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EDITORIAL

Role of Pharmacoeconomic Analysis in Healthcare Systems

Mehwish Rizvi

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Pharmacoeconomics or health economics is the field that assesses the experimental and economic features of healthcare products, services, and plans for the healthcare providers, patients, and policy makers. It comprises multiple techniques including cost effectiveness, cost benefit, cost of illness, cost minimization, cost utility, and other economic analytical techniques, facilitating the decision makers in the allocation of resources.

It is also sometimes referred to as health outcomes, when a technique is conducted for the non-pharmaceutical courses of therapy or surgical strategies. All resources used to construct and dispense a specific drug therapy are measured to determine its cost. Outcomes are usually classified as positive and negative, based on the measurement of drug usefulness and its side effects including drug resistance and treatment crash[1]. Different pharmacoeconomic approaches could be utilized for economic evaluations. These evaluations provide a useful way of comparing various treatment options with their costs and outcomes.

Healthcare professionals must follow proper guidelines for an impactful implementation of any economic analysis. Official panel experts of the United States Public Health Service, Center for Disease Control and Prevention; and the Division of Drug Marketing, Advertising, and Communication [DDMAC] of the FDA in the United States, have designed rules for appropriate management of pharmacoeconomic studies.

The guidelines developed by the academy of managed care pharmacy for formulary proposal include in-depth information of pharmacoeconomic data that should be considered for drug reporting decisions[2]. Pharmaceutical Research and Manufacturers of America (PhRMA) has set principles to guide industrial associates in decreasing bias during pharmacoeconomic studies. Different countries, including Australia, Canada, Italy, Spain, The Netherlands, Switzerland, Germany, France, and the United Kingdom have developed their own sets of recommendations.

Babar and Scahill conferred in their commentary circulated in 2010 that performance and design of health system and pharmaceuticals expenditures of the country are the obstructing factors in the progress of pharmacoeconomics in developing countries[3]. It is essential to incorporate the subject of pharmacoeconomics in later years of Pharmacy curriculum so that the future practitioners can measure the cost and consequences of drug therapy in a healthcare system[4].

Pharmacoeconomic analyses are employed in many disciplines mainly pharmaceutical compensation, price cooperation, formulary discussions, guideline developments in clinical practice, and exchange of ideas with prescribing physicians[5]. Pharmacists are expected to have diversified roles in healthcare systems as they are scientifically trained. Hence, pharmacy students need to be familiar with this new concept of pharmacoeconomics.

Currently, the aim of the stakeholders is to follow cost-controlled health policy to reduce health expenditures which are rising swiftly. In this regard, cost-effectiveness analysis is the most rapidly growing subject of pharmaco-economic studies due to its impactful application in healthcare systems. A study conducted in Pakistan, mentioned that the budgets of patients and hospital resources are overburdened by poly prescription however, could be minimized through appropriate screening, relevant prescriptions, and proper medications. An accurate economic history of each patient would surely assist the physicians in prescribing secure and cost effective brands of medicines.

It is, therefore, imperative to educate the future practitioners about the pharmacoeconomic parameters and aspects to implementat in healthcare system in the true sense. This could be achieved by incorporating content related to the pharmacoeconomic approaches in undergraduate curriculum of pharmaceutical sciences. It is also recommended to arrange learning sessions frequently to educate health professionals about pharmacoeconomic analysis.

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ORIGINAL ARTICLE

Diagnostic Accuracy of Computed Tomography Based Anthropometric Measurements of Maxillary Sinuses in Sex Determination in Pakistani Population

Mehreen Fatima[1], Binish Rashid[1], and Ghulam Murtaza[2]

ABSTRACT

Objective: The aim of this study is to determine the diagnostic accuracy and reliability of CT based anthropometric measurements of maxillary sinuses in sex determination of human beings

Methodology: This prospective cross-sectional study was conducted in Dow University of Health Sciences' Institute of Radiology from October 2019 till June 2020. Cases of CT para nasal sinuses with morphologically intact maxillary sinuses without any disease were included. The anthropometric measurements of the maxillary sinuses were determined by a radiologist. Using those values, sex was predicted by a formula and compared with actual sex to determine diagnostic accuracy and reliability of CT scan.

Results: We reviewed CT scan PNS of 97 patients (194 sinuses); 45 females and 52 males. Most of the patients were between 20-40 years of age (75.6%). All the dimensions and volumes were larger in males than females and statistically significant. When using the dimensions of both maxillary sinuses (n=194 sinuses) on CT scans, the over all diagnostic accuracy to determine sex was found to be 90% with accuracy of 78% in females and 100% in males. However, the reliability (predictive value) for females and males was 100% and 84.5%, respectively.

Conclusion: CT measurements of maxillary sinuses are useful to determine sex in forensic identification. If the CT scan suggests that the skull belongs to a female or a male, the probability that it would turn out to be so is100% and 84.5%, respectively.

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INTRODUCTION

Identification of human beings is essential for personal, social and legal reasons[1]. Establishment of the identity of a person, living or dead, is a legal necessity and is consistent with social requirements. Forensic science is of considerable help in establishing the identity of an individual, both living and dead. In forensic medicine, post mortem identification of bony remnants and putrefactive human remains is one of the most arduous tasks[1]. When established methods of identification, such as visual recognition and comparison of dental data, cannot be used as in cases of advance decomposition or insufficient record, alternative methods should be considered.

Sex determination is one of the vital parameters in forensic identification as sex assessment constitutes an integral step in building a post mortem profile[2]. The skull and the pelvis, along with assessment of epiphysis and metaphysis of the long bones, are considered the most useful for radiological determination of sex[1,3]. In addition to these conventional methods, one of the methods suggested by many studies is; sex determination through the size and volume of maxillary sinus specially in cases of mass disasters and incineration[1,3,4]. Furthermore, it has been reported that the anatomical shape and structure of maxillary sinus remains intact even though the skull and other bones may be severely disfigured[1,4].

Maxillary sinuses are two air filled spaces, situated in the maxillary bone and can be in diverse sizes and shapes. After maturity, their size and shape may alter due to loss of teeth. The sizes of maxillary sinuses can

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also be altered by genetic diseases, by infections and other environmental factors[5].

Computed Tomography (CT) scanning is considered the gold standard for examining maxillary sinuses[2]. An over all accuracy of 83.3% for sex determination is reported by Prabhat *et al* using the anthropometric measurements of maxillary sinuses, in a study conducted on 30 patients[1]. An accuracy of 69.3% for sex determination, using anthropometric measurements of CT scans of maxillary sinuses of 127 patients, was reported by Teke *et al* in a study conducted in Turkish population[3]. An over all accuracy of 88% was reported by Bangi *et al,* using anthropometric measurements of CT scan of maxillary sinuses of 100 patients[6]. The variations in some of the results of maxillary air sinus dimensions and volume in these studies are probably due to the combination of many factors like the effect of ethnicity on the sinuses or different methodologies applied in those studies. Genetic and environmental factors and anatomical variations of sinus also play a role in these variations. However, the method is not considered to be error free. Moreover, no such study is conducted in our population, hence, this study was conducted to determine the diagnostic accuracy and reliability of CT based anthropometric measurements of maxillary sinuses in sex determination in Pakistani population.

METHODOLOGY

This prospective cross-sectional study was conducted in Institute of Radiology after approval by the Institutional Review Board of Dow University of Health Sciences. CT paranasal sinuses of males and females aged 20-50 years, having morphologically intact maxillary sinuses without any disease, were included using consecutive sampling technique. Patients having facial / maxillary deformity, sinus inflammatory disease or surgery were excluded from study.

After informed consent, examination was performed on 64 slices GE CT scanner using 3mm slice thickness with scan parameters of 120 kv and 60-220 Ma ranges, keeping patient steady during examination. The images were then transferred to workstation for post processing and reporting to be performed on picture archiving and communication system (PACS). A consultant radiologist with eight years of experience after fellowship in diagnostic radiology reviewed the scans for the following parameters:

Anthropometric measurements:

The mediolateral (ML) and superoinferior (SI) measurements were taken at the widest part of sinuses on coronal view, while anteroposterior (AP) diameter was measured on axial view. (Fig.1) Volumes and coefficients were derived using the formulae described by Bangi *et al*.

Following equation was used to calculate Sinus volume individually

Volume = (width × depth × height) × 0.5[1]

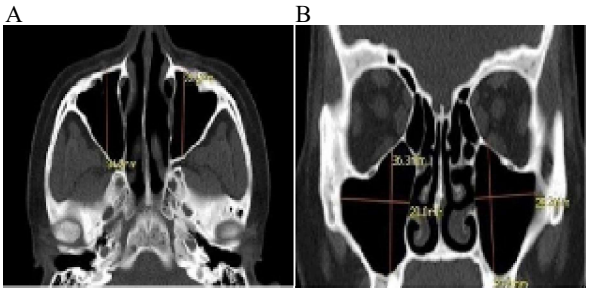

Fig 1: Axial CT scan showing AP measurement of right and left maxillary sinus (A), coronal CT scan showing SI and ML measurements of right and left maxillary sinuses (B)

Sex determination:

The resulted values based on anthropometric diameter were put in the formula given below for discriminative analysis of sex by Bangi *et al*.

Sex from Right Maxillary Sinus= -11.919 + 0.204 × SIR+ 2.330 × APR - 0.180 × MLR + 1.906 × VR

Sex from Left Maxillary Sinus= -8.552 + 0.347 × SIL + 1.376 × APL - 0.015 × MLL+1.020 × VL

A numeric value was obtained when the derived values were placed in the formulae. A positive (+ve) value predicted the sex as *male* and a negative (-ve) value predicted as *female*. The sex predicted by this formula was then compared with actual sex of the same patient. All these calculations were inserted into the formulae by the radiologist.

Assuming 88% accuracy of CT scan[6] in determination of sex with bound on error of 6.5%, for the sake of achievement of the sample as due to covid 19 the desired sample size was not achieved, a sample size of 97 was required based on 95% confidence interval as per WHO software. The data was entered and analyzed in SPSS. Continuous variables i.e. age and maxillary sinus dimensions were analyzed as means with standard deviation and compared between the groups by students' t-test. The categorical variables i.e. sex were analyzed as proportions. The agreement of the sex determination by the CT scan with the original sex of participants, was checked by kappa statistics. The diagnostic accuracy and predictive values were calculated by 2x2 table by following formula:

Accuracy of CT scan (Females) = Females correctly detected by CT scan/total females

Accuracy of CT scan (Males) = Males correctly detected by CT scan/total males

Accuracy of CT scan (Over all) = True females+ True males detected by CT scan/total patients

Predictive Value (Females)= Females correctly detected by CT scan/Total number of females predicted by CT scan dimensions

Predictive Value (Males) = Males correctly detected by CT scan/Total number of males based on CT scan dimensions

RESULTS

We reviewed CT scans of 97 patients (194 sinuses): 45 females and 52 males. Most of the patients were between 20-40 years of age (75.6%). All the dimensions and volumes were larger in males than in females and statistically significant (Table1) and there was no overlapping of coefficients between males and females (Fig. 2).

Table 1: Distribution of Maxillary Sinus Dimensions Measured on CT and Their Standard Deviation Dimensions:

Dimensions	All Patients	Female	Male	p-value
VR	14.1±5.6	10.4±3.8	17.3±4.8	0.001*
VL	14.01±5.7	10.04±3.6	17.4±5.01	0.00*
MLR	2.4±0.54	2.0±0.5	2.5±0.5	0.002*
SIR	3.1±0.64	3.5±0.5	3.2±0.3	0.001*
APR	3.5±0.43	3.2±0.35	3.8±0.35	0.001*
MLL	2.3±0.53	2.2±0.46	2.5±0.54	0.001*
SIL	3.1±0.64	2.6±0.41	3.5±0.5	0.001*
APL	3.5±0.46	3.2±0.41	3.8±0.35	0.00*

*Student's t-test

VR: Volume of right maxillary sinus; VL: Volume of left maxillary sinus; MLR: Mediolateral dimension of right maxillary sinus; SIR: Superoinferior dimension of right maxillary sinus; APR: Anteroposterior dimension of right maxillary sinus; MLL:Mediolateral dimension of left maxillary sinus; SIL: Superoinferior dimension of left maxillary sinus; APL: Anteroposterior dimension of left maxillary sinus

When using the dimensions of right maxillary sinuses on CT scans, the over all diagnostic accuracy to determine sex is 87%. From forensic point of view, reliability (predictive value) is more important than accuracy. The reliability (predictive value) for females and males is 100% and 81%, respectively, which means, when the CT scan suggests that the skull belongs to a female or a male, the probability that it would turn out to be so is 100% and 81%, respectively.

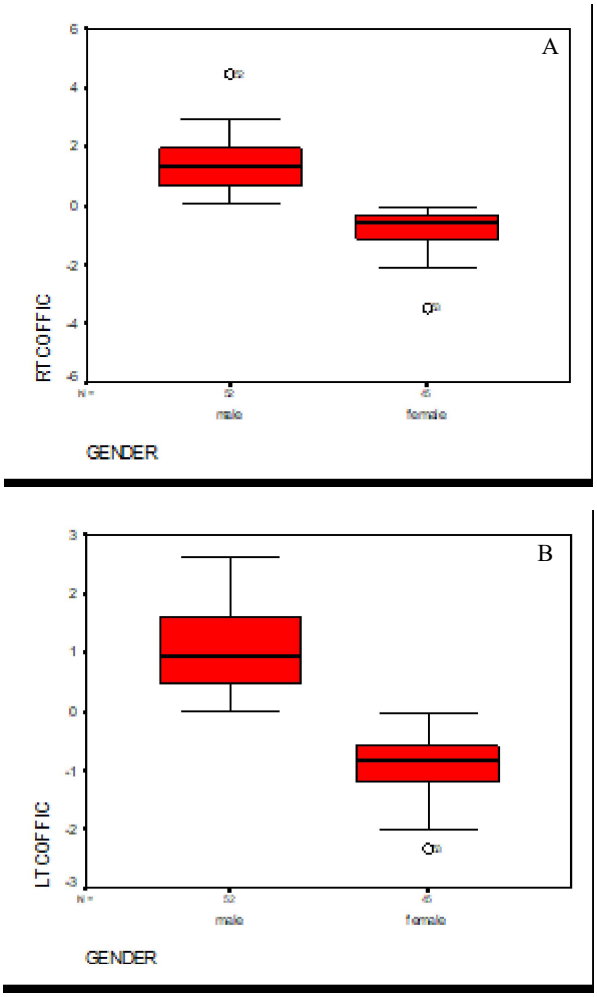

Figure 2: Box plot displaying the distribution of coefficients derived from different volumes and dimensions of right (A) and left (B) maxillary sinuses

When using the dimensions of left maxillary sinuses on CT scans, the over all diagnostic accuracy to determine sex is 92%. The reliability (predictive value) for females and males is 100% and 88%, respectively. So, when the CT scan suggests that the skull belongs to a female or a male, the probability that it would turn out to be so is100% and 88%, respectively.

When using the dimensions of both maxillary sinuses on CT scans, the over all diagnostic accuracy to determine sex is 90%. However, the reliability (predictive value) for females and males is 100% and 84.5%, respectively. So, when the CT scan suggests that the skull belongs to a female or a male, the probability that it would turn out to be so is100% and 84.5%, respectively.

Over all, there was a high degree of agreement between the actual sex of the human participant and sex based on the dimensions of CT scan was 74.7%, 85.5% and

80% for right, left and both maxillary sinuses, respectively, based on kappa statistics (Table 2).

Table 2: Agreement of CT Scan with Actual Sex based on Measurements of Right, Left and Both Maxillary Sinuses

		Actual Sex		PV*	Kappa statistics	p-value
		Female	Male			
Sex as Per Right Maxillary Sinus Dimensions (n=97)	Female Male	33 12	0 52	100% 81%	0.74	0.001
Sex as Per Left Maxillary Sinus Dimensions (n=97)	Female Male	38 7	0 52	100% 88%	0.85	0.001
Sex as Per Both Maxillary Sinus Dimensions (n=194)	Female Male	71 19	0 104	100% 84.5%	0.8	0.001

*Predictive value

DISCUSSION

Personal identification of unidentified bodies is a forensic procedure which is pivotal for ethical and social reasons as well as for policy making. Sex determination of the recovered skeletal remains is an essential part of the process of identification. It has been reported in many studies that if whole skeleton is available, sex can be determined with 100% accuracy and if both pelvis and skull are available, accuracy for sex determination is 98%. Accuracy is 95% from pelvis only or the long bones and pelvis, 90–95% from both the long bones and the skull, and 80–90% from the long bones only[1,7].

