOS belonged to 15-20 age bracket and 44.4% belonged to 21-25 age bracket. Findings are in concordance with the studies of India showing that 46.50% infertile women were suffering from PCOS and majority belonged to the age group 21-30 years (71.53%).¹⁵ A similar study conducted

in India reported 30% cases diagnosed with PCOS are in 15-20 years of age and 35% cases in 21-25 years.¹⁵ This, thus, summarizes the existence of the signs and symptoms related to PCOS start appearing in young menstrual life which stresses the importance of evaluation of young girls at an early age in order to prevent them from serious problems like impaired glucose tolerance, type 2 diabetes, hyperlipidemia, CV diseases and increased risk of endometrial cancer in the later ages.²

Results showed that 66.7% of PCOS sufferers suggested that doctor was the most suitable source of information ($p < 0.01$) that are in accordance to the findings of Taylor and co-authors.¹⁶ However, are different from Avery¹⁷ who reported Internet as the preferential source. Avery's¹⁷ findings are parallel to the present study for Non-PCOS females in particular as they reported internet as the most significantly popular source of information.

Life style modulations might play a crucial role in the occurrence of PCOS. Total 10 items from the questionnaire focused on the prevalent life style which was with reference to chicken consumption; its quantity and type of meat selected, exercise, sleeping habits, and presence of chain smokers, coffee consumption, and storage of food in plastic containers.

A study conducted in Rawalpindi has demonstrated a strong association of PCOS with regular intake of broiler chicken¹⁸ similar to the present survey. In addition the probable cases also consumed poultry thus it could be the causative agent in the precipitation of PCOS in both vulnerable and known cases: while the probable cases exhibited a greater likeness towards the leg piece and the known towards the breast piece and this could be due to the reason that commercial chicken reared on commercial feed causes increased synthesis of estradiol and disrupts the irregularity of menstrual cycle leading to a disturbed reproductive cycle causing infertility. Frequency of chicken consumption alters estradiol levels that could lead to obesity.¹⁹

Probable cases also exhibited lack of exercise which is a

Table 1: Shows the awareness in non-PCOS females regarding the symptoms of PCOS

	Known (n)	Not Known (n)	
Menstrual Problem	48	134	$p < 0.001$
Obesity	13	169	$p < 0.001$
Acne	44	138	$p < 0.01$
Depression	38	144	$p < 0.05$

Table 2 shows the frequency (n) of non-PCOS females having knowledge about diagnostic tests and treatments for PCOS

		Known (n)	Not Known (n)	
Diagnostic Test	Pelvic Ultrasound	82	103	$p < 0.01$
	Sonography	29	156	$p > 0.05$
	Laparoscopy	08	177	$p > 0.05$
	Serum Androgen Test	27	158	$p > 0.05$
PCOS Treatment	Oral Contraceptives	32	145	$p > 0.05$
	Clomiphene, Leuprolide	09	168	$p > 0.05$
	Weight Loss and Diet Management	65	112	$p < 0.01$
	Surgery	131	46	$p > 0.05$
	Glucophage	21	156	$p < 0.05$

fine line of treatment and in the management of PCOS.²⁰ Weight loss improves every aspect of PCOS from ovulation to pregnancy rates. It lowers testosterone levels and improves psychological anomalies as well.²¹

Passive smoking environment could instate irregularity in menses and acne as reported in the current findings which could be supported from the findings that second hand smoke could induce a high risk of metabolic syndrome and reduce conception rates in PCOS.²² A greater percentage of surveyed population is using plastic storage boxes and bottles. Research has established that bisphenol A (BPA) present in the plastics can act as hormone disruptor and be a cause of Polycystic ovaries.²³ PCOS sufferers and probable cases exhibited delayed sleep. Our results exhibit consistency with the previous authors that women with PCOS demonstrate poor sleeping habits^{24,25} while to add to it women with one or two symptoms of PCOS exhibited inappropriate sleeping habits in the current survey.

Thus, it is prudent to take care of the signs and symptoms of PCOS and modulate life styles which are also acting as determinants of PCOS.

The limitations of the present study could include the diversification of the sample that is the questionnaire could have been floated to the girls of similar age group having less education. Thus, it then becomes prudent to translate the questionnaire in Urdu and other languages to get a better outlook regarding awareness. Many other lifestyle modifications could be also incorporated in the questionnaire.

CONCLUSION:

Dissemination of awareness of the underlying features of PCOS would be imperative in reducing PCOS induced psychological stress and to resort to immediate medical treatments; hence, reducing the burden on economy. Moreover unhealthy lifestyle modulation could be a contributing factor which could be; otherwise, avoided to minimize or alleviate PCOS associated pathologies.

Authors Contribution:

Zara Sami: Conception and design

Dania Farah: Analysis and Interpretation of data

Hajra Naz: Intellectual design and interpretation

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Association of Levels of Anxiety in Resident Doctors with Factors related to the Postgraduate Training in Teaching Hospitals

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ABSTRACT:

Objective: To assess level of anxiety, its associated factors and coping strategies in postgraduate trainees of public and private teaching hospitals of Karachi

Study Design and Setting: It was a cross-sectional study. The data was collected from different major teaching hospitals February 2019 till April

Methodology: A total of 230 postgraduate trainees were interviewed using a pre-tested structured questionnaire specifically designed for this study which included General Anxiety Disorder-7 Scale and Brief COPE Questionnaire. Data were analyzed on SPSS version 21. Chi-square test and multinomial logistic regression was performed and P-value <0.05 was considered as statistically significant

Results: Total 39.6% of the participants had no anxiety, 34.3% had mild, 16.1% had moderate while 10.0% had severe anxiety. Being single, nuclear family system and low monthly household income had higher odds of having severe anxiety (Adjusted Odds Ratio (AOR); 5.50, 95% CI 1.38,22.14, AOR; 2.50, 95% CI 0.83,7.51 and AOR; 3.17, 95% CI 0.96,10.49 respectively). Severe anxiety was also highly associated with irregular sleep pattern (AOR; 2.06, 95% CI 0.70, 6.06), no daily exercise (AOR; 5.01, 95% CI 1.21, 2.69) and lack of job satisfaction (AOR; 2.64, 95% CI 0.90, 7.90). The most frequently adapted coping strategies by participants who were found to have anxiety were, planning (89.9%), acceptance (87%) and religion (85.6%).

Conclusion: Postgraduate trainees should be provided with psychological counseling and support at workplace to keep them mentally healthy to enhance their everyday performance in dealing and treating patients.

Keywords: Anxiety levels, Coping Strategies, Medical residents, Postgraduate trainees, Teaching hospitals.

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INTRODUCTION:

The field of medicine is very tense and demanding profession involving a variety of stressors and risks. ¹ Severe stress level in health care workers has found to be not only harmful to their own health but is reported to be detrimental to the health of the patients and to the subordinates and colleagues as well. ¹ These stressors can lead to reduced concentration and self-esteem, compromised decision making and increased level of anxiety. ² It is considered that the level of training is the only stressor among doctors but, socio-demographic factors and working environment of the hospital also plays a key role. ² Not addressed timely, the increased level of anxiety manifests in the form of severe psychological and behavioural issues or even more serious issues like depression which is the fourth leading cause of disability world-wide ³ and suicide in worst cases. ^{1,2} In a New York medical university-based survey, the prevalence of anxiety was eight times higher among medical trainees than their age matched controls causing a significant effect on their academic and clinical performance. ³ Long working duration, female gender, low income group, peer pressure, job dissatisfaction and marriage are some common risk factors found to be the leading causes of anxiety. ^{4,5} Doctors start facing psychological distress right from the beginning of their medical school

which continues throughout their training and later professional life.³ It may not only affect their personal life in the form of sceptical behaviour and emotional exhaustion but may also affect their patient care performance as well.⁶

Coping refers to the opinions, views and actions of an individual to deal with stressful life events.⁷ Every person responds to anxiety by adapting and using different coping strategies which may include acceptance, self-blame, planning, positive reframing, religious practices, isolation and sleeping etc.^{8,9} However, resilience may develop with time seeking different strategies that might be adapted spontaneously or may be self-directed.⁷ Usually, it has been noticed that health care workers are adapted toward self-distraction in which they draw their own thoughts away from stressors.⁸ However, the coping strategies may vary deemed to the individual thoughts and circumstances.⁹

Anxiety may lead to depression which can be prevented by addressing anxiety early in time and in an appropriate way.¹⁻³ Several studies have explored the presence of stress and depression among postgraduate trainees internationally^{1,2} and even in Pakistan.¹⁰ However, the local data on prevalence of anxiety and various coping mechanisms is scarce. The main objective of our study was to find out the prevalence of general anxiety disorder among post graduate trainees to carryout in time preventive measures. Secondly, to explore the potential risk factors that may lead to anxiety. Moreover, it was intended to identify various coping strategies that the postgraduate trainees opt to deal with the continuous and yet deteriorating mental ailment to keep themselves going with everyday challenges.

METHODOLOGY:

To study the prevalence of anxiety among post graduate trainees, data were collected through convenient sampling from different major teaching hospitals of Karachi from February 2019 till April 2019. The study was approved by the Ethical Review Board and the Institutional Review Board Baqai Medical University. An online software was used to calculate the sample size. The prevalence of anxiety was taken as 16%,³ and 5% absolute precision the sample size was calculated to be 207 with 95% confidence level that was inflated to 230. After a written informed consent, 280 participants were interviewed. Irrespective of age and gender, all the volunteered participants were included who were working as Post-graduate trainees. However, participants were inquired about history of any diagnosed medical, surgical or psychological diseases or disorder through self-report. Those found positive, were excluded. Similarly, self-reporting pregnant female participants were also excluded. To rule out undiagnosed depression, a depression screening tool PHQ-2 (Patient Health Questionnaire-2)¹¹ was used after which we had a morbidity, pregnancy and depression free sample of 230 participants - eligible to participate in the study.

The basic socio-demographic traits like age, gender, marital status, family system, monthly income and other factors that are known or might be associated² with anxiety among health care providers were recorded. These include, job satisfaction, peer pressure, sleep duration, regular physical exercise or walk, history of any tragic event and other job or private practice despite of the training. The level of anxiety was assessed through "General Anxiety Disorder-7 Scale (GAD-7)"¹² while the "Brief COPE questionnaire"⁷ was used to observe the coping strategies opt by the respondents who were suffering from anxiety.

GAD-7 Anxiety Scale: It is a seven-item scale to assess level of anxiety. Having the response categories of not at all, several days, more than half the days, and nearly every day which can be calculated by assigning scores of 0, 1, 2, and 3, respectively. Total score of the seven items ranges from 0 to 21. Scores ranging from 0-4, 5-9, 10-14 and 15-21 represent cut points for no anxiety, mild, moderate, and severe anxiety, respectively.

Brief COPE Questionnaire: Brief COPE is related to assessment of 14 different coping strategies namely, self-distraction, active coping, denial, substance use, use of emotional support, use of instrumental support, behavioral disengagement, venting, positive reframing, planning, humor, acceptance, religion and self-blame. Consisting of 28 questions (2 questions per type), the responses are measured on a 4-point Likert-type scale from 1 being 'I've not done this at all' till 4 being 'I've been doing this a lot'. Only those participants who were found to have anxiety by GAD-7 were given the Brief COPE Questionnaire to observe the coping strategies.

Data were analyzed by SPSS version 21.0 whereas graphical presentations were made using MS Excel. Frequencies and percentages were used to present the descriptive analysis. Categorical data was analyzed using chi-square test with 0.05 significance level. To compare continuous data, t-tests and Analysis of Variance (ANOVA) were used. Logistic regression model was used to analyze the categorical Anxiety Score.

RESULTS:

A total of 230 participants were included in the study with the mean age of residents was 28.44 ± 2.43 years and all the participants belonged to the religion Islam. Table 1 shows the descriptive findings of the factors potentially leading to anxiety and their comparison with the level of anxiety taken as no anxiety, mild, moderate and severe. Gender ($p = 0.006$), monthly income ($p = 0.021$), peer pressure ($p < 0.001$), history of tragic incident ($p < 0.001$), having regular exercise or walk ($p=0.005$) and job satisfaction ($p = 0.011$) were found to be highly statistically significant with levels of anxiety.

The association of factors leading to anxiety and different level of anxiety based on logistic regression model is shown

in table 2. Values present adjusted odds ratios with corresponding 95% confidence intervals. Age group younger than 30 years were observed to have mild anxiety than the older age group (AOR 1.28; 95% CI 0.61, 2.66). On the other hand, being male was found to be protective towards developing anxiety. With the odds of 5.50 (95% CI 1.34, 22.14) and 2.655 (95% CI 0.97, 7.23) single participants were likely to have severe and moderate anxiety respectively. Less household income was also found to be highly associated with severe anxiety (AOR 3.17; 95% CI 0.96,10.49). Participants who were not regular with daily physical exercise had 5 times more chance to develop anxiety than those who exercise regularly. Similarly, lack of job satisfaction was highly associated with severe anxiety (AOR 2.64; 95% CI 0.90, 7.90).

Participants scoring high on GAD -7 Scale were asked about different approaches they usually opt to deal with anxiety. The various strategies used to cope with anxiety is shown in figure 1. The most frequently being planning (89.9%) and acceptance (87.1%), whereas the least adopted was substance use (7.9%).

The pie chart illustration in figure 2 displays the overall prevalence of anxiety level among participants with 39.6% of the participants not having any symptoms of anxiety, 34.3% mild, 16.1% moderate while 10.0% had severe anxiety.

DISCUSSION:

In the current era of research and development, there has been a surge to get deep insight into the physical, mental and psychological wellbeing of health care personnel. Reason being the increased prevalence of physical and mental health issues among the health care workers. ¹ There is a general assumption that doctors and health care workers are trained to adopt the pressure and stress of their profession and do not need any support. ^{1,13} However, working in stressful and critical environment, health care professionals are among the most vulnerable occupational categories. ¹⁴ Supporting the literature, our study observed that 60.4% of the postgraduate trainees were found to be suffering from some level of anxiety. According to our results, 10% of the participants were having severe, 16% moderate while 34.3% were having only mild anxiety. Dave et al. in 2018, found 36.58% anxiety among resident doctors that is almost half of our findings. Nevertheless, the residents had some level of depression (27.7%) and stress (24.2%) as well. ² Our finding was consistent to some extent with another study by in 2020 by Khurshid et al. They compared the frequency of anxiety among consultants and postgraduate trainees and observed that 48% of the postgraduate trainees were suffering from anxiety that significantly differed with the prevalence of anxiety among consultants that was found to be 20% ¹⁰.

Table 1: Potential risk factors with different Level of Anxiety among participants (N=230)

Potential factors of anxiety		Descriptive (N=230) n (%)	No (n=91) n (%)	Mild (n=79) n (%)	Moderate (n=37) n (%)	Severe (n=23) n (%)	p-value
Age Group (Years)	< 30	152(66.1)	59(38.8)	54(35.5)	26(17.1)	13(8.6)	0.689
	30 or above	78(33.9)	32(41.0)	25(32.1)	11(14.1)	10(12.8)	
Gender	Male	84(36.5)	43(51.2)	29(34.5)	9(10.7)	3(3.6)	0.006
	Female	146(63.5)	48(32.9)	50(34.2)	28(19.2)	20(13.7)	
Marital Status	Single*	121(52.6)	44(36.4)	36(29.8)	25(20.7)	16(13.2)	0.042
	Married	109(47.4)	47(43.1)	43(39.4)	12(11.0)	7(6.4)	
Family System	Nuclear	104(45.2)	34(32.7)	34(32.7)	22(21.2)	14(13.5)	0.052
	Joint	126(54.8)	57(45.2)	45(35.7)	15(11.9)	9(7.1)	
Monthly Income (Rupees in Thousands)	<50 or >100	114(49.6)	46(40.4)	35(30.7)	15(13.2)	18(15.8)	0.021
	50 - 100	116(50.4)	45(38.8)	44(37.9)	22(19.0)	5(4.3)	
Private Practice	Yes	172(74.8)	64(37.2)	63(36.6)	30(17.4)	15(8.7)	0.274
	No	58(25.2)	27(46.6)	16(27.6)	7(12.1)	8(13.8)	
Sleep Duration (hours)	< 6 - > 8	98(42.6)	38(38.8)	26(26.5)	19(19.4)	15(15.3)	0.029
	6 - 8	132(57.4)	53(40.2)	53(40.2)	18(13.6)	8(6.1)	
Daily Exercise	No	163(70.9)	53(32.5)	60(36.8)	30(18.4)	20(12.3)	0.005
	Yes	67(29.1)	38(56.7)	19(28.4)	7(10.4)	3(4.5)	
Job Satisfaction	No	84(36.5)	26(31.0)	31(36.9)	12(14.3)	15(17.9)	0.011
	Yes	148(63.5)	65(44.5)	48(32.9)	25(17.1)	8(5.5)	
Workplace Peer Pressure	No	86(37.5)	48(55.8)	22(25.6)	13(15.1)	3(3.5)	<0.001
	Yes	144(62.6)	43(29.9)	57(39.6)	24(16.7)	20(13.9)	
Tragic Incident History	No	162(70.4)	73(45.1)	58(35.8)	23(14.2)	8(4.9)	<0.001
	Yes	68(29.6)	18(26.5)	21(30.9)	14(20.6)	15(22.1)	

Table 2: Logistic Regression Analysis of Anxiety Levels with its Potential Risk Factors

Potential Factors of Anxiety	Mild Anxiety		Moderate Anxiety		Severe Anxiety	
	AOR* (95%CI [†])	p value	AOR* (95%CI [†])	p value	AOR* (95%CI [†])	p value
Age Group; <30 years	1.28 (0.61, 2.66)	0.517	0.69 (0.25, 1.94)	0.491	0.19 (0.05, 0.74)	0.017
Gender; Male	0.66 (0.34, 1.26)	0.216	0.30 (0.12, 0.77)	0.012	0.12 (0.03, 0.53)	0.005
Marital Status; Single	0.82 (0.40, 1.65)	0.581	2.65 (0.97, 7.23)	0.056	5.50 (1.34, 22.14)	0.018
Family System; Nuclear	1.20 (0.62, 2.33)	0.58	1.86 (0.79, 4.37)	0.153	2.50 (0.83, 7.51)	0.102
Monthly Income; < 50 & > 100 Thousand	0.8 (0.42, 1.50)	0.487	0.57 (0.24, 1.32)	0.192	3.17 (0.96, 10.49)	0.059
Private Practice; No	1.38 (0.65, 2.96)	0.396	1.72 (0.64, 4.59)	0.274	0.66 (0.21, 2.08)	0.486
Sleep Duration; <6 or >8 hours	0.59 (0.30, 1.17)	0.133	1.49 (0.66, 3.37)	0.335	2.06 (0.70, 6.06)	0.189
Daily Exercise; No	1.98 (0.98, 3.97)	0.054	2.91 (1.12, 7.55)	0.028	5.01 (1.21, 20.69)	0.026
Job Satisfaction; No	1.26 (0.62, 2.56)	0.516	0.79 (0.32, 1.93)	0.608	2.64 (0.90, 7.90)	0.082
Peer Pressure at Work; No	0.37 (0.19, 0.74)	0.005	0.57 (0.25, 1.32)	0.194	0.20 (0.05, 0.82)	0.025
Tragic Incident History; No	0.8 (0.37, 1.72)	0.57	0.41 (0.17, 0.99)	0.049	0.14 (0.05, 0.44)	0.001

