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EDITORIAL

Social Distancing and Covid-19: Is It Ethical?

Noor-Mah Khan

The CDC recommended social distancing of 6 feet in public and quarantine for exposed individuals for 14-20 days at the start of the COVID-19 Pandemic. (Centers for Disease Control and Prevention) The vast history of public health validates the need and effectiveness of social distancing over the course of documented history. (Qian 259-261) However, the widely debated question is whether it is ethical to impose the social and economic burdens that accompany social distancing, on the general population, in the midst of a Pandemic such as COVID-19?

The value of imposing social distancing is not the conclusion of a debate rather the beginning of a very important discussion in the context of public health ethics. The burdens that come with social distancing fall disproportionately on different cohorts of society. While convenient for people in one domain of physical location, for example software engineers in the tech industry who have the privilege of working from home while having negligible effects on their work outcomes, it can take away the livelihood of a daily wage worker who has to go out every day in search of work and depends on engaging with strangers to be employed and earn a livelihood. This has highlighted the need of being sensitive to the distributive inequity associated with federal and public health policies related to policies regarding social distancing.

The most important question we can bring up in trying to resolve this dilemma is to ask what do we as policy makers and public health professionals owe to the general public most affected by these policies? In trying to reach an answer, we need to categorize the individuals into two categories of harms incurred; the harm that an individual incurs in having to quarantine/isolate for a significant period of time and the harm the broader industries incur in having to implement social distancing as a policy. In trying to reach a balance where "fewest harms" are incurred, we need to address the responsibility that the government has towards the people. To lessen the socio-economic burdens of social distancing, we need to make sure that that person is cared for; food is provided, phone and internet is available for staying connected to loved ones, income is replaced and security is provided on an employer and government level. Albeit a grand expectation, in my opinion it is not just the responsibility of the elected government but the due right of its people.

The ethical theory of Utilitarianism builds on the concept of consequential moral reasoning - meaning the onus of reasoning relies on the consequence of the act. (Sandel 31) It works to increase overall utility; defined as the net sum of pleasure over pain. (Sandel 103) Using the doctrine of Utilitarianism in the context of the evident benefits of social distancing (Qian), I believe imposing social distancing in a pandemic such as COVID-19 is ethical. By forming policies to halt the spread of the virus, protect the most vulnerable in the society and attempt at containing a disease that little is known about in the setting of no vaccines or credible treatments, it is the overall beneficial choice to make. It aims to reduce death and debility of near ones, which is by far one of the most painful experiences humans can go through, it buys time for solutions to evolve, it helps people live long enough to figure a way past such a situation with minimal losses.

For public health professionals and policy makers who find themselves consumed by the ethical dilemma of structuring and executing time-sensitive policies in a pandemic caused by a respiratory infection such as COVID-19, they can take out a page from John Rawls' book. John Rawls created the thought experiment which he called, "The Veil of Ignorance" - it is a moral reasoning method used to test whether an act is fair and impartial by disallowing the thinker to use any information that might potentially bias his/her decision in favor or against a certain people/situation. (Huang) This experiment will allow the power holders to exercise a sense of consciousness when making policies and will help them analyze all their propositions through

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the lens of fairness and justice. As Rawls mentions, " When addressing major decisions about the allocation of resources, we need only ask ourselves: 'how would I feel about this issue if I were stuck behind the veil of ignorance?" (Huang)

In the context of COVID-19, it will help policy makers access the impartial state of the brain and allow them to reason beyond their position of privilege and from the point of view of the common man that makes up the larger part of the society. It will make it easier to help lead the population into a transitory phase of lockdown, ease their anxieties and provide for the basic necessities of living while socially distancing and isolating.

It is important that policies such as social distancing, quarantine and isolation are imposed with the consciousness of distribution and its consequences. These policies need to be respected for the greater good and everyone's equal safety, provided that those people are given security of food, shelter, connection and financial and health coverage for that specified time. Norman Daniels wisely points out the matter of prioritizing the worse off and how it matters *who* is prioritized and *how much*. He also discusses how there is no sure way of knowing what is actually "just" and "fair" in allocating resources especially in settings such as a novel pandemic.

Norman Daniels says and i quote, " Fairness is even more problematic because we don't have a criterion for what counts as fair and we have to accept the outcome of a fair process as what's fair." (Daniels 2-16) In a situation such as the outbreak of COVID-19 and the ensuing pandemic, no government, public health officials or political party knew what to expect and how to go about imposing policies that were strict, safe and considerate enough for the general population. It was only after going through the process of forming and reforming policies while analyzing the outcomes on different strata of the society, did we get a clearer idea of the harms and benefits of the policies - in short, 'the outcome of a process' regardless of the procedural fairness.

Daniels continues on to say, " …how do we measure whether we get fairer decisions if we didn't have a prior agreement on what counts as fair? Since we don't have that agreement we need a process but the outcome of that process might not comply with some people's judgements about fairness, and if so, what do we do about that and the answer is "I don't know."" (Daniels 2-16) In the case of mandating social distancing policies in COVID-19, I agree with this statement. If we consider a collective societal and global benefit that may be gained through containing the spread of the virus, we need to consider that the policy will not be received well by all segments of the community and it might sit well with some while getting high criticism from others. In such a context, I believe, tying in the utilitarian perspective helps us justify this policy by arguing that as long as the benefit of the larger community outweighs the harm caused as collateral damage, the policies are fair.

It is granted that no one policy can be the right policy. Although it could be argued that it is every human's right to choose what they deem best for themselves, in a global situation such as a pandemic, it should also be weighed that one person's choice does not end up hurting other people's safety and health. Thus, it is important that policies such as social distancing and isolation are respected for the greater good and everyone's equal safety. However, these avenues should only be employed provided that people are given security of food, shelter, connection with loved ones as well as financial, physical and mental health coverage for that specified time. Governments need to plan ahead of time and be prepared to take on such a challenge if the need arises with the best interest of the people at its core.