Radiological identification of sex is utilized when body is putrefied and disintegrated. Different techniques which have been mentioned here, have been utilized for sex determination of corpses recovered from crime scenes or sites of mass casualties. One of the radiographic methods for sex determination using radiographs of the calcaneus, determines sex with accuracy of 84.4% based on all angles and distances[14]. Another study reported that sex can be determined from circumference and area of foramen magnum using helical CT scan with an accuracy of 67% and 69.3%, respectively[8]. In addition to these conventional methods, one of the methods suggested by many studies is sex determination from size and volume of maxillary sinus specially in cases of mass disaster and incineration as it remains intact despite severe degradation of other bones.

It has been reported that in the identification of unknown human remains computerized tomography is an appropriate imaging technique as compared with conventional radiographs[13]. Measurement of size and volume of maxillary sinuses in CT scans can be used to determine sex when routine identification methods may be inconclusive.

Our study showed a pattern of maxillary sinuses being larger in males than in females but the difference was statically insignificant. Similar results were seen in studies conducted in other parts of the world[12,15]. Volumes of both maxillary sinuses are larger in males than females. Similar findings were observed in several other studies.[6,12,15]

In the present study, the over all diagnostic accuracy of CT scan to determine sex based on dimensions of both right and left maxillary sinuses is 100 % in males and 78% in females with an over all diagnostic accuracy of 90% which matches multiple earlier studies that show good diagnostic importance of anthropometric measurements in both sexes[1,6].

Bangi *et al* reported sex determination by right and left maxillary sinus dimensions with 84% accuracy in males and 92% accuracy in females[6]. Prabhat *et al* reported that sex can be determined from the anthropometric measurements and volume of the right and the left maxillary sinuses together with 80.0% accuracy in males and 86.7% accuracy in females, and the over all accuracy of sex prediction was 83.3%[1]. Our results are also comparable with a study conducted on Indian population in which the over all accuracy rate was 86% (86% in males and 87% in females)[16]. However, the prediction accuracy in our study is comparatively greater than some studies. Amin and Hassan estimated sex from radiological measurements of maxillary sinus using CT scan among Egyptian population, with an accuracy of 62% in females and 70% in males[17]. The study done by Teke *et al* on Turkish population stated that sex could be determined from CT scans of the right and left maxillary sinus measurements together with an accuracy of 69.4% in females and 69.3% in males with over all accuracy of 69.3%[3]. Sharma *et al* reported an accuracy rate of 68.9% in females and 65% in males using CT measurements of maxillary sinus dimensions and volume[18].

The variations in some of the results of maxillary air sinus dimensions and volume in these studies are probably due to combination of many factors like the effect of ethnicity on the sinuses or different methodologies applied in those studies. Genetic and environmental factors and anatomical variations of sinus also play a role in these variations.

Our study emphasizes on the use of CT scan for prediction of sex based on maxillary sinus dimensions, which has 100% reliability if it predicts female sex and 84.5% reliability for males. The lower reliability on CT scan for male sex may be attributed to the fact

that some females (15.5%) may have higher enough dimensions of maxillary sinuses to be falsely labelled as males.

The dimensions of maxillary sinuses are affected by diseases or age due to teeth loss. In order to reduce this selection bias, we excluded the scans with other pathology and also limited the age to 20-50 years to attain a homogenous study population.

Another study has been carried out to check the reliability of the use of CT scan for prediction of sex based on maxillary sinus dimensions which reported that the sensitivity of the discriminant functional analysis was 80% (20/25) and specificity was 72% (18/25)[5].

CONCLUSION

The study concludes that CT based identification of sex is highly accurate and of utmost importance in forensic medicine. When the skull is predicted to be female based on a CT scan, the chances of it turning out to be female actually are 100%; however, for prediction as male, the chances of accuracy are 84.5%.

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Conflict of interest: None declared
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Authors' contribution: MF worked on protocol writing, introduction, literature search, methodology, discussion, and proof reading. BR worked on Data collection, interpretation and data entry in SPSS. GM worked on statistcal analysis, results and final proof reading.

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ORIGINAL ARTICLE

Magnitude of Post Stroke Depression (PSD) and Its Association with Socio-Demographic and Disease Related Factors in Stroke Survivors Visiting Tertiary Care Hospitals: A Cross-Sectional Descriptive Study

Ashfaq Ahmad[1], Dildar Muhammad[2], Sehrish Naz[3], and Sardar Ali[2]

ABSTRACT

Objectives: To determine the magnitude of Post Stroke Depression (PSD) and its association with socio-demographic and disease related factors among stroke survivors visiting tertiary care hospitals of Peshawar, Pakistan

Methodology: A cross-sectional study was carried out in three major tertiary care hospitals, of Peshawar on 120 stroke survivors. A valid (r = 0.79) and reliable (r = 0.84) self-administered Siddiqui Shah Depression Score (SSDS) was used as study tool. A non-probability convenience sampling technique was used. Demographic information, including age, gender, marital status, income status, education, and family system was obtained. Disease related factors, including duration after stroke, co-morbidity, and level of dependency were measured. Depression level was evaluated via SSDS translated into Urdu.

Results: Post Stroke Depression (PSD) was found in 79.1% of the total sample. Sixty-six (55%) survivors were males. The mean age of the respondents was 47.43±11.83 years. Chi-Square test showed a significant association between the age of stroke survivor and education status, while other demographic variables were found to be non-significant. In disease related factors, duration after stroke revealed significant association with PSD, whereas level of dependency was also found significant.

Conclusion: The prevalence of PSD is high among stroke survivors and timely detection, family support, and adequate measures by healthcare professionals are important in management of PSD.

Key words: Post Stroke Depression, Stroke Survivors, Stroke, Depression, Functional Disability, Social Support, Dependency

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INTRODUCTION

Post Stroke Depression (PSD) is the highest prevailing psychiatric complication and the most common emotional disorder afflicting stroke survivors[1]. The prevalence of PSD has been reported to be as low as 5% and as high as 70% around the globe[2]. Literature reports that nearly 30% of the stroke survivors develop depression, either at early or late stages after stroke[3]. However, only a small number of patients are diagnosed and even fewer are treated in common clinical practice. Although depression affects the functional recovery and quality of life, it is usually ignored or misdiagnosed. PSD prevalence varies across different regions of the globe. Umair J. et.al has reported prevalence of PSD as 37.9% among stroke survivors[4]. Similarly, Chen et. al conducted a cohort study over five years and reported 33% prevalence of PSD among stroke patients[5]. Jiang X. et al. have reported wide range of prevalence ranging from 5% to 63% in their studies[6]. Stroke survivors with PSD suffer higher mortality rate and minor improvement in rehabilitation programmes in comparison to non-depressed stroke patients[7].

The situation in Pakistan is not very different from the rest of the world. In local context, Seethlani et al have reported the prevalence rate of PSD as 47% while another study conducted by Adnan et al, found a prevalence rate of 35% in stroke survivors[8,9]. These

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variations in the reported prevalence of PSD may be due to the differences in study settings, study designs, diagnostic tools, and timing of assessment[10]. None of these findings give a clear etiology of the prevalence of PSD. Despite extensive literature on this topic, there is no agreement on causal mechanism, risk factors and consequences of PSD which usually results in longer hospital stay and hinders the process of rehabilitation and recovery[11].

The available evidence suggests PSD as being multifactorial in origin, and consistent with bio psychosocial model of mental illness[12]. Literature also shows that multiple factors are responsible for the development of depression in stroke survivors. However, the most common reason reported is the neuro-chemical disproportion in the brain that results in pathology of the disease which influences the person's physical and cognitive manners, mood regulation, and imbalance leading to depression among stroke survivors[13]. Further, demographics such as age of the stroke survivor, gender, marital status, level of literacy, residence, socio-economic background, location of lesion, co-morbidity, severity of diseases, social and family support system, and personal habits and lifestyle are the factors that associate, correlate and contribute in the development of PSD in stroke survivors[6,7,14].

A study conducted by Alajbegovic et al reported that the incidence of PSD is higher in working age group (20 to 70 years) especially in those who experience stroke for the first time in life[15]. In addition, higher prevalence has been reported in females than males and in those who had left hemisphere lesion location[16]. The tendency or risk of development of PSD has also been found high in stroke survivors who lack family or social support[17]. PSD is common but unnoticed which, on the whole, prolongs the treatment and rehabilitation process[8].

The idiopathic nature of psychological distress makes the stroke survivors overburdened economically in their families[9]. Early detection and taking appropriate intervention for the prevention of PSD in stroke survivors may limit the number of deaths due to stroke. In Pakistan, especially in local region there has been a great discrepancy in reporting true prevalence and factors responsible for PSD. The current study was, therefore, aimed to assess the magnitude of PSD in local context, and to determine its association with demographic and disease related variables.

METHODOLOGY

A cross sectional study was carried out recruiting 120 stroke survivors to assess the frequency of PSD and associated factors in non-aphasic stroke survivors with no previous history of mental illness and one month after the stroke visiting tertiary care hospital. Study duration was from November 2018 to April 2019. A non-probability convenience sampling technique was used. A valid (r = 0.79) and reliable (r = 0.84) self-administered Siddiqui Shah Depression Scale (SSDS) was used as a study tool[18–20]. Approval was obtained from Advance Studies & Research Board (ASRB) and Ethical Review Board (ERB) of Khyber Medical University (KMU), Peshawar**.** A sample of 120 was calculated via online Raosoft Sample Size Calculator (P = 47%)[9]. It was further divided proportionally according to the sampling frame available in three different tertiary care hospitals.The data was analyzed using SPSS version 20 and presented in the form of tables, frequencies, and percentages. Chi-square and Pearson correlation tests were applied to interpret the findings of the study. Depression and Dependency for Care were categorized as per recommended guidelines of the SSDS and the following categories were used.

For Level of Depression

No Depression	01-25
Mild Depression	26-36
Moderate Depression	37-49
Severe Depression	50-50+.

For Level of Dependency for Care

Almost independent for care	< 6
Limited care dependent	06-14
Partially dependent	15-20
To a great extent dependent	21-28
Complete care dependent	>28

RESULTS

All the study participants returned the filled questionnaire so the response rate remained 100%. PSD was found in 79.1% of the stroke survivors. The mean age of the respondents was 47.43±11.83. Majority of the respondents [79 (65.8%)] were in the age group of 35-65 years, and more than half [66 (55%)] of them were males. More than two thirds (70%) of the sample stroke survivors belonged to rural areas. Moreover, [63(52.5%)] reported their average income to be between PKR11,000 to PKR30,000 per month. Majority of the respondents [105(87.5%)] were married, whereas almost half [53(44.2%)] were unemployed. Very few of the respondents were single (10%). As shown in Table 1, more than half, [66(55%)] of the respondents were living in joint families.

Table 1: Comparison of PSD with Demographic variables

Variable	Category	PSD	No PSD	Total	P-value
Age group	<36	13(81.25%)	3(18.75%)	16	
	36-65	61(77.21%)	18(22.78%)	79	0.001
	>65	21(84%)	4(16%)	25	
Gender	Male	50(75.75%)	16(24.24%)	66	
	Female	45(83.33%)	9(16.66%)	54	0.370
Residence	Rural	69(81.17%)	16(18.82%)	85	
	Urban	26(74.28%)	09(25.71%)	35	0.460
Marital Status	Single	11(91.66%)	1(8.33%)	12	
	Married	81(77.14%)	24(22.85%)	105	0.535
	Widow	2(100%)	0(0%)	2	
	Separated	1(100%)	0(0%)	1	
Employment	Unemployed	42(79.24%)	11(20.75%)	53	
	Self-Employed	23(71.87%)	9(28.12%)	32	
	On Daily wages	13(81.25%)	3(18.75%)	16	0.645
	Salaried	12(92.30%)	1(7.69%)	13	
	Pensioners	5(83.33%)	1(16.66%)	6	
Qualification	Illiterate	51(83.60%)	10(16.39%)	61	
	Matric	29(69.04%)	13(30.95%)	42	
	Intermediate	8(80%)	2(20%)	10	0.159
	Graduate or above	7(100%)	0(0%)	7	
Income Status	<10000	36((81.81%)	8(18.18%)	44	
	11K – 30K	48(76.19%)	15(23.80%)	63	
	31K – 50K	7(77.77%)	2(22.22%)	9	0.662
	>50K	4(100%)	0(0%)	4	
Family Structure	Single	40(74.07%)	14(25.92%)	54	
	Joint	55(83.33%)	11(16.66%)	66	0.261

Table 2: Association of Co-morbidity and PSD in Stroke Survivors

Variable	Category	PSD	No PSD	Total	P-value
Co-Morbidity	Hypertension	54(76.05%)	17(23.94%)	71	0.515
	Diabetes	19(79.16%)	05(20.83%)	24	0.318
	Neuropathies	16(84.21%)	03(15.78%)	19	0.166
	IHD	6(100%)	0(0%)	6	0.515

Table 3: Association of Disease Related Factors and PSD in Stroke Survivors

Variable	Category	PSD	No PSD	Total	P-value
Time	One Month	55(73.33%)	20(26.66%)	75	
	Two Months	40(88.88%)	05(11.11%)	45	0.062
Hemisphere Affected	Left side	45(71.42%)	18(28.57%)	63	
	Right Side	29(85.29%)	5(14.70%)	34	
	Both side	21(91.30%)	2(8.69%)	23	0.077
Care Provider	Wife	54(72.97%)	20(27.02%)	74	
	Children	18(90%)	2(10%)	20	
	Relatives	20(86.95%)	3(13.04%)	23	0.189
	None	3(100%)	0(0%)	3	

Table 4: Association of the Level of Dependency for Care and PSD (n=120)

Variable	Category	PSD	No PSD	Total	P-value
Level of Dependency for Care	Almost Dependent	1(20%)	4(80%)	5	
	Limited Dependent	19(61.29%)	12(38.70%)	31	
	Partially Dependent	25(73.52%)	9(26.47%)	34	0.000
	To a great extent Dependent	36(100%)	0(0%)	36	
	Complete Dependent	14(100%)	0(0%)	14	

Table 1 shows comparison of demographic variables with PSD. It can be inferred from the findings that the gender, residence, marital status, employment, income status and structure of the family system have shown no significant effect on development of PSD. However, age of stroke survivors plays a significant role in this regard with a P=0.001.

Table 2 displays the association of co-morbidities with PSD. Post-Stroke Depression was found in stroke survivors having comorbidities; that is, Hypertension, Diabetes, Neuropathies, and Ischemic Heart Diseases. Over all, no significant association was found among co-morbidities and Post Stroke Depression.

Table 3 illustrates the association of factors related to disease process with PSD such as duration after the occurrence of stroke, the affected hemisphere of the brain and body side, and care provided to the patient with PSD. These findings suggest that there is no significant association found between PSD and disease related variables in stroke survivors.

Table 4 demonstrates that the level of dependency and PSD is positively associated. These findings reveal that a very low number of the stroke survivors live independently and majority were dependent on others. As the level of dependency increases, the tendency of depression occurrence in stroke survivors increases.

DISCUSSION

This was the first study from local context to generate the first line data regarding depression among stroke survivors. PSD is a common ailment but unnoticed and ignored at the time of treating and caring for stoke survivors. The overarching aim of this study was to determine the magnitude of PSD and its association with demographic and disease related variables. Depression is one of the most common ailments after the stroke incident. The current study reported 79.1% prevalence of depression in stroke survivors. The findings of this study are consistent with previous studies reported at local and international level[8]. For instance, a study reported by Alajbegovic et al. found PSD among 63% female stroke patients in Bosnia. Similarly, another study by Kumar (2015) reported depression amongst 47% stroke patients in Karachi[9,15].

PSD has been found significantly associated with age in the current study. Previous studies also reported similar findings that PSD has a strong relationship with younger age. Current study noted PSD was more prevalent in males as compared to females, however, these results are contrary to previous studies findings which noted high rate of PSD among female stroke survivors[11]. The reason of high prevalence of PSD in males remains unknown.