[†]CI, Confidence intervals, *AOR, Adjusted odds ratio

Figure 1: Anxiety coping strategies in percentages:

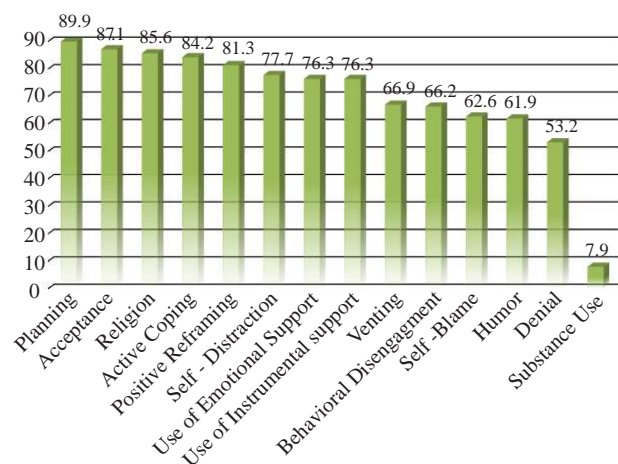
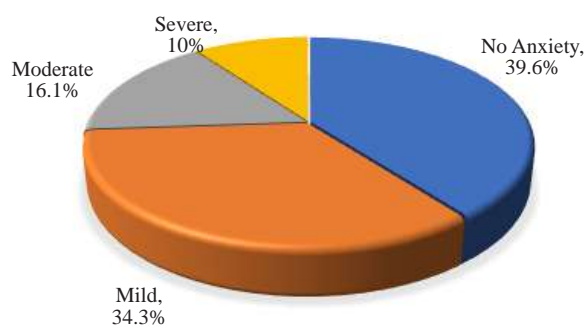


Figure 2: Over all anxiety level among participants



Yet, Mousa et al., in 2016 reported that only 15.9% of the postgraduate residents were dealing with the misery of anxiety which was much less than our findings.³ These variations in study findings may be attributed to several factors deemed to gender, working environment, peer pressure, job satisfaction, ergonomics, management-employee relationship, seasonal workload and so on. Some of the

leading factors were clutched in this study to find out the relationship with different levels of anxiety.

We observed that female postgraduates were more likely to have moderate and severe anxiety. It is also evident from literature that females suffer more with anxiety than males.^{15,16} Studies also show that even female medical students had more anxiety than male students.¹⁷ The higher number of females may explain the high prevalence of anxiety in this study as we had more than 60% female participants. Many previous studies showed low frequency of anxiety

i.e., 22% and 36.58% most likely as the female respondents were lesser in number i.e., 25% and 45.6% respectively.¹
² Therefore, it is evident that gender has an immense impact on the overall result.

Low monthly household income leads to a cascade of reactions including, limited resources, sub-standard lifestyle and poor physical and mental health, making a person at risk for anxiety. Poor socio-economic status and fiscal problems increase the odds of having anxiety.¹⁶ We found that participants with low or very high monthly household income were more likely to have severe anxiety, though we had more participants with high-income as compared to low, but no data supports that high income may lead to anxiety. Nonetheless, continuous inflation and lifestyle upgradation might be the causative factors that needs to be addressed in future studies.

The odds of having severe anxiety was 5 times and of having moderate was 2.6 times higher among the participants who were single. These findings are parallel to previous studies.^{17,18} Though, there is some literature available that shows that anxiety was more prevalent among the married respondents as they have family responsibilities.^{19,20}

Regular physical activity and adequate sleep are protective against anxiety and other physical and mental health issues.²¹ Having unhealthy lifestyle, improper sleep pattern and lack of daily physical activity is correlated with anxiety.¹⁶ Our study findings also support the data that participants who did not exercise or walk daily were more likely to have moderate and severe anxiety than participants who were regular at it. Regular exercise or walk keeps a person healthy leading to a healthy mind and less time for negative thoughts eventually making him less prone to anxiety.²¹

It was observed that anxiety was associated with peer pressure and lack of job satisfaction at the workplace. Moreover, participants with a history of tragic incident were more likely to develop anxiety. Similarly, Fan et al. reported that 40.5% of the participants had anxiety after an earthquake disaster.²² Negative life experiences and tragedies make individuals more vulnerable to develop anxiety that significantly affects the mental and physical health eventually making them unable to concentrate on work.²³

Despite of stressful conditions at the workplace doctors develop some level of resilience to keep going. For this purpose, they usually adopt certain strategies to cope up. Mc Cain et al. in 2018 found self-blame, behavioral engagement and substance abuse, the most prevailing approaches among doctors.⁹ Furthermore, in 2020, Babore et al. concluded that positive reframing was a defensive feature against anxiety.¹⁴ Positive framing was found in the fifth place with 81.3% of respondents using it as a coping tool. By virtue of positive reframing, individuals improvise a difficult and negative situation positively performing as a better psychological wellbeing.²⁴ Contradicting the above,

we concluded that planning, acceptance and religion were the most frequent coping strategies among our study respondents while, substance abuse and denial were least used. Yet, several studies had observed that smoking, alcohol use and substance abuse were the commonest lines to deal with anxiety and demanding circumstances.^{3,16}

Despite of adding job satisfaction as a proxy, which is a limitation of study, working atmosphere, employee-management relationship, job security and ergonomics, might be some of the causative factors of anxiety that should be addressed in future studies. Secondly, another limitation might be the greater number of female participants that may have affected the overall result to some extent. Efforts are needed to abstain them from the risk factors leading to anxiety including making duty schedule of postgraduate trainees in a less stressful way so that they have enough sleep and adequate time for themselves and their family. Incentives and supportive working environment in addition to regular psychological counseling and support can help them maintain good health.

CONCLUSION:

The study findings revealed that more than a quarter of the postgraduate trainees were found to have either moderate or severe anxiety.

Authors Contribution:

Sehrish Zehra: Conceived the main research idea & developed the study design, developed the study tool i.e. Questionnaire
Samira Faiz: Manuscript Drafting, literature review, bibliography, revising it critically for important intellectual content
Zulfiqar Haider Naqvi: Research Supervisor, final approval of the version to be published
Farhan Muhammad Qureshi, Data acquisition, statistical analysis, interpretation of results and tabulation, final proof-read for any grammatical or language errors
Imtiaz Ali Jafry: Data acquisition, statistical analysis, interpretation of results and tabulation, final proof-read for any grammatical or language errors
Zafar Iqbal Hydrie: Data acquisition, statistical analysis, interpretation of results and tabulation, final proof-read for any grammatical or language errors

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Prognostic Factors and Association of Inflammatory Biomarkers with Severity and Mortality in COVID-19

Hamzullah Khan, Shahtaj Khan, Huma Riaz, Asad Rehman Khattak

ABSTRACT:

Objectives: To determine prognostic values and association of inflammatory markers with severity and mortality in COVID-19 in a hospital based study.

Study design and setting: This retrospective study was conducted from 1st June 2020 to 30th Sept 2020 in Department of Pathology, Qazi Hussain Ahmed Medical Complex, Nowshera and Medical Teaching Institute, Hayatabad Medical complex Peshawar.

Methodology: Out of 215, 71 cases were selected that had all relevant information's on chart available in Blood bank and department of Pathology.

Results: Out of 71 patients, 54 (76.1%) were males and 17 (23.9%) females. Thirty five (49.3%) had age>55 years while 31 (43.7%) were in age range 36-55 years. The frequency of the different blood groups were; 25 (35.2%) B+ blood group followed by 19 (26.8%) A+ and 14 (19.7%) O+ blood group. The AUC for d-dimers was (0.725, 95% CI 0.599-0.855) followed by CRP (0.565 95%CI 0.422-0.7.8) and ferritin (0.519 95%CI 0.36-0.679). The median values of d-dimers was significantly higher in the deceased as compared to the survivors ($p < 0.05$ - Mann Whitney U test). The CRP and ferritin levels were not significantly different in study groups. There was a significant positive uphill correlation of the hospital stay with higher values of d-dimers ($p = 0.01$, $r_s = 0.287$).

Conclusion: D-dimer is a main prognostic factor that predicts mortality in COVID-19 followed by CRP and serum ferritin levels. Male gender and patient with age>60 are at risk of worst outcome under the impact of deranged values of inflammatory mediators. Hospital stay and blood group of patients have no relation with outcome.

Keywords: CRP, Mortality, COVID-19, Ferritin, D-dimers, Inflammatory markers.

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INTRODUCTION:

Covid-19 is a respiratory disease that was reported to the World Health Organization in Dec 2019 from the metropolitan city of Wuhan, China. The World Health Organization (WHO) declared global emergency due to rapid rise in cases of COVID-19 in China and nearby countries by the mid of

February 2020. By the date 20th Feb 2020 the number of laboratory confirmed cases reached to 60,000 in China with 1700 deaths.¹

Globally, Since the 31st December 2019 and till date (22nd January 2021), a total of 98,353,744 cases have been reported worldwide, in accordance with the definition of the Centre of Disease Control (CDC) of COVID-19 cases, with 2,106,818 deaths.²

In Pakistan, the literature so far covering the prevalence and incidence is deficient. By 22nd Jan 2021, reported data from government sources declares 529,000 confirmed cases with 11204 deaths. Khyber Pukhtunkhwa has reported 64651 cases and 1823 deaths.³

Increasing scientific research in field of COVID-19, the abnormalities in routine laboratory investigations, particularly the baseline investigations, has the potential to indicate the severity of the disease in a quick, easy, affordable, accessible and economical way.⁴ Consequently the inflammatory markers like serum ferritin, d-dimers and C-reactive proteins, prolactin and erythrocytes sedimentation rate have been reported to predict the disease severity and mortality in

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COVID-19.⁵ The number of patients are increasing in the second wave and critically ill patients needs ICU treatment that causing a major challenge. Therefore timely identification of severe disease is required with identification of values of prognostic markers to label patients with high risk for mortality.

Authors have reported from the city of Wuhan, China, the hyperferritinemia as predictor of mortality and severity of the disease.⁶ The literature supported the fact that on admission to isolation wards the average ferritin concentration in COVID-19 patients was >800 ìg/L, that was 5.3 times higher in patients with severe disease at time of presentation. Similarly in-hospital mortality was higher in patients with serum ferritin levels >1400 ìg/L as compared to the survivors with <1400 ìg/L ferritin.^{7,8}

A local study conducted in Peshawar, Pakistan concluded that more than 80% of the COVID-19 patients admitted in isolation and ICU had abnormally higher readings of serum ferritin. There was a statistically significant correlation of deranged ferritin levels with an increase in age of patient and with worst outcome in terms of death. Female gender more protective with higher chances of survival with deranged serum ferritin levels in all age groups compared to male gender.⁹

Potentially the linkage of COVID-19 and venous thromboembolism is well described and reported by number of authors with significant alteration of the hematological parameters in corona infection. Some have described the positive association of mortality and morbidity with an increase in the level of d-dimers in COVID-19.¹⁰ A study reported the AUC for plasma CRP levels (0.896) on ROC curve which was significantly higher than age (0.833), ANC (0.820) and platelet count (0.677) in outcome prediction with cutoff values of 41.4 (Sensitivity 90%, specificity 77%).¹¹

The rapid spread of the pandemic necessitates to prioritize patients in risk groups based on levels of these markers to detect the severity of the disease well in time to reduce mortality.

Facilities of costly cytokine analysis is not available everywhere in most of the healthcare facilities. Hence markers like CRP, D-dimers, ferritin are of great interest of the researcher for prognostic values to predict the severity of the pandemic.

Therefore present study was conducted to determine the prognostic values and association of inflammatory markers with severity and mortality in COVID-19 in a hospital based study

METHODOLOGY:

This retrospective study was conducted from 1st June 2020 to 30th Sept 2020 in Department of Pathology, Medical Teaching Institute (MTI) Qazi Hussain Ahmed Medical Complex, Nowshera and Postgraduate Medical Institute,

MTI, Hayatabad Medical complex Peshawar. Out of 215 files, 71 COVID-19 patients had complete information and they were referred to pathology with the request of transfusion of packed cells, blood product, FFP or COVID convalescent plasma therapy' were further studied.

Patients hospitalized with COVID-19 in ICU-COVID-19, HMC were included. Patients where all inflammatory mediators were advised like d-dimers, ferritin, and CRP were advised by the treating consultant were included only, irrespective of age and gender. Similarly those patients were further observed for disease outcome in terms of satisfactory discharge or case fatality due to COVID-19 to be included.

COVID-19 patients where deficient inflammatory mediator readings were available on chart of patients, or patients expired before to be fully investigated were excluded. Similarly all patients with any type of symptoms came to emergency or outdoor patients department or even confirmed patients of COVID-19 in isolation department where readings of the inflammatory mediators were not advised were also excluded. The Serum Ferritin, d-dimer levels was measured by electro-chemiluminescence immunoassay using Roche Cobas E411 Chemistry Analyzer, using commercial kits of Roche diagnostics as per the instructions of the manufacturer.

This study was conducted in line with the research regulations, followed the sound medical practice, redetected human rights and also within the principles of declaration of Helsinki of World Medical Association.

Ethical endorsement was obtained from the institutional ethical review board of Post-Graduate Medical Institute, Hayatabad Medical Complex under notification No (316/HEC/B & PSC/2020 Dated 15th May 2020) and notification No (346/HEC/B & PSC/2020 Dated 10th Dec 2020).

For COVID confirmation, PCR results of the naso-pharyngeal swab duly reported in Public health research laboratory of the Hospital and also of the Khyber medical University (a designated Lab for RT-PCR of 2019nCoV by the Government of Khyber Pukhtunkhwa) were considered only.

Data was entered in SPSS, version 25 and descriptive and correlation statistics were applied. Numerical variables like age of patients and serum ferritin, d-dimer, CRP, age and hospital stay were presented with Mean and SD in case of normal distribution and with median and range where the data was not normally distributed.

Normality of data was assessed using Shapiro-wilk Test.

Independent t-test/Mann Whitney U test were used to determine the difference of the numerical variables (serum ferritin, d-dimer, CRP, age and hospital stay) in groups (discharged satisfactory vs expired). Chi-square test was used to show an association of blood group age and gender with disease outcome in COVID-19 patients.

Receiver operating characteristics (ROC) curve was used

to determine the relationship of clinical sensitivity and specificity of different inflammatory mediators to predict the worst outcome in COVID-19. Correlation tests using Spearman ranked correlation was used to determine the correlation of quantitative variables (serum ferritin d-dimer, CRP, age and hospital stay).

RESULTS:

Out of 71 patients who were selected for plasma therapy, 54 (76.1%) were males and 17 (23.9%) were females. Thirty five (49.3%) had age >55 years while 31 (43.7%) were in age range 36-55 years and 5 (7%) had age less than 35 years. Majority 25 (35.2%) had B+ blood group followed by 19 (26.8%) A+, 14 (19.7%) O+ blood groups. Sixty one (85.91%) had Rh+ while 10 (14.08%) had Rh- blood. Out of total, 25(35%) expired during hospitalization.

The data distribution was assessed with Shapirouilk test and we found that distribution of age in both genders was normally distributed (p -value >0.05) while the distribution of all the three inflammatory markers was in a skewed pattern (p -value <0.05).

While assessing the association of different demographic and hematological factors with outcome, we observed that there was no significant association of gender (p -0.993), age (0.892) and blood group (0.855).

The difference in Mean/median values of different inflammatory markers and hospital stay with disease outcome,

it was observed that the median value of d-dimers was significantly higher in the deceased as compared to the survivors (p <0.05- Mann Whitney U test). No significant difference in median value of ferritin was observed between survivors versus non-survivors (Mann Whitney U test, p >0.05). The Mean with SD of CRP and hospital stay was not significantly different in groups (survivors vs expired) with (independent t test, p =0.566, p =0.423 respectively). (Table 1)

The cut off values of inflammatory mediators for predicting mortality is shown in Table 2. The table further shows the AUC for d-dimers was (0.725, 95% CI 0.599-0.855) followed by CRP (0.565 95% CI 0.422-0.7.8) and ferritin (0.519 95%CI 0.36-0.679).

Correlation matrix showing the correlation coefficient for different quantitative variables in table 6. There was a positive uphill significant correlation of hospital stay with higher values of d-dimers (p =0.01, r_s = 0.287). Unlikely d-dimer by assessing the correlation of the hospital stay with CRP and ferritin was not statistically significant. (Table 3)

The ROC curve showing the area under curve for different inflammatory markers in figure 1.