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ORIGINAL ARTICLE

Evaluation of Fluorescent Microscopy and GeneXpert MTB/RIF Assay for The Detection of Mycobacterium Tuberculosis Complex in Respiratory Specimen of Patients with ZN Smear Negative Pulmonary Tuberculosis

Ahmed Khan Tareen[1], Shereen Khan[2], Abdul Rauf[3], Muhammad Naeem[4], Muhammad Umer[5]Muhammad Ali Khan[6], Amin Fahim[7]

ABSTRACT

Objective: To evaluate the diagnostic validity of the GeneXpert for quick diagnosis of TB and recognition of Rifampin resistance in Ziehl–Neelsen smear-negative Broncho-alveolar lavage and sputum specimens obtained from suspected TB patients, keeping LJ culture as "Gold Standard".

Study Design: Cross sectional study.

Place and Duration of Study: The study was conducted at Fatima Jinnah General and Chest Hospital (FJGCH), Quetta from January 2018 to December 2018.

Materials and Methods: One hundred ZN-smear negative pulmonary specimens (63 BAL and 37 sputum) were collected from suspected TB patients (34% males and 66% females; mean age 52.8±18) visiting FJGCH, Quetta. The isolates were processed for fluorescent microscopy, LJ culture and GeneXpert according to standard protocol. Efficacy of these diagnostic tests for the detection of MTB was evaluated comparatively.

Results: Out of 100 ZN smear-negative specimens; MTB was detected by FM in 18 (18%) samples while LJ culture detected MTB in 59 (59%) and GeneXpert in 55 (55%) samples.

Conclusion: We concluded that GeneXpert is an innovative assay for prompt detection of MTB in smear-negative cases having higher sensitivity and specificity with additional advantage of drug resistance detection and turnaround time of two hours. The assay facilitates early diagnosis and appropriate management of TB to minimize morbidity and mortality.

Key Words: *Fluorescent Microscopy, GeneXpert MTB/RIF Assay, Mycobacterium Tuberculosis, Respiratory Specimen, ZN Smear Negative.*

Introduction

Tuberculosis (TB) is a transmittable chronic disease and one of the leading causes of mortality worldwide. It is caused by *Mycobacterium tuberculosis* (MTB) complex which was first identified by Robert Koch in 1882.[1,2] TB mostly affects the human pulmonary system, known as pulmonary tuberculosis, however it also affects bones, joints, lymph nodes, meninges, brain, and kidneys. Usually, the sign and symptoms of TB are fever, night sweats, chill, fatigue, appetite, and weight loss.[3] TB is a treatable disease but still has higher mortality rates. World Health Organization (WHO) estimates that one third population of the worlds is infected with TB, however; only small percentage (5-10%) will convert to active TB. while remaining cases will have latent TB infection and will remain asymptomatic, but they can also get active TB disease if immune systems weaken at any stage.[4]

TB is a major public health problem in Pakistan and accounts for 300,000–500,000 cases which results in 50000 deaths annually. There is no proper disease surveillance program in Pakistan. Therefore, it is very difficult to estimate the exact incidence, prevalence, morbidity, and mortality of TB cases in Pakistan.[5,6] Based on different scarce surveys that have been conducted in various parts of the country, 518,000 TB cases are estimated to occur each year, with about 15,000 cases of multi drug resistant-TB patients.[7] Currently, there is very limited empirical data

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available on the prevalence of TB in Pakistan.

The WHO recommends that close contacts of TB patients and other high-risk individuals should be screened out. This will help to identify the TB patients in proper and earlier time to start the needful management strategies. It is further recommended that screening should be started with proper history and clinical examination and later chest X-ray and other investigations may be carried out like sputum smear and molecular techniques using GeneExpert MTB/RIF. The findings may be confirmed by culture and sensitivity. Although the sensitivity and specificity of X-ray chest and sputum smears are low whereas culture is considered as reference standard.[8,9]

Quetta, the capital of Balochistan, is a major metropolitan city; the population belongs to several tribes and castes having different economic backgrounds. Many Afghan refugees are also residing in Quetta. The present study was designed to have samples of various ethnic groups, different tribes, and various socioeconomic backgrounds. The aim of the study was to evaluate the diagnostic validity of the GeneXpert for quick diagnosis of TB and recognition of Rifampin (RIF) resistance in Ziehl–Neelsen (ZN) smear-negative Broncho-alveolar lavage (BAL) and sputum specimens obtained from suspected TB patients, keeping LJ culture as "Gold Standard".

Materials and Methods

This cross-sectional study was conducted from January 2018 to December 2018 at Fatima Jinnah General and Chest Hospital (FJGCH), Quetta. The Broncho Alveolar Lavage (BAL) and sputum samples of one hundred (100) TB suspected patients, who were negative for the AFB on Ziehl-Neelsen (ZN) staining, were selected, based on their clinical evaluation through nonprobability convenient sampling. After taking approval from Institutional Review Board (IRB) Ref: FLS&I/BUITEMS: 249/17 dated: August 20, 2017; informed consent was taken from all the study participants. Sensitivity and specificity were confirmed using Fluorescent Microscopy and GeneXpert (MTB/RIF Assay). Sputum or Broncho Alveolar Lavage (BAL) specimens of these TB suspects against the gold standard mycobacterial culture (Lowenstein-*Jensen* Media) were carried out.[10]

All the necessary steps of the study; including samples collection, specimens processing; Zeihl-Neelsen and fluorescent stain, microscopic study, culture and GeneXpert assay were performed at the Hi-tech laboratory in FJGCH, Quetta, Pakistan. Suspects of all age groups with ZN smear-negative results and presumptive TB symptoms including chest pain, chronic coughing, fever, chills, fatigue, loss of appetite and weight, night sweats, chest X-ray abnormalities showing infiltrates and cavities or only chronic coughing for more than two weeks with or without other symptoms were recruited in the study. The patients with ZN smear positive results and those who had started anti-tuberculosis drugs were not included in study.