Joint family system may be another factor in the development of PSD, however, physical impairment by stroke carries a high risk for developing depression in stroke survivors[21]. The findings of current study also suggested high prevalence of PSD in married people, whereas previous studies reported that post stroke depression was associated with single, separated or widowed status[22]. The results of current study revealed that PSD has significant correlation with education level. Similar findings were reported by a previous study which showed a significant association between level of education and post-stroke depression[23]. Socio-economic status and social support from family and friends plays an important role in rehabilitation. These findings are consistent with White JH. et al who reported social support to be a significant predictor[24]. Similarly, another study also supported the current study findings that PSD was associated with low social support[25]. Trend of PSD has a temporal effect which means the condition of the patient changes as time passes. Patients at one-month post stroke had higher prevalence of PSD as compared to patients at two months (57.89% and 42.1%) respectively. The study results were consistent with the findings of a previous study[26].

The current study generated baseline data from local context to uncover the unnoticed problem of depression among stroke survivors. This study recruited a small sample of stroke survivors therefore caution needs to be taken in generalization of findings. The study employed convenient sampling technique which may be another limitation in generalization of findings. The current study was limited to only three tertiary care hospitals of Peshawar, therefore future studies may include multiple centers with large sample size and random sampling techniques. The study highlighted that many factors are involved in the development of PSD in stroke survivors. Healthcare workers need to be vigilant while caring for stroke survivors for early detection and management of psychological complications.

CONCLUSION

The study concluded that prevalence rate of depression (PSD) was 79.1% in stroke survivors. Moreover, PSD has significant association with lack of social or family support among stroke survivors. Over all, dependency for care and poor physical and mental wellbeing are strongly associated with PSD in stroke survivors. Therefore, proper steps and interventions need to be taken by healthcare agencies and professionals to reduce further ailments among stroke survivors.

Authors' contributions : AA Conceived the idea ,worked on methodology and concept designing, research and manuscript writing and final galley proofing. DM and SA Supervise the project worked on designing and concept, data collection and data entry in SPSS, worked on statistical test application, manuscript writing. did critical review. SN did Critical review of the final version and essential changes in manuscript.

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ORIGINAL ARTICLE

COVID-19: Perspective and Practice of Urban Population of Pakistan

Asma Dahar[1], Taleeque-ul-Karim[2], and Tahira Assad[3]

ABSTRACT

Objective: To understand the level of awareness and practices in urban population of Pakistan towards the deadly outbreak of COVID-19 and SARS-CoV-2 in Pakistan

Methodology: A descriptive, cross-sectional online study was conducted amongst the people of Pakistan in the month of July, 2020 by non-probability, convenience sampling technique. The questionnaire was filled by people aged 20-60 years, both male and female, employed or unemployed, married or single regardless of their occupation and residing in Karachi, Pakistan.

Results: A total of 600 participants filled the questionnaire. Majority of respondents were in the range of 20-30 years, with 477(79.50%) responses. Mean KAP score was found to be 18.59± 2.455. Among these, 74.2% of the population were known to have 'Good KAP', 24% of the population had 'Fair KAP' and 1.9% of the population had 'Poor KAP'.

Conclusions: Knowledge related to COVID-19 was found to be fair, whereas attitude and practice towards the pandemic was good. Although, many of the knowledge questions were answered rightly by the respondents, still there were some misconceptions related to face masks, gloves, and high-risk people for the disease.

Key words: Awareness, Behaviour, Pneumonia, RNA Viruses, SARS Virus, COVID-19.

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INTRODUCTION

Health authorities of China identified many pneumonia cases of unknown cause in the city of Wuhan, Hubei province in December 2019[1]. Signs and symptoms of this disease included reduced or normal white blood cells, pyrexia, dry cough, radiological signs of acute respiratory distress, rare gastrointestinal symptoms, failure to resolve on 3 to 5 days of treatment with an antibiotic, and lymphopenia[1,2]. These cases were seen particularly in the Hunan seafood wholesale market located in Wuhan, Hubei province of China. Nevertheless, in January, the atypical viral disease spread to many provinces such as Hunan, Zhejiang, Henan, Guangdong, Hubei and others, including cities like Shanghai and Beijing; leaving thousands of people infected[2]. The WHO tentatively titled this newly emerged virus as 2019 Novel Coronavirus (2019-nCoV) on 12 January 2020. At the daybreak of 30 January 2020, the 2019-nCoV was declared a Public Health Emergency of International Concern by the WHO. The WHO officially named the disease caused by 2019-nCoV, as Coronavirus disease 2019 (COVID-19) on 11 February 2020. On the same day, the virus that caused this disease was named by Coronavirus Study Group (CGS) of International Committee on Taxonomy of Viruses (ICTV) as "SARS-CoV-2". The virus was named as SARS-CoV-2 because it was found to be closely linked to Severe Acute Respiratory Syndrome Coronavirus (SARS-CoV)[3].This outbreak was proclaimed as a pandemic by WHO as the countries all over the world grappled with an upsurge in the number of confirmed cases. According to the situation report of WHO released on 15 August 2020, the total number of cases all over the world were 21,026,758[4].

The Corona Viruses (CoVs) belong to the Coronaviridae family, the subfamily of Orthocoronavirinae and order Nidovirales. CoVs are classified into four genera: Alpha Coronavirus (alpha CoV), Beta Coronavirus (betaCoV), Delta Coronavirus (deltaCoV), and Gamma Coronavirus (gamma CoV). The genera Beta Coronavirus is further divided into five sub-

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genera/lineages. CoV presents like a 'crown' under the Electron microscope (Coronam is the Latin term for crown) because of the presence of spike glycoproteins on the envelope[5]. These are single-stranded, positive-sense RNA viruses. They are infective in a wide number of hosts and cause diseases ranging from flu to severe lethal illness.

The history of Coronavirus goes back to 2003, having a suspicious aetiology of pneumonia when it emerged from South-East China mostly in Guangdong province. This was called SARS Coronavirus satisfying Koch's postulate[6]. This virus had a mortality rate of 10%-15%[7,8]. A similar outbreak of Coronavirus was seen in 2012 in the Middle East, and it possessed identical characteristics as the outbreak in 2003[9]. The disease caused by Coronavirus in 2012 was called MERS. Dromedary camel was an intermediary host in MERS, with a mortality rate of 37%[7]. Both SARS and MERS, most of the times non-specific, shared similar initial symptoms, including respiratory symptoms and fever. The staff of the hospital that were unprotected and in contact with droplets of infected patients, developed nosocomial infections[8,10].

The first case of COVID-19 in Pakistan was reported on 26 February, 2020. However, there were 288,047 confirmed COVID-19 cases and 6,162 total deaths due to COVID-19 in Pakistan according to the WHO as updated on 15 August, 2020[11]. The Government of Pakistan had imposed incomplete lockdown with total closure of non-essential services, restaurants, shops, and air travel for months. Academic institutions across the country had also been closed.The Higher Education Commission issued guidelines for online education to compensate for the loss of education because the closure of institutions as well[12].

After the appearance of the Coronavirus in China, the people of Pakistan had meager knowledge about it. When it travelled to Pakistan, then the people realized the seriousness of the issue and the Government of Pakistan started awareness campaigns as well[13]. Pre-emptive measures have been adopted by the Government to curb the rapid spread of the ongoing COVID-19 epidemic in Pakistan. Currently, Pakistan has comparatively lower incidence of Coronavirus cases than other countries[14].

Surveying the Knowlege, Attitude, and Practice of people provides an appropriate way to assess ongoing programmes and to discover compelling strategies and tactics for positive demeanor change[15]. The purpose of this study is to estimate the level of awareness, in the people of Pakistan regarding Coronavirus in the ongoing situation of COVID-19 pandemic. We also aimed to assess the attitude and practices by people of an urban city of Pakistan towards the pandemic. This study will result in better patient healthcare outcomes in future by identifying the gaps and deficiencies in the knowledge of people regarding coronavirus disease, counseling them for improving their attitude and practices towards pandemic. We can also direct our healthcare services and campaigns for further improvement.

METHODOLOGY

A descriptive, cross-sectional study was conducted amongst the people of Pakistan in the month of July 2020. Ethical approval was obtained from Ethical Review Board of Ziauddin University with the Reference code of 2280620ADOM. The study was conducted in the period of strict lockdown in the country which is why it was impractical to execute it as a community-based sampling. Keeping this in mind, it was determined that most of the data should be collected online. Non-probability, convenience sampling technique was used for sampling. A well-formulated, close-ended questionnaire was designed on Google Forms and Microsoft Word. Participants were approached through social media platforms like Facebook,Whatsapp, Instagram, and Email. The hard copy was circulated to the people who were met in person. The questionnaire included a proper consent statement which notified individuals about the anonymity of the data and agreement for their voluntary participation.

The questionnaire was filled by people aged 20-60 years, both male and female, employed or unemployed, married or single, regardless of their occupation and residing in Karachi, Pakistan. On the contrary, People who were below 20 years of age and aged more than 60 years, less qualified than Higher Secondary Education, and those who were not residents of Karachi, were excluded from this study.

The questionnaire was partially adopted from a study conducted in Saudia Arabia[16]. The demographic variables included age, gender, marital status, education, occupation and employment status. A score of '0' was given to the wrong answers and a score of '1' was given to the right answers in the Knowledge section. The total knowledge score bracket was from 0 to 11. The internal consistency of the questionnaire was measured and the Cron Bach alpha for knowledge questions was found to be 0.704 which was acceptable. A pilot study was first performed on 30 individuals to assess the reliability and understanding of the questionnaire by people which showed that major modifications were not required.

The attitude of the respondents was measured by Likert scale. A score of '1' representing "Disagree" through '3' representing "Agree" was used. In practice questions, a score of '2' had been given to answers of "Yes", '1' was given to answers of "Sometimes" whereas "0" was given to answers "No".

Descriptive statistics like frequency and percentages were analyzed for the all the categorical variables. The responses were converted into Knowledge scores, Attitude, and Practice scores along with KAP scores which were analyzed for mean and standard deviation. Responses for Knowledge, Attitude, and Practice questions were analyzed for frequency, percentage, and 95% confidence interval. The Knowledge score, Attitude and Practices scores, and KAP score were compared with different independent variables by using Chi-square test. Pearson-correlation was used to measure the strength of the association between Knowledge, Attitude, and Practice score.Data entry and analysis were done using Statistical Package for Social Sciences (SPSS) version 24.0 (SPSS, Inc., Chicago, IL, USA). $P<0.05$ was set as the statistical significance level.

The awareness level of the participants was assessed by their responses in the Knowledge section (Table 2). Majority of the respondents 532 (88.70%) were aware that the disease was caused by a virus. Upon questioning if Coronavirus caused the disease before 2019 as well; less than half, 278 (46.30%) of the respondents answered that it did not cause disease before. Most of the respondents, 581 (96.80%) were aware of the mode of transmission and said it spread through direct contact that is person to person. Almost all of them, 561 (93.50%) were aware of the signs and symptoms of the disease. Majority, 540 (90%) were aware of the incubation period of the virus that was 2-14 days. More than half of the respondents, 428 (71.30%) said that the only treatment available was to treat the symptoms. More than half, 365 (60.80%) of the respondents said that surgical/N95 facemask should be worn by everyone and at all times. More than half, 435 (72.50%) of the respondents said gloves were necessary in preventing the disease (Table 2).

Table 1: Demographic Characteristics of the Respondents and Their KAP Scores

Characteristics	Sub group	Frequency	Percentage (%)	KAP Scores (P-value)
Age	20-30	477	79.5%	0.169
	31-41	102	17.0%	
	42-52	19	3.2%	
	53-60	2	0.3%	
Gender	Female	341	56.8%	0.003
	Male	259	43.2%	
Marital status	Single	400	66.70%	0.037
	Married	200	33.30%	
Employment status	Employed	330	55.0%	0.288
	Unemployed	270	45.0%	
Highest level of education	Higher secondary school (college)	73	12.0%	<0.001
	University (Bachelors)	376	62.70%	
	University (Masters)	151	25.20%	

RESULTS

A total of 600 respondents were included in this study forming a response rate of 100%.Their age bracket was from 20-60 years (Table 1). Most of the respondents fell in the bracket of 20-30 years, 477 (79.50%) respondents (Table 1). Among the sample, the mean age of the respondents was 21.4±0.496 years. Out of 600 respondents, 259 (43.2%) were male. Majority of the respondents were students, 278 (46.3%).

Upon the assessment of the attitude of people towards COVID-19, majority of the respondents, 494 (82.30%) agreed that people should avoid leaving their homes during the pandemic while, 84 (14.0%) disagreed. Majority, 521 (86.8%) had views that the Government should isolate the infected paients while 50 (8.30%) disagreed (Table 3).

Table 2: Responses to the Knowledge Questions Regarding COVID-19

S.No	Questions	Options	Frequency (N)	95% CI	Percentage (%)
1.	Did Coronavirus cause disease before 2019 as well?	Yes	193	1.84-1.95	32.20%
		No	278		46.30%
		May be	129		21.50%
2.	How is the disease spread?	It is spread by droplets after sneezing/ touching and shaking hands.	581	1.04-1.12	96.80%
		It is spread by food/water contamination.	2		0.30%
		It is spread through faeces.	4		0.70%
		I don't know.	13		2.20%
3.	What are the signs and symptoms of the disease?	Same as seasonal flu (fever, cough, sore throat, muscle ache etc.)	561	1.09-1.18	93.50%
		Could lead to sudden death	15		2.50%
		Nausea, vomiting, diarrhea	4		0.70%
		Don't know	20		3.30%
4.	Who should wear the Surgical/N95 facemask?	Everyone and at all times	365	1.44-1.56	60.80%
		Healthcare professionals	177		29.50%
		People who are more anxious about the disease	51		8.5%
		Don't know	7		1.20%
5.	Are gloves necessary in the prevention of this disease?	Yes	435	1.35-1.47	72.50%
		No	83		13.80%
		Don't know	82		13.70%
6.	How long does it take to see the symptoms of the disease after exposure to virus?	Immediately	26	2.02-2.10	4.30%
		2-14 days	540		90.0%
		1 month	6		1.0%
		Don't know	28		4.7%
7.	Is there a treatment for the disease?	Treating the symptoms only	428	1.32-1.42	71.30%
		No definite treatment	123		20.50%
		Don't know	49		8.2%
8.	What kind of hand sanitizer should be used?	Non-alcoholic hand sanitizer	50	2.17-2.27	8.30%
		Hand sanitizer with 60% or greater than 60% alcohol	368		61.30%
		Any kind of hand sanitizer	182		30.30%

Table 3: Questions Related to Attitude and Practice of Respondents Towards COVID-19

S.No	Questions	Options	Frequency(n)	95% CI	Percentage(%)
1.	The government should isolate infected patients in hospital.	Disagree	50	2.74-2.83	8.30%
		Neutral	29		4.80%
		Agree	521		86.80%
2.	We should avoid leaving our homes nowadays.	Disagree	84	2.63-2.74	14.0%
		Neutral	22		3.70%
		Agree	494		82.30%
3.	I wash hands often.	Yes	552	1.10-1.17	92.0%
		Sometimes	33		5.50%
		No	15		2.50%
4.	I cover my nose and mouth with a tissue when coughing or sneezing.	Yes	552	1.18-1.29	87.0%
		Sometimes	63		10.50%
		No	15		2.50%
5.	I use face mask to cover my nose and mouth in crowded places.	Yes	518	1.17-1.26	86.30%
		Sometimes	49		8.20%
		No	33		5.50%

To evaluate the practice of the general population in these conditions, questions like how often they washed their hands, if they covered their nose and mouth with tissue when coughing or sneezing, and if they used face mask to cover their nose and mouth in crowded places, were asked. Majority of the respondents, 552 (92.0%) said that they washed their hands often, 552 (87.0%) answered that they covered their nose and mouth with tissue when coughing or sneezing and 518 (86.30%) said that they used face masks to cover their nose and mouth in crowded places (Table 3).

There were 11 Knowledge questions, 2 Attitude questions and 3 Practice questions in the questionnaire. The mean knowledge score was 7.58±1.719, indicating 68.90% (7.56/11*100)correct rate in the Knowledge section. The cut-off point (median) and mode for Knowledge score has been determined to be 8. Mean attitude and practice score was found to be 11.02±1.498. The cut-off point and mode for Attitude and Practice score was determined to be 12. The highest possible KAP score was 23. The mean KAP score had been 18.59± 2.455. The cut-off point and mode for KAP score was determined to be 19.

Results indicated that 74.2% of the population were known to have "Good KAP", 24% of the population had "Fair KAP" and 1.9% of the population had "Poor KAP" (Figure 1).