DISCUSSION:

Male predominance (76.1%) was found in this study. Likewise 35 (49.3%) of the patients presented with age >55 years and 25 (35.2%) had B+ blood group followed as major

Table 1. Difference in inflammatory markers in COVID-19 in study groups

Hematological Markers	Improved or (survivors) (N=42)	Died or (non-survivors) (N=25)	p-value	Test of significance
C-Reactive Protien (CRP) Mean \pm SD	15.18 \pm 12.10	16.86 \pm 10	0.566	Independent T Test
Serum Ferritin Median	1518.4	1363.12	p >0.05	Mann Whitney U Test
d-dimers Median	28.89	135.4	p <0.05	Mann Whitney U Test
Hospital Stay Mean \pm SD	9.6 \pm 8	7.92 \pm 8	0.423	Independent T Test

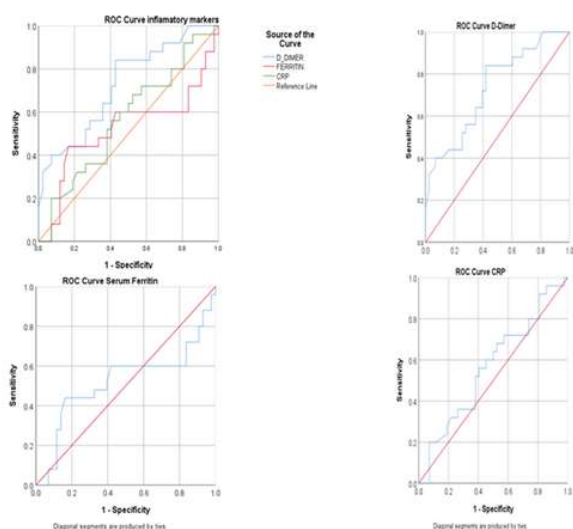
Table 2. ROC statistics for predicting mortality in COVID-19 patients

Test Result Variable(s)	Cutoff values	Sensitivity (%)	Specificity (%)	Area (AUC)	Std. Error	Asymptotic 95% Confidence Interval		Sig. (p-value)
						Lower Bound	Upper Bound	
D_Dimer	2.25	82	80	0.725	0.064	0.599	0.85	0.002
CRP	8.7	72	57	0.565	0.073	0.422	0.708	0.378
Ferritin	1103	62	60	0.519	0.081	0.36	0.679	0.795
The test result variable(s): D_Dimer, CRP, Ferritin has at least one tie between the positive actual state group and the negative actual state group. Statistics may be biased.								
a. Under the nonparametric assumption								
b. Null hypothesis: true area = 0.5								

Table 3. Correlation matrix showing the the Spearman’s correlation coefficient (rs) for Hospital stay with different inflammatory markers

		CRP	Ferritin	D_Dimer
Ferritin	r_s	0.196		
	p	0.111		
D_Dimers	r_s	0.103	0.189	
	p	0.405	0.123	
Hospital stay (days)	r_s	0.037	0.044	.287*
	p	0.764	0.719	0.017
Number of patients		67	68	68

Figure 1. ROC Curve for inflammatory markers



blood groups. The target population was bit biased as included patients who were selected for plasma therapy and by default in initial phases only serious patients were selected for plasma therapy and was thought to be one of the most safe therapy for the serious patients. Total n=25 cases out of 71 of the target population whose files were present in the department reported expired during hospitalization. This mortality reflects the higher rate and as mainly of those patients had serious disease. Reportedly 215 cases received transfusion of blood products for different complication and needs. It was observed that the AUC for d-dimers was (0.725) followed by CRP (0.565) and ferritin (0.519) which shows the higher clinical sensitivity of d-dimer on ROC curve to predict mortality in COVID-19. Similarly the median value of d-dimers was significantly higher in the deceased as compared to the survivors (28 vs 135) with p-value<0.05. The surviving ability drops to less than 20% in age >70 with female gender confer more immunity/chances of survival as compared to male gender.

The measurements of inflammatory markers assist the physicians to predict the severity of the disease.¹² Accumulative assessment have concluded that inflammatory response play a critical role in the COVID-19 progression.^{12,13}

Several inflammatory markers such as Serum ferritin, d-dimers, c-reactive proteins, Interleukin-6 have been reported with high risk of the severe disease.¹³

Gao Y et al¹⁴ have reported that the area under curved for deranged d-dimers as 0.840, which is higher than the findings and further confers the higher clinical impact of deranged d-dimers on the worst outcome in COVID-19. Similarly a meta-analysis reported d-dimer 3.9 times higher in the exposed groups who meet worst outcome in term of death.¹⁵The abnormally deranged serum ferritin levels may be crucial for in COVID-19 patients. A study from Wuhan reported patients who had d-dimer>2 µg/mL had higher fatality than patient who presented with d-dimer>2 µg/mL (p<0.05).¹⁶

A study appeared in JAMA recommended therefore that it would be more beneficial to use the cut off values of the d-dimers for specific population and then for age and gender in the scenario of the COVID-19. That must be added then to the national surveillance system to be used for population studies to determine the high risk group more vulnerable to meet worst outcome in COVID-19.¹⁷

A local study reported the probability of worse outcome in term of death was 2.06 times more in patients with dimers > 0.5 µg/ml (OR = 2.06) with a relative risk of 1.1.¹⁸

The serum ferritin levels are reported high and non stoppable in hospitalized patient with COVID-19. A study reported an increase in the ferritin levels exceeding the upper limit of detection, with increase in hospital stay. Similarly ferritin levels were significantly higher (p<0.05) in critically ill patients (ICU patients) as compared to severe diseased group (Non-ICU).¹⁹ However in present study it was observed a higher ferritin in both groups survivors vs. deceased and was not statistically different in both the groups. The reason may be that hospital is the end stage referral hospitals for COVID-19 care and usually received referral at very end stage with severe disease. A study from China reported higher levels of the serum ferritin in patients died due to COVID-19 infection as compared to the patients discharged. But a trend of high ferritin was noted in COVID-19 patients throughout the clinical course as observed in both the groups (Discharges vs Deceased).²⁰ Another local study that was reported from the Peshawar Pakistan showed that 80% of the COVID-19 patients had deranged levels of serum ferritin at presentation to hospital. These abnormally higher ferritin levels had a statistically significant relationship with an increase in age of patients and outcome in terms of death.⁹

Furthermore it was the only hospital that was allowed and authorized for plasma exchange and included patients from ICU. Therefore at entry to the ICU, majority of the patients were in cytokine storm with high inflammatory markers. Hence, ferritin values was higher in both groups irrespective of outcome and the impact on outcome was less specific than d-dimer. High d-dimer values can be observed in severe

disease after long time while the values of the ferritin and d-dimer decreased with an increase in the disease duration. Likewise a higher in-hospital mortality has been reported in patient with high levels of CRP ($>101\text{mg/dl}$).²⁰ Their findings were higher than the results of this study where the mean \pm SD of CRP was $16.86\pm 10\text{mg/dl}$, but the difference was not statistically significant.

A retrospective study from Karachi reported C-reactive protein (CRP) levels predicting ICU admission with area under the curve (AUC): 0.806, positive predictive value (PPV): 85.1%.²¹

Thus findings of this study support the literature reported from the metropolitan cities affected by COVID-19. The initial readings of the inflammatory markers are predictive of severity and mortality for this pandemic, however the preference in values of d-dimer with ferritin and CRP is different in different studies reported from different quarter/regions as evident from literature/research studies.^{16, 19, 21,22} These markers values need to be specified for different age and gender groups of the respective populations in order to know the severity of the disease. There were some limitations of the study. Smaller sample size restricts us to predict the application of this study on larger population, including more inflammatory markers like LDH etc. Studies executed with larger sample size can estimate the true population impact. Therefore it is suggested that future studies should cover large population with representation to predict/suggest the findings for decision makers.

CONCLUSION:

D-dimer values can be relied as best prognostic indicator at all stages of the disease. D-dimer is a main prognostic factor that predicts mortality in COVID-19 followed by CRP and serum ferritin levels. Male gender and patient with age >60 are at risk of worst outcome under the impact of deranged values of inflammatory mediators. Hospital stay itself has no significant correlation with outcome. Blood group itself does not predict about the severity or fatality of the disease.

Hamzullah Khan: Conception, design, analysis and/or interpretation of data writing the manuscript
Shahtaj Khan: Design, Data analysis and critical review
Huma Riaz: Data Collection analysis and/or interpretation of data
Asad Rehman Khattak: Data Collection

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Role of Early Brief Psychological Interventions in Substance Use Disorders

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ABSTRACT

Objective: To assess the effects of early brief psychological interventions in patients of substance use disorders.

Study Design and Setting: This descriptive prospective study was conducted at main reception centre filter clinic/ Emergency Department of PNS Shifa hospital from 1st July 2020 to 31st March 2021.

Methodology: Total n=78 patients were identified after a simple screening question regarding substance abuse which was how many times the patient had used an illegal drug in the last one year. An answer of more than 1 was considered as a positive response and further screening was done with Drug and Alcohol screening test (DAST). Patients who showed low scores on DAST were recommended for brief interventions which were given as weekly sessions for 6 weeks and reassessment was done at 3rd month. The SPSS 20 package program was used for statistical analysis. The descriptive statistics were analyzed for all the variables evaluated in the study.

Results: This study revealed that that after 3 months of brief psychological interventions, 43(55.1%) patients remained abstinent from drugs. 18(23%) patients did not report for follow up. 9(11.5%) had reduced their use while 8(10.2%) were still using drugs regularly.

Conclusion: This study showed that brief psychological interventions at the level of filter clinics/Emergency departments can help patients of substance use seek early care who fear going to a psychiatric clinic.

Keyword: Brief Psychological interventions, Primary care, Substance use disorders.

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INTRODUCTION:

Around the world, it has been seen that the global burden of disease due to illicit substance use is around 1.5% and in

some countries this is high as 5%. World wide data suggests that 5.5% of the world population aged 15-64, had used drugs in the year 2017. A detailed analysis shows that the number of people who use drugs has increased by 30 per cent since 2009.¹ The most commonly used drug around the world in 2017 was cannabis, with an estimated 188 million users. In 2017, Opioid overdose lead to the death of 47,000 people which is 13 per cent higher than the previous year, however around 100,000 deaths were reported due to overdose of opioid. The cumulative number of deaths which may be due to substance abuse including long term smoking, alcohol use and other illicit drug abuse was around 11.4 million deaths in 2017. By combining these deaths, it has been established that the leading risk factor for premature death globally is substance abuse. It is evident that the age of more than half Literature revealed that the prevalence of drug dependence in males is two times higher than females. In 2016, 2.4% males and 1.2% females were drug dependent.²

As per UNODC survey report of 2013, approximately 6.7 million people in Pakistan were involved in illicit substance use in 2012. Total disease burden due to psychoactive substance abuse in Pakistan was 1.18% whereas 2.39% of Pakistan population was involved in substance abuse. The death rate was 1.71 per 100000 in Pakistan. Cannabis was most commonly used drug in Pakistan and was prevalent in

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3.6% of the population which was roughly equivalent to about four million users nationwide. Every one in five drug addict was found to be involved in poly drug abuse. An estimated 860,000 or 0.8 per cent of the population were regular heroin users and 320,000 (0.3%) were opium users.³

Studies have shown that identification of substance use disorders at primary care level can help patients overcome this disorder but the primary care physicians are less trained in handling substance abuse disorders and have severe time limitations due to the increased load of patients.^{4,5} Globally the availability of treatment for substance abuse remains less than its actual requirement with only one in seven people receiving treatment each year. The primary care clinician's responsibility is increasing and they need to be trained to give some sort of supportive treatment in the initial phase of the disorders.⁶ A study in 2017 showed that collaborative care involving brief behavioral interventions and psychotherapy at the primary care level helped the patient remain abstinent for a longer period of time as compared to regular care that is given to drug addicts⁷. The major hindrances for referring patients directly to psychiatric clinic are the scarcity of available facilities, the financial load and stigma associated with psychiatric treatment and the ambivalence of patients towards seeking long term addiction treatment.⁸ Another option already being implemented in Europe is to have clinical psychologists/therapists/ councilors offer psychological services on-site in coordination with the primary care systems which can help reduce stigma and increase patient access to appropriate treatment.^{9, 10}

Hence, the rationale of this study was to look into the application of brief psychological interventions at an early level at primary care level in Pakistan to see their effect in the recovery of patients of substance abuse. Therefore this study was aimed to assess the effects of early brief psychological interventions in patients of substance use disorders.

METHODOLOGY

This was a descriptive prospective study conducted at main reception center/emergency department PNS Shifa Hospital from 1st July 2020 to 31st March 2021. The research was approved by the Ethical Committee of PNS Shifa hospital vide ERC no ERC/2020/Psy/25. The sample size calculated by WHO formula was found to be 78 with a confidence interval of 80%.⁷ These patients were identified after a simple screening question regarding substance abuse which was how many times the patient had used an illicit substance in the last one year. An answer of more than 1 was considered as a positive response for further screening.¹¹

Sample collection was done through random sampling technique. The exclusion criteria included presence of any other psychiatric illness and lack of consent on part of the patient whereas inclusion criteria included the use of any illicit substance. Drug and Alcohol screening test (DAST)

was applied on all patients during the interview. If the patients showed a score of up to 2 on DAST, they were recommended for brief interventions by the clinical psychologist at the primary care clinic. If the patients showed score of 3 or more on DAST they were referred onwards to psychiatrists for detailed assessment and interventions including laboratory based drug screening tests. Brief interventions based on counseling, motivational interviewing and informational care was given over 6 sessions on a weekly basis by clinical psychologist and resident psychiatrists. Patients were called for follow up at the 3rd month and the screening scales were reapplied. The SPSS 20 package program was used for statistical analysis. Variables were described as mean \pm SD. The descriptive statistics were analyzed for all the variables evaluated in the study.

RESULTS

A total of 78 male patients participated in the study. Participants mean age was 26.4 years (\pm 9.6). Majority of the subjects had some level of education (80.7%) whereas 21.7% of the patients were students. Total 34(43.5%) patients were unemployed. Cannabis was the most abused substance (48.7%) followed by Heroin (17.9%). 14(17.9%) of the subjects were also involved in poly substance abuse.

Brief psychological interventions including motivational interviewing, informational care and drug abstinence based counseling was used over 6 weekly sessions and patients were reassessed after 3 months. It was seen that at the end of 3 months. That 43(55%) patients remained abstinent from drugs. Total 18(23%) patients did not report for follow up, 9(11.5%) had reduced their use but still using it while 8(10.2%) were still using drugs regularly.

Table 1: Demographic Distribution Of Patients

Age(Years)	Frequency	Percentage (%)
= 25	28	35.8
26-36	34	43.5
>36	16	20.5
Mean \pm SD	26.4 \pm 9.6	
Educational status		
Uneducated	15	19.2
Matriculate	24	30.7
Intermediate	21	26.9
Higher studies	18	23.0
Occupational status		
Employed	27	34.6
Unemployed	34	43.5
Students (college/university)	17	21.7
Type of substance abuse		
Cannabis	38	48.7
Heroin	14	17.9
Amphetamines	04	5.1
Alcohol	08	10.2
Poly substance abuse	14	17.9

Table 2: Effect of Brief Interventions

Effect of brief interventions (after 03 months)		
Completely abstinent users	43	55.1
Reduction of drug usage	09	11.5
Failure to follow up	18	23.0
Still using drugs regularly	08	10.2

DISCUSSION:

Research has shown long term substance use can lead to domestic violence and unemployment complicated by increased borrowing of money. It is suggested that peer groups, family behaviors and interactions can affect the behavior of substance abusers.¹² Study comprising of 316 responses which were analyzed using regression analysis has shown that easy availability of illicit drugs, pressure of colleagues, avoidance of family and domestic conflicts have a significant effect on substance use.¹³ Another study from Pakistan based on a survey of 102 male candidates showed that a large number of the individuals (35%) had initiated substance abuse in their teenage years. Majority of the respondents were skilled (60%) and had secondary education (47%), whereas 8% of the patients were students. The most commonly abused substance was heroine (48%) followed by cannabis (28%) whereas domestic disputes and peer pressure were the most common reasons for starting substance abuse. It was also seen that around 46% of patients suffered from co morbid depression.¹⁴ Research has recommended establishing addiction study centers at college and university level to counter the increased menace of substance abuse in students.¹⁵ Patients of substance use thrive on the basis of a strong therapeutic relationship with their doctors/councilors or “Recovery coaches” and are particularly sensitive about their confidentiality. In order to achieve both these targets, an improvement in primary care resources and substance use based training is needed to increase therapeutic relationship and doctor/ councilor’s preparedness to address substance use.¹⁶ Another similar study has also shown that primary care intervention and adequate training of primary care physicians can help promote drug safety behavior. A comprehensive approach known as Screening, Brief Intervention, and Referral to Treatment (SBIRT) can help in the delivery of early intervention and treatment services by universally screening persons who have substance use disorders or are at risk of developing these disorders. Research has shown that application of SBIRT lead to short-term improvements in individuals, however the long-term effects on population health are yet to be seen.¹⁷ The American College of Physicians suggested integrating principles of SBIRT into primary care by utilizing existing primary care clinic-based psychologists to conduct the brief interventions and facilitate early referral to treatment.^{18,19} A study based on Alcohol, Smoking, Substance Involvement Screening Test (ASSIST) – a sensitive screening questionnaire to help

identify misuse of alcohol and other substances – linked to Brief Intervention (BI) in which ASSIST questionnaire was used to screen patients attending primary care units and further categorize the patients into ‘low-risk’, ‘moderate-risk’ and ‘high-risk’ groups. Patients at ‘moderate-risk’ were given ASSIST-linked BI over a six-month trial. The percentages of patients who converted from moderate to ‘low-risk’ category were 36.7% at 3 months, and 53.3% at 6 months.²⁰ In another trial, the participants with opiod and Alcohol use Disorders were treated with Brief interventions over 6 sessions group compared with usual care and it was found that brief interventions participants reported increased abstinence from opioids or alcohol at 6 months (32.8% vs 22.3%) respectively.⁷ A study involving 731 participants from four countries: Australia, Brazil, India and the United States who were given Brief Interventions based on their moderate ASSIST scores found that these interventions help reduced ASSIST scores to mild levels indicating effectiveness of Brief Interventions.²¹ Another research conducted on 780 participants who were given therapist based brief interventions showed that post interventions patients had a reduced intake or abstinence from all form of drugs including alcohol.²² A RCT conducted on 718 individuals comparing brief interventions including motivation interviewing and health informational care sessions found both of them effective at reducing frequency or abstinence of heavy drinking and stimulant use but had no effect on cannabis use.²³ Anderson et al established that primary care training and support in alcohol screening and brief advice had an impactful effect on patients who received the intervention that was sustained even after 9 months.²⁴ This study also showed that early and brief interventions at the level of filter clinics or emergency departments can be helpful in reducing substance use disorders.

However there are some limitations including the smaller sample size of the study, the shorter duration of follow ups and the high risk of patients failing to continue their review. Detailed research needs to be conducted in Pakistan regarding the process and funding of screening of all patients along with utilization, training and availability of clinical psychologists in Main Reception Centers of hospitals to help promote treatment of such disorders

CONCLUSION

Patients of substance use disorders who find it difficult to visit psychiatric clinics can be identified early by simple screening at emergency/filter clinics. Brief psychological interventions applied at the level of these clinics can help in abstinence and reduction of use of such substances.

Authors Contribution:
Muhammad Siddique Kakar: Main author, selection of topics & synopsis
Shehzad Rauf: Supervisor, Methodology
Muhammad Waleed Iqbal: Data Collection, brief interventions
Azaan Qureshi: Statistical analysis
Saad Nabeel: Brief interventions, data collection

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Perception of Dental Faculty on Face-to-Face and Virtual Programs of Faculty Development; A Cross-Sectional Study

Shaur Sarfaraz, Muhammad Kashif Nisar, Samira Adnan, Sabeen Masood, Zohaib Khurshid

ABSTRACT

Objective: To compare the perception of dental faculty regarding face-to-face and virtual faculty development programs (FDPs) in dental institutes of Karachi.

Study design and Setting: A descriptive cross-sectional study was conducted at multiple dental colleges of Karachi. (January to April 2020).