Various parameters viz; age, sex, signs and symptoms, body mass index (BMI), history of contact with TB patient(s) and use of anti-TB drugs (i.e., relapse, defaulter, failure, treatment completed and cured) were considered, in a standardized pre-designed questionnaire, during data collection. For the sample processing Class-II Biological Safety Cabinet (BSC) was used, moreover-acetyl-L-cysteine (NALC)-NaOH solution was used for the digestion and decontamination of the samples which was followed by concentrating the samples by spinning using the standard protocol recommended by Kent andKubica.[11] The data was subjected to analysis by SPSS version 21.0. Statistics including sensitivity, specificity, negative predictive value (NPV), positive predictive value (PPV) of GeneXpert/RIF was calculated. P value of <0.05 was taken as significant.

Results

Out of 100 ZN smear-negative clinical specimens examined for the pulmonary TB diagnostic analysis, Broncho Alveolar Lavage (BAL) and sputum specimens were 63% and 37%, respectively. The mean age of the clinically suspected TB patients was 52.8±18 years (ranging from 15 to 86 years) while the mean Body Mass Index (BMI) was 22.1±4.9 (ranging from 11 to 37). The study population included 34 (34%) males and 66 (66%) females (sex ratio 1:1.94).

Among the hundred ZN smear negative cases of TB, almost all the clinically suspected TB cases had history of cough (90%), most of the cases complained of fever (75%) and weight loss (73%), followed by night sweat (50%), and hemoptysis (21%). About 17% of the suspected cases had the history of TB contact.

Detection of tuberculosis by using three different techniques based on specimen type in ZN smear negative TB cases revealed that with fluorescence microscopy 12(19%) out of 63 cases were positive in BAL specimen whereas 6(16.2%) out of 37 cases were positive in sputum specimens (Figure-1).

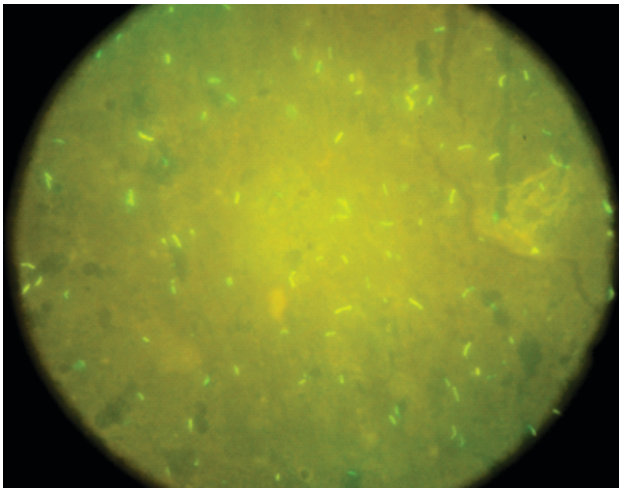

Fig.1: Fluorescent Microscopy Indicating Fluorescing AFB

The findings on GeneXpert showed 42(67%) out of 63 cases were positive in BAL specimen whereas 13(35%) out of 37 cases were positive in sputum specimens (Figure-2).

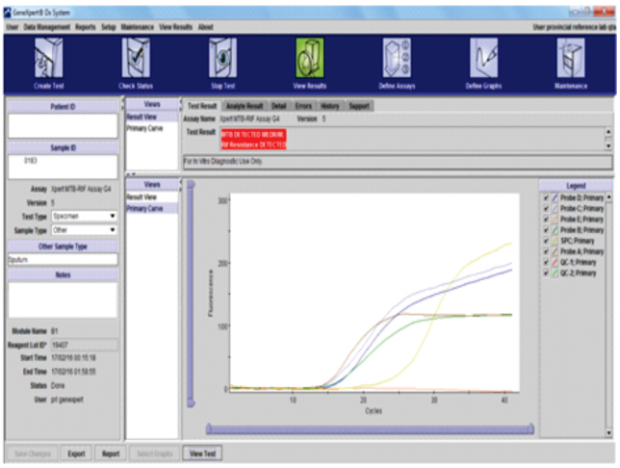

Fig. 2: Real Time PCR Curve Indicating Positive Results for The SPC Along With A, B, C And D Probes Whereas, Negative Result is shown for the Probe E. Results for Detected Rifampin Resistance and Genexpert Mycobacterium Tuberculosis/Rifampin Assay

The results of LJ culture showed 43(68%) out of 63 cases were positive in BAL specimen whereas 16(43%) out of 37 cases were positive in sputum specimens (Figure-3).

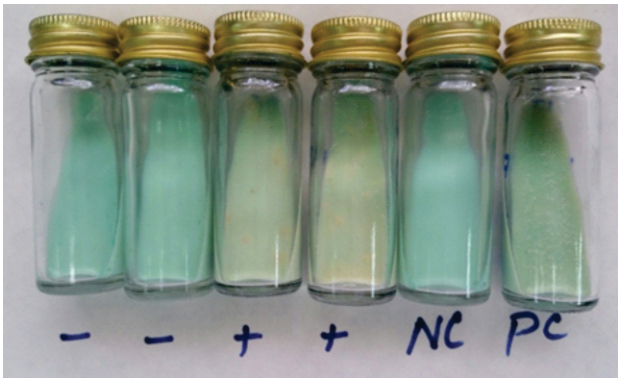

Fig. 3: Mycobacterium Growth on LJ Culture Medium. From Left to Right 1st and 2nd Slants are Negative for MTB, 3rd and 4th Slants are Positive for MTB, 5th Slant is Negative Control (NC) and 6th Slant is Positive Control (PC) for MTB

One of the most routinely used techniques in laboratory for the diagnosis of TB is FM. But FM detected the least number of positive cases 18% (18/100) in ZN smear-negative samples in contrast with mycobacterial culture with the detection rate of 59(59%) out of 100 cases. Among eighty-two FM auramine-O negative samples, half of the samples 41(50%) were found to be positive by LJ culture (Table-I). Therefore, chi-square test indicated a statistically significant difference (χ^2= 15.25, df=1, p<0.001) between FM auramine-O staining and LJ culture.