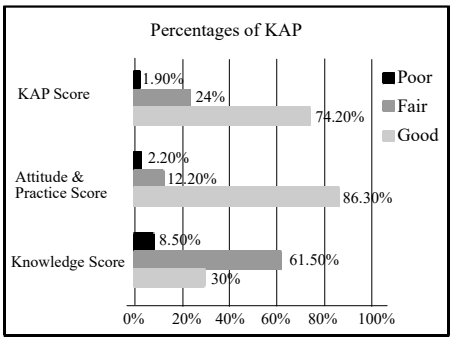

Figure 1: Percentage Distribution of KAP Categorized as Good, Fair and Poor

When Pearson correlation was applied, it was seen that Knowledge with Attitude and Practice score, Knowledge with KAP score, and Attitude, and Practice with KAP score were significantly related (<0.001). The co-relation of Knowledge with Attitude and Practice score was found to be (r=0.16), Knowledge with KAP score was (r=0.798) and Attitude and Practice with KAP score was (r =0.722).

The t-test was performed to compare the differences between the two grouped independent variables (Gender, age, employment status, and marital status) with KAP scores, wheras ANOVA test was done to compare the independent variables having multiple choices (Highest level of education and occuupation) with KAP scores.

DISCUSSION

Present study indicated some serious misconceptions of people regarding Coronavirus disease when the questions like, if Coronavirus caused disease before 2019 as well, who should use surgical/N-95 face mask, if gloves were necessary were asked (Table 2). The closely related values of mean, mode, and median indicated symmetrical distribution of the data.

The Knowledge score obtained by most of the respondents was found to be Fair (Figure 1). According to literature from China, less awareness and meager risk assessment had been the two reasons for accelerated spread of COVID-19 in China and to nearby areas. Partnerships of governmental and international agencies like WHO can be beneficial in fighting against the spread of disease by circulating public health information and discussing the risk as seen from the quick response to the outbreak of MERS in 2015 in South Korea[18].

The accepted mode of transmission of this disease is known to be inhalation of infectious aerosol[17]. A study conducted by Khurshid Z et.al, showed that 631 (97%) of the respondents answered that they were aware of the mode of transmission of the disease[19]. When the participants of this study were questioned regarding the mode of transmission of the disease, 581 (96.80%) of the respondents answered correctly that it was transmitted through droplets after sneezing/touching and shaking hands (Table 2).

As stated by WHO, the incubation time of the virus is 5-6 days on average but it can take up to 14 days[20]. A recent KAP study conducted in Pakistan related to COVID-19 amongst healthcare workers had indicated 77.2% of correct responses from respondents on the question of incubation period of the disease[21]. In this study, when respondents were asked about incubation period of virus, 90% (540) of the respondents answered it correct that was 2-14 days (Table 2).

The specimens used for testing of COVID-19 include nasal secretions, sputum, blood, and bronchoalveolar lavage (BAL). Enzyme Linked Immunosorbent Assay (ELISA) and Western Blots are the serological tests whereas Real Time-PCR (RT-PCR) and Northern Blot Hybridization are the molecular tests being employed on the specimens to detect COVID-19. The viral antigens present in the specimen are detected by Direct Immune Fluorescent Assay (IFA)[22].

When Pearson correlation was applied, it was seen that Knowledge with Attitude and Practice score, Knowledge with KAP score, and Attitude and Practice with KAP score were significantly related (<0.001) and there was a positive (direct) association among all. Weak relationship was found for Knowledge with Attitude and Practice score (r =0.13) whereas a strong relationship was found for Knowledge with KAP score and Attitude and Practice with KAP score (r =0.70). A KAP study related to respiratory tract infections, conducted among Hajj and Umrah pilgrims of Malaysia also indicated a weak correlation between Knowledge with Attitude and Practice score[23].

When demographics were compared with KAP scores, gender, education, and marital status were found to have significant association (Table 1). Similar findings were observed in KAP studies related to respiratory tract infections in Malaysia and COVID-19 in China[17,23]. However, the recent KAP study conducted in Pakistan amongst healthcare workers showed that their profession and awareness were interlinked. Moreover, it was seen that physicians were more aware of the signs amd symptoms of the disease[24].

In present study, Attitude and Practice score, as well as KAP score attained by most of the respondents, was found to be Good (Figure 1). This was contrary to the study conducted in Pakistan amongst healthcare professionals according to which the awareness of respondents was good but there was a need for improvement in terms of practice measures for healthcare professionals when dealing with COVID-19 patients[24].

Upon asking various practice questions related to COVID-19, the majority of respondents responded positively (Table 3). According to CDC, the only way to protect ourselves from the virus was to wash our hands frequently, staying at home, covering our mouth and nose with a mask in crowded areas, covering coughs and sneezes, maintaining proper cleanliness, and disinfection of surfaces[25]. The WHO advises to use non-medical mask such as cloth mask for general public in crowded areas and medical mask like surgical mask for healthcare providers[26].

This study will help in identifying the gaps and deficiencies in the knowledge of people regarding the disease as well as misconceptions, which will be addressed in future by healthcare agencies and educationists. Help of media can also be taken in improving the understanding of concepts. By knowing the attitude and practices of people, we can also direct healthcare services and help counselors to play their role better. More studies should be conducted with the aim of exploring the views and practices of people, especially in rural areas, together with creating awareness among them regarding this critical issue. Practices of people should be monitored from time to time so that we do not face an upsurge in the number of cases again. Strict rules and policies should be applied to shrink the scope of the disease in Pakistan.

CONCLUSION

Knowledge about health topics are the main cause of a negative or a positive attitude towards a health phenomenon. COVID-19 has changed everyone's lives drastically and has led us to follow practices which people never took seriously like washing hands frequently. In the present study, Knowledge of the population related to COVID-19 had been found to be fair, whereas Attitude and Practice towards this pandemic had been good. Results indicated that people were well aware of the disease and taking this disease seriously. This may be the reason for decrease in the number of new cases in the country.

Authors' contributions: AD: Contributions in concept, design, data collection, data analysis, drafting the manuscript and final approval of the manuscript, galley proofing. She was a major contributor of the study and corresponding author. TK: Contributions in data collection, revising the article. TA: Interpretation of the data, revised the manuscript critically, final approval of the manuscript.

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ORIGINAL ARTICLE

Comparison of Factors Associated with Hepatitis B and C in Different Age Groups of Patients Visiting A Tertiary Hospital in Lahore: A Cross-Sectional Study

Waqas Shabbir[1], Kiran Namoos[2], and Muhammad Aslam[3]

ABSTRACT

Objective: To compare the risk factors and the possible mode of acquisition of Hepatitis B and C in patients of different ages

Methodology: A descriptive cross-sectional study was carried out at Lahore General Hospital from January 2020 to June 2020. Total 350 previously unscreened patients with ages between 16 and 55 years were included in the study after approval from the Ethical Review Committee of PGMI/LGH (095/20- 8/6/20). Patients were grouped according to age: Group 1 (16-35 years) and Group 2 (36-55 years). Screening was done by ELISA technique. Data was collected through questionnaire and was analyzed on Statistical Package for Social Sciences (SPSS) version 21.

Results: Incidence of Hepatitis C Virus (HCV) was found to be more common than Hepatitis B Virus (HBV) in both genders. Risk of developing viral infection in both genders increased with age. Use of I/V drugs, barber shave (via razor), dental procedures, and body piercings were the risk factors for developing infection observed in more in Group 2. Co-infection was observed more in males in Group 2.

Conclusion: Major contributors for Hepatitis B and C are the use of unsterilized injections tools and unscreened blood during dental procedures, blood transfusions, and visits to community barbers. Awareness regarding equipment sterilization in both the age groups may help in reducing the burden of infection in this community.

Key words: Age, HBV, HCV, co-infection

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INTRODUCTION

Viral Hepatitis is caused by etiological mediators with different epidemiological and clinical characteristics, responsible for global morbidity and mortality. In 2015, an estimated 257 million people were living with chronic hepatitis B virus (HBV) infection, and 71 million people with chronic hepatitis C virus (HCV) infection globally[1,2]. In Pakistan, the prevalence of HBV is 3.83% and for HCV is 11.96%[3]. In developing countries, the reasons for increased frequency are multifactorial like blood transfusion, use of unsterilized needles and syringes used by drug addicts and some professions including healthcare staff, barbers, household contacts[4]. Besides age and gender, unsafe practices in using contaminated injections, injuries due to needles, tattooing, piercing of body, use of razors, use of injecting drugs, dental care, body fluid including saliva and seminal fluid etc increase the risk of HBV and HCV[5]. Sharing of syringes by intravenous drug abusers is a significant risk factor for Hepatitis B and C globally[6]. Similarly, the people who regularly need blood/blood products, as well as patients who undergo dialysis and organ transplantation are also at risk of developing viral hepatitis[7].

HBV and HCV can affect both males and females of different ages[8]. However, provincial level estimates regarding the epidemiology in the most populous province of Pakistan, risk factors, and prevalence in different age groups for hepatitis B and C are currently not available. Therefore, we initiated the current study with the purpose of finding out the prevalence and

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common risk factors among the male and female populations of different age groups visiting a tertiary hospital in Lahore.

A cross sectional study was designed to compare risk factors and the possible mode of acquisition of hepatitis B and C in patients of different ages.

METHODOLOGY

This descriptive/cross sectional study was carried out at Lahore General Hospital Lahore, Medicine Unit 1 after approval from Ethical Review Committee of PGMI/LGH (095/20- 8/6/20) from Jan 2020 to June 2020. Sample size of 350 was calculated using WHO software and patients were selected by Non-probability sampling technique.

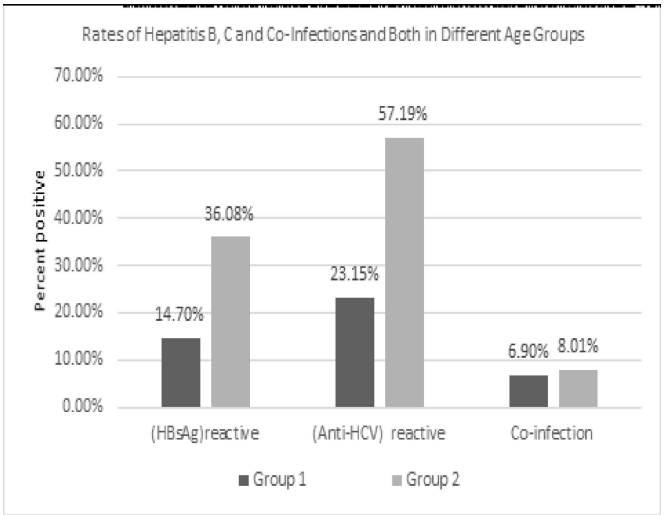

Figure I: Rates of Hepatitis B and C and Both in Different Age Groups

Table I: Distribution of Reactive and Non-Reactive Cases of HBV, HCV, and Co-Infection

HBV and HCV Screened Patients n = 350	Group 1 (age 16- 35 years)		Group 2 (age 36 to 55 years)	
	Male N (%)	Female N (%)	Male N (%)	Female N (%)
Hepatitis B virus surface antigen (HBsAg)reactive 74 (21.14%)	12 (16.20%)	5 (6.75%)	36 (48.64%)	21 (28.37%)
HCV Antibody (Anti-HCV) reactive 144 (41.14%)	23 (16.00%)	18 (12.50%)	57 (39.58%)	46 (32.00%)
Co-infection 19 (5.4%)	6 (31.5%)	2 (10.52%)	8 (42.10%)	3 (15.78%)

Total 350 previously unscreened patients of ages ranging from 16 to 55 years were included in the study. Patients were grouped according to age: Group 1 (16-35 years) and Group 2 (36-55 years). Patients of either sex, both married and unmarried, having various socioeconomic backgrounds, and previously unscreened were included in the study. All known cases of hepatitis B and C were excluded from the study.

Blood was collected using aseptic technique by an expert phlebotomist. Sera was separated and analyzed on the same date. Screening for Hepatitis B virus surface antigen (HBsAg) and HCV Antibody (Anti-HCV) was done in the clinical laboratory of LGH by ELISA technique.

Statistical Analysis:

Data was analyzed using Statistical Package for Social Sciences (SPSS) version 21. Variables were defined qualitatively and frequency distribution was applied. Analysis was carried out using chi square test. P value <0.05 was considered statistically significant.

RESULTS

A total of 350 patients were screened for HBsAg and anti-HCV, 237 patients were found reactive. Results showed that both HBV and HCV reactive cases were more in males as compared to females and HCV reactive cases were 39.58% and HBV reactive cases in males were 16.2% as shown in Table I.

Figure I results show thenumber of reactive cases ofHBV 17(7.17%) and reactive cases of HCV 41 (17.29%) in Group 1 (age 16- 35 years). In Group 2 (age 36 to 55 years), the reactive cases of HBV were 57(24.05%) and of HCV were 103(43.45%). Co infection rate in group 1 was 8(3.37%) and 11(4.64%) in group 2.

Comparison of various risk factors and their frequency in HBV and HCV infective individuals in different age groups is shown in Table II and Table III. Majority of the patients (66.41% of HBV and 66.31% of HCV) in Group 2 had the history of visiting community barbers. Dental procedure history was obtained in 67.56% and 65% in HBV and C infections in Group 2. In HBV and HCV reactive cases, history of blood transfusion, dental procedures, shaving from barbers, and body piercing was considered as significant risk factors ($p<0.05$).

Table II: Comparison and Frequency of Factors in HBV (n= 74) Infective Individuals in Different Age Groups

Factors		Group 1 (age 16-35 years) n (%)	Group 2 (age 36-55 years) n (%)	Total n=74 (%)	p value
IV drug	Yes	8 (24.24%)	25 (75.75%)	33 (44.59%)	0.77
	No	9 (22%)	32 (78%)	41 (55.40%)	
Blood transfusion	Yes	15 (31%)	34 (61%)	49 (66.21%)	0.02*
	No	2 (8 %)	23 (92.00%)	25 (33.78%)	
Dental Procedure	Yes	12 (32.43%)	25(67.56%)	37 (50%)	0.04*
	No	5 (13.51%)	32 (86.48%)	37 (50%)	
Hospitalization	Yes	10 (41.66%)	14 (58.33%)	24 (32.43%)	0.008
	No	7 (14%)	43(86%)	50 (67.56%)	
Surgery	Yes	4 (16.66%)	20 (83.33%)	24 (32.43%)	0.37
	No	13 (26%)	37 (74%)	50 (67.56%)	
Barber shave	Yes	15 (36.58%)	26 (63.41%)	41 (55.40%)	0.00*
	No	2 (6%)	31 (94.00%)	33 (44.59%)	
Sharing items	Yes	6 (14.28%)	36 (85.71%)	42 (56.75%)	0.04*
	No	11 (34.37%)	21 (65.62%)	32 (43.24%)	
Tattooing/body piercing	Yes	5 (11.11%)	40 (88.88%)	45 (60.81%)	0.00*
	No	12 (41.37%)	17 (58.62%)	29 (39.18%)	
Family member suffering from HBV	Yes	6 (27.27%)	16 (72.72%)	22 (29.72%)	0.56
	No	11 (21.15%)	41 (78.84%)	52 (70.27%)	

*p value < 0.05 = statistically significant, Chi-square applied

Table III: Comparison and Frequency of Factors in HCV (n= 144) Infective Individuals in Different Age Groups

Factors		Group 1 (age 16-30 years) n = 41	Group 2 (age 40-55 years) n = 103	Total n=144 (%)	p value
IV drug	Yes	19 (33.33%)	38 (66.66%)	57 (39.58%)	0.29
	No	22 (25.28%)	65 (74.71%)	87 (60.41%)	
Blood transfusion	Yes	14 (18.91%)	60 (81.08%)	74 (51.38%)	0.00*
	No	27 (38.57%)	43 (61.42%)	70 (48.61%)	
Dental procedure	Yes	29 (35.00%)	54 (65.00%)	83 (57.63%)	0.04*
	No	12 (19.67%)	49 (80.32%)	61 (42.36%)	
Hospitalization	Yes	15 (31.91%)	32 (68.08%)	47 (32.63%)	0.52
	No	26 (26.80%)	71 (73.19%)	97 (67.36%)	
Surgery	Yes	18 (36.00%)	32 (64.00%)	50 (34.72%)	0.12
	No	23 (24.00%)	73 (76.00%)	96 (66.66%)	
Barber shave	Yes	32 (33.68%)	63 (66.31%)	95 (66.00%)	0.05*
	No	9 (18.36%)	40 (81.63%)	49 (34.00%)	
Sharing items	Yes	19 (38.00%)	31 (62.00%)	50 (34.72%)	0.06
	No	22 (23.40%)	72 (76.59%)	94 (65.27%)	
Tattooing/body piercing	Yes	20 (41.66%)	28 (58.33%)	48 (33.33%)	0.01*
	No	21 (21.87%)	75 (78.12%)	96 (66.66%)	
Family members suffer from HCV	Yes	8 (25.80%)	23 (74.19%)	31 (21.52%)	0.71
	No	33 (29.20%)	80 (70.79%)	113 (78.47%)	

*p value < 0.05 = statistically significant, Chi-square applied

DISCUSSION

The worldwide epidemic of hepatitis B and C is a serious health issue as it is the major reason of chronic liver diseases like cirrhosis and hepatocellular carcinoma, if not treated timely[9].