Methodology: The study was carried out among 161 faculty members teaching in private dental institutes, using a modified, validated questionnaire with convenient sampling. Data was analyzed on SPSS version 21.

Results: The mean age of study participants was 32.31 ± 8.09 years, and teaching experience was 5.01 ± 6.34 years. Majority of the participants had not received any faculty development training (p-value of 0.001). Most of the faculty reported no established faculty development program available either face-to-face or virtually in their respective institute. Majority (28.8 %) of participants perceived that the main barrier for FDPs was the lack of administrative support. However, the faculty desired to enhance their teaching skills, recommending that faculty development programs be made compulsory for all faculty members. The majority of participants (35.43 +ve mean rank) were in favour of face-to-face sessions (p=0.001) but were reluctant towards virtual sessions. Most (49.2 %) of the faculty perceived the foremost benefit of attending FDPs to be improvement in teaching skills and MCQs /EMQs writing.

Conclusion: Dental faculty were more inclined towards face-to-face sessions than virtually conducted sessions however, their perception of the utility of FDPs were found to be limited. Moreover, it was that some of the barriers to attend FDPs was faculty determinants like deficient time and dearth of commitment.

Keywords: Dental faculty, Faculty development programs, Self-perception.

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INTRODUCTION:

Faculty development (FD) refers to activities that are organized for effective professionalization of teachers.^{1,2} These sessions vary in length, context and complexity depending upon faculty and institutional needs.²⁻⁴ The most common formats of faculty development programs (FDPs) include workshops, seminars, courses and degree programs. Till date, FD activities have shown convincing evidence in enhancing the professional skillset of the faculty and in helping them perform their academic roles as teachers, assessors, leaders, managers, researchers and mentors.^{5,6} Besides these essential facets, FD can also serve as a useful medium for curricular and institutional reforms that are insinuated to improve the overall educational environment.⁷

Many institutes recognize the value of FD and they invest variable amount of human and logistic resources to assist their teachers in improving their teaching competencies.^{7,8} Although FD is a well known teaching capacity building process, its recognition in the context of dental education in a developing country like Pakistan is still evolving. This could be attributed to the unavailability of expert

educationists, insufficient resources and/or mere lack of institutional priorities.⁸ The commencement of FD activities is less frequent in dental field, and with the additional strain caused by the COVID 19 pandemic lockdown, it becomes even more challenging for health professions educationists to effectively design and conduct workshops for the dental faculty. An additional hurdle is the inflexible attitude of some faculty that hinders the effective translation of training to their teaching practices.⁹ Such faculty members fail to practice evidence-based teaching and eventually revert back to their didactic methods. The factors can include the “Dunning-Kruger effect”, insufficient motivation, lack of institutional support and/or not internalizing the significance of FD.¹⁰ Henceforth, continuous professional development of faculty is essential to ensure evidence-based teaching practices that can positively influence students’ learning and keep faculty’s spirit motivated since they are the key stakeholders steering the professional education of their students.⁵

There is scant evidence in literature related to faculty development programs in dentistry. Hence, this study aimed to compare the perceptions of faculty towards faculty development programs and determine their interest in face-to-face sessions compared with virtual sessions in various dental institutions of Pakistan. The results of this study will facilitate universities, accrediting bodies and policymakers to recognize the needs of faculty development initiatives in dental education. The observations will also aid dental educationists in promoting faculty development programs in various formats, especially in dental institutions.

METHODOLOGY:

This was a descriptive cross-sectional study to compare the perception of dental faculty regarding faculty development programs (FDPs) being conducted in different dental colleges of Karachi, Pakistan. The study spanned over a period of four months, from January 2020 to April 2020.

A self-administered semi-structured questionnaire in the English language was designed to collect data. The study questionnaire consists of three sections. The first section recorded demographics like age, gender, and information about qualification (specialization), teaching program, academic rank and teaching experience of the faculty. The second section comprised of twelve items based on responses on a 3-point Likert scale (Agree, Neutral and Disagree) and assessed the opportunities, support and formal training offered by the institution as well as the attitude of the participants towards faculty development programs in both face-to-face and virtual mode of delivery. The third section contained three open-ended questions. Faculty were asked about the barriers and hindrances in implementing faculty development programs, suggestions regarding areas for training and development of faculty and the rationale they believed for faculty development programs. The questionnaire

was adapted from a similar study conducted by N. Karl Haden and O’Sullivan^{1,3} and modified by authors according to context. The questionnaire was piloted among twenty participants giving Cronbach’s alpha value of 0.81, showing acceptable reliability.

The research was approved by an independent local review body, ethics committee of Altamash Institute of Dental Medicine (Ethical Review #: AIDM/EC/10/2018/05). The final questionnaire was distributed among 200 faculty members. Visiting and adjunct dental faculty and faculty who did not give consent to become part of the study were excluded. Each participant was informed about the purpose and benefits of this research, and a guarantee of confidentiality was provided prior to the data collection. Only after acquiring verbal and signed consent from the candidates, the responses were recorded. A total of 161 responses with no missing data were included in the study. The data was then gathered and transferred into SPSS sciences (version 21). Descriptive statistics like frequency (f), percentage (%), Arithmetical mean (X), standard deviation (s) and Wilcoxon Signed Ranks Test was used to compare the perception of faculty for face to face and virtual programs for faculty development. p-value <0.05 was considered as statistically significant.

RESULTS:

The data related to the demographics of the participants is shown in Table 1. The mean age of study participants was 32.31 ± 8.09 years, and the mean teaching experience was 5.01 ± 6.34 years. A female predominance characterized the respondents, with most participants having only BDS degree. Majority (83.6%) of the faculty taught undergraduate students and more than half (60.2%) of the participants had appointment as senior lecturer.

The majority of the participants had not received any type of faculty development training as data presents disagreement for both formats of FDPs with a significant p-value of 0.001.

Significant mean ranks was found for the format of faculty development programs with opportunities for developing the skills of educational administration ($p=0.000$), improving teaching skills ($p=0.026$), formal training for improving teaching skills attended in other institutions ($p=0.009$) and for the parent institution offering faculty development programs ($p=0.000$). In addition, other significant results are presented in Table-2. In Table 3, the correlation between the faculty’s interest in participating in FDPs conducted through both face-to-face and virtual mode with institutional support is shown. The faculty’s motivation in attending FDPs was significantly more than the support and resources provided by their institutions. This interest was inclined towards the face-to-face sessions as compared to online sessions. Figure 1 shows the perceived barriers to participation in FDPs by the responders. The most significant hurdle in this regard was the lack of moral and financial support from the administration of the institute of employment, followed

by a lack of time and commitment as well as financial constraints.

Responses related to the perceived benefits of the attending FDPs demonstrated that the majority of the participants believed FDPs helped improve teaching skills and provided guidance in the development of assessment tools like Multiple Choice Questions (MCQs) and Extended Matching Questions (EMQs) (44%). Other perceived advantages reported by the faculty are shown in Figure 2. Participants were also asked to suggest topics for which FDPs should be conducted. The responses were categorized into themes, as shown in Table 4.

DISCUSSION:

This study is an initiative to aid dental educationists to determine the current views of dental faculty regarding FD training, the consistency of the FD programs and issues related to these programs in private dental colleges. In the study, it was observed that majority of the faculty members had negligible or no support from their institutions in improving and developing their teaching skills, and that there was lack of trainers or educationists who could develop and facilitate the faculty in improving and enriching their teaching and assessing skills. The lack of availability of appropriate professional personnel for faculty training could be due to the lack of interest of leadership as well as scarcity of relevant resources provided by the administration and other figures of authority towards developing their faculty. Similar findings have been reported in other studies¹⁵⁻¹⁶ where emphasis has been placed on the need of administrative support to implement professional development programs to improve faculty teaching skills and organizational outcomes.³⁻¹¹ Such support to the faculty results in a positive change in their teaching behaviours and they contribute in their institutions by escalating the quality of teaching programs.¹²⁻¹⁷

This study showed that majority of participants had not received any type of faculty development training as represented by the data for both modes of delivery. In addition, the participants who received the training offered by the institution or elsewhere, increased the prospect of developing and improving the skills of educational administration and teaching. The faculty also affirmed that FDPs should be compulsory for all faculty and relevant opportunities should be provided by the institutions. In many studies, similar results regarding faculty development initiatives were found, where there was an outstanding change in faculty confidence after gaining knowledge and skills of teaching when they had undergone proper training.^{5,9,11,16}

Our study also identified the most significant barrier towards FD programs that the faculty perceived was the lack of support from the administration and institutions towards such activities. Many studies reported similarly, where

faculty receive no support or time to improve their teaching and capabilities skills.¹⁸ Teaching and managing students are not spontaneous skills. The faculty requires training and development while being cognizant of evidence-based practices followed globally.¹⁹ Considering the results of this study, if institutes are not willing to promote FDPs in their settings and fail to encourage the faculty to improve their teaching and assessing skills then subsequently, the students would suffer, leaving them less equipped to effectively apply their knowledge in clinical practice.¹⁸⁻¹⁹ Hence, it is imperative that dental colleges and institutes invest in resources required to continually conduct and propagate FD programs, including acquiring the service of health professions educationists and faculty trainers. Moreover, the administration should ensure that all faculty members participate actively in such programs since, besides institution-related barriers, lack of time and

Table 1: Descriptive Statistics of Dental faculty (n=161)

	Mean ±SD
Age(years)	32.31±8.09
Teaching Experience (years)	5.01±6.34
	n(%)
Gender	
Female	99(61.5)
Male	62(38.5)
Qualification	
B.D.S	63(39.1)
M.Sc.	35(21.7)
F.C.P.S	28(17.4)
M.C.P.S	19(11.8)
MPH	6(3.7)
FDSRCS	8(5.0)
PhD.	2(1.2)
Field of Specialization	
Not specialized (BDS only)	38(36.9)
Dental Material	3(2.9)
Oral Biology	2(1.9)
Community Dentistry	3(2.9)
Oral Pathology	10(9.7)
Periodontology	11(10.7)
Oral Surgery	12(11.7)
Prosthodontics	9(8.7)
Operative Dentistry	8(7.8)
Orthodontics	7(6.8)
Teaching Program	
Undergraduate	139(86.3)
Postgraduate	22(13.7)
Academic Rank	
Senior/Lecturer	97(60.2)
Assistant Professor	34(21.1)
Associate Professor	18(11.2)
Professor	12(7.5)

Table 2: Comparison of items means pertaining to perception of face-to-face and virtual mode of faculty development programs (FDPs)

Items	Median(IQR)		Positive Mean Rank	Negative Mean Rank	P-value
	Face to Face	Virtual			
I try my level best to improve the learning of the students	4.00(2)	4.00(2)	0.00	0.00	1.000
I get opportunities for developing the skills of educational administration	3.00(2)	3.00(1)	11.00	0.00	0.000*
I want to improve my teaching skills by faculty development programs	4.00(1)	4.00(1)	0.00	3.50	0.026*
I attend formal training for improving my teaching skills in other institutions	3.00(2)	2.00(2)	4.50	0.00	0.009*
My institution offered us to participate in faculty development programs	3.00(1)	3.00(2)	14.50	0.00	0.000*
I attend formal training in my institution in faculty development programs	3.00(2)	3.00(1)	4.93	1.50	0.019*
I have undergone through faculty evaluation after faculty development program	3.00(2)	2.00(2)	32.71	26.29	0.000*
Teaching abilities are considered while considering faculty promotion in my institution	3.00(2)	3.00(2)	8.78	12.50	0.002*
Teaching abilities are considered necessary while regarding students learning in my institution	3.00(2)	3.00(2)	7.59	3.75	0.007*
I receive institutional support for improving teaching skills	3.00(2)	3.00(2)	7.65	10.25	0.024*
Faculty training programs should be compulsory for all faculty	4.00(1)	2.00(4)	8.14	8.14	0.000*
Opportunities are available in my institution for trying out alternative approaches in teaching	3.00(1)	3.00(2)	13.98	14.07	0.028*

Wilcoxon Signed Ranks Test was applied. p-value<0.05 considered as significant. * Significant at 0.05 levels

Table 3: Comparison of attitude of faculty and support from the institute with faculty’s preference interest towards face to face or online FDPs

Questions	Median(IQR)		Positive Mean Rank	Negative Mean Rank	P-value
	Face to Face	Virtual			
Attitude (1,3,4,6,7,11)	2.00(1.50)	2.00(1.50)	35.43	20.50	0.000*
Institute Support (2,5,8,9,10,12)	2.00(1.00)	2.00(1.50)	18.00	14.60	0.000*

Wilcoxon Signed Ranks Test was applied. p-value<0.05 considered as significant. * Significant at 0.05 levels

Table 4: Topics suggested by dental faculty to be conducted in FDP (n=161)

Topics for FDPs	n(%)
Don’t know/No idea	62(38.5)
Teaching methods and strategies	50(31.1)
Constructing MCQs/EMQs	30(18.1)
Distance learning/Integration of online education	8(5.0)
Communication skills/Student counseling	7(4.3)
Research/Education Administration	4(2.5)

Figure 2: Perceived benefits of attending FDPs identified by dental faculty.

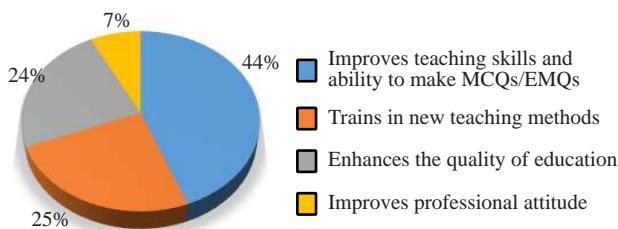
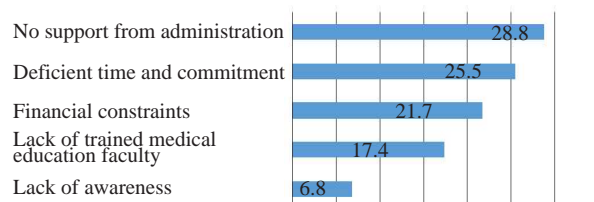


Figure 1: Perceived barriers identified by dental faculty in attending faculty development programs



commitment was reported to be the most significant personal barrier for FD. This is similar to another study where finding time to engage in such activities while balancing multiple work responsibilities was determined to be a significant personal barrier.²⁰ Other barriers reported by the faculty can be mitigated by developing a committee dedicated to oversee the FD activities in order to facilitate the conduction of training in collaboration with the department of medical/dental education. In case of dearth of resources in parent institution, provision should be made to facilitate the faculty to attend

workshops, seminars, hands on training sessions related to FD offered and operated elsewhere physically or remotely by allocating dedicated time, the required resources and offering encouragement and support.²¹ Moreover, interestingly the participants of this study were found to be more inclined towards attending face-to-face FD sessions compared to those conducted virtually. However globally, the trend to conduct FD sessions is shifting online in order to continue facilitating the faculty to participate and engage in FDPs amid their many academic commitments. Unfortunately, there is still reluctance observed in faculty members for online sessions in our settings. The faculty should be cognizant of the benefits of using virtual medium to attend training sessions, which helps to save time and resources.²²

In this study, the faculty's responses regarding their perceptions of the benefits of attending FDPs indicated the lack of realization of the potential advantages that FDPs can offer. Even though faculty's primary role is teaching and assessment of the course content, the scope of FDPs has widened and includes multiple skills and competencies to help faculty develop leadership qualities, mentoring and promoting the scholarship of teaching to bring positive improvement in behaviour and attitude.^{22,23} The responses of the faculty in our study are such because they may not be aware of new educational approaches, through various online modalities and are not exposed to innovative teaching methodologies which have great impact on students learning, engagement and motivation during distance education.²⁴ There is a need to propagate the potential of virtual/ online sessions that can be utilized to engage the faculty in FDP in order to facilitate them with their hectic schedules and other academic commitments. The satisfaction of faculty with online courses as been reported in the literature²² hence it can be incorporated in our context with suitable modifications.

It is interesting to note that even though the majority of the participating faculty was interested in faculty development programs and realized the importance of such activities for enhancing their professional skills, they were unsure on the areas or aspects of dental education for which developing and training activities should be being conducted. The reason could be unfamiliarity with the areas in which the educational skills of the faculty could be enhanced or lack of self-reflection to identify areas of improvement. This is an unfortunate state of affairs and needs to be changed with faculty development workshops and training sessions, familiarizing the faculty with all the avenues in which they have the opportunities to enhance and develop their competencies and expertise. Other notable responses showed an interest in sessions on teaching methods and strategies as well as the development of MCQs and EMQs. Related to these findings, one study covered these aspects as an integral part of the faculty's academic responsibilities, and it is encouraging to observe the faculty deems these important

enough to warrant the conduction of FDPs on them.²³ However, the faculty needs to be made aware of the current trends and requirement of online and distance teaching in the wake of the current COVID-19 pandemic, since it was evident from the responses that the participants did not consider this aspect as an important area for enhancing their expertise. In order to assess the needs of the faculty, faculty development committees may be devised, which could identify focus areas in which the faculty requires and desires training. Additionally, since there is scant literature available on dental faculty development programs, this area along with related aspects like faculty training, curriculum designing, assessment construction and classroom management should be explored, researched and the findings published in order to build awareness and interest in the dental faculty towards improvement in quality of education.^{24,25} Furthermore, to improve the current situation, it is recommended to curtail the perceived barriers related to faculty and institutions in terms of conduction and participation in FDPs, and the provision of administrative support to faculty to improve their didactic skills in the interest of the students, institutions and the dental profession.

There are some limitations to the present study. The study participants were recruited using convenience sampling and the number of study participants was relatively low compared to the total number of dental faculty currently working in different institutes in Karachi. Therefore, the generalizability of our findings is somewhat restricted. A future study conducted using a larger sample will ensure better reliability, generalizability and will further substantiate the results regarding factors causing hindrance in implementing faculty development programs. Further studies could also be conducted to develop solutions to promote the development and implementation of FDPs.

CONCLUSION:

It was concluded that dental faculty were more inclined towards face-to-face sessions than virtually conducted sessions however, their perception of the utility of FDPs was found to be limited. Moreover, it was also found that the some of the barriers to attend FDPs were faculty determinants like deficient time and dearth of commitment.

This study reported minimal administrative support and inadequate opportunities provided towards faculty development programs (FDPs) contrary to faculty participation and interest in training activities to enhance their teaching and assessment skills.

Authors Contribution:

Shaur Sarfaraz: Conception, Methodology, analysis and review

Muhammad Kashif Nisar: Analysis and interpretation of data

Samira Adnan: Writing Introduction and review

Sabeen Masood: Analysis and results

Zohaib Khurshid: Writing Discussion and conclusion, review

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Perceptions and Anxiety Level of Students during Administration of Local Anesthesia

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ABSTRACT

Objective: To assess perceptions and anxiety levels of dental students during administration of local anesthesia

Study Design & Setting: This comparative cross sectional study was conceived in Foundation University Dental College and conducted in multiple institutes after endorsement from the ethical committee of the university from August – October 2021.