Table I: Comparison of Fluorescent Microscopy (FM) and *GeneXpert MTB/RIF assay* with LJ culture for detection of TB

Fluorescent Microscopy (FM)	LJ Culture		Total
	+ve	–ve	
FM +ve	18	0	18
FM –ve	41	41	82
Total	59	41	100
GeneXpert +ve	52	3	55
GeneXpert –ve	7	38	45
Total	59	41	100

LJ culture yielded maximum number of positive cases (59%) for the presence of AFB in BAL and sputum samples. On the other hand, GeneXpert detected 55% of the suspected cases. Among 45 GeneXpert-negative samples, 7(15.5%) samples were also found to be positive for AFB by LJ culture indicating that culture is more sensitive than GeneXpert. Chi-square test revealed a highly significant difference (χ^2= 63.84, df=1, p<0.001) in the detection rate of MTB between GeneXpert assay

and LJ culture (Table-I).

Table-II depicts the diagnostic validity of FM for the detection of MTB in the Broncho alveolar and sputum samples while considering culture as a gold standard diagnostic technique. In this study the overall sensitivity and specificity of FM using ZN smear-negative samples for the detection of AFB were found to be 30.5% and 100%, respectively, whereas 100% PPV and 50% NPV were observed for total samples.

Table II: Diagnostic Validity for detection of TB by Fluorescent Microscopy

Specimen Type	Technique		LJ Culture		Total	Sensitivity (%)	Specificity (%)	PPV (%)	NPV (%)
			+ve	-ve					
-ve Total	31	20	51			37.5%	100%	100 %	39.2%
	43	20	63					100 %	67.7%
+ve			6	0	6				
-ve Total	10	21	31			30.5%	100%	100 %	50%
	16	21	37						
+ve			18	0	18				
Combine	F M								
		-ve	41	41	82				
Total			59	41	100				

BAL= Bronchoalveolar lavage
FM= Fluorescent Microscopy
PPV= positive predictive value
NPV= Negative predictive value

Table-III represents the validity of GeneXpert for the detection of *M. tuberculosis* in the bronchoalveolar and sputum samples while considering culture as the "reference standard" diagnostic technique. The overall sensitivity and specificity of the GeneXpert assay for the MTB detection using ZN-smear negative samples in this study were found to be 88.1% and 92.7%, respectively, whereas the positive predictive value (PPV) and the negative predictive value (NPV) were observed 94.5% and 84.4%, respectively for total samples.

Table III: Diagnostic Validity of GeneXpert MTB/RIF for Detection of TB from ZN Smear-Negative Samples

Specimen type	Technique		LJ Culture		Total	Sensitivity (%)	Specificity (%)	PPV (%)	NPV (%)
			+ve	-ve					
BAL	GX	+ve	40	2	42	93.0%	90.0%	95.2%	85.7%
		-ve	3	18	21				
Total			43	20	63				
Sputum	GX	+ve	12	1	13	75.0%	95.2%	92.3%	83.3%
		-ve	4	20	24				
Total			16	21	37				
Combine	GX	+ve	52	3	55	88.1%	92.7%	94.5%	84.4%
		-ve	7	38	45				
Total			59	41	100				

BAL= Bronchoalveolar lavage
GX= GeneXpert
PPV= positive predictive value
NPV= Negative predictive value

Discussion

It was observed in the present study that the infection rate of TB was higher in females (62%) than males (53%). These results are in agreement with those reported by Shafee *et al.,* 2014.[12] However some other studies have reported that the prevalence of TB is more in males than females.[13] Present study showed 67% infected people between the age of 15-35 years, these results remained in close agreement with a descriptive study from Nairobi in which infection rate of 66.7% was reported with the age between 18-34 years.[13] Whereas a study from Pakistan in 2015; demonstrated 62% of the patients were in the age of 21-50 years.[14] However, this study found no significant association of age with TB infection (p>0.05).

Statistically, results of the present study were non-significant (p>0.05) for BMI with increased risk of TB. However, patients with a high BMI had the highest risk of TB infection followed by normal BMI as compared with low BMI. These findings were not in agreement with the results reported by another researcher that a low BMI are more at risk of TB than the higher BMI.[15]

In the present study, 55% of the ZN smear-negative TB cases were GeneXpert positive, 59% culture positive and 18% were FM smear positive. Out of 59% culture positive samples, 18% were FM smear positive and 41% were FM smear negative cases. The result of our study is almost comparable with the study from Pakistan by Iram *et al.* (2015)[16] in which MTB was detected in 49.8% pulmonary TB suspects by GeneXpert MTB/RIF test, 47.8% by culture. However unlike to our result; comparatively higher smear positivity of 40% was observed. Our finding is lower as compared with a study by Munir et al. (2015)[14] who reported 67.5% ZN smear positivity for MTB and 77.4% GeneXpert positivity.

Diagnosis of TB by smear microscopy is the mainly used apparatus in low and middle-income countries, despite of its limitations.[17] The sensitivity of fluorescent smear microscopy is higher in contrast with ZN smear microscopy however it is costly and requires a dark functioning place. Smear microscopy

for the diagnosis of TB from clinical samples has a lower sensitivity than the LJ culture because a smear requires a high bacterial load (105/ml) to be positive.[18]

In the current study the MTB was detected in 18% samples by FM that were negative on ZN staining indicating higher detection rate of FM than ZN microscopy. Similar findings were reported in studies by Ahmed S et al (2019)[19] who observed that FM has higher levels of sensitivity as compared with ZN staining for the detection of AFB in the clinical samples.