We have found high prevalence rate of viral hepatitis in our study compared to the previous study reports from Pakistan[10,11]. Several social factors are responsible for the higher prevalence of HBV and HCV, including lack of health and safety standards due to unsatisfactory awareness and knowledge of the disease in the general population, as reported by Shedain PR et al[12].

Our study observed that in the age Group 2 (36-55 years), a high rate of HCV was present compared to HBV, in both males and females as compared to the younger adults in Group 1. The results are similar to a study conducted by Kinner SA et al, showed prevalence of 70% HCV and 25% HBV in older age group[13].

We have found that increasing age is associated with the occurrence of HBV and HCV. Similarly, there is a higher risk of co-infection in the older age group. Our study showed that in Group 2 (age 36 to 55 years), the infection rates for HBV, HCV increased to 36.08% and 57.19% respectively. The variation in the seroprevalence of HBV in different age groups could be due to the changing immune response of the body with age to infectious agents, as also supported by the findings reported previously[14]. We also found males to be at a higher risk and barber shaving was significantly associated with HBV and HCV occurrence. Exposure to barber shaving and sharing IV injections, could be promoting the risk of HBV infections in males in our study population.[15] Frequent exposure to barber shaving, surgical and dental procedures, blood donation, and a higher number of injections being important risk factors for HCV infection have been reported elsewhere[16]. A study also found that the incidence rate of viral infection rises with age and with dental therapy[17]. It is observed that in dental procedures, infections can be accelerated via many routes like indirect or direct contact with oral fluids, blood, aerosol, droplet splash, etc. Our results are in line with the findings reported from other regions of the world[4,10].

Hepatitis C viral infection has been reported to be an emerging epidemic in Pakistan[18]. In our study, an elevating trend of HCV seroprevalence was recorded with an increase in age. This is likely due to a cumulative effect whereby exposure to multiple risk factors increases with age. For instance, the number of child births, recreational drug use, exposure to barbers and number of injections all increase with age. These results are in line with the findings of Riaz H et al[19]. This might be due to unhygienic environments where a procedure is carried out and the use of unsterilized instruments that are not properly autoclaved and are used on multiple individuals[20]. Other exposure variables found in this study have previously been reported, such as history of hospitalization, surgical procedures, IV injections, tattooing, piercing, barbers shaving, blood transfusion, and family member infected with viral hepatitis B or C[21,22].

Our study reported that the frequency of co-infection was more in Group 2 (42.10%) in males as compared to Group 1 (31.5%). According to a study, more than 52% of people are co-infected with viral hepatitis[23]. The reason may be the use of injectable medicine and via sexual transmission[24].

Limitations of study:

Data concerning vaccination against hepatitis B is self-reported. Besides, the questionnaire was also self-reported. A small number of patients was included in the study.

CONCLUSION

Major contributors for Hepatitis B and C are the use of unsterilized injections and unscreened blood during dental procedures and blood transfusions, and visits to community barbers. Awareness regarding sterilization for both the age groups may help in reducing the burden of infection in this community.

For elimination of viral hepatitis from the society, there is a need to increase information about the modes of transmission of HBV and HCV, estimation, and surveillance. This may help to identify more people who are at risk of developing viral infection and may help to target control and prevention programmes.

Authors' contribution: WS conceived the idea, edited manuscript, proofread and was responsible for the accuracy or integrity of the work. KN did literature search and referencing, data collection and write up. MA collected data and wrote manuscript.

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ORIGINAL ARTICLE

Effect of Microteaching Sessions on Teachers' Rating by Students in A Public Sector Medical University

Anam Pario[1], Sarah Zahid[1], Amber Ilyas[2], Ghulam Sarwar Qureshi[3], Surriya Sarwat[2], and Tanzeela Kausar[1]

ABSTRACT

Objective: To determine the effect of microteaching and students' feedback on teachers' performance in a Medical University.

Methodology: Secondary data analysis was done at Sindh Medical College, a constituent college of Jinnah Sindh Medical University Karachi. Duration was two years from 2015 to 2017. Teachers' evaluation was conducted through students' feedback for the years 2015 and 2016. Quantitative data was generated by a Higher Education Commission (HEC) designed questionnaire which was circulated among the students of 2nd, 3rd and 4th year MBBS. The average mean score was calculated and teachers who scored below 2 were mandated to attend the microteaching and professional development workshops. The data was analyzed on SPSS version 20. The average mean scores of teachers' evaluation of years 2015 pre microteaching and 2016 post microteaching were compared by applying Wilcoxon test and paired "t" test. Improvement in teaching quality among teachers of different genders and designations was observed.

Result: The study revealed that teaching quality improved after the microteaching sessions which was reflected in the increased mean scores of students' feedback and p-value of 0.0001 was obtained for the faculty of 2nd and 3rd years, while the p-value of 4th year faculty was 0.010.

Conclusion: The results indicated that the students' feedback is a powerful tool for teachers' self-reflection which, combined with professional development programmes and microteaching, can enhance teaching capabilities of an individual.

Key words: Students' feedback, Teachers' evaluation, Teachers' effectiveness, Microteaching, Quality Enhancement Cell

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INTRODUCTION

Teaching is a skill, in which a teacher effectively imparts knowledge. Effective teachers are ones who are knowledgeable, motivated, skilled, competent and focused on students' learning[1]. They enhance students' learning by using different modes of teaching and maintain a healthy, interactive environment within the classroom which motivates and encourages them to accomplish their goals[2]. Good teachers serve as role models for their students as they are responsible for career as well as character building of their students. Their warm, friendly nature towards their pupils ensures a good interpersonal relationship where a learner feels appreciated and admired[3].

The value of good and effective teachers has been identified by the education stakeholders. They have realized that without capable and highly skilled teachers, the educational system will decline. In the current era, the aim of university administrations is to give better education and learning to their students which can be achieved by enhancing teaching quality and professional development that, in turn, is thought to be possible through teachers' appraisal[4]. Traditionally, teachers were assessed by their educational qualifications and years of experience for appointments and subsequent promotions[5]. Teachers' evaluation is now a part of an international trend in which their performances are being evaluated by different methods, like classroom observations, students' feedback, analysis of students' test scores, teachers' portfolio, etc[6-7]. The administrations of several universities are using evaluation tools for promotion, contract renewal, and

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salary adjustments[8]. However, most of the researchers suggest that to drive professional development[9], students' feedback can be best used to identify the weaknesses and deficiencies in a teachers' performance.

The main objective of the administration is to get desirable students' learning and achievement for which teachers' effectiveness is measured by highly sophisticated statistical models[10]. These tools should be properly designed, effective, measurable, unbiased and reliable[11]. To have a highly refined faculty in medical education programmes, training of specific skills to the teachers is a need, and for this, teacher training programmes, like microteaching are introduced. Microteaching is an effective method by which a teacher can gain instructional experiences and stronger skills regarding the art of teaching.

Microteaching was introduced in 1960s by Stanford University, the original model involved a cycle of steps: plan, teach, observe, re-plan, re-teach and re-observe. This cyclical exercise enables to identify the weaknesses, reduce the errors, build self-confidence and develop classroom management skills with improved and enhanced in-class performance[12]. Microteaching along with students' feedback produces a dual effect on the performance of teachers, as students' feedback is considered as one of the most important improvement and performance measuring tool, as it is a method that gives insight regarding teachers' knowledge, efficacy and skills assessed by their students[13]. Students' feedback gives key information to the teachers regarding their teaching practices, their strengths, and gives clues regarding the areas which should be improved. This information can be used to build faculty development programmes and improve teaching instructional skills, as well as giving the administration a justification for teachers' accountability[14-15]. Teachers should be held accountable as well as rewarded for their evaluation results, the administration must also give some benefit to highly rated teachers and guide the low rated ones by organizing peer consultation and professional development programmes[16]. Thus, it may be hypothesized that students' feedback incorporated with professional development creates an opportunity for growth and is one of the best ways in motivating and improving the faculty to fulfill the needs of modern era medical education[13].

Generally, research in the area of students' feedback has focused on the utility of students' rating as a teacher evaluation tool or the teachers' perceptions and attitudes toward microteaching has been observed, hence a study was designed to observe that whether the students' feedback and microteaching have an impact on teacher's performance and teaching quality. This study aimed to measure the improvement caused by microteaching and students' feedback on teachers' performance, and also to compare the improvement among faculty members of different genders and designation.

METHODOLOGY

This study is based on analysis of secondary data, undertaken at a large public sector medical university, Jinnah Sindh Medical University. This study is based on data collected by conducting online survey of teachers' evaluation in the years 2015 and 2016. The teaching faculty of Sindh Medical College, a constituent college of JSMU was the subject of the study, while teachers who were new and were not present in this two-year duration were excluded.

Data was obtained by requesting all the students of 2nd, 3rd, and 4th years to fill the teachers' evaluation pro forma online at the end of the academic year before their exams in 2015. The questionnaire was validated by HEC and is used by our university. It comprises 12 items measuring teaching skills, subject knowledge, communication skills, class preparation and clarity of explanation, enthusiasm, availability, and punctuality on a 5-point rating scale. The questionnaire was administered by the Quality Enhancement Cell of JSMU.

The responses to the questionnaires were compiled by the QEC department and an over all feedback score was tabulated for each teacher. The response rate was around 80%. The evaluation reports were forwarded to the Medical Education Unit, which gave the results to the respective teachers in sealed envelopes. The results were kept confidential so that only the concerned teacher and the head of the respective department know about the strengths and weaknesses.

Following the gathering of the first cycle of students' feedback, the teachers were asked to reflect on the data and identify areas to be improved. The JSMU administration decided that teachers who received low ratings (a score below 2) will be restrained from teaching for three months and were encouraged to attend microteaching and professional development workshops. Microteaching workshops were mandatory and two sessions were conducted by the Medical Education department of JSMU. After this three months' period, all these teachers were given equal opportunity to teach and interact with the students for the whole year. At the end of the academic year 2016, the online evaluation form was once again filled by the students. The response rate was almost 80%.

The data of two years for 76 teachers who were involved in teaching the students of 2nd, 3rd, and 4th years, was obtained from the Quality Enhancement Cell of JSMU after coding to maintain confidentiality. The mean scores of the teachers were compared and analysis was done using SPSS version 20. The data was first analyzed for normality, and then descriptive statistical analysis was done by applying Wilcoxon signed ranks test and paired samples t-test to observe the following variables.

Improvement in mean score of teachers in consecutive two years
Effect of microteaching on the rating of teachers by students' feedback
The comparison of improvement among male and female teachers
Improvement among teachers of different designations: lecturers, assistant professors, associate professors, and professors

The research synopsis was approved by the Institutional Review Board of JSMU, and the data was analyzed with the help of the Research Department of JSMU.

RESULTS

The data was analyzed using SPSS version 20. It was found that the data of 2nd and 3rd years failed to fulfill the assumption of normality therefore Wilcoxon test was applied and the p-value obtained was 0.0001, which is highly significant. The paired t-test was applied for the data of 4th year as it fulfilled the assumption of normality and a p-value of 0.010 was obtained (as shown in table I).

The analysis of the data revealed that among the 66 teachers involved in teaching 2nd year MBBS students, 19 teachers got their average mean score below 2, out of these 17 teachers improved their mean score after attending the microteaching and professional development workshops. While from 3rd year faculty (total 42), only 3 teachers scored below 2, and they all improved in the consecutive year. Similarly, from 20 teachers of 4th year faculty, only 2 teachers scored below 2, and they all improved in the next year. Both male and female teachers showed remarkable improvement in their respective weighted mean scores. As shown in table II, 71% of the male teachers and 86% of the female teachers involved in teaching the 2nd year MBBS students increased their mean scores, while 93% of the male and 84% of the female teachers belonging to 3rd year faculty raised their mean score, while the 4th year faculty teachers about 66% male and 100% female teachers improved their mean scores.

Teachers of various designations also improved their mean scores. As described in table III, 88% of Lecturers, 100% Senior Lecturer, 83% Assistant Professors, 50% Associate Professors, and 71% Professors increased their mean scores. Similarly, in the 3rd year, 100% of Senior Instructor, 90% of Lecturers, 100% Senior Lecturers, 100% Assistant Professors, 60% Associate Professors, and 66% of the Professors improved their mean scores. From the faculty of 4th year, 100% Senior Instructors, 60% Lecturer, 80% Assistant and Associate Professors, and 100% Professors increased their weighted mean scores.

Table I: Descriptive Statistics of Average Mean Scores

Class	Year	N	Median score	Std. Deviation	Minimum	Maximum	P-Value	Test Statistics
2nd Year	2015	66	2.4567	0.60696	1.60	3.78	0.0001	Wilcoxon Signed Ranks Test
	2016	66	3.0370	0.63626	1.73	4.24		
3rd Year	2015	42	2.5218	0.60987	1.78	4.14	0.0001	Wilcoxon Signed Ranks Test
	2016	42	2.9960	0.62078	1.84	4.47		
4th Year	2015	20	2.8298	0.49883	1.78	3.94	0.010	Paired Samples Test
	2016	20	3.1804	0.56070	2.01	4.38		

*Std. = Standard deviation, *N = total number of teachers * p value < 0.05 is significant.

Table II: Gender Weighted Difference Cross Tabulation

	2nd year faculty			3rd year faculty			4th year faculty		
Gender	Weighted mean decrease	Weighted mean increase	N	Weighted mean decrease	Weighted mean increase	N	Weighted mean decrease	Weighted mean increase	N
Male	6(28.57%)	15(71.42%)	21	1(6.25%)	15(93.75%)	16	4(33.33%)	8(66.66%)	12
Female	6(13.33%)	39(86.66%)	45	4(15.38%)	22(84.61%)	26	0(0%)	8(100%)	8
Total	12(18.8%)	54(81.82%)	66	5(11.90%)	37(88.09%)	42	4(20%)	16(80%)	20

*N = total number of teachers

Table III: Designation Weighted Difference Cross Tabulation

	2nd year faculty			3rd year faculty			4th year faculty		
Designation	Weighted mean decrease	Weighted mean increase	N	Weighted mean decrease	Weighted mean increase	N	Weighted mean decrease	Weighted mean increase	N
Senior instructor	-	-	-	0(0%)	2(100%)	2	0(0%)	2(100%)	2
Lecturer	4(11.42%)	31(88.57%)	35	2(9.09%)	20(90.90%)	22	2(40%)	3(60%)	5
Senior lecturer	0(0%)	4(100%)	4	0(0%)	2(100%)	2	-	-	-
Assistant professor	2(16.66%)	10(83.33%)	12	0(0%)	8(100%)	8	1(20%)	4(80%)	5
Associate Professor	4(50%)	4(50%)	8	2(40%)	3(60%)	5	1(20%)	4(80%)	5
Professor	2(28.5%)	5(71.42%)	7	1(33.33%)	2(66.66%)	3	0(0%)	3(100%)	3
Total	12(18%)	54(81.82%)	66	5(11.90%)	37(88.09%)	42	4(20%)	16(80%)	20

*N = total number of teachers

DISCUSSION

Highly skillful and trained doctors are the need of society. They should be knowledgeable, kind, and empathic to their patients, as they bear a great responsibility. Producing such highly refined professionals is the responsibility of medical universities. Teachers play an important role in building the characters and careers of their students. Medical universities are trying to recruit the best faculty to improve their standards and quality of education. They are continuously refining their teaching by using students' feedback and microteaching sessions, as these are effective tools. The students' feedback and microteaching programmes help in building the teachers' self-esteem and encourage them to improve their teaching skills by reflecting on their teaching practices. This is supported by a study done by Jonas Floden 2017 which states that the teachers having a positive attitude towards students' feedback have improved more in comparison to teachers having a negative attitude[17].