Methodology: The questionnaire comprised of three sections which included demographic profile section, perceptions, and experience of administration of mandibular, maxillary, or inferior alveolar nerve block on the 5-point Likert's scale and comparative anxiety analysis before, during or after local anesthetic administration with interval scale of anxiety response.

Results: It was found that 311 (81.8%) dental students/professionals were anxious (cumulative response of "little nervous" and above) before administering local anesthesia injection. It was found that students were significantly more anxious during and after local anesthesia administration as compared to clinical practitioners ($p < 0.001$). About 89% of the responders agreed to the usefulness of video demonstration while 98% agreed to the usefulness of hands-on practice of local anesthesia administration techniques

Conclusion: Students were significantly more anxious during and after local anesthesia administration as compared to clinical practitioners. Video demonstration and hands-on practice are useful adjuvants in the reduction of local anesthesia administration anxiety.

Key Words: Anxiety, Local Anesthesia, Students

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INTRODUCTION:

Administration of local anesthesia is associated with increased dental anxiety scores, being considered as the most anxiety-provoking procedure. Understanding and acquiring accurate knowledge and skill to deliver local anesthesia injection using accurate technique is an essential component of dental curriculum. Dental anxiety is the leading cause of patient nonattendance leading to delay in seeking dental care which significantly impacts oral health-related quality of life.¹ Dental student must acquire competency in delivering pain free infiltration and block anesthesia for restorative and surgical procedures and successful management of orofacial pain. Successful administration of painless local anesthesia is vital to allow stress-free dental management safe and effective delivery of local anesthesia may cause significant doctor and patient anxiety which require rigorous student training.² One of the key skills in dentistry is competent to administer local anesthesia. There are considerable variations in dental curricula as far as mode of teaching is concerned some dental schools use preclinical teaching or non-human simulators while in other dental schools students have to perform their first injection on humans which provokes considerable anxiety. Pain-free delivery of dental care may

be the reason for a patient choosing their dentist. The dentist must be confident enough and projects this confidence towards their patients to reduce anxiety-induced psychogenic reactions like nausea, vomiting, hyperventilation, and syncope.³ To significantly improve students' confidence while the delivery of local anesthesia teaching methods other than direct clinical training can be helpful like video demonstrations, use of anatomically correct models designed to verify that correct landmarks have been hit during local anesthesia delivery. Difference in teaching can have a significant influence on student's anxiety level. This further emphasizes the significance of acquiring accurate skill during delivering effective local anesthesia injection in oral cavity.⁴ Teaching strategies for local anesthesia include lectures, literature studies, focus groups, and demonstrations. The practical session involves step-by-step administration of local anesthesia to the patient under teacher supervision. One of significant requirements of quality assurance is obtaining student feedback and appropriate evaluation mechanism. Feedback is important to assure best possible training is delivered to undergraduate dental students.⁵

Recent literature has shown that video demonstration is very effective to improve student confidence in psychomotor skills.^{6,7} Real-time virtual reality learning experience has been introduced as an educational tool to enhance the clinical learning of students.⁸ Contextually, learners in dental school deliver their first injection directly on patients under supervision of teachers to reduce patients anxiety and build confidence. Recently simulations are being used in various fields to acquire necessary psychomotor skills before real-time clinical application.⁹ Mobile devices today provide students access to wide resources of educational resources mobile aided learning or m-learning can be used by master anatomical landmarks and students can have more access to educational video demonstrations.¹⁰ Therefore, this study is aimed to assess perceptions and anxiety levels of dental students during administration of local anesthesia

METHODOLOGY:

This comparative cross-sectional study was conducted in Foundation University Dental College and multiple institutes after the research was approved by institutional review board of the university from August – October 2021 (ERC Number – FUCD/632/ERC/015).

The required sample size is 380, calculated by the WHO online sample size calculator, where the prevalence of anxiety was 46.0% (12) among dental students before and during the injection procedure, 95% confidence level, 80% study power, and 10% precision.¹¹

A total of 380 dental students from 3rd year to final year and dental professionals having less than 2years experience were recruited by consecutive nonprobability sampling technique. The written consent and elaboration of the study protocol were given to the participants before data collection. Whereas

dental professionals with experience greater than 2years, working in teaching faculty and enrolled in dental specialization program were excluded. The investigation tool was a close-ended, validated, and structured questionnaire devised on previous studies on the subject. The questionnaire comprised of three sections which included demographic profile section, perceptions, and experience of administration of mandibular, maxillary, or inferior alveolar nerve block on the 5-point Likert's scale (1 – strongly disagree, 2 – disagree, 3 – neutral, 4 – agree, and 5 – strongly agree) and comparative anxiety analysis before, during or after local anesthetic administration with interval scale of anxiety response with seven parameters (Calm and relaxed, a little nervous, tense and upset, afraid, very afraid, panicked, and terrified).¹²

RESULTS:

There were 380 subjects included in this study. The majority of them were females, n=296 (77.9%) and most of the participants belonged to the younger age group of 21-30 years, n=273 (71.8%). Third- and fourth-year students comprised the major chunk of the sample, n=207 (54.4%), whereas n=81 (21.3%) were house officers and n=92 (24.2%) were demonstrators. The number of patients dealt on daily basis ranging from 10-15 for most of the participants as shown in table 1.

A total of 206 (54.2%) participants agreed that their hands shivered while administering the first local anesthesia injection during a dental procedure, n=252 (66.3%) reported that they faced difficulty in determining the landmarks while giving an injection, while n=294 (77.3%) were worried about the complications that could occur during the administration of local anesthesia injection. Most of the responders, n=239 (62.8%) agreed that delivery of local anesthesia was stressful to both the patient and the dentist, similarly, n=336 (88.4%) thought that anxiety of the administrator affects the patient's cooperation during anesthesia administration. Detailed responses to the anxiety questionnaire are summarized in table 2.

It was found that n=311 (81.8%) dental students/professionals were anxious (cumulative response of "little nervous" and above) before administering local anesthesia injection, n=261 (68.6%) were anxious during administering the injection while n=167 (43.9%) were anxious after local anesthesia administration as shown in figure 1. Anxiety was at the peak before local anesthesia administration, which reduced during administration and further reduced after administration. Table 2 gives a detailed summary of the level of anxiety among study participants before, during, and after local anesthesia administration.

It was found that students were significantly more anxious during ($p < 0.001$) and after ($p < 0.001$) local anesthesia administration as compared to house officers and demonstrators, similarly responders dealing with a lesser

Table 1: Responses to the anxiety questionnaire regarding the first experience of local anesthesia administration during the dental procedure (n=380)

Questions	Responses n(%)				
	1	2	3	4	5
1. Hands shivered while giving the first injection	17 (4.5%)	55 (14.5%)	102 (26.8%)	143 (37.6%)	63 (16.6%)
2. Anxious during your first LA administration	16 (4.2%)	34 (8.9%)	68 (17.9%)	184 (48.4%)	78 (20.5%)
3. It was difficult to determine the landmarks while giving the injection	15 (3.9%)	27 (7.1%)	86 (22.6%)	184 (48.4%)	68 (17.9%)
4. I was worried about the complications that would occur during LA injection	17 (4.5%)	13 (3.4%)	56 (14.7%)	248 (65.3%)	46 (12.1%)
5. Failure to achieve anesthesia is the most common complication of LA administration	9 (2.4%)	81 (21.3%)	123 (32.4%)	150 (39.5%)	17 (4.5%)
6. Patient was comfortable during your injection	2 (0.5%)	53 (13.9%)	140 (36.8%)	164 (43.2%)	21 (5.5%)
7. Delivery of LA gives stress to both the patient and the dental student	4 (1.1%)	23 (6.1%)	114 (30.0%)	223 (58.7%)	16 (4.2%)
8. Anxiety levels of students will have an impact on patient's cooperation during LA administration	0 (0.0%)	17 (4.5%)	27 (7.1%)	284 (74.7%)	52 (13.7%)
9. Simulations (with model/cadaver) would be better for first injection administration	0 (0.0%)	9 (2.4%)	45 (11.8%)	235 (61.8%)	91 (23.9%)
10. Student-to-student administration of LA is an effective method of training dental students regarding local anesthetic techniques	44 (11.6%)	149 (39.2%)	100 (26.3%)	72 (18.9%)	15 (3.9%)
11. First LA injection directly on patient will help to provide a realistic experience	3 (0.8%)	37 (9.7%)	69 (18.2%)	228 (60.0%)	43 (11.3%)
12. Supervision from teachers is not required for the next injection to be administered	52 (13.7%)	223 (58.7%)	45 (11.8%)	55 (14.5%)	5 (1.3%)
13. Good theoretical knowledge of LA is essential before administering LA injection	1 (0.3%)	12 (3.2%)	23 (6.1%)	207 (54.5%)	137 (36.1%)
14. More emphasis should be laid on LA teaching methodology in dental curriculum	0 (0.0%)	6 (1.6%)	64 (16.8%)	220 (57.9%)	90 (23.7%)
15. LA administration teaching programs are the same across the globe	12 (3.2%)	134 (35.3%)	164 (43.2%)	59 (15.5%)	11 (2.9%)

number of patients on daily basis were found to be more anxious before ($p < 0.001$), during ($p < 0.001$) and after ($p < 0.001$) local anesthesia injection administration as shown in table 4. About 89% of the responders agreed for the usefulness of video demonstration while 98% agreed about usefulness of hands-on practice of local anesthesia administration technique as shown in figure 2.

DISCUSSION:

It was found that n=311 (81.8%) subjects were anxious (cumulative response of “little nervous” and above) before administrating local anesthesia injection in dental patients, n=261 (68.6%) were anxious during administrating the injection while n=167 (43.9%) were anxious after local anesthesia administration. Hence, anxiety was at the peak before local anesthesia administration, which reduced during

administration and further reduced after administration. Additionally, students were significantly more anxious during ($p < 0.001$) and after ($p < 0.001$) local anesthesia administration as compared to house officers and demonstrators, similarly responders dealing with a lesser number of patients on daily basis were found to be more anxious before ($p < 0.001$), during ($p < 0.001$) and after ($p < 0.001$) local anesthesia injection administration.

Administration of local anesthesia effectively constitutes the backbone of dental treatment with the affirmation of patient comfort and analgesia. Therefore endeavors are to be ensured at students and early practical levels for safe application of theoretical knowledge on the patient in terms of delivering local anesthetic without compromising patient safety and comfort.^{13, 14}

Table 2: Comparison of anxiety among study participants before, during, and after local anesthesia administration for professional status and flow of practice.

	The anxiety of local anesthesia administration					
	Before (n=311)	p	During (n=261)	p	After (n=167)	p
Level of professional development						
• Student	177 (56.9%)	0.246	172 (65.9%)	<0.001	104 (62.2%)	<0.001
• House officer	63 (20.3%)		54 (20.6%)		20 (12.0%)	
• Demonstrator	71 (22.8%)		35 (13.4%)		43 (25.7%)	
No. of patients dealt with daily						
• 10-15	236 (75.9%)	<0.001	206 (78.9%)	<0.001	137 (82.0%)	<0.001
• 16-20	47 (15.1%)		46 (17.6%)		30 (18.0%)	
• 21-25	28 (9.0%)		9 (3.4%)		0 (0.0%)	

Figure 1: Presence of anxiety among study participants before, during, and after local anesthesia administration during the dental procedure

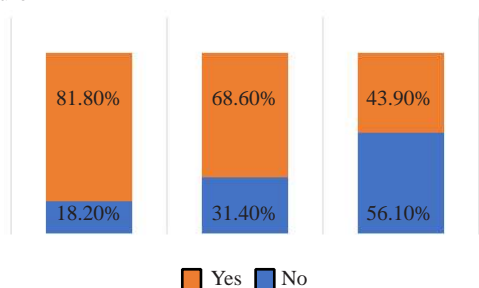
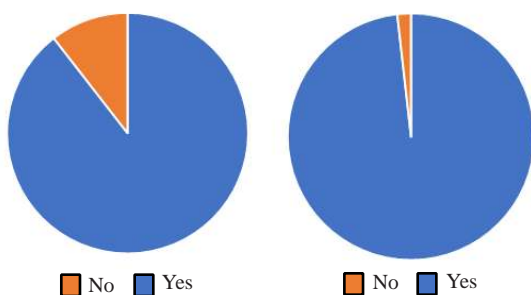


Figure 2: Response of study participants to:
 a). The usefulness of video demonstration of local anesthesia administration technique, b). The usefulness of hands-on patient demonstration of local anesthesia administration techniques



Wong et al evaluated the dental local anesthetic administration trial in student to student administration model. The later cohort was subjected to training and improvement was achieved after training was endorsed in terms of their anxiety and confidence level in giving their first injections to patients. The primary concern which was responsible for raised anxiety was fear of the patient’s pain and discomfort while giving the first infiltration of inferior alveolar nerve block injections. Major factors affecting the level of confidence were the age of patients and the type of local anesthetic injections.¹⁵

About 89% of the responders agreed for the usefulness of video demonstration while 98% agreed about usefulness of hands-on practice of local anesthesia administration technique.

Previous literature on the employment of teaching modalities such as visual techniques has deciphered promising results. Kenny et al evaluated used video clips of pediatrics local anesthetic administration in addition to theoretical training with seminars and lectures to assess the impact on the confidence of local anesthesia administration in 86 undergraduate dental students of the fourth year. The study group was divided into intervention groups receiving an intervention-based visual aid for local anesthetic administration. The intervention and control groups were provided a questionnaire for evaluation. A significant difference was endorsed in the confidence level of the two groups (p-value .003) and the impact of which remained up to 4 months (p-value .001).¹⁶

Wong G et al analyzed dental students’ clinical perspectives regarding the administration of dental local anesthetics. However, the student-to-student modality was most consistent but they introduced manikin simulation models to eradicate fear, possible complications, and ethical concerns. Study participants were divided into batches receiving practical experience of local anesthetic administration on either patients or manikin. Although results did not differ statistically between the two groups manikin simulation provided a safe clinical practice platform.¹⁷

Absolute local anesthesia and dental practice go hand in hand therefore it is mandatory to pave the way for absolute precision to prevent possible major and minor complications associated with the modality. Maximal comfort and analgesia are mandatory for the successful treatment hence vital for patient and practitioner.¹⁸

Brand et al enrolled sixty five students who were distributed in two groups one exposed to pre-clinical teaching model for local anesthesia administration whereas other group was not given such exposure. Endorsements made by recipients

in the questionnaire after on hands experience reported a significant difference between expertise of two groups concluding significance of pre-clinical teaching models.¹⁹ To enhance expertise and confidence of students it is mandatory to teach and train faculty as well in particular student centered perceptions.²⁰

This study had limitations of smaller sample size and short study duration. Additionally facilities of manikan simulation model wasn't available at the university to assess competence and develop confidence of students and young dental professionals.

CONCLUSION:

Students were significantly more anxious during and after local anesthesia administration as compared to house officers and demonstrators, similarly, responders dealing with a lesser number of patients on daily basis were found to be more anxious before, during, and after local anesthesia injection administration. Video demonstration and hands-on practice are useful adjuvants in the reduction of local anesthesia administration anxiety, thus improving the technique.

Authors Contribution:

Beenish Abbas: Study conception, data analysis, drafting manuscript

Sana Abbas: Analyzing critically, drafting manuscript, proof reading

Muhammad Umair: Data analysis, final approval

Ramesha Azam: Data collection, proof reading, final approval, revising critically

Majida Rahim: Logistic support, proof reading, data collection

Batool Zara: Drafting manuscript

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Learning Preferences among Medical and Physical Therapy Students: A Systematic Review

Sarwat Ali, Ashfaq Ahmad, Arooj Munawar, Muhammad Waqas

ABSTRACT

Learning style is known as affective, cognitive, physiological, or combined characteristics which indicate the ways through which students interact, respond and understand the learning environment. A systematic review was conducted with relevant literature from 2012 to 2021 by hand searching and from electronic databases (PubMed, MEDLINE, ProQuest, and Eric) with proper search strategy as Boolean operator. They were searched using the keywords 'allied health students' 'learning style', 'medical students', 'MBBS students' and 'physical therapy students OR physiotherapists'. Out of 1027 studies, only 16 potentially relevant articles were included in this review. This study reflected undergraduate physical therapy and MBBS students from various countries and their most preferred learning style is kinaesthetic and activist which states learning is based on experiments, hands-on practice, audio-visual lectures, teaching sessions in a new environment allowing students to analyze and synthesize theories. However, students require adaptable, educative, and assessment strategies as they have different learning styles.

Keywords: Allied health, Learning style, Learning style, Medical students, Physiotherapy, Questioner.