Culture using Lowenstein–Jensen medium is regarded as the "Gold standard" method in the developing countries and has high sensitivity for the detection of acid-fast MTB in the clinical samples. Overall, the highest detection rate of 59% by culture in ZN smear negative cases was found in present study proves its validity and accuracy as the reliable diagnostic method in the laboratory but it takes four to eight weeks to produce result. This finding is higher than 10.3% culture positivity in smear-negative pulmonary TB cases reported in Ethiopia by Tadesse et al. (2016)[20] and 47.8% in Pakistan by Iram et al. (2015)[16] detected in pulmonary TB cases. This high prevalence in our study is due to the inclusion of clinically significant and highly suspicious TB cases in the present settings. BACTEC and MGIT are the rapid culture methods which have greatly shortened the discovery time to 7-10 days. However the operating cost and equipment's are greatly high, continuous monitoring for numerous days, more skilled personals, and further proof of positive cultures by smear microscopy are required. [21]

MTB was detected in 55% of the pulmonary TB cases in the current study by GeneXpert MTB/RIF which is comparable to another study from Pakistan with the GeneXpert positivity of 49.8% (Iram *et al.,* 2015)[16]. In this study, GeneXpert MTB/RIF test detected all the ZN and FM smear-positive, 88.1% (52/59) culture-positive cases and 7.3% culture-negative samples from clinical pulmonary TB cases. Whereas 11.8% culture positive cases appeared negative on GeneXpert.

Using LJ culture as the reference standard, the sensitivity and specificity of GeneXpert were 88.1% and 92.7% respectively, for detection of MTB in smear-negative respiratory specimens for diagnosis of TB which is in line with the results published by Reechaipichitkul et al. (2016)[22] reporting 83.9% sensitivity and 92.1% specificity of GeneXpert assay. Compared to our study, a lower sensitivity 68.6% on GeneXpert has been observed by Zeka et al. (2011).[23] In a study by Pinyopornpanish et al. (2015)[24] the sensitivity of GeneXpert assay was observed 95.3%, specificity 86.4%, PPV 82% and NPV 96.6%.

Conclusion

We conclude from the current study that GeneXpert MTB/RIF assay was an effective and reliable technique to diagnose pulmonary TB from smear negative specimens, with more sensitivity and excellent specificity. GeneXpert has a great diagnostic value for AFB detection in smear-negative cases because it has outperformed smear microscopy as revealed in the current study. Smear-negative patients can be more benefited from GeneXpert technique especially in those areas where culture is not applicable. Prevention from fatal TB disease is essential to enhance the discovery of *Mycobacterium Tuberculosis Bacterium* (MTB) using individual or mutual laboratory techniques that in turn could avoid huge economic loss. However, since the study participants of one tertiary care institute were evaluated; more multicenter studies are recommended.

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CONFLICT OF INTEREST

Authors declared no conflicts of Interest.

GRANT SUPPORT AND FINANCIAL DISCLOSURE

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DATA SHARING STATMENT

The data that support the findings of this study are available from the corresponding author upon request.

ORIGINAL ARTICLE

Assessment of Bacterial Profile and Antimicrobial Susceptibility Pattern of Blood Culture Isolates

Kanwal Hassan Cheema[1], Muhammad Saeed Anwar[2], Fatima Hameed[3], Majid Rauf Ahmad[4], Qanita Fahim,[5] Ayesha Bashir[6]

ABSTRACT

Objective : To determine the pattern of bacterial isolates in bloodstream infections and their antimicrobial susceptibility in a tertiary care hospital, Lahore.

Study Design: Descriptive cross-sectional study.

Place and Duration of Study: The study was carried out at the Pathology department of Combined Military Hospital, Lahore from November 2019 to January 2020.

Materials and Methods: A total of 359 blood culture specimens were collected over a period of three months. Organisms were identified by using API. Antimicrobial susceptibility testing was carried out by Modified Kirby Bauer disk diffusion method on Mueller Hinton agar and interpreted by CLSI guidelines 2019.

Results: Out of 359 bacterial isolates, only 11(3.1%) were Gram-positive cocci, whereas 348 (96.9%) isolates were Gram-negative rods (GNRs). Amongst the GNRs, most commonly isolated organism was *Salmonella typhi* (207; 59.5%) followed by *Salmonella paratyphi* (60; 17.2%). Twenty-seven (7.7%) *Acinetobacter* sp., 20 (5.7%) *E. coli* and 20 (5.7%) *Klebsiella* sp. were isolated. The antimicrobial resistance pattern of *S. typhi* showed 158 (76%) MDR and 106 (51%) XDR isolates.

Conclusion: The emergence of MDR and XDR bacteria especially amongst *Salmonella typhi* is quite daunting. Our study emphasizes the importance of antibacterial susceptibilities surveillance in determining the sensitivity pattern of microorganisms causing Blood stream infections.

Key Words: *Blood Stream Infections, Multidrug Resistance, Blood Cultures.*

Introduction

Infection caused by viable organisms is known as Blood stream infection (BSI).[1] The Clinical scale of BSI ranges from mild bacteremia to severe septic shock.[2] A scientific publication in 2017 reported that sepsis accounted for almost 20% of all global deaths.[3] These infections remain a significant cause of morbidity, mortality, prolonged periods of hospital stay, and higher health care cost worldwide. Increased mortality of BSIs is often attributed to inadequate diagnostic facilities and inappropriate, delayed, or insufficient treatment.[1]

Prevalence of carbapenem-resistant *Enterobacteriaceae* (CRE) and methicillin-resistant *Staphylococcus aureus (MRSA)* is on the rise.[4] The occurrence of multidrug-resistant bacteria and the failure to develop new antibiotics has compounded this public health issue.[5]

Despite immense improvements in clinical diagnosis, blood culture remains the gold standard test for BSI detection. The spectrum of microorganisms isolated form hospitals and their antibiotic susceptibilities not only varies according to geography but even within the same hospital setting.[6] This holds true for Pakistan as well, as we have recently seen a shift to a rise in Gram negative bacteria as compared to Gram positive bacteria.