In our study, we observed that microteaching along with students' feedback created a great impact on teaching practices, and helped in improving the average mean score of the faculty in the consecutive year. The results of our study are supported by Luke Mandouit (2018) who concluded that professional learning process provided with students' feedback created a positive impact on teaching practice.[13] Another study done by Sadiq Abdulwahed (2011) provided clear evidence that inclusion of microteaching in teacher training programmes enhanced the development of instructional strategies[18]. Microteaching activities incorporated in professional development programmes have the ability to enhance communication skills, critical thinking skills, reflective thinking, and problem solving as concluded in the study by Nicholas (2009)[19].

Different studies have reported gender biases related to students' feedback, as a study done by Narissra (2015) found that male students have given higher grades to female teachers whereas female students have given higher grades to male teachers[20]. Shilpa Rajesh (2018) found that most of the students preferred female teachers in grading[21]. A study conducted by Centra and Gaubatz (2000) showed that female students gave higher evaluation rating to female teachers, while male teachers were equally rated by the male and female students. They found that female teachers were good in communication, good in organizing the classroom and conducting exams, they are sympathetic listeners and they make sessions more interactive[22]. This finding is similar to the study done by Krieg (2005) who thought that students, who were taught by female teachers, performed better than the ones taught by male teachers[23]. In our study, we found that microteaching and students' feedback played a great role as both male and female teachers have improved their quality of teaching although female teachers have improved slightly more than the males. This is probably due to their hard work, sincerity, voice quality, politeness, dedication, planning, and designing.

Literature shows a vast range of opinions regarding the age of teachers. Some studies suggested that the teachers' enthusiasm declines as their age advances, which is probably due to the increased academic and administrative responsibilities. It could also be due to the repetition of the same content every year which reduces their interest in teaching[21]. Some studies have reported that students rated the seniors well and neglected the juniors as they believe that their marks are in the hands of senior faculty members. This hits at the confidence of junior teachers[24]. Thus, it is a responsibility of the universities to support their junior faculty by arranging professional development programmes.

In our study, we found that the young lecturers have improved more than the senior faculty, which is probably due to eagerness and the flexible nature of the younger junior teachers. Lecturers usually have more student oriented teaching especially in short group discussions where they directly interact with the students. They adopt different ways of attracting students in their teaching styles which help them in achieving higher grades[21].

A crucial fact about this study is that it is not a simple comparison of data of students' feedback, rather an integrated programme in which reflections of students' feedback and microteaching were incorporated to support teachers' professional growth. Even though positive results were obtained after students' feedback, microteaching multiple tools should be used to evaluate teachers with the aim of improving student learning and teacher development. More research is needed in this context, asg how the effect of feedback is perceived by students, the psychological perspectives of microteaching, and students' feedback about a teacher.

The limitations of this study include that it was conducted in only one university and thus only represents the situation at Jinnah Sindh Medical University. Taking a multidisciplinary approach would be a step forward if other institutes or other teaching specialties like Engineering, Commerce were also added. Different components like age, gender, religion, personal appearance that can create biases were not added in the research design[4]. The limitations of microteaching like no emphasis on content, skills dependency, and logistic problems were present. Similarly, peer evaluations, in-depth interviews with students would affect the results if they were added in the study.

CONCLUSION

Despite all these limitations, our study has supplemented the pool of research done on the effects created by microteaching and students' feedback, and has pointed out new areas of inquiry like longitudinal studies on teachers' perceptions regarding students' feedback and microteaching, and observing the prolonged effects created by it. Hence it is concluded that students' feedback added with professional learning has the potential to create a positive impact on teaching quality. The information provided by the students' feedback aided with microteaching, enlightens the path for a teacher's successful journey, by turning the direction of teacher towards a more interactive, students oriented classrooms, where trust is supreme and destination is enhanced learning and growth of the students.

Authors' contribution: GSQ, AP proposed the idea, concept and vision of this research work. They designed the research study. SZ and TK contributed in data acquisition. Analysis and interpretation of data was done by AI, AP and SZ. Drafting of manuscript was completed by AP and SZ. The final critical revision was done by GSQ, AI and SS.

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ORIGINAL ARTICLE

Preparedness of Radiology Departments against COVID-19: An Online Survey

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ABSTRACT

Objectives: To determine the preparedness of the radiologists and their departments against COVID-19 and the impact of institution type, training, and written guidelines

Methodology: We conducted this survey by sending an online questionnaire to practicing radiologists in April 2020. The questionnaire included queries about institution (type, training status, written guidelines) and the preparedness against COVID-19. The groups sorted by institution were compared for preparedness i.e. appropriate personal protective equipment (PPE), equipment decontamination protocol, and infection prevention measures (IPM) for public (screening, masks, social distancing, and hand sanitizers).

Results: We received 100 responses out of which 72% were from females. The mean age of the respondents was 37.2±8.2 years. Government institutes (68%) did not differ from private institutes (32%) except in screening at the entrance of the institute [7/68 (10.2%) vs. 9/32 (28.1%), p-value: 0.039], respectively. Comparison of training institutes (32%) with non-training institutes (68%) revealed higher adherence of radiologists to the appropriate PPE [30/32 (93.7%) vs. 44/68 (64%), p-value: 0.001] and equipment surface decontamination [22/32 (68.7%) vs. 18/68 (26.4%), p-value: 0.029]; however, the difference between IPMs for public was not statistically significant. Institutions that provided written guidelines, achieved significant impact on masks (cloth/surgical) and social distancing for public, in addition to appropriate PPE by radiologists and surface decontamination of equipment.

Conclusion: Institutional training combined with written guidelines has significant impact on preparedness of radiologists and radiology departments against COVID-19.

Key words: Personal Protective Equipment, infection control, public health practice, decontamination, training, guidelines

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INTRODUCTION

Corona Virus Disease-19 (COVID-19) is a highly infectious disease, first identified in Wuhan, China in December 2019, and declared a pandemic by the World Health Organization (WHO) within a span of four months[1]. Pakistan reported its first case on February 26, 2020 and by May 2020, more than 209,000 COVID-19 positive cases had been reported including healthcare workers (HCW)[2]. Insufficient data is available related to the spread of infection in hospital settings; however, reports suggest that HCWs make up 3% to 11% of the positive cases[3].

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Radiological examinations including X-ray and computed tomography (CT) chest are instrumental in the diagnosis and management of COVID-19 and its related complications[4]. The key role of radiology leads to proportional increase in the risk of healthcare associated infection within the radiology departments[3]. There have been reports of infection acquired by radiology staff during examination of patients. Strict infection control practices are required during and after imaging of a suspected case and failure to do so may lead to cross-infections[5].

Although the breakthrough discovery of COVID-19 vaccine early in year 2021 has changed the landscape; however, its manufacturing, procurement, and execution across a critical percentage of the population to achieve herd immunity would take quite a long time. Therefore, still the most important step is to break the chain of transmission. In radiology departments, various safety measures are suggested in the wake of current pandemic

especially social distancing, appropriate PPE, hand hygiene, and equipment disinfection[6-9], which can be achieved by training and enforcing protocols[10,11]. This aim has huge bearing especially in a developing country with limited resources to fight the disease.

Therefore, we sought to ascertain the preparedness of radiologists and radiology departments against COVID-19 in a developing country in order to identify the lacunae in the existing systems which should be addressed with effective and timely interventions. The objective was to determine the preparedness against COVID-19 i.e. appropriate use of PPE by radiologists, the equipment surface decontamination and IPMs in public areas of the radiology departments, and the impact of institution type, training and written guidelines on it.

METHODOLOGY

This was an online, unlinked, and anonymous survey on 'Google Forms' conducted in April, 2020. It included consent to participate and was approved by the Ethical Review Board (PMEC reference#128). Convenient sampling was used to send the link of online form to practicing radiologists via WhatsApp and email for their responses alongwith the request to forward the link to radiologists in their directory (snowballing) until the desired sample size was achieved.

The content of instrument focused on the institution type (government or private), training received for IPMs against COVID-19 (yes or no), written guidelines (yes or no), and the preparedness of radiologists and radiology departments against COVID-19 e.g. PPE, hand hygiene, social distancing (seating/queue arrangement with 1-2 m distance), professional distancing (workstation and seating arrangement with 1-2 m distance), and IPMS in public areas of radiology departments (screening at the entrance, hand sanitizers in public areas, social distancing with 1-2 m in queues/sitting areas, compulsory cloth/surgical masks for every patient/visitors).

As per CDC and Royal College of Radiologists[12,13], appropriate PPE for Group-A radiologists (posted in ultrasound, conventional, and interventions) include mask (surgical for ultrasound and conventional radiology; N-95 for interventional radiology), gown and glove as appropriate PPE. For Group-B (posted in cross-sectional imaging), at least a surgical mask was considered appropriate PPE against infection transmission to and/or from co-workers.

Using the lowest compliance for hand hygiene i.e. 40.7% reported by Xu et al.[14], using 95% confidence level and 10% bound of error (Since there was a lack of qualified radiologists and early publication of this information was considered vital, the authors used a higher level of bound of error at 10%.), a sample of 93 was calculated by World Health Organization software for Sample Size Determination in Health Sciences. We decided to inflate the sample size to 100 participants.

Analysis was conducted on SPSS version 21. Frequencies with percentages were calculated for categorical variables and means with standard deviations for continuous variables. Comparison of institute type (government with private), training with non-training institutes and written guidelines (yes or no) was done with chi-square test for the outcome variables signifying preparedness i.e. appropriate PPE, surface decontamination of machines and IPMs in public areas of radiology departments.

RESULTS

We received 100 responses in four days in which the majority of respondents were serving in university hospitals (55%), followed by those in tertiary care centers (26%). The mean age of participants was 37.2±8.2. Majority of participants were females (72%) and worked in government hospitals (68 %). Fifty-three percent (53%) of all respondents were posted in cross sectional reporting (Table 1).

Table 1: Summary of the Responses

Variable	Frequency (n=100)
Demographics	
Sex	
Female	72
Male	28
Institute	
Government	68
Private	32
Set up	
University Hospital	55
Tertiary care center	26
Diagnostic Radiology center	17
Others	2
Current Posting	
CT/MRI	53
Ultrasound	28
X-ray/Fluoroscopy/Mammography	10
Interventional Radiology	09

Table 2: Summary of the Infection Prevention Measures for Radiologists and Their Departments

Variable	Frequency (n=100)
Infection Prevention Measures Practiced by Radiologists	
Hand wash/sanitization before and after interacting with patients	92
PPE used by radiologists	
· Surgical Masks	85
· Gloves	81
· Sanitizers	72
· Gowns	30
· N-95	24
· Plastic Aprons	13
· Full PPE suit e.g. tyvec	7
· Goggles/eye shield	5
Hand sanitization at workstation	72
Ensure patients wear masks during procedures/scan	41
Infection Prevention Measures Practiced by Institutes to Protect Employees of Radiology Departments	
Optimized workforce (reduced working days and employees)	88
Mandatory use of at least surgical masks by all HCWs	69
Provision of sanitizers around workstations	62
Promoting social distancing (1-2m) within the radiology department premises	44
Separate workstations	42
Disinfection protocol following imaging of a suspected or confirmed COVID-19 patient	40
Generated some guidelines for radiology department	39
Contingency plan for at-risk staff (e.g., pregnant, other defined risk groups) including job expectations and potential alternate roles and locations	37
Formal infection control training of employees	32
Family support	15
Reporting from home	7
Infection Prevention Measures Practiced by Institutes to Protect Patients and Visitors in Radiology Departments	
Surveillance on patients to wear at least cloth masks in public areas	13
Queue management with 1-2 m distance	19
Seating arrangement with 1-2 m distance	25
Screening (thermal/history) at the entrance	16
Hand sanitizers in public areas	22

Radiologists reported favorable adherence to individual IPMS; highest being hand hygiene followed by masks (Surgical/N-95) and gloves (Table 1). However, the PPE level of 26% radiologists was found to be inappropriate and deficient. On further analysis, the use of appropriate PPE reported by Group-A radiologists posted in cross-sectional imaging (51/53, 96.2%), was higher than Group-B radiologists posted in interventional radiology (4/9, 44.4%), ultrasound (14/28, 50%) and conventional radiology (5/10, 50%), and the difference among the four categories was statistically significant (p-value- 0.001).

IPMs practiced by institutions to protect the employees (Table 2) were favourable in terms of workforce optimization by reducing the working days from a routine of six days a week to reduce foot count and exposure (88%), mandatory use of at least surgical masks by all HCWs (69%), and supply of sanitizers around workstations (62%). However, social distancing, surface decontamination, training, guidelines and employee support were the neglected areas (Table 2). The most neglected of all were the IPMs of the institutes needed to protect the public against COVID-19 (Table 2).

Table 3.1 Preparedness of the Institutes Where Radiologists Received Training Against COVID-19 Compared to The Institutes Where Radiologists Did Not Receive Training

	Training (n=32)	No Training (n=68)	p-value
Appropriate PPE by Radiologists	30 (93.7%)	44 (64%)	0.001
Infection Prevention Measures for public			
Social distancing (seating/queues at 1-2 m) for public	21 (65.6%)	12 (17.6)	0.64
Masks (cloth, surgical) mandatory for everyone	04 (12.5%)	07 (10.2%)	0.74
Hand sanitizers in public areas	10 (31.2%)	12 (17.6%)	0.19
Screening (temperature, history) at entrance	08 (25%)	08 (11.7%)	0.14
Surface decontamination following imaging of a suspected or a confirmed case	22 (68.7%)	18 (26.4%)	0.029

Table 3.2 Comparison of Preparedness Between Government and Private Institutes

	Government (n=68)	Private (n=32)	p-value
Appropriate PPE by radiologists	51 (75%)	23 (71.8%)	0.8
Infection Prevention Measures for Public			
Social distancing (seating, queues at 1-2 m) for public	22 (32.3%)	11 (34.3)	1.0
Masks (cloth, surgical) mandatory for everyone	06 (8.8%)	05 (15.6%)	0.32
Hand sanitizers in public areas	13 (19.1%)	09 (28%)	0.31
Screening (temperature, history) at entrance	07 (10.2%)	09 (28.1%)	0.039
Surface decontamination following imaging of a suspected or a confirmed case	24 (35.3%)	16 (50%)	0.19

Table 3.3 Preparedness of the Institutes Where Radiologists Received Written Institutional Guidelines Compared to The Institutes Where No Guidelines Were Received.

	Guidelines (n=39)	No guidelines (n=61)	p-value
Appropriate PPE by Radiologists	33 (84.6%)	41 (67.2%)	0.042
Infection Prevention Measures for Public			
Social distancing (seating, queues at 1-2m) for public	20 (51.3%)	13 (21.3%)	0.002
Masks (cloth, surgical) mandatory for everyone	10 (25.6%)	6 (10%)	0.038
Hand sanitizers in public areas	11 (28.2%)	11 (18%)	0.171
Screening (temperature, history) at entrance	7 (17.9%)	04 (6.6%)	0.075
Surface decontamination following imaging of a suspected or a confirmed case	22 (56.4%)	18 (29.5%)	0.007

Comparison of government institutes with private institutes did not yield any statistically significant differences of dependent variables except screening at the entrance of institute [7/68 (10.2%) vs. 9/32 (28.1%), p-value: 0.039], which was 17.9% higher in private than in government institutes (Table 3.1). Comparison of training institutes with non-training institutes revealed better adherence to the use of appropriate PPE [30/32 (93.7%) vs. 44/68 (64%), p-value: 0.001] and surface decontamination of equipment [22/32 (68.7%) vs. 18/68 (26.4%), p-value: 0.029]; however, the difference of IPMs for public was not statistically significant (Table 3.2).

Institutions that provided written guidelines, achieved significant impact on the use of masks (cloth/surgical) by everyone entering the department and social distancing for public (1-2 m in queues/seating), in addition to appropriate PPE by radiologists and surface decontamination of equipment (Table 3.3).