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INTRODUCTION:

Learning style is known as affective, cognitive, physiological, or combined characteristics which indicate the ways through which students interact, respond and understand the learning environment. Different learning inventories are used which are predicted through information-processing models to describe any individuals' assimilating information from an intellectual approach.¹ In writing, learning style is characterized as "a bunch of elements, practices, and

mentalities that make learning simpler for a person in a given circumstance" and is additionally characterized as "in the feeling of learning, the reasonable manner by which individuals react to and use stimulation".^{2,3}

In both classroom curriculum and layout, learning style has always played a key role. Its mechanism is the creation of comprehensive understanding as part of the evolution of knowledge. It's vital to find out how students think to spread the information about certain subjects. It can also be used to plan, design, develop, and disseminate instructional and support services. It will also empower, stimulate, integrate, teach, and broaden students' professional awareness. Understanding the learning pattern can help with the design and delivery of learning strategies that are suitable for the students.⁴

When researching learning styles, it can be shown that learning style preferences are distinct. Although some people tend to use a particular learning style, others prefer to use more than one learning style and both choices lead to having a more successful learning experience.⁵ Knowledge perception, interpretation and absorption are described as the learning style, which has been created by several instruments and mechanisms for studying and labelling or classifying any particular learning way.⁶

A style of learning determines a method of choice and is called an umbrella concept that encompasses a variety of interests and techniques. The concept of learning style is found in the broader concept of personality. One's learning

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style is neither superior nor similar to another; rather, it is different, with distinct strengths and limitations. Understanding learning patterns should be used to help learners and tutors become more self-aware about their abilities and limitations as learners. In addition, the logic of lifelong learning shows that students are more driven to learn as learners by understanding more of their abilities and shortcomings.⁷

Multiple learning style models have been adapted and designed on lower levels however they are not widely acknowledged. About 9 of the 71 models described were good enough to incorporate concepts such as Kolb Learning Model, Learning Styles Inventory (LSI), Honey and Mumford's Learning Styles Questionnaire, Reichmann and Grasha's Learning Interaction Model Style, Gregorc's Style Delineator, VARK (Visual, Aural, Reading/ writing, Kinesthetic), VAK, Felder-Silverman model.⁸

The model of the Kolb's learning style is a famous instrument which was designed to measure a group of emotion-related activities. It involves reflecting, thinking and doing, which means that any of the four key learning skills that any person can use (AE) active experiment, (AC) abstract conceptualization, (RO) reflective evaluation, and (CE) specific experience. On average, any individual may develop a specialized preference, which will be known as a learning style, for their skills and activities. We have to understand that any single specialization is not inferior or more preferable to another because according to character, strength, and weakness, each of them is distinct.⁹

For these categories of students, Honey and Mumford suggested a grouping of academic styles into activists, reflectors, theorists, and pragmatists. Each of these learning methods has its own set of teaching designs. Honey and Mumford illustrated that Pragmatic learners learn when learning challenges are practical and concrete. The activist will learn when an environment is a new, varying, and continuing action. Reflectors learn better as learning experiences give them the ability to think about what is being learned and reflect on it. Theorists learn when they have time to analyze and synthesize theories. The use of accurate, sensitive, and detailed psychometric tools to assess and consider learning styles is a major challenge in learning style study.¹⁰

The LSI (learning style inventory) and the LSQ (Learning Style Questionnaire) are the two most comprehensive psychometric instruments endorsed, assessing the learning patterns of Honey and Mumford and Kolb (LSQ). In various studies, the validity and reliability of the Learning Style Questionnaire differ, but it has been found to be better than the learning style inventory. The statistical validity of the Learning Style Inventory is stronger. The Learning Styles Questionnaire (LSQ) is widely regarded as a more valuable and effective tool for assessing students' learning styles from

various backgrounds. LSQ data can be effectively used to generate appropriate and relevant learning experiences and learning methods.

GRLSS (Reichmann and Grasha's Student Learning Style Scale) categorizes students based on the type and intensity of their interactions. The learning interface style focuses on the preference of the student but it also includes dimensions of affective and social in the style of measurement. The model explains various dimensions which are the avoidant-participant, competitive-collaborative, and dependent-independent. The GRLSS is a questionnaire that is presented in two categories, one for the assessment of class and one for the assessment of the individual style.

The Style Delineator from Gregorc described four behaviours distinctively: sequential, concrete, random and abstract. The individual style is indicative of a combination of these tendencies. Gregorc believes that this pattern reflects born predispositions, but people must be able to function outside of their instinctual genre. There are Four learning styles Concrete sequential learning is portrayed by direct, bit by bit, systematic, tactile based learning; concrete random learning is portrayed by experimentation, instinctive, and autonomous learning draws near; the abstract sequential study is characterized by coherent, rational approaches and a predisposition for verbal injunction; and abstract random learning is characterized by a preference for coherent, visible, trained, and verbal instruction. This Style Delineator is a Forty-item inventory of individual reporting containing the ranking of a set of words.

VARK (Visual, Aural, Reading/ writing, Kinesthetic) is a questionnaire formed by Neil Fleming, an educator, and instructor in New Zealand, who implemented a model for differential learning, consisting of 16 multiple-choice questions.¹¹ He described the 4 sensory aspects. Visual learners learn through figures, diagrams, movies, images, and layouts. Aural students learn through seminars, discussions, small-scale learning, and speeches. Learners with a reading/writing style learn through books, lecture books, and notes. Kinesthetic learners learn through demonstration, touch, and experience, physical actions, mock-ups, case-based learning, group visits, role plays, and working with their hands.

Using the Felder-Silverman model a large number of studies have looked at the learning style characteristics of medical students. Auditory, visual, and sequential learning is the most commonly identified types of learning by medical students, according to research.¹² Besides, a few investigations have found that clinical understudies are prone to a reflective learning style.^{13,14}

The Axis tool is to be used to evaluate observational cross-sectional studies. It aims at dealing with problems that often occur in cross-sectional studies and at helping the reader determine the quality of the study. The tool aims to aid in

the analysis of the observational cross-sectional studies used in a systematic review and to give suggestions about the quality of research.¹⁵

At present, many different learning style inventories and questionnaires are used to check the learning style preference among students of varied professions from various countries. But there are no specific recommendations to use which model to assess the preferred learning style. The purpose of this review is to gather all the information about the learning styles of medical students and then appraise which learning style is the most preferable among medical and physiotherapy students.

Methodology:

A systematic review was conducted according to PRISMA guidelines as EQUATOR network follow. Relevant articles published between years 2012 to 2021 were located using the following databases including PubMed, MEDLINE, ERIC, and ProQuest Search strategy was used for each database by combining the following MeSH terms and Key Words: 'Learning style', 'physiotherapy', 'allied Health', 'academic performance', 'medical education', 'VARK', 'Learning preferences', 'Kolb', 'learning methods', 'learning style questionnaire', 'medical students', 'effective learning' and boolean operators i.e. AND, OR and NOT related to the objective of study. Full-text articles were retrieved for eligibility or in case if a conflict exists in any article then authors have to decide whether to include it or not in the study. Indexing terms, synonyms were used and filtered applied: Full text, observational studies, and English and relevant information from the study was extracted and reviewed by the authors. A Prisma flow diagram (Figure 1) is used to show how the articles were searched and included in the study. Studies were included only when: (i) Only medical and allied health student's e.g., DPT and MBBS. (ii) Study design was observational, cross-sectional studies. (iii) Full-text articles. (iv) Participants were undergraduate students. (v) Peer-reviewed. (vi) Professional and scientific journals. (vii) If it contains any standardized questionnaire for assessment. (viii) Studies included without language restriction (ix) Published in the year 2012 till 2020. Studies to be excluded when: (i) if the participants were other than medical and allied health students. (ii) Any other form of study design. (iii) Studies not using standardized questionnaire (iv) If older than the year 2012. (v) No full-text article.

Search records were saved in EndNote X7 software. Duplicate records were removed after that different screening of articles was conducted based on abstract and full-text articles. At the end, final text articles which were included from different databases were used to create tables that describe different variables like methodology, sample size, demographic data. A table was created to describe the different studies characteristics and studies were managed according to quality scores.

In order to evaluate the methodological quality of all studies the critical assessment AXIS tool created by Downes MJ et al. with Delphi methodology was used.^{16,17}

The AXIS tool, which was formed in 2016 and contains 20 items, is a critical assessment method for cross sectional studies which discusses the design and quality of studies and the risk of bias in cross-sectional studies.

Outcomes of interest: Outcome measures included: Different versions of Kolb's LSI (Learning style inventory), GRLSS (Grasha-Riechmann learning style scale), The VARK (Visual, Aural, Reading/ writing, Kinesthetic) questionnaire, Gregorc style delineator, Felder Silverman's ILS (Index of learning style) and Honey and Mumford's Learning Style Questionnaire.

RESULTS:

Initially, 1033 studies were found through PubMed, Eric, ProQuest, and MEDLINE databases as well as through other records identified through Hand searching. Total 234 out of 1033 studies were removed because of duplication records. 799 studies/articles were examined for acceptability based on the title and abstracts of studies. Total 60 studies were included. 697 studies were excluded which did not meet our inclusion criteria. For the eligibility of studies 42 full-text articles were assessed out of which finally 16 studies were included for study analysis and synthesis and results were drawn.(Fig:1)

The Result is summarized in Tables. Demographic data like participants or sample size, country, and population of included studies and Methodological Characteristics of included studies like Learning style theories/ models and learning style identified are drawn in Table 1. The critical appraisal tool developed by Downes MJ, et al. using Delphi methodology was used to assess the methodological quality of all studies. Which was formed in 2016 and contains 20 items, is a critical assessment method which discusses the design and quality of studies and the risk of bias in cross-sectional studies. The whole quality of each article was evaluated by twenty closed-ended questions. Each question was marked as 1 or 0. 1 for totally fulfilled criteria and 0 for not fulfilling criteria.

The AXIS tool which is the Critical Appraisal method for cross-sectional studies is made up of 20 close-ended questions. In the Axis Tool, the following seven questions dealt with the reporting quality (1, 4, 10, 11, 12, 16, and 18), and the other seven questions dealt with the study design (2, 3, 5, 8, 17, 19, and 20) and the rest six questions dealt with the possibility of risk of biasness being introduced into the study (6, 7, 9, 13, 14 and 15). (Table 2)

The study looked into the current evidence for medical students' preferred learning styles. This review showed that the 16 studies which evaluated the learning style preferences the most commonly used questionnaire was VARK (Visual,

Aural, Reading/ writing, Kinesthetic) which was used in six studies having kinaesthetic type followed by The Honey and Mumford which had activists style found to be commonly used in three studies and among six studies two using Kolb's learning style inventory had assimilating style, two used the Grasha-Riechmann learning style scale which had both dependent independent along with collaborative style and two studies used Index of learning style in which visual-verbal aspect was found. While only one study used Gregorc Style Delineator in which most physical therapist students preferred concrete-sequential learning styles.

DISCUSSION:

The study's purpose was to look into the current evidence for Medical and Allied health student's preferred learning styles. We included 16 studies with 2616 participants. This review showed that 16 studies evaluated the learning style

preference among participants from 2012 to 2021 and these the most commonly used questionnaire was VARK (Visual, Aural, Reading/ writing, Kinesthetic) which was used in six studies followed by Honey and Mumford used in three studies and among six studies two used Kolb's learning style inventory, two used the Grasha-Riechmann learning style scale and two studies used Index of learning style. While only one study used Gregorc Style Delineator.

Self-confidence in evidence based physical therapy is increasing as time passes. In this review, an expert panel used the Delphi methodology which was developed by Downes MJ, et al. for the methodological quality of the studies which was appraised critically by the Axis Tool.

The VARK questionnaire is one of the most widely used methods for defining and evaluating various sensory learning approaches. Among the studies the preferred style was Unimodal and among the learners who had unimodal style, the Kinesthetic (K) type was found to be in the majority in five studies while one study claimed to have Quadmodal as

Table 1: Summary table of included studies

NO	Study Author (Latest to old)	Country	Participants	Population	Learning style theories / models	Learning styles identified
1	(WNI Kularathne et al., 2020) ²⁹	Sri Lanka	112	Ug, Dpt	Honey and Mumford, LSQ	Activist learning style.
2	(Amtul Anum et al., 2019) ¹¹	Pakistan	278	Ug, Dpt, Mbbs, Bds	VARK	Unimodal, Kinesthetic
3	(Assad Ali Rezigalla et al., 2018) ³	Saudi Arabia	136	Ug, Mbbs	VARK, Version 7.1.	Unimodal, Aural.
4	(D A Shead et al., 2018) ³⁰	South Africa	group 1: 59 group 2: 54	Ug,Dpt	GRLSS	Dependent style for group 1 and the Independent style for group 2.
5	(Nursen Ýlçin et al., 2018) ³¹	Turkey	217	Ug, Dpt	GRLSS	Collaborative learning style
6	(Daniel Hernández-Torrano et al., 2017) ³²	Kazakhstan	52	Ug, Mbbs	ILS	Visual and Sequential learning styles.
7	(Shama Mashhood et al., 2017) ³³	Pakistan	210	Ug, Mbbs	VARK	kinesthetic
8	(Rahila Nizami et al., 2017) ³⁴	Pakistan	120	Ug, Dpt, Mbbs	Honey and Mumford, LSQ	Both the groups have Reflector as dominating learning style
9	(Salilthip Paiboonsithiwong et al., 2016) ³⁵	Thailand	140	Ug, Mbbs	VARK	Quadmodal
10	(Myo Kyi Tha et al., 2015) ³⁶	Thailand	65	Ug, Mbbs	Kolb's LSI, Version 3.1.	Diverging and Assimilating
11	(Siaw-Cheok Liew et al., 2015) ¹⁹	Malaysia	419	Ug, Dpt	VARK	Unimodal Kinesthetic type.
12	(D Hess et al., 2014) ³⁷	South Africa	246	Ug, Dpt	ILS, LSQ, PSSQ	Feeling for (PSSQ), kinesthetic for (LSQ) and visual-verbal for (ILS).
13	(Hadi Peyman et al., 2014) ³⁸	Iran	231	Ug, Mbbs	VARK	Aural and reading/writing.
14	(Mohamed A. Al Maghraby et al., 2013) ³⁹	Saudi Arabia	53	Ug, Dpt	Gregorc Style Delineator	concrete-sequential learning style
15	(Irfan Shukret al., 2013) ¹⁰	Pakistan	Group 1:85, Group 2: 85	Ug, Pg, Mbbs	Honey and Mumford, LSQ	UG student's activist, PG student's reflector, theorist. Pragmatist in both
16	(Steve Milanese et al., 2013) ⁴⁰	Australia	54	Ug, Dpt	Kolb's LSI, Version 3.1	Converging, Assimilating and Accommodating

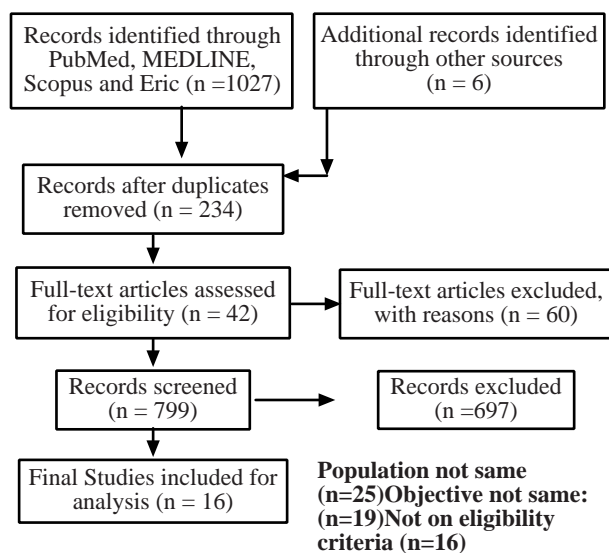
UG: undergraduate, PG: Post graduate, DPT: Doctor of Physical Therapy, MBBS: Bachelor of Medicine and Bachelor of Surgery

Table 2: Methodological quality of articles: Critical Appraisal

Study Author (Latest to old)	Quality of reporting							Quality of study design							Possible biases in study					
	01	04	10	11	12	16	18	02	03	05	08	17	19	20	06	07	09	13	14	15
(WNI Kularathne et al., 2020) ²⁹	All the points in quality of reporting were mentioned in the article except 18, the limitations of the study were not discussed							All the points for Quality of study design were mentioned except for 19 in which neither funding sources were mentioned nor any conflicts of interest.							The possible bias in this study is that appropriate information about non-responders were not described.					
(Amtul Anum et al., 2019) ¹¹	All the related points were mentioned hence representing a good quality of reporting.							All the points for Quality of study design were mentioned except for 19 in which neither funding sources were mentioned nor any conflicts of interest.							The possible bias in this study is that appropriate information about non-responders were not described.					
(Assad Ali Rezigalla et al., 2018) ³	The quality of reporting is good as all the points are well addressed.							The quality of the study design is good as all the points are well addressed. There was no conflict of interest.							There were no possible biases found in this study.					
(D A Shead et al., 2018) ³⁰	The quality of reporting is good as all the points are well addressed.							The quality of the study design is good as all the points are well addressed. There was no conflict of interest but there were funding sources.							The possible bias in this study is that appropriate information about non-responders were not described and response rate for the group one was low.					
(Nursen Ýlçin et al., 2018) ³¹	The quality of reporting is good as all the points are well addressed.							All the points for Quality of study design were mentioned and there was neither funding sources nor any conflicts of interest.							There were no possible biases found in this study.					
(Daniel Hernández-Torrano1 et al., 2017) ³²	The quality of reporting is good as all the points are well addressed.							All the points for Quality of study design were mentioned and there was neither funding sources nor any conflicts of interest.							The possible bias in this study is that appropriate information about non-responders were not addressed and described.					
(Shama Mashhood et al., 2017) ³³	All the points in quality of reporting were mentioned in the article except 18, the limitations of the study were not discussed.							All the points for Quality of study design were mentioned and there was neither funding sources nor any conflicts of interest.							There were no possible biases found in this study.					
(Rahila Nizami et al., 2017) ³⁴	statistical significance, methods and limitations were not properly reported leading to low quality of reporting							statistical significance, methods and limitations were not properly reported leading to low quality of reporting							The possible bias in this study is that appropriate information about non-responders were not addressed and described.					
(Salilthip Paiboonsithiwongle et al., 2016) ³⁵	The quality of reporting is good as all the points are well addressed.							The quality of the study design is good as all the points are well addressed. There was no conflict of interest but there were funding sources.							The possible bias in this study is that appropriate information about non-responders were not described and response rate was not mentioned.					
(Myo Kyi Tha et al., 2015) ³⁶	The quality of reporting is good as all the points are well addressed.							The quality of the study design is good as all the points are well addressed. There was no conflict of interest but there were funding sources.							There were no possible biases found in this study.					
(Siaw-Cheok Liew et al., 2015) ¹⁹	The quality of reporting is good as all the points are well addressed							The quality of the study design is good as all the points are well addressed. There was no conflict of interest but there were funding sources.							The possible biases found in this study is that response rate was not mentioned.					
(D Hess et al., 2014) ³⁷	The quality of reporting is good as all the points are well addressed							The quality of the study design is good as all the points are well addressed. There was no conflict of interest mentioned but there were funding sources.							There were no possible biases found in this study.					
(Hadi Peyman et al., 2014) ³⁸	All the related points were mentioned hence representing a good quality of reporting.							All the points for Quality of study design were mentioned except for 19 in which neither funding sources were mentioned nor any conflicts of interest.							There were no possible biases found in this study.					
(Mohamed A. Al Maghraby et al., 2013) ³⁹	All the related points were mentioned hence representing a good quality of reporting.							All the points for Quality of study design were mentioned except for 19 in which neither funding sources were mentioned nor any conflicts of interest							There possible biases found in this study was there was no response rate mentioned and non-responders were not addressed, categorized and there was no appropriate information about it.					
(Irfan Shukret et al., 2013) ¹⁰	The quality of reporting is good as all the points are well addressed.							All the points for Quality of study design were mentioned except for 19 in which neither funding sources were mentioned nor any conflicts of interest.							The possible biases found in this study is that response rate was not mentioned. Due to which points 7, 13 and 14 are N.A					
(Steve Milanese et al., 2013) ⁴⁰	All the points in quality of reporting were mentioned in the study except 18, the limitations of the study were not discussed.							The quality of the study design is good as all the points are well addressed. There was no conflict of interest and funding sources.							There were no possible biases found in this study					

Flow chart showing number of studies included according to PRISMA guidelines for systematic review

Figure 1: Preferred Reporting Item for Systematic Review and meta-analysis (PRISMA) flow-chart



preferred learning style. Quadmodal learning was the most popular among medical students. Our findings are consistent with Almighal and Liew et al.^{18,19}

The majority of the students were unimodal, according to both previous and recent findings. Meanwhile, old local studies have found that the dominant type is multimodal, which contradicts the current data. The VARK (Visual, Aural, Reading/ writing, Kinesthetic) questionnaire is widely used due to its validity and reliability, as well as its ease of use and free availability.²¹

The results were found to be mixed on the predominance of the international data on multimodal and unimodal patterns of learning style. The dominance of multimodal was reported by Murphy et al and EL Tantowi from the United States^{22,23} as well as Baykan from Turkey.^{24,24} While Pakistan's Siddiqi et al and Haq et al supported the unimodal dominance.²²⁻²⁵

Three studies that used Honey and Mumford learning style had Activist as the majority of the respondent's style among them (51.2%). In another study, Reflector was the most popular learning style among both groups, while Pragmatist is the second most popular learning style (16.7%). The last study included both undergrad and postgrad students in which Undergraduate students preferred being an activist 45 %, whereas postgraduate students preferred reflector (38 %) and theorist (35 %).