Antimicrobial resistance (AMR) has become a profoundly serious issue in Pakistan, as there is a paucity of a good quality blood stream infection surveillance data that can influence policy change.

The present study was undertaken to determine the pattern of bacterial isolates in blood stream infections and their antimicrobial susceptibility pattern. The aim of the study was to determine the recent trend in antimicrobial susceptibility pattern of microorganisms that cause BSI in our setup and to

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prepare an antibiogram that will aid the clinicians in executing better decisions in treating their patients and can help to improve the antimicrobial stewardship programs in their hospital setting.

Material and Methods

This was a descriptive cross-sectional study done at the Pathology department of CMH, Lahore from November 2019 to January 2020 after getting approval from the Ethical Review Committee of CMH Lahore Medical College (IRB No: 532/ERC/CMH/LMC).

Simple convenient sampling technique was employed.

A total of 359 samples of blood culture from patients with suspected signs of infection that presented to either OPD or indoor facilities of Combined Military Hospital were included in the study. Duplicate samples were excluded. Both adult and pediatric tryptic soya broth blood culture bottles were used to collect blood through aseptic blood collection technique. All the samples were collected before start of any antimicrobial drugs in the hospital. About 5 ml and 1 ml of blood was drawn and then inoculated into the adult and pediatric blood culture bottle.

The blood culture bottles were transported to Microbiology section of Combined Military Hospital Lahore and were placed in an incubator at 35±2 ºC overnight. First subculture from broth bottles was done on Blood agar and MacConkey agar plates. The subculture plates were incubated at 35±2 °C overnight and observed next day for any visible growth. If no growth occurred, then second and third subculture were done at day 4 and 7. The blood culture bottles were incubated for seven days in case of negative subculture.

Preliminary identification was based on Gram staining, catalase test, oxidase test and motility. Catalase positive and oxidase negative rods were identified by analytical profile index (API) 10S (BioMerieux). Oxidase positive rods were identified using API 20NE (BioMerieux).

Gram positive, catalase positive cocci were identified by coagulase and deoxyribonuclease (DNAse) tests. Gram-positive cocci with a negative catalase test were further grouped by Streptococcal grouping latex kit UK. Antimicrobial susceptibility testing was carried out by Modified Kirby Bauer disk diffusion method on Mueller Hinton agar and interpreted by CLSI guidelines 2019. Vancomycin and colistin susceptibility were tested by using E test method and broth microdilution method, respectively as per CLSI guidelines.[7]

Statistical analysis was done by using SPSS 22. Descriptive analysis of sample distribution, age, sex, and antimicrobial data was performed, and results are presented as frequencies and percentages.

Results

The study was conducted over a period of three months and a total of 359 positive blood cultures were collected during this period. Positivity was higher in males (233; 64.9%) as compared to females (126; 35.1%). Majority of the samples with positive culture were isolated from patients visiting the OPD 177 (49%) followed by medical ward 79 (22%), pediatric ward 69 (19%) and 34 (10%) from ICU.

Out of 359 bacterial isolates, only 11(3.1%) were Gram-positive cocci, whereas 348 (96.9%) isolates were Gram-negative rods (GNRs). Amongst the GNRs, most isolated organism was *Salmonella typhi* (207; 59.5%) (Table I).

Table I: Breakup of Gram Positive and Gram-Negative Isolates from Positive Blood Cultures (n=359)

Organism		**Number Isolated**	**Percentage (%)**
Gram Positive Cocci		**11**	**3.1**
	Staph. aureus	04	4/11 = 36.4
	CoNS	05	5/11= 45.4
	E. faecalis	02	2/11= 18.2
Gram Negative Rods		**348**	**96.9**
	Salmonella typhi	207	207/348= 59.5
	Salmonella paratyphi	60	60/348= 17.2
	Acinetobacter sp	27	27/348= 7.7
	Escherichia coli	20	20/348= 5.7
	Klebsiella sp	20	20/348= 5.7
	Pseudomonas sp	05	5/348= 1.4
	Citrobacter	03	3/348= 0.86
	Enterobacter	02	2/348= 5.3
	Serratia	03	3/348= 0.86
	Burkholderia	01	1/348= 0.28

Out of the 11 Gram-positive cocci isolated, 4 were *Staphylococcus aureus* (2 Methicillin sensitive staphylococcus aureus MSSA strains and 2 Methicillin sensitive staphylococcus aureus MRSA strains), 5 were Coagulase negative Staphylococci (CoNS). These were considered as contaminants and not processed further. Two strains of *Enterococcus fecalis* were isolated and were susceptible to vancomycin.

The antimicrobial resistance pattern of *Salmonella typhi* showed that out of the 207 isolates, 158 (76%) were MDR and 106 (51%) were XDR strains. No isolate was resistant to either meropenem or azithromycin (Table II).

Table II: AMR Pattern of *S. Typhi* and *S. Para typhi* Isolates Form Positive Blood Cultures (N=267)

Antibiotics	Salmonella Typhi (N=207)		Salmonella Para Typhi (N=60)	
	Resistance No.	%	Resistance No.	%
Ampicillin	158*	76	14	23
Fluoroquinolones	203†	98	60	100
Ceftriaxone	106**	51	01	2
Meropenem	0	0	0	0
Azithromycin	0	0	Not tested	
Chloramphenicol	163	79	10	17
TMP-SMZ	160	77	14	23

*MDR *S. typhi* isolates (defined as resistant to ampicillin, chloramphenicol and trimethoprim-sulfamethoxazole)
**XDR *S. typhi* isolates (defined as resistant to ampicillin, chloramphenicol and trimethoprim-sulfamethoxazole, fluoroquinolones and third generation cephalosporins)
† 98% isolates were resistant to fluoroquinolones.

It was observed (Fig.1) that *S. typhi* was more commonly isolated in younger age groups, whereas, *E. coli*, *Acinetobacter* sp. and *Klebsiella* sp. were isolated from older age groups.