DISCUSSION

In this study, the radiologists report favorable adherence to individual infection prevention measures; however, 26% of respondents were still using inappropriate PPE at their postings. Training of radiologists yielded 30% and 40% higher adherence to appropriate PPE and equipment surface decontamination, respectively; while the guidelines achieved added impact on use of masks (cloth/surgical) and social distancing for public. IPMS of government institutes did not differ from the private institutes except screening at the entrance i.e., 17.9% higher in the private than in government institutes.

There were a few limitations of our study: (i) radiographic technicians and nurses working in the radiology departments were not included; (ii) our study demonstrated gender bias (70% females). Females stay cautious about IPMs for the sake of family; thus overestimating the over all adherence to individual practices; (iii) designation and/or work experience of the radiologists was not included in our questionnaire; (iv) The survey was conducted early in lockdown during the first wave of COVID-19 with experience of six weeks following the first diagnosed case.

This survey highlights several lacunae in the existing system of radiology set ups in Pakistan: (i) lack of formal training of employees, (ii) non centralized guidelines, (iii) shared workstations and/or improper social distancing, (iv) suboptimal droplet/airborne precautions in suspected or confirmed COVID-19 patients, (v) limited contingency plan for at-risk staff or family support services, (vi) scarce reporting from home facility, (vi) Lack of surveillance on patients to wear masks in public areas and maintain social distance, and (vii) screening (history, temperature) at entrance to detect high risk patients. State of the art healthcare systems throughout the world are suggesting strict protocols, to fill these lacunae[5,10], and contingency plans taking into consideration factors such as illness, pregnancy, and school closures[9,14].

The training of radiologists was associated with significant increase in the appropriate use of PPE by 30% in all areas of posting (Table 3.1). As the radiologists keep rotating from one to the other station, therefore, training of the staff is highly advocated in the literature concerning COVID-19[5,10,15]. It is important to note that only 41% radiologists reported to ensure that patients were wearing masks, which means that the training has major impact on personal protection; while the protection of public requires protocols and refined management by the department or institute[14].

In our study, 99% radiologists reported wearing masks (surgical mask/N-95) and a similar response has been reported from China with use of masks by 100% participants[14]. This study from China reported 99% compliance to wearing a mask and temperature screening at the entrance, which in our case are reported only at 13% and 16%, respectively. In our study, 92% radiologists reported practicing hand hygiene especially before and after interaction with the patients. On the contrary, 22% reported availability of sanitizers in public areas that means 78% of public did not have access to sanitizers. The similar kind of neglect was observed from China[14], with 40.7% compliance rate of hand hygiene.

For infection prevention and control, World Health Organization (WHO) strongly recommends training of healthcare workers[5], reported only by 32% of the participants. Training is crucial because a study conducted by Bello et al. in Ghana, way before COVID-19 pandemic, revealed intermediate knowledge of standard infection control measures among radiology department technicians[16]. Xu *et al.* summarized the IPMS against COVID-19 in non-isolated areas in a general hospital, and they reported no hospital acquired infection among staff when they developed and implemented standards for prevention and control[14]. Similar results were also reported by Cheng et al. in Hong Kong[17].

During SARS outbreak in 2003, King et al. concluded that radiology staff was not familiar with infection control practices and suggested that standardized operating procedures should be imparted to minimize spread of infection via staff or radiology equipment[18]. In our study, 60% of radiologists reported no post procedural decontamination procedures. This is alarmingly high considering extreme contagious nature of COVID-19[19]. Studies conducted before COVID-19 pandemic suggest that standardized cleaning of medical equipment can reduce hospital acquired infection by up to one-third[20]. The studies conducted during COVID-19 pandemic era suggest that hospitals should devise appropriate protocols for decontamination of imaging rooms with proper PPE worn by radiology technologists, including CT and MR machine gantries, ultrasound probes, blood pressure cuffs, image viewing station mouse, and keyboard[15,21].

The utility of radiology is increasing and the radiology department is a common place, visited frequently by staff (doctors, nurses, and nursing aides), patients, and attendants with the capacity to spread infection in all the directions. In spite of international and national recommendations and guidelines[12,13,22,23] for optimum

use of radiology and infection control measures, noncompliance by radiologists, technicians, other HCWs, patients or attendants in radiology departments is unacceptable as the consequences can be disastrous for healthcare workers as well as the community[5,8].

CONCLUSION

It is not the type of institute (government or private) that determines the preparedness against COVID-19. It is the institutional training combined with written guidelines that leaves significant impact on the preparedness of radiologists and their departments during a pandemic. Radiology departments have a central place in modern healthcare systems, hence, these are visited by various HCWs and public. Institutional training and written guidelines have strong potential to diminish the transmission of COVID-19.

Authors' contribution: NR worked on introduction, methodology, and proof reading. BR worked on data collection, interpretation, and writing of manuscript. AS conceived the idea, worked on discussion, and proof read. GM worked on statistical measures using SPSS, worked on results, and proof read.

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SHORT COMMUNICATION

Content Analysis of Twitter Data of College Students on Alcohol Consumption

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ABSTRACT

Objectives: To determine the frequency of tweets on news related to college students' alcohol use, the typical effects of alcohol consumption on college students expressed in news, and the general attitude towards college students' alcohol use
Methodology: A manual content analysis was used to explore the mentioned effects and the general attitude of tweets of news on this topic collected by keyword search method.
Results: The study found that people shared news of the topic approximately twice a month, indicating a low awareness and concern level of public on college students' alcohol consumption. Among seven types of effects mentioned in tweets, sexual risk was referred to most often. Moreover, people expressed a negative attitude towards college students' alcohol use generally except a few who did not give any opinion on this topic.
Conclusion: This study was among the first attempts to employ Twitter as the analysis instrument in the area of college students' alcohol consumption. Practically, this study may provide college administrators with functional materials to deconstruct the negative impact of alcohol on campus.

Key words: Alcohol consumption, Alcohol misuse, Alcohol disorder, College students' alcohol usage, Twitter, Public awareness

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INTRODUCTION

According to the results from the 2015 National Survey of USA on Drug Use and Health, alcohol use becomes a serious threat for emerging adults ranging from 18 to 25 years of age[1]. This age range is mostly in accordance with college students who show the highest rates of alcohol use, binge drinking, and alcohol dependence. In addition, research also found that compared to non-college students of similar age, college students tend to use more alcohol at a higher frequency[2]. Knight et al. did a survey among more than 14,000 college students in the United States[3]. The results showed that 31% students engaged in alcohol misuse and 6% reported alcohol dependence. Wechsler and Nelson reported a consistent result as well. More than 40% of their samples were heavy binge drinkers[4]. This situation is not limited to the United States. Alcohol misuse is also a prominent concern in other countries around the world[5]. A study in Germany reported that 24% of college students engaged in heavy binge drinking more than once within two weeks[6]. A study on Italian students also reported more than 20% binge drinkers[7].

However, this increasing prevalence of alcohol abuse has been found to bring negative impact on college students themselves and their fellow students both physically and psychologically. Research has found robust proof of the correlation between alcohol and poorer academic performance[8], poorer memory performance and more memory blackouts[9], increase in unemployment rates[10], sexual risk behaviours[11], alcohol use disorder and co-occurring mental illness[1].

As alcohol misuse becomes common among college students, the previous research has focused on revealing the effect of alcohol use on college students. Most of these studies attempted to find out the answer from academic or vocational aspects. Little research has included the impact from the most basic needs aspect—safety. And few studies[12,13] considered using Twitter as the research instrument with the prevalence of social media usage. The combination of traditional media

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feature and new media feature emerges nowadays. News sharing on Twitter can be both social, informational, and educational. Thus, this study came up with the following questions:

1. How often do people share news related to college students' alcohol use on Twitter?
2. What is the effect of college students' alcohol use indicated in news shared on Twitter?
3. What is the general attitude of news sharers on Twitter towards college students' alcohol use?

Therefore, this study intends to find out the frequency of Tweets on news related to college students' alcohol use, the typical effects of alcohol consumption on college students expressed in news, and the general attitude towards college students' alcohol use. The sample was chosen from Twitter for analysis. All the tweets worldwide posted in English from March 8, 2018 to March 8, 2019, related to college students' alcohol use were collected as samples.

This study may have some practical implications in preventing alcohol-related incidents. It could inspire news producers on what news Twitter users would like to share more about alcohol-related topics. Moreover, it enables college administrators to facilitate more targeted alcohol-misuse prevention and treatment efforts. Twitter and its news sharing function could be incorporated properly into college alcohol education programmes. Meanwhile, it can actively assist college policymakers to educate and inform the risk of alcohol misuse so that students achieve moderation of alcohol use.

METHODOLOGY

A lot of useful information about people's attention and attitudes towards news are embedded in Twitter stream aggregately. Therefore, Twitter can be used to track the effect of alcohol usage on college students from the aspect of safety, and explore the general attitude of people after hearing the related incidents' news. Because the purpose of this study is to investigate the mentioned effect of alcohol consumption of college students and the publics' general attitude towards college students' alcohol consumption, the sample was drawn from Twitter that has 326 million active users worldwide as of January 2019[14] .

All the tweets worldwide from March 8, 2018 to March 8, 2019, related to college students' alcohol use were collected for analysis. Only comments in English were chosen. The keyword search was used to select all the related tweets (alcohol and college students). In addition, merely tweets in the news column were selected to indicate the frequency of accidents caused by college students' alcohol use. Then 28 tweets appeared in the list. A further confirmation of whether these tweets related to the research topic or not was conducted by two coders from Journalism and Media Studies (Krippendorff's alpha = .95). Before the study, these two coders were trained until the agreement rate reached 98%. In the pre-test, each of them will read 50 news gathered online separately and identify whether they are related to the topic of college students' alcohol usage or not. Another 50 news should be added until most of their categorization reached the same answer.

In the actual test, 27 Tweets were considered as related to the topic of college students' alcohol consumption. The Tweets account, date, news heading, and Twitters' attitude towards college students' alcohol consumption shown in the comments were documented. The attitude towards college students' alcohol consumption (Krippendorff's alpha = .80) and types of effect mentioned (Krippendorff's alpha = .75) in these tweets were also coded by two coders from Journalism and Media Studies. In this study, Kripendorff's alpha was reported to ensure the credibility of the instrument because it works well with small sample compared to other coefficients like Kappa and Scott's pi[15]. Alpha values of each variable in this study were all accepted as reliable.

RESULTS

There were 27 Tweets of news including the words of "alcohol" and "college students" (see appendix A). That means on average, all Tweets users (English speakers) shared news related to college students' alcohol usage approximately twice a month. Those who share this kind of news include both individual Tweeters and organizations. Therefore, it can be concluded that the alcohol use of college students has not become a significant concern in society and is not a commonly shared topic on Twitter considering that there are 326 million active users worldwide as of January 2019.[14]

According to Table 2, 25 Tweets mentioned the negative effect of college students' alcohol use from seven aspects, namely sexual risk, alcohol poisoning to death, crimes behaviour, academic success, the effect on organs, suicide, and injuries. Only two Tweets did not imply any specific negative effect of college students' alcohol use. During this time period, sexual risk was mentioned most frequently among all the news stories shared on Twitter while injuries were the least frequent. Similar findings were noted for people's concern about these negative effects. People cared about the sexual risk the most with seven shared Tweets while focusing

on injuries the least with only one Tweet. Among these negative effects, safety concerns occupied the majority of the Tweets' mentioned effect while academic success only accounted for three Tweets.

Table 1: Search Strategy

Keywords (all of these words)	Alcohol and college students
Date	2018/03/08 – 2019/03/08
Location	Worldwide
Language	English
Inclusion Tweets	News

Table 2: Effect of Alcohol Use (N=27)

Types of effect	Number of Tweets	Number of news
Sexual risk	7	5
Alcohol poisoning leading to death	4	4
Crimes	4	3
Academic success	3	2
Effect on organ	3	2
Suicide	3	2
Injuries	1	1

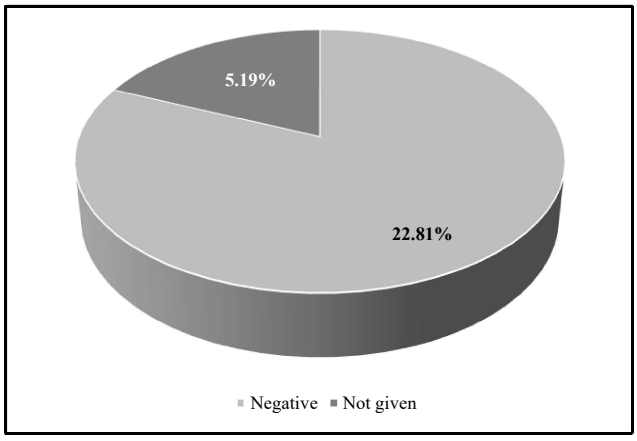
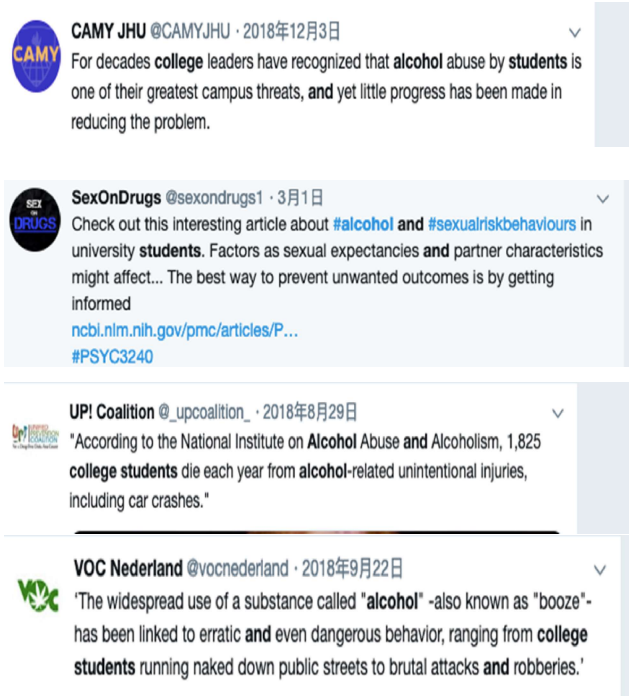


Figure 1: Attitude of Tweets Owners towards College Students' Alcohol Use (N=27)

Figure 1 shows that all people expressed a negative attitude towards college students' alcohol use except five persons who did not give any opinion on this topic. It indicates that generally, it has become a consensus that alcohol does more bad than good to college students. After viewing news related to college students' alcohol use, the most popular attitude towards college students' alcohol use on social media was negative.

The following screenshots of Tweets related to college students' alcohol use revealed the negative attitude of people towards this phenomenon. From these comments, it was clear that the alcohol use of college students has been considered as a big threat on campus. People wished to minimize or eradicate this phenomenon so that alcohol-related outcomes could be prevented. When they thought about alcohol use of college students, they may automatically relate to unwanted outcomes and behaviours.



DISCUSSION

This study examined the mentioned effects of alcohol consumption on college students worldwide and investigated the public's general attitude towards college students' alcohol consumption through the social media app Twitter. From the records of the date of Tweets sharing, the frequency of Tweets related to news stories on this topic was very low, which means college students' alcohol consumption received insufficient attention from the public. This is inconsistent with the claim of Leeman, Perez, Nogueira, and DeMatini: college students' alcohol consumption is a huge public health concern[16]. They explained that the public pays much attention to this issue because unrestricted alcohol consumption can result in serious personal and social problems when college students engaged in heavy drinking. The research also found that "young adults attending college are more likely to engage in heavy episodic drinking than their peers not in college.[17]" Dangerous levels of alcohol usage seems to get promoted in the college environment, leading to public concern over the related problems. The inconsistency may happen because of the less amount of news relating to college students' alcohol usage. Therefore, the number of tweets of news may decrease corresponding with the decline in news on the same topic.

The results also found that sexual risk was the leading concern of the negative effect of college students' alcohol consumption on Twitter. Other concerns were alcohol poisoning to death, crimes behaviour, academic success, the effect on organs, suicide, and injuries in descending order. White and Hingson draw a similar conclusion that college students' alcohol consumption correlates with unwanted outcomes, like poorer academic performance, vehicular accidents, injuries, physical fights, risky sexual acts, and sexual assaults[18]. And among these consequences, sexual risk behaviours grabbed the most prominent attention because of its considerable public health importance[19]. Another survey also showed the same result that some of the most frequent consequences involved doing something later regretted, partial or full blackouts, unprotected sex, and alcohol-related injury[20].