The true purpose of identifying these various learning styles is to have matching teaching strategies and appropriate assessment methods. When four different learning styles are present in a class, it stipulates that a single teaching

methodology is ineffective for the entire group. When planning for teaching and learning activities, keep the preferred learning style in mind. Honey and Mumford learning styles can be used to map a class and create a teaching strategy that works.

Two studies that used Kolb's learning style inventory had Assimilating style frequent in both of them. In which Assimilating and Diverging styles were the largest groups of the study population (30.8%), while in the other studies the preferences of learning style were evenly dispersed among the three learning styles which were Converging, Assimilating, and Accommodating, with diverging style as the least preferred one.

The Grasha-Riechmann study in which physiotherapy students' learning styles are consistent and compatible with lecturers' teaching styles, resulting in better learning outcomes. The dependent style was the most popular choice for group 1 and the independent style was the most popular choice for group 2. While in the other study in which the relationship between learning styles and educational accomplishment was to be researched had the most common learning style as to be Collaborative.

According to the previous research, physiotherapy students preferred abstract learning styles. As well as having desirable study methods²⁷ Converger (40%) and Assimilator (35%) learning styles were preferred by physiotherapy students in Canada and the United States, respectively.²⁸

In the two studies which used the Index of learning style among them the visual-verbal aspect of learning style was more common. The Learning style among students which were presented in 2 groups of first-year medical students had their learning styles analyzed across four dimensions: verbal-visual, reflective-active, sequential-global, and intuitive-sensing. There was very little difference when the results were analyzed. The number of students who preferred sensing (54.9 %) versus intuitive (45.1 %) learning styles, as well as those who preferred reflective (49.1 %) versus active (50.9 %) learning styles.

Only one study has used Gregorc Style Delineator, where, even though there are mixed styles of other styles, most physical therapist students preferred concrete-sequential learning styles. The majority of those students also preferred the random training, digital media activities, advanced organisers and demonstrations. Further studies should be conducted with various parameters like learning style with academic performances, gender influences, and among different demographic participants. This study only contained undergraduate students of MBBS and Doctor of Physical Therapy among all the Allied health and medical students. Further research should concentrate on defining and describing physiotherapy and MBBS learning styles in such a way that they can be used as an industry standard, as well as developing valid and reliable learning style outcome

measures that are applicable across physiotherapy and MBBS learners and settings. Also, more research is needed to determine whether there is a correlation of learning style preferences with teaching styles learning strategies. In addition, a longitudinal study would be compelling to see how the learning style changes with time and its influence on the students' performance within a specific field.

CONCLUSION:

All studies supported learning style among the students and the most commonly used learning style questionnaire is VARK (Visual, Aural, Reading/ writing, Kinesthetic). In conclusion, this study affirms the heterogeneity in students' learning preferences. Among them, the most preferred learning style is kinaesthetic and activist. That state's learning is based on experiments, hands-on practice, audio-visual lectures, teaching sessions in a new environment allowing students to analyze and synthesize theories. However, students require adaptable, educative, and assessment strategies as they have different learning styles. In order to further investigate the valid and reliable outcome of learning styles applicable across physiotherapy and MBBS, it should be defined and described in a way that can be used in the health discipline as a standard.

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Authors Contribution:

Sarwat Ali: Original idea, Literature search, Manuscript write up, data collection, final layout

Ashfaq Ahmad: Final approval of the version to be published, agreement to be accountable for all aspects, revising it critically

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Ingestion of A Sharp Foreign Body by an Infant

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ABSTRACT

A four-month-old infant, previously healthy and developmentally normal, presented to the emergency department (ER) of a tertiary care hospital with hematemesis and pallor for one day, as well as a three-week history of irritability and intermittent vomiting. The infant was taken to various hospitals in their town, where he was given symptomatic treatment for vomiting and the mother was advised to feed infant. Nothing out of the ordinary was reported by the parents. The infant's symptoms were managed in the ER, and baseline labs were performed to determine the cause of the blood-stained vomiting and pallor. Except for a low Hb level, the baseline labs were normal. An abdominal x-ray revealed a stainless-steel blade in his stomach. The ingestion of a blade was unknown to the parents. The case was referred to pediatric gastroenterology for further treatment. The blade was removed through endoscopy, and recovery was uneventful.

Conclusion: The importance of supervising infants and young children under all circumstances is emphasized.

Keywords: Blade, Endoscopy, Foreign body, Hematemesis, Unexplained pallor.

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INTRODUCTION:

Foreign body ingestion is common in children under the age of five years. Approximately half of all ingested foreign bodies go unnoticed, and the other half exhibit no symptoms.¹ The majority of foreign bodies pass through the gut, and only 1% require surgical intervention. Foreign bodies that

are commonly ingested include coins, pins, needles, batteries, toys, and sharp objects.^{2,3} The majority of cases of foreign body ingestion are unintentional, but some have occurred as a result of child abuse. Ingestion of sharp objects, such as needles and blades, can be dangerous and cause significant mucosal damage, resulting in blood loss and perforation.⁴ This may pose a diagnostic challenge in infants or toddlers whose parents are unaware of their ingestion. A case of stainless-steel blade ingestion in a four-month-old infant is presented in this case report, along with the presenting symptoms and signs, as well as the diagnostic and therapeutic approach used at our center.

CASE REPORT

A four-month-old infant, formerly healthy with normal development, presented to a tertiary care hospital's emergency department (ER) with hematemesis and pallor for one day. Over the previous three weeks, the infant had experienced bouts of vomiting and irritability. The infant was receiving formula milk in addition to breast milk, and no other symptoms such as cough, fever, loose stools, abdominal distension, rash, jaundice, bruising, or bleeding from any other site of the body were present. There were no reports of urinary or neurological symptoms. Nothing out of the ordinary was reported by the parents. The infant was cared by his mother, a housewife. The infant was developing normally, and his growth parameters were within normal limits for his age. The general physical examination revealed significant pallor due to hematemesis at the time of presentation. The systemic examination revealed no abdominal mass, and the rest of the findings were normal. During the history and examination, no concerns about child protection or abuse were raised.

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The infant was treated in the emergency room for his symptoms and was given a blood transfusion. The baseline labs, which included a CBC, renal profile, coagulation profile, liver function tests, serum electrolytes, septic screens, urine and stool analysis, were all normal except for the low Hb. An abdominal X-ray revealed a stainless-steel blade in the stomach [Figure.1]. The ingestion of a blade was unknown to the parents. The child was referred to pediatric gastroenterology for further action. The blade was removed via endoscopy [Figure2,3] and he was discharged one week later after an uneventful recovery. Despite the fact that this case raised concerns about child protection and safety, the psycho-social evaluation of the family and caregivers was inconclusive. Nonetheless, social service and child protection authorities were notified, and education regarding safeguarding the children was provided to the family and caregivers. The infant is doing well and is being followed in a pediatric and gastroenterology clinic.

Despite the fact that this case raised concerns about child protection and safety, the psycho-social evaluation of the family and caregivers was inconclusive. Nonetheless, social service and child protection authorities were notified, and education regarding safeguarding the children was provided to the family and caregivers. The infant is doing well and is being followed in a pediatric and gastroenterology clinic.

DISCUSSION:

Foreign body (FB) ingestion is particularly common in pediatrics because of the innate tendency of children to explore objects with their mouths. It has no sex predilection, reports⁵ showing almost the same incidence in both boys and girls. Coins are one of the most frequently ingested foreign objects. Buttons, batteries, toys, marbles, metallic balls, and rings are examples of blunt objects. Sharp objects such as blades, pins, and wires are uncommon particularly in under 6-month-olds.⁶

Overviews on FB ingestion are plentiful, but the ingestion of sharp objects, especially in pediatric patients, is rarely discussed, and guidelines regarding definitive management are infrequent. Generally, such ingestions reveal a variety of underlying intentional or unintentional reasons, but studies on sharps ingestion in adults establish a common presentation amongst prisoners⁷ or patients with significant psychiatric comorbidities.⁸ Multiple symptoms of varying severity have been attributed to FB ingestion depending upon its location. Gastrointestinal symptoms include anorexia, vomiting, globus pharyngeus⁹ (sensation of having a lump at the back of the throat), odynophagia, and dysphagia. Respiratory symptoms include cough, stridor, and breathing difficulty.¹⁰

History and examination form the key components for initial assessment and witnessed consumption. Warning signs in history are symptoms and their onset, history of previous ingestions, and accompanying conditions. Findings in physical assessment¹¹ that can indicate probable ingestion

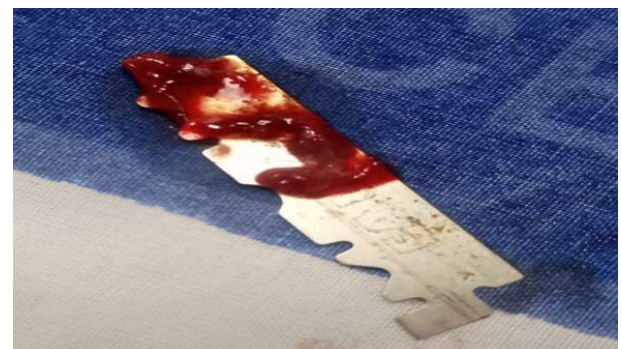
Figure 1 : Blade localized in stomach on Chest X-ray



Figure 2: Blade in stomach on Endoscopy



Figure : The retrieved blade after endoscopy



include vitals, respiratory and gastro-intestinal examination including breath and bowel sounds, abdominal tenderness, or rigidity. Consistent indicative findings have not been identified in presumed ingestions, but depending upon the location of FB, perforation may reveal mediastinal emphysema or signs of peritonism with pain, tenderness, and a rigid abdomen. Diagnosis¹² is majorly made on plain radiographs, as the metal is radio-opaque and can be reasonably localized, although one case employed computed tomography for precise localization. Blood reports including hematocrit, hemoglobin levels can also be suggestive of ongoing blood loss. Hematemesis, as in our case, is a major indicator of gastrointestinal blood loss.

The general agreement is the wait-and-see approach¹³ to allow for FB passage, but sharp objects warrant alarm. The lower esophageal stricture is frequently quoted as the location of perforation and often warranted as a reason for emergency intervention. Other zones of concern are the ileocecal junction, the hepatic and splenic flexures, and the rectosigmoid junction. Unless adequately managed, they can lead to complications like gastrointestinal ulceration and/or perforation, peritonitis, and aorto-esophageal fistula, and even death. There are no established guidelines¹⁴ for paediatric age groups. Acute presentation with pain, bloody emesis, or in stool are pointers towards emergency laparotomy.

CONCLUSION:

Sharp foreign body ingestion is extremely rare in infants, but any strange incidents must be brought to the notice of police and child protection societies, along with social care services. Parental education and counseling should be centered on child neglect, and safeguarding practices should be implemented in order to avoid similar problems in the future.

Authors Contribution:

Nagina Shahzadi: Acquisition of data, Case Management, Original Draft Preparation, Revising it critically for important intellectual content, Supervising, Final approval of the version to be submitted.

Naureen Kanwal Satti: Conception and design, Writing original Draft, Visualization, Revision, Final approval of the version to be submitted.

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Unusal Presentation of Dengue Fever as Pyomyositis

Hozefa Runderawala, Priyanka Anvekar

ABSTRACT:

Dengue is the most common and widespread arthropod-borne arboviral infection. Symptoms include fever, headache, muscle, and joint pains, and a characteristic skin rash. Although viral myositis is common, myositis caused by the dengue virus is not commonly reported. The case of serologically confirmed dengue fever complicated by pyomyositis associated with a tenfold increase in serum creatine phosphokinase is presented.

Keywords: Dengue, Creatinine phosphokinase, Myositis

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INTRODUCTION:

Dengue is the most common and widespread arthropod-borne arboviral infection in the world today. The geographical spread, incidence, and severity of dengue fever (DF) and dengue hemorrhagic fever (DHF) are increasing in the Americas, South-East Asia, the Eastern Mediterranean, and the Western Pacific.¹ With the recent epidemic of dengue; there have been increased report of cases of dengue fever with unusual manifestation. Dengue fever associated with myositis with or without rhabdomyolysis and acute renal failure is extremely rare.² We report a case of a 22-year-old male who presented with dengue fever complicated by pyomyositis, surgical debridement of pus and antibiotic coverage lead to complete recovery without residual damage.

CASE REPORT:

A 22-year male, no comorbidities, presented with complaints of high-grade fever with chills for the last 3 days with no diurnal variation and was not associated with any skin rash, bleeding, or joint pains. He also had myalgia and headache for the last 3 days, diffuse abdominal pain, and vomiting for 2 days. Myalgia was predominantly in lower limbs and gradually progressing and he was unable to walk due to severe pain. He did not have any bowel and bladder complaints, respiratory distress, or neurological symptoms.

Upon general examination, he was conscious, oriented, and febrile with a temperature of 100°F, pulse was 118/ minute,

blood pressure was 90/70mm of Hg and respiratory rate was 24/min. The patient had bilateral pedal edema, pitting in nature extending up to mid-thigh. On per abdominal examination, he had 2 cm palpable liver below right subcostal margin and mild splenomegaly. On neurological examination, the patient had bilateral lower limb weakness with proximal and distal power 3/5. It was associated with marked tenderness on active and passive stretching of the muscles.

On investigation, his Hemoglobin was 12.6mg/dl, total leucocyte count was 2270/mm³, platelet count was 78000/mm³. Peripheral smear for malarial parasite and rapid malarial antigen was negative, Dengue NS1 was negative, Dengue IgM was positive and Dengue IgG was equivocal.

He was started on intravenous fluid therapy along with antipyretic. A daily complete blood count was done which showed a gradual fall of platelet count as low as 30000/mm³ and hematocrit was monitored for hydration therapy. Bilateral pedal edema did not subside and it extended to the groin.

His fever did not subside despite adequate antipyretic; further investigation revealed serum Procalcitonin- 10.33 ng/ml, Creatine Phosphokinase- 2705 IU/l (normal 30-200), Lactate Dehydrogenase- 322.20 IU/l (normal <248), total protein- 4.30 gm/dl with serum Albumin- 2.5gm/dl. Urine examination was normal without myoglobinuria. Serum electrolytes, renal profile, and other biochemistry markers were normal.

Ultrasonography of bilateral lower limbs was suggestive of intermuscular fluid in both thighs with diffuse soft tissue edema bilaterally with mild suprapatellar effusion on the right side. Blood cultures and swab cultures from both thighs were negative.

Reference was given to the surgery department. Bilateral thigh debridement was done with secondary suturing with skin grafting of both legs were done. There was a massive slough and pus was present on the right thigh extending up to the popliteal fossa and superiorly up to the gluteal region. About 3 liters of pus was removed, pus pockets in gluteal regions were drained separately, thorough surgical wash

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given and dressing done. In subsequent two sittings, wounds were closed with secondary suturing with a split skin graft. Aerobic culture revealed heavy growth of Extended-spectrum beta-lactamases (ESBL) producing *Escherichia coli*.

The patient was treated with intravenous antibiotics, intravenous albumin, antipyretics, and supportive management. Nutritional support and intensive physiotherapy were given. The patient recovered well gradually and was discharged home after a long stay at the hospital.

DISCUSSION:

Dengue viruses belong to the genus *Flavivirus* of the *Flaviviridae* family. There are 4 distinct types of dengue viruses (DENV1–4), all of which can cause dengue fever. The dengue viruses are transmitted to humans through the bite of the infective *Aedes Aegyptus* female mosquitoes.³ The common symptoms of the dengue infection range from mild to high-grade fever, severe headache, retro-orbital pain, joint and muscle ache, and rash. The symptoms normally appear 3–14 days after the infective mosquito bite. The neurological complications of the dengue virus infection include meningitis, encephalitis, acute disseminated encephalomyelitis, transverse myelitis, and Guillain Barre Syndrome. Recently, a rise in cases of acute dengue myositis has been reported.⁴ Myositis, rhabdomyolysis, and acute renal failure are known to occur as a sequel of severe viral infections like influenza A and B virus, HIV, coxsackieviruses, and cytomegalovirus.¹ Dengue fever associated with myositis with or without rhabdomyolysis and acute renal failure is extremely rare. Most of these manifestations of dengue fever are underreported, recognized, or not casually linked to dengue fever. Musculoskeletal manifestations of dengue fever include polyarthritis, rhabdomyolysis, and myositis with elevated CPK.⁵ Direct viral invasion of the muscle fibers and generation of myotoxic cytokines such as tumor necrosis factor have been described as the possible mechanism for dengue virus-associated myositis.⁶

One study emphasizes the importance of serum CK in patients with fever and myalgias with or without overt muscle weakness and concludes that increased serum CK levels in the context of fever and myalgias should be considered as dengue fever even before serological confirmation, with a positive predictive value of 84% and negative predictive value of 98%.^{7,8} Though the patients with dengue fever commonly present with myalgia, associated myositis may go undiagnosed due to the lack of clinical suspicion and necessary investigations. Myositis seen in dengue fever is usually acute onset, short-lasting and benign. Few present with elevated CPK levels and they rarely go on to develop rhabdomyolysis and acute renal failure.^{1,9} A few cases of dengue fever associated with acute myositis with or without rhabdomyolysis which was confirmed by muscle biopsy and EMG has been reported in the past.^{1,10}

In this case, the appropriate timely intervention of myositis

has prevented the lethal complication of rhabdomyolysis and acute renal failure and there was complete recovery of the patient without any residual damage.