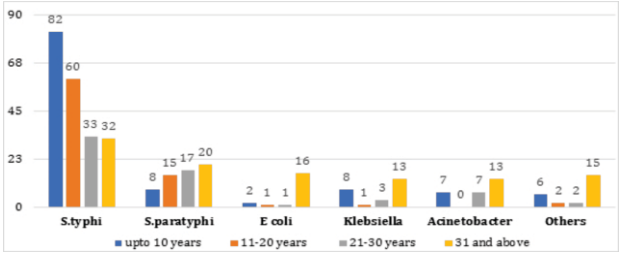

Fig. 1: Distribution of Positive Blood Cultures According to Age Group

Antimicrobial resistance pattern of *E. coli* and *Klebsiella sp*. and *Acinetobacter sp.* is shown in Table III.

Resistance to third generation cephalosporins was 85%, 70% and 52% respectively for *E. coli*, *Klebsiella* and *Acinetobacter sp.* Overall fluoroquinolones were 100% resistant to *E. coli*. Whereas they showed 75% and 52% resistance to *Klebsiella* and *Acinetobacter sp*. respectively.

E. coli, *Klebsiella* and *Acinetobacter sp*. showed no resistance to colistin.

Table III: Antimicrobial Resistance Pattern of E. Coli, Klebsiella Sp. and Acinetobacter Sp. Isolates Form Positive Blood Cultures (n=67)

Antibiotic	Antimicrobial Resistance of Organisms					
	Escherichia coli n=20		Klebsiella n=20		Acinetobacter n=27	
	No	%	No	%	No	%
Amoxicillin-Clavulinic acid	14	70.0	20	100	17	62.9
Third generation Cephalosporins	17	85.0	14	70.0	14	51.8
Imipenem	04	20.0	12	60.0	10	37.0
Meropenem	03	15.0	12	60.0	10	37.0
Fluoroquinolones	20	100	15	75.0	14	51.8
Gentamicin	08	40.0	13	65.0	18	66.6
Amikacin	02	10.0	12	60.0	14	51.8
TMP-SMZ	16	80.0	13	65.0	10	37.0
Doxycycline	19	95.0	14	70.0	15	55.5
Colistin	0	0	0	0	0	0
Tigecycline	11	55.0	14	70.0	13	48.1
Piperacillin-Tazobactam	05	25.0	13	65.0	09	33.3
Cefaperazone-sulbactam	04	20.0	13	65.0	08	29.6

Discussion

The appropriate use of antibiotics by clinicians is paramount in preventing antimicrobial resistance. The challenges faced by the developing world in monitoring antimicrobial resistance are lack of surveillance systems, inadequate means, and indigent compliance to prevention of infection and injudicious prescription as well as use of antibiotics.[8]

In the current study, 96.9% isolates were Gram-negative rods (GNRs) while only 3.1% were Gram-

positive cocci. In another study conducted in Lahore, out of a total of 267 positive blood cultures, 112 (41.9%) cases were of Gram-positive cocci followed by 102 (38.2%) isolates of non-fermenters and 52 (19.47%) isolates were of Enterobacteriaceae.[9] In a study conducted by Kulkarni [10], a total of 720 samples showed growth on culture. 60.67% of the bacterial isolated were Gram-positive whereas 39.33% were Gram-negative bacteria.

The most isolated organism isolated among the GNRs in the present study was *Salmonella typhi* (59.5%) followed by *Salmonella paratyphi* (17.2%). *Acinetobacter* sp.*, E. coli and Klebsiella* sp. were isolated in the frequency of 7.7%, 5.7% and 5.7 % respectively.

A study conducted by Imran et al[9] showed *Staphylococcus aureus* and coagulase negative *Staphylococcus* sp. isolation as 56.25 % and 41.96 % respectively. Whereas, amongst the Enterobacteriaceae, 55.76 % were *E. coli* and *Klebsiella* species were 34.6 %. Among 102 non-fermenters, 68.6 % were *Acinetobacter* sp. and 31.37 % were *Pseudomonas* sp.

The antimicrobial resistance pattern of *S. typhi* showed 158 (76%) MDR and 106 (51%) XDR isolates. No isolate was resistant to either meropenem or azithromycin. This is comparable to a study conducted by Hussain et al [11] in which isolation of multidrug-resistant (MDR) isolates was 76% in *Salmonella typhi* and 34% in *Salmonella paratyphi*. One hundred and fifteen (48%) isolates of *Salmonella typhi* were Extensively drug resistant.

Another study conducted in Rawalpindi [12] showed isolation of MDR isolates of *S. typhi* to be 57% whereas in case of *S. paratyphi* A, it was 42%. Ninety-eight percent strains of *S. typhi* were resistant to fluoroquinolones, a finding supported by regional studies as well as in India and Bangladesh. A study conducted by Shrestha[13] in Nepal also showed 94.6% resistance to fluoroquinolones among Salmonella species. The increase of MDR and XDR isolates of *S. typhi* has become one of the serious issues as the clinicians are left with few choices resulting in increased cost of treatment.

The resistance pattern of *Escherichia coli* in the current study was relatively greater in comparison to other studies performed in the region. A study in Port Blair, India[14] showed *E. coli* sensitive to fluoroquinolones in 55.5% isolates, 50% sensitive to ceftriaxone, 90% sensitive to imipenem and 83% to meropenem, 75% sensitive to gentamicin and 90% to amikacin, respectively.