Moreover, the findings suggested that generally, the public held a negative attitude towards alcohol consumption of college students. In other words, they regard alcohol as a harmful influence on campus. Rosenberg, Bauld, Hooper, Buykx et al. explained that government education, media coverage and campaign, medical research, and health institution promotion play a role in improving public awareness towards alcohol[21]. The research also revealed that 'more than half of students who drink report one or more negative alcohol-related problems[22]. As alcohol-related accidents in the news coverage are frequently reported, the association between college students' alcohol consumption and potential accidents or problems may become common sense in public under the effect of repeated exposure.

This study was among the first attempts to employ Twitter as the analysis instrument in the area of college students' alcohol consumption. Therefore, it filled in the gap between research development and new technology deployment. The results may also provide college administrators with functional materials to deconstruct the negative impact of alcohol on campus.

CONCLUSION

In this study, the public awareness of college students' alcohol consumption was found to be very low reflected by the frequency of Tweets of news on this topic worldwide. The content analysis also revealed seven types of negative consequences of college students' alcohol use in the news shared on Twitter, namely sexual risk, alcohol poisoning to death, crimes behaviour, academic success, the effect on organs, suicide, and injuries. It found the public's attitude towards alcohol consumption of college students to be negative in general as expressed on Twitter.

Underlying data:

Open Science Framework: A Twitter Analysis of college students on Alcohol consumption. https://doi.org/10.17605/OSF.IO/XW8VH. Data are available under the terms of the Creative Commons Zero "No rights reserved" data waiver (CC0 1.0 Public domain dedication). This project contains the following underlying meta-data: study characteristics of tweets included in this study, figure and table of study characteristics of tweets.

Authors' contribution: MSA: concept, study design, manuscript review, and editing. DR: date collection, data analysis, write up and review of the manuscript.

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CASE REPORT

Apexification of A Permanent Immature Central Incisor: A Case Report

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ABSTRACT

Aim: To report the induction of apical root development in an open apex central incisor with necrosed pulp by calcium hydroxide

Summary: A 27-year-old female patient came to dental OPD with ache and discoloration of tooth #11 with a history of dental trauma. There was negative response on pulp sensitivity test on tooth #11. Periapical radiograph showed incomplete root formation with wide canal, divergent foramina, and fragile dentinal walls of tooth #11. After giving local anaesthesia on her first appointment, access was opened, working length was measured and pulp was extirpated. Chemo-mechanical debridement was done with 2.5% sodium hypochlorite solution and application of calcium hydroxide paste was placed. Access was then closed and patient was recalled for subsequent appointments. After a duration of nine-months, radiograph showed the evidence of complete root development with closure of foramina opening. Canal was filled with sealer and Gutta-Percha by thermo-chemical compaction.

Key words: Apexification, calcium hydroxide, foraminal closure

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INTRODUCTION

Trauma to the anterior teeth is a common occurrence in infancy[1]. Any trauma to immature tooth before root completion causing concussion, luxation, fracture, or avulsion of tooth, may result in loss of vitality and disruption in root development and short thin walls pose a huge risk of fracture[2]. Pulpal necrosis in such cases may lead to periapical abscess formation and tooth discoloration that would require endodontic treatment[3]. The incompletely developed permanent tooth serves as a challenge in diagnosis and treatment to the clinician. Endodontic treatment becomes difficult in such cases due to a wide canal, lack of apical stop against which root filling material can be curtailed, and thin dentinal walls[4]. Closure of root apex is essential in tridimensional sealing of root canal for the prevention of microleakage and to increase the prognosis of the endodontic treatment[5]. The induction of apical closure known as apexification is defined as "a procedure of induction of a calcified barrier in the apical zone of an incompletely formed root with necrotic pulp"[6]. As a result, a bone-like calcified barrier is formed called osteocementum[7]. This barrier can be attained through Ca (OH)2 which forms a biologic hard tissue barrier. An artificial apical plug can also be formed through MTA or other bioceramic material[8]. Apexification with Ca (OH)2 is known to have a 90% success rate[9].

The aim of this report is to illustrate the efficiency and capacity of calcium hydroxide to form a biological barrier in an immature tooth with incomplete root formation.

CASE:

A 27-year-old female visited the dental clinic of the Sindh Institute of Oral Health Sciences at Jinnah Sindh Medical University, Karachi in January 2019 with the chief complaint of poor aesthetics due to the discoloration of her upper front tooth. History revealed that the patient had a fall when she was 9 years old. The discoloration was present for the past 8-10 years but had progressively increased over the past couple of years. Treatment had been abandoned due to financial constraints.

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There was no obvious swelling or asymmetry on her extra-oral examination while intra-oral examination exhibited discolored tooth#11 and porcelain fused to metal crown on tooth#21. The rest of the dentition was sound with mild fluorosis and the patient had a healthy periodontium.

Tooth #11 was not tender on palpation and percussion also showed a negative response to pulp vitality tests. Radiographs showed wide apex and thin walls with no radiolucency on periapical area of tooth#11. Tooth # 21 was root canal treated. Tooth #11 was diagnosed as immature tooth with pulp necrosis secondary to trauma. After discussing various treatment options with the patient, it was decided to carry out apexification with Ca (OH)2 as the most suitable treatment option for tooth#11 and re-endodontic treatment for tooth#21. As the patient was asymptomatic for #21 and had no major aesthetic concern, she refused any treatment for tooth #21(Fig 01).

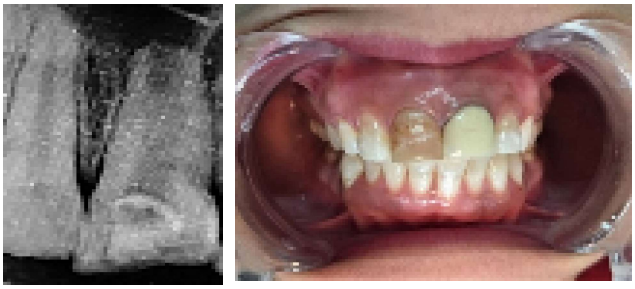

Figure 01: (a) Pre-op radiographic evaluation, (B) Pre-op clinical evaluation.

Treatment was initiated after obtaining written informed consent from the patient. The treatment consisted of multiple visits and was completed in the duration of 10 months. After ensuring adequate local anaesthesia by injecting lidocaine (2% Lignocaine with 1:100,000 epinephrine) isolation was done with rubber dam. Access was opened through palatal surface. Pulpectomy was done and working length was confirmed on periapical radiograph with conventional endodontic 45K-file (Fig 02). Sodium hypochlorite 2.5% was used for thorough irrigation and disinfection. Canal preparation was done up to 60-K file. Later on canal was dried with paper points and dressed with Calcium hydroxide with Iodoform dressing (Metapaste, Metabiomed, USA) up to the apex with the help of endodontic plugger. Dressing was confirmed with the help of periapical radiograph. Cotton was placed within the coronal part of the canal and the access was sealed with Cavit (3M, USA), a temporary filling material. Patient was advised to retain good oral hygiene and instructed to avoid her anterior teeth for tearing or biting and was recalled after one month.

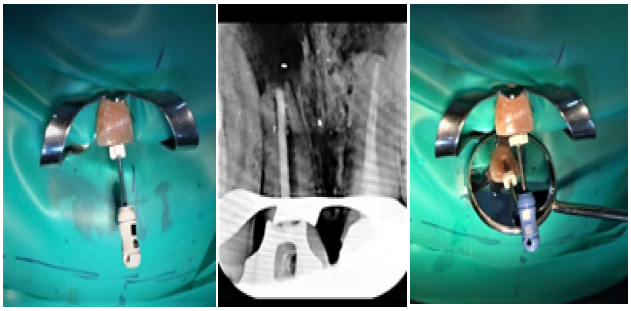

Figure 02: (a) Working length measurement, (b) Radiographic confirmation of working length, (c) Obtaining MAF

At recall appointment after one month, radiograph was taken to evaluate the periapical condition of tooth#11. As patient was asymptomatic, she was advised follow-up visits at 3-months intervals, for the next nine months. At each recall visit, a radiograph was taken to evaluate the periapical condition and success of procedure. To minimize chances of coronal leakage, the temporary filling material was replaced at each visit.

At six-month follow-up, the periapical radiograph showed signs of an apical barrier formation, albeit incomplete. The patient was therefore called for follow-up after another three months. Periapical radiograph at nine-month follow-up revealed complete apical barrier formation, without any signs and symptoms of periapical radiolucency (Fig 03).

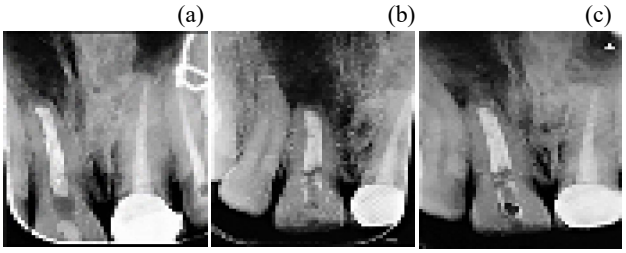

Fig 03. (a) radiograph at nine-month interval, (b) raiograph at six-month interval, (c) radiograph at nine-month interval.

After removal of temporary filling and calcium hydroxide dressing, the apical barrier was palpated with the help of Gutta-Percha of size #35. Absence of any exudate or bleeding from the apical area was ensured. Canal was then thoroughly irrigated with NaOCl, washed with water and dried with paper points. Ca (OH)2 sealer (Sealapex, Kerr, SA) was then coated on the canal walls with the help of a paper point. Thermoplasticized injectable Gutta-Percha using the Calamus 3D Obturation system (Dentsply Sirona, USA) was then used to fill the canal space. Access of the cavity was thoroughly cleaned and restored with light cure resin composite (Fig 04).

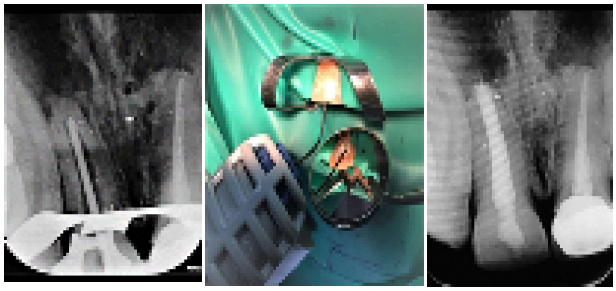

Figure 04 (a) Confirmation of apical stop with #35 Gutta-Percha (b) Obturation with Calamus Obturation System (c) Restoration of access cavity with composite resin

DISCUSSION

Apexification with calcium hydroxide anticipates apical barrier in 74% to 100% of cases[10,11]. According to Guerrero F *et al*[12], apexification with calcium hydroxide showed the formation of more thickened walls and a rounded apex. It is an intra-canal medicament which has historically been used in apexification procedure due to its biological and healing performance[13]. It is a strong base with poor water solubility. It can be mixed with different substances to induce apical barrier such as camphorated monochlorophenol, distilled water, saline, anaesthetic solutions, chlorhexidine, and cresatin. The PH of Ca (OH)2 plays a great role in mineralization action. Alkaline pH induces hard tissue formation by the activation of alkaline phosphatases and neutralization of lactic acid secreted by osteoclast[14]. High pH of calcium hydroxide provides antibacterial activity in the apical and periapical soft tissue[15]. According to Masmoudi F *et al*[16], when it comes in contact with connective tissue, calcium hydroxide causes superficial necrosis of about 1-1.5 mm thickness. Under this necrosed zone, fibroblastic cells induce fibrous matrix formation. Later on, fibroblast segregate into odontoblast and form tubular dentine (orthodentine). At the periodontal ligament level, fibroblastic cells differentiate into cementoblast and osteoblast to form osteoid tissue. A higher survival rate has been seen for the Stem Cells of Apical Papilla (SCAP) when the dentine was exposed to Ca (OH)2[17,18].

Despite of its property of making biological apical barrier, alkaline pH also denatures the dental organic proteins thus upsurges the risks of fracture[19,20]. However, studies have shown that chances of root fracture are correlated more to the phase of root development than to the enduring use of calcium hydroxide[21]. Apexification with Ca (OH)2 requires a protracted treatment time to produce acceptable results. Studies showed that long term follow up visits of about five-months up-to twenty-motnhs could couple with poor patient compiliance which can adversely affect treatment outcomes[22].

An alternative material which has gained popularity in recent years for apexification is MTA. Studies have shown that there is no substantial difference in the treatment results among these two medicaments[16]. Even though MTA has the advantage of shortening the time of treatment significantly; apexification with calcium hydroxide has an advantage over MTA pertaining to better elongation of apical root length[23]. Limitation of using MTA for apexification include its long setting time, ability to cause tooth discoloration, difficulty in handling at the root-end and an increased risk of adverse periapical reactions[24]. From clinical point of view, apexification procedure with MTA is an expensive treatment modality and is not easily affordable by patients, especially those presenting to a public sector hospital. A study has shown that, in addition to the thin dentinal walls still present after single-shot apexification, there is not as much quantifiable rise in root dimensions with MTA[25]. Another study has revealed that both MTA and calcium hydroxide have similar weakening effect on dentine properties[26].

CONCLUSION

In this case report, a clinically acceptable apical barrier was formed after calcium hydroxide apexification. Irrespective of the multiple visits and long term treatment plan associated with it, apexification is most suitably performed by the use of calcium hydroxide as it forms a biological apical plug.

Authors' contribution: FAK: Conceived the idea, performance, clinical and radiographical evaluation and wrote the case report. YAA: Evaluated the clinical and radiographical data and reviewed the final report. MML: Performed the clinical and radiographical evaluation and co-edited the case report. SA: Performed the clinical and radiographical evaluation and co-edited the case report.

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LETTER TO EDITOR

The Prevalence of Mandibular Residual Alveolar Ridge Patterns in Adult Edentulous Population

Naseer Ahmed[1], Maria Shakoor Abbasi[1], and Quratulain Mariam[1]

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Sir,

The residual alveolar ridge is a basal jaw bone and soft tissue covering left after teeth loss. The alveolar ridge constantly resorbs and goes through a series of changes, into different shapes throughout life[1]. The remodeling of residual alveolar ridge affects the prosthodontic treatment in its different phases[2]. Therefore, during treatment planning, it is essential to consider the quality and quantity of bone. The ridge pattern varies in edentulous patients, which directly affects the denture-bearing area, facial muscle support, retention, stability, and function[3]. Atwood[5] in 1971 classified the mandibular ridge form into six anatomical orders. The classification, which is in practice and is widely used, was based on topographic analysis of residual alveolar bone[4].

Class I - Pre-extraction, Class II - Post-extraction, Class III - High, well rounded, Class IV - Knife edge, Class V – Low well rounded, Class VI – Depressed.

The evaluation of Atwood[5]'s ridge order to date has not been carried out to the best of authors' knowledge. Therefore, a need of evaluating ridge form exists as it is yet unknown that the classification incorporated in curricula is valid or a need of new classification or modification in the existing one is needed. In a pilot project of 105 participants, we have clinically evaluated the prevalence of residual ridge form according to Atwood[5] classification and studied its correlation with period of edentulism, previous denture use and age. The ridge morphology was judged clinically, and height of the ridge was recorded further from Orthopantomography (OPG) and lateral cephalography.

Considering the methodologies implemented in our study, it was concluded that the most prevalent ridge form was order V 27 (25.7%) and VI 28 (26.7%). Additionally, order VI was also found in majority with diabetes 22 (20.95%) and osteoporosis 17 (16.19). The depressed form was found in females 17 (16.19%) while low well rounded was prevalent in males 15 (14.29%). However, we found that the residual ridge form becomes unfavorable with period of edentulism ($rp = 0.845$), ($p<0.001$) and advancing age ($rp= 0.655$), ($p<0.001$). While a weak relationship ($rp = 0.479$), ($p=0.003$) of ridge form was found with denture use. Beside this, we also detected shortcomings in the current ridge classification in terms of difficulties encountered in management of ridge order like encroachment of inter arch space with well-formed ridge type, lack of morphological details, lack of quantitative measurements of residual alveolar bone, and why certain ridge orders like V and VI are suggested because there is no difference in treatment planning. Therefore, we recommend a modification in the current classification according to complexities in treatment and logical sequence with additional details of residual ridge forms.

Conflict of Interest: Authors declare no conflict of interest.

Authors' contribution: MSA: Substantial contributions to the conception and design of the work, NA: The acquisition, analysis, and interpretation of data for the work, QM: Drafting the work, revising it critically for important intellectual content; and final approval of the version.

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