This is suggested that patients with serologically confirmed dengue fever with myalgia should measure serum creatinine kinase levels and urine analysis to be done for hemagglutination for early diagnosis of myositis which might be complicated with rhabdomyolysis and acute renal failure.¹⁰ If myositis and rhabdomyolysis are detected early, then potential lethal complications can be prevented.

CONCLUSION:

Myositis and rhabdomyolysis associated with dengue fever are recognized complications. Clinicians should be vigilant and ask for necessary investigations at the appropriate time to prevent life-threatening complications like acute renal failure. All the dengue fever patients presenting with severe myalgia should undergo measurement of Creatinine phosphokinase and early appropriate interventions to prevent lethal outcomes. A timely intervention can reduce morbidity and mortality.

Authors Contribution:

Hozefa Runderawala: Construct the Manuscript, References and Detailing, Title

Priyanka Anvekar: Proof Read, Plagiarism and Finesse

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Incautious Use of Antibiotics During Covid-19

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The severe acute respiratory syndrome corona virus (SARS-CoV-2), the etiologic agent of the most detrimental disease of the century, has tragically influenced the world dynamics. One of the major challenges faced by health sector globally, was to establish a treatment regimen and guidelines to combat this lethal condition. The World Health Organization (WHO) advocates early empiric antibacterial medication with continuous scrutiny for downscaling of signs and symptoms in the patients with severe COVID-19.¹ Nevertheless, serious queries have driven in the context of use of irrational antibiotics in the time where the world is already on the verge of antimicrobial resistance. In 2019, the UN Interagency Coordination Group on Antimicrobial Resistance alarmed that by 2050, antibiotic-resistant diseases would be the culprit for 10 million deaths each year and can be calamitous by 2030, and antimicrobial resistance could put 24 million people into extreme scarcity of resources.² The antibacterial resistance is another pandemic which is silently approaching the millennials and netizens, irrespective of their oblivion.

The most commonly prescribed antibiotics during COVID-19 pandemic are found to be fluoroquinolones, macrolides and cephalosporins.³ The basic purpose of the antimicrobials drugs is to curb and to prevent secondary bacterial infections in the COVID-19 pneumonia patients. However, there is a paucity of supporting data regarding the association of coronavirus related respiratory illness and superimposed bacterial infections. Around 8% cases of COVID-19 globally presented with bacterial and fungal co infections so far.⁴ Study from UK demonstrated 3.2% SARS-CoV-2 patients developed secondary bacterial infections.⁵ Li and co researchers from Wuhan, China showed 6.8% COVID-19 patients developed hospital associated infections.⁶ The commonest observed offenders are *Acinetobacter baumannii*, *Klebsiella pneumoniae*, *Methicillin resistant Staphylococcus aureus*, *Pseudomonas*, *Candida*, *Mycoplasma*, and *Cryptococcus*. Despite of lower rates of bacterial co infect-

ions, surprisingly higher rates of antibiotic prescriptions are reported. A study from China revealed around 99% critical and non-critical patients received antibacterial therapy including cephalosporin, carbapenems and quinolones, although none of the cases were found to be co infected with bacterial or fungal pathogens.⁴ Similarly, a study by Guan et al reported 58% out of 1099 patients were given intravenous antibiotics.⁷ A review analysis by Rawson and his colleagues showed that antibiotics were given in 72% cases of COVID-19 however, only 8% were found to be co infected with bacterial species.³ The preliminary results by Buetti et al illustrated that early administered antibiotics had no impact on significant reduction of mortality or delayed hospital-acquired infections in critically ill patients.⁸

The role of antibiotics in the treatment of COVID-19 is still debatable. The use of hydroxychloroquine alone or in combination with azithromycin has been recommended by clinicians worldwide for the treatment of SARS-CoV-2 patients. Although the polarity has been observed regarding the effectiveness of these drugs in terms of reduced morbidity, span of hospitalization and case fatalities especially in elderly patients with ischemic heart diseases. The drug-drug interaction has found to be responsible for prolonged QT intervals and torsades de pointes along with the potential threat of antibiotic resistance.⁹

One of the possible reasons for commencement of empirical antibiotic therapy for SARS-CoV-2 patients is synergy which exists between viral and bacterial infections, as it has been observed with influenza viruses. However, strong evidence is still required. It has been observed that respiratory viruses are responsible for immune paralysis, a condition in which antigen presenting cells (macrophages and dendritic cells) are overwhelmed by the load of apoptotic lung cells owing to viral infection. Consequently, there is an increase in bacterial pathogens growth. The viral infections disrupt mucocilliary apparatus and cause thickening of the mucus resulting impaired movement of immune cells. If such stipulated synergy is proven, the usage of antibiotics would be fruitful, otherwise, it is cumbersome.¹⁰ Currently the beneficial effects of antibiotics in context of SARS-CoV-2 is still debatable, however, the evidences of impending side effects exist.

Several reports have come in lime light depicting the increased rate of antibiotic resistance in the dark era of covid

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pandemic. The Carbapenem Resistant Enterobacteriaceae (CRE) have been reported in French COVID-19 positive population. This can be associated with irrational use of antibiotics. Some of the studies reported exaggerated symptoms of COVID-19 illness in the patients of gastrointestinal (GIT) problems. Provided that antibiotics can disturb the gut microbiome, hence further complicating the GIT issues and emergence of resistant bacterial strains. Therefore, empirical antibiotics should be prescribed cautiously.¹¹ Another noteworthy finding is association of frequent sanitizers and disinfectants to disarray of natural environmental niche of microbiota, causing emergence of various resistant superbugs, for instance alcohol resistant strain of *Enterococcus faecium* has recently been reported in Australia.¹² Undriven antibiotic steward programs, curtailing of hospitalization for bacterial infections, limited diagnostic abilities due to telemedicine are some of the factors which have promoted the unnecessary prescription of antibiotics and eventually rise in antibiotic resistance.

The crème de la crème approach to prescribe antibiotics for viral illness generally and SARS-CoV-2 specifically, based on evidences, is to seek for COVID-19 most and least common compatible symptoms. The commonest symptoms are fever, dry cough and lethargy, while the uncommon symptoms include sore throat, diarrhea, conjunctivitis, headache, loss of taste or smell, skin rashes and discoloration.¹³ Antibiotics should be prescribed to the patients experiencing the worst signs and symptoms for example those with low oxygen saturations and rapidly developing respiratory failure. Biomarkers including C-reactive protein, procalcitonin, and serum ferritin may play a role in deciding for patient selection, but this needs further evaluation. The thumb rule to follow is “Patients without severe respiratory complaints should be managed without antibiotics”. In hospital settings, the diagnostic work-up includes a thorax CT scan, this offers more findings of the typical infiltrates related with bacterial lower respiratory tract infections as contrary to the typical glass ground opacities observed in COVID-19. This extra diagnostic approach should permit physicians to hold back the empirical antibiotics in patients with peculiar images for COVID-19 on CT scan.¹⁴ Antibiotic regimen should be properly followed as per the standard protocol. The important biomarkers should be considered for stopping the antibiotics, once the treatment plan is completed. A beta lactam coverage is required for *S. pneumoniae* and *Methicillin resistant S. aureus* (MRSA) preferably once a day administration. For atypical coverage, preference should be given to doxycycline. If secondary respiratory worsening is suspected, re-administration of antibiotics should be made only when there is a bacterial culture evidence, as in most cases the deterioration in symptoms is associated with hyper inflammatory responses rather than secondary bacterial infections.¹⁴

The use of proper personal protective equipment has proven to be the main source of dissipating bacterial infections during COVID-19 pandemic. Hand hygiene measures are mandatory and all health workers should adopt World Health Organization (WHO) 5 moments for hand hygiene approach.¹⁵ This can help in curbing spread of nosocomial infections. Antibiotic stewardship programs (ASP) bears a pivotal role in traditional health system. ASPs can evolve strategies to spot the patients with COVID-19-like-illness; this is specifically fruitful when these cases are overlooked initially. ASPs can also aid in the management of potential drug shortages, establishing local treatment guidelines, optimizing the use of antibiotics, and in the diagnostic stewardship of COVID-19 testing. Unfortunately in Pakistan, the role of ASP is still in the budding phase, despite the fact, irrational use of antibiotics is a norm in our clinical practice. The usage of antibiotics was higher during the COVID-19 pandemic as compared to the pre-pandemic period: the consumption of azithromycin raised from 11.5 daily define doses (DDD) per 100 occupied bed-days in 2019 to 17.0 DDDs per 100 occupied bed-days in 2020, while the administration of ceftriaxone escalated from 20.2 DDDs per 100 occupied bed-days in 2019 to 25.1 DDDs per 100 occupied bed-days in 2020.¹⁶ This can be alarming and warrants strict health interventions and their implementations by the stake holders.

Prompt diagnosis of COVID-19 is multifactorial, which can be achieved by developing communication strategies with patients, COVID-19 testing, and symptoms management plans. They all can contribute to damper injudicious use of antibiotics and saving mankind from an upcoming challenge.

Authors Contribution:

Faiza Zeeshan: Construct the Manuscript, References and Detailing, Title

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Myths Associated With Covid-19 Infection

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COVID-19 has affected the wide number of individuals globally. The gravity and the fast spread of the disease have led the researchers and the scientist around the world to take several steps to combat the disease.¹ The rapid spread of the infection also brought along numerous conspiracy theories and created panic of spreading disease and develop various myths.^{2,3} The source of expeditious dissemination of myths is social media. One of the measures other than social distancing and limiting overcrowding is vaccination of individuals. The researchers are working in a collaborative environment to develop vaccines that can save everyone from the drastic consequences. WHO testify that a great number of individuals are reluctant to get vaccinated.^{4,5}

Sahoo et al have stated several myths that people have in their minds related to the spread and precautionary measures against covid-19 infection. These include the use of garlic, turmeric and lemon as home remedies, the virus killed in saline water, heating can kill the infection, donating blood can make an individual prone to catch virus, newspapers are considered as sources of virus spreading as the virus can remain there for several hours and if someone develops covid infection, the virus will always remain in body.³ There are several reasons behind this apprehensive approach including religious beliefs, misinformation about the effects of vaccine and lack of knowledge.⁵ Rutten et al have documented that lack of confidence in vaccination results in refusal of vaccine. Other reasons include the rapid development of vaccine, social media propaganda and the sociopolitical environment surrounding the people.⁶ Similarly a research conducted in USA has stated that the reason behind lack of vaccination includes believing that Covid-19 is a myth and also the disbelief in regarding the safety of the vaccine.⁷ Al-Kuraishy reported that in Iraq the myths are communicated in great number through a social media platform via Facebook. Many believe that the disease can be prevented by spraying face masks with disinfectants and chlorine, not realizing that the intervention can be a source of pneumonitis and chemical poisoning. The infodemic

spread by charlatans regarding the beneficial effects of onion, garlic and peganum seeds in prevention from disease prevails in high numbers.⁸ The decision to be vaccinated or not also depends on the social, cultural and political values surrounding people. These days, the propaganda on the media has made the people disbelieve the affectivity of vaccines against the pandemic. The anti-vaccine attitude surrounding society lead to failure of vaccination program and their success.⁵

Pakistan is no different from other regions; in fact the reluctance witnessed here is way ahead of other nations. We as a nation are still not being able to eradicate polio. The major reason for still having polio and doubtfulness in getting vaccinated for both polio and covid is due to myths that are present in peoples' mind regarding the consequence of being vaccinated. The natives of Pakistan believe that the vaccination is a planned conspiracy against the Muslim nations and that is why the common men stay away from being enrolled for free of cost vaccination.² Another study conducted in Pakistan has also reflected the myth oriented mindsets of the Pakistani natives. The public believe that use of hand dryer, taking warm bath, staying in a warm environment, nose rinsing with saline water are among the measures that can prevent the illness. This study reported that (55.3%) of participants had false beliefs that the Covid virus is a bioweapon that was made by the government authorities and it was made in laboratory to harm the general public.⁹ Yang et al in their study have highlighted various false perceptions that have been spread through twitter. The public believes that the spread of covid infection is done through cell phones' 5G technology. The infodemic such as the virus is being spread through mobile phones make it sounds like a computer virus rather a biological one. Additionally people believe that drinking alcohol prevents the covid virus infection.¹⁰

The myths related to the pandemic, its spread and infection have also created stress among the individuals leading to the development of fear and anxiety among the affected ones.¹⁰ Many have become obsessive compulsive as they think that virus could attack them from any surface or any person they come in contact with.⁸ The anxious behavior and fear of unknown is causing various mental ailments. Also, the life during quarantine has also brought several psychological, emotional and social impacts associated with the pandemic.² A study conducted in West Africa documented

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that the natives believed that drying hands with the hair dryer and use of hand sanitizers can kill the virus.¹¹ Vraga et al in their study have mentioned the role of social media in the spread of misconceptions. The general public without any know how of the science behind the virus infectivity and Covid-19 prevention possibilities, spread misperceptions that lead to misunderstandings on a whole. It was concluded that genuine fact based information in the form of graphics can have a powerful effect on the disruption of Covid-19 based myths. Although such measures cannot fully control the disinformation but reduction and busting of myths by organizations like WHO, can certainly occur at the level of general public.¹² Dutta et al in their study also highlighted the myths that affect the general population. People believe that exposure in sunlight have protective effects against the pandemic. Other common myths include the transmission of infection by mosquito bites, thermal detectors can detect whether a person has containment of virus within the body, consumption of alcohol as a protection against the deadly virus, affectivity of antibiotics in the treatment of Covid-19, acid in the stomach has the ability of killing virus within the body provided consumption of ample water is taken. Other interesting myths include the destruction of virus by clapping hands and by reciting religious chants. Also, the people believe that Indian people have better immunity than the west and they can face the Corona virus without having any detrimental effects on their bodies.¹³ Sarla et al also mentioned myths like eating meat and keeping pets can lead to the spread of virus.¹⁴

The myths regarding Covid infection and its spread have caught the attention of the general public on a larger scale. The false believes lead to wrong comprehension and imaginations regarding the virus.¹⁵ Contextually in Pakistan, there is excessive burden of virus, various stake holders has to work together to halt the spreading of disinformation such as Pakistan Electronic Media Regulatory Authority has to take measures that can stop false media propaganda. The health professionals should come on social media to create awareness among the people. The policy makers should take a step forward in abolishing the false prevalent beliefs and surveillance based information should be available on social media. To rectify the religious misconceptions regarding the vaccines, the Islamic scholars of the country should have meetings with health and government officials so all of them can be on one page. This step could help clear several ambiguities in people's mind regarding the vaccines being halal or haram. By working collaboratively, the medical authorities would be able to neutralize the conspiracies budding in peoples' minds.

Authors Contribution:

Quratulain Javaid: Substantial contributions to conception and design, acquisition of data, analysis and interpretation of data

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“Pakistan’s Scenario in Pandemic Situation of COVID-19”

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Emergence of Covid-19 in Pakistan is an element of continuing pandemic caused by (SARS-CoV-2) virus¹ It was confirmed in our country on 26th February 2020². By 18th March 2020, cases were confirmed in 4 different provinces of Pakistan,³ and by 17th June, each district had recorded a minimum of one confirmed case of COVID-19. On 12th January 2020, WHO announced corona virus causes pulmonary disease among individuals of Wuhan City, China.^{4,5} Pakistan has witnessed 4 waves of COVID-19. The first wave started in May 2020, and increased in June to 165,062. 4,944 new cases and 136 total mortalities. Till 12th December 2021 mortality rate in Pakistan reached to 28,850 cases. The first wave depicted sporadic death rate. Subsequent to the initial wave, COVID-19 situation in our country subsided, day to day mortalities and positivity rates of testing in the country sustained to moderate levels. By the end of November 2020, deaths and new cases again started rising, though, culminating within the second wave. This wave was comparatively less in strength, and it influenced Sindh peaking in middle of December 2020. The 3rd stream commenced in middle of March 2021, when testing ratio of positivity, with day to day established cases and mortalities began to increase. Khyber Pakhtunkhwa and Punjab province were mainly affected by the 3rd wave. This wave gained its peak at the end of April 2021, new deaths, cases, positivity ratios are constantly falling. Punjab, by far has witnessed (334,000) established cases and (9,770) deaths. Sindh, second-highest registered patients (308,000) and (4,910) number of deaths, it has high registered cases compared to other provinces. Next to Khyber Pakhtunkhwa, Punjab had the highest death rate. Third-highest number of registered cases of COVID-19 (129,000) were from Khyber Pakhtunkhwa faced an unusual high death rate of 3% and number of mortalities (3,920) were third-highest. Balochistan had less number of cases (24,500) and lowest number of deaths (270). Balochistan has low mortality rate, presently ranking around 1.10%. Islamabad has announced 80,300

number of cases and has witnessed 745 number of deaths, taking it to the next highest deaths rate per capita and a better number of victims per capita compared to any Pakistani province⁴⁻⁵. The Fourth wave of Covid-19 was commonly known as the Indian variant which increased the fatality rate up to a way high extent.

Pakistan imposed a country-wide lockdown from 1st April which was extended twice till 9th May. The fourth wave of Covid-19 in Pakistan commonly known as the delta variant took over its peak in the months of July- August 2021 bringing the country into strict lockdown. This brought the government to impose compulsion on the administration of covid- vaccines. By far Pakistan has administered COVID-19 vaccines like Chinese Sinopharm, Sinovac, CanSino-Bio, Russian Sputnik, Moderna and Astra Zeneca among individuals starting from age groups 60 to 50, 40, 30, 18 and below. Recently Pfizer booster shot.

Covid 19 not only increased the number of mortalities but also brought massive downfall to the economy of countries. Thus, it would take a lot of time for countries including Pakistan to come out of the long-lasting consequences the pandemic has brought over 2.5 years. Therefore, only way to prevent themselves from this virus lies in following the COVID-19 SOPs; wearing masks, hand washing, getting vaccinated and maintaining social distance. Lifelong imprint on the economy of the planet will be left by Covid-19, causing persistent changes and tutoring important lessons. The most important lesson learnt so far from the COVID-19 pandemic has been the significance of uniting together on difficulties that influence the entire humanity.

Authors Contribution:

Saima Mazhar: Construct the Manuscript

Farzeen Tanwir: Proof Read, Plagiarism and Finesse

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b) Organization as author

The Cardiac Society of Australia and New Zealand. Clinical exercise stress testing. Safety and performance guidelines. *Med J Aust* 1996; 164: 282-4

c) No author given

Cancer in South Africa [editorial]. *S Afr Med J* 1994;84:15

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Phillips SJ, Whisnant JP. Hypertension and stroke. In: Laragh JH, Brenner BM, editors. *Hypertension: pathophysiology, diagnosis, and management*. 2nd ed. New York: Raven Press; 1995. p. 465-78

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