In the current study, the resistant pattern of *Klebsiella* species to third generation cephalosporins, fluoroquinolones, Imipenem and meropenem was comparable to a study in Nepal which showed *Klebsiella* to be highly resistant to third generation cephalosporins, fluoroquinolones and aminoglycosides but showed better susceptibility to Colistin, Carbapenems, and Tigecycline.[15]

Prevalence of carbapenem-resistant *Enterobacteriaceae* (CRE) is rising. The present study showed 20% resistance to imipenem, 15% resistance to meropenem in strains of *E. coli* while resistance to imipenem and meropenem were seen in 60% of the isolates of *Klebsiella*. The isolation of carbapenem-resistant *Klebsiella pneumoniae* rose from <0.1% in 2002 to 4.5% in 2010 in the United States.[16]

Acinetobacter species are often multidrug resistant and associated with life threatening infections.[17] *Acinetobacter sp.* isolated in the current study showed significant resistance to third generation cephalosporins, fluoroquinolones, gentamicin, and amikacin. No isolate was resistant to colistin. In a study conducted in Delhi, 80.3% of the isolates of *Acinetobacter* sp. revealed resistance to at least three or more classes of antibiotics.[18]

The present study endorses the importance of antimicrobial surveillance as a valuable means in evaluating the load of AMR. Surveillances on a national scale are essential for providing decision makers with the information they need to develop appropriate action plans. Antibiograms are more helpful for clinicians in making up to date decisions about optimum empirical therapy.

This study emphasizes the need to motivate clinician to request antimicrobial sensitivity testing more frequently for better treatment outcome.

The limitation of our study was that it was a single center study; hence more studies involving multiple hospitals should be carried out so that the results can be more reflective of the AMR issue in our region.

Conclusion

Emergence of MDR and XDR Salmonella along with CRE is quite alarming. Unfortunately, indiscriminate use, easy availability and over the counter use of

antibiotics has compounded the issue of AMR. The present study focuses on the significance of antimicrobial susceptibilities surveillance in determining sensitivity pattern of microorganisms causing blood stream infections to help the clinicians in making sound decisions when prescribing antibiotics to treat their patients.

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CONFLICT OF INTEREST

Authors declared no conflicts of Interest.

GRANT SUPPORT AND FINANCIAL DISCLOSURE

Authors have declared no specific grant for this research from any funding agency in public, commercial or nonprofit sector.

DATA SHARING STATMENT

The data that support the findings of this study are available from the corresponding author upon request.

ORIGINAL ARTICLE

Effectiveness Of Oral Intermittent Vs Oral Continuous Isotretinoin Therapy in Patients with Moderate to Severe Acne Vulgaris; A Randomized Controlled Trial

Lubna Rani Faysal[1], Riffat Iqbal[2], Bilqees Fatima[3]

ABSTRACT

Objective: To compare the effectiveness of oral intermittent Isotretinoin treatment vs daily Isotretinoin therapy in patients with moderate to severe acne vulgaris.

Study Design: Randomized controlled trial.

Place and Duration of Study: The study was conducted for 06 months (1st March to 30th August 2021) at department of Dermatology, Pakistan railway hospital, Rawalpindi.

Materials and Methods: A total of 100 patients with moderate to severe acne selected through random sampling were divided into two groups A & B, each having 50 patients. In Group A, a daily dose of 0.5-0.75mg/kg of oral Isotretinoin was given only for 01 week, every 4th week for 04 months. Group B patients were given the same dose of oral Isotretinoin once daily regularly for 04 months. The clinical improvement was measured as difference in GAGS score calculated before and after the treatment using Global Acne Grading System (GAGS). The results were compared & analysed by using paired t-test.

Results: The age, weight, and GAGS scores of the patients in both groups were comparable at the baseline. The GAGS score at baseline was 29.94 $\pm$ 4.42 in group A, while in group B, the score was 29.84 $\pm$ 4.69. After 04 months of treatment, the difference in GAGS from baseline in group A was 17.44 $\pm$ 4.07 in group A compared to 19.09 $\pm$ 5.02 in group B. The P value of 0.006 was significant to prove the association of results.

Conclusion: The oral intermittent Isotretinoin therapy is more effective than daily continuous Isotretinoin therapy in patients with moderate to severe acne vulgaris.

Key Words: *Acne Vulgaris, Global Acne Grading System, Isotretinoin.*

Introduction

One of the most frequently occurring skin disorders, mainly affecting adolescents is acne vulgaris, with the prevalence of 87% worldwide.[1] It varies among countries and different ethnic groups.[2] The pathophysiology of this disease is multifactorial, an intense inflammatory process involving the pilosebaceous units with altered androgen activity at puberty, enhanced sebum production, follicular hyperkeratinisation and later invasion of the follicle by the Propionibacterium acnes are the key underlying factors.[3] Acne vulgaris has serious impact on affected individuals with negative effects on self-esteem, social isolation and cosmetic disfigurement by causing permanent facial scarring.[4]

There are multiple treatment options available which can be used alone or in various combinations. These include topical agents like salicylic acid, benzoyl peroxide, antibiotics, and retinoids. Among the systemic therapy, there are tetracycline, macrolides, clindamycin, and Isotretinoin.[5] The sensitivity of various antibiotics has decreased over the last two decades, and oral Isotretinoin has emerged as a treatment of choice. [6] It is FDA approved and its efficacy is well established in a conventional dose of 0·5–1·0 mg/kg per day for a period of 4 to 8 months, reaching to a cumulative dose of 120 mg/kg.[7] However, at this dose it is frequently associated with many side effects like dryness of skin, cracked lips chapped lips, hyperlipidaemia, and elevated liver enzymes.[8]

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The efficacy of low dose isotretinoin is well established through a number of clinical trials with better clinical outcome, good safety profile, and cost-effectiveness in moderately severe Acne vulgaris.[9,10] An intermittent regimen with low dose oral Isotretinoin has gained popularity over last decade but there is lack of literature on comparative studies with different regimens of intermittent oral isotretinoin in south Asia.[11] The objective of this study was to assess the effectiveness of intermittent Isotretinoin therapy in comparison to continuous daily Isotretinoin therapy in our population.

Materials and Methods

This randomized controlled trial was carried at department of Dermatology, Pakistan Railway hospital, affiliated with Islamic International medical college. The duration of study was 06 months. A sample of 100 patients (50 in each group A & B) was calculated with 95% confidence interval and 80% power using the open-source calculator, Open epi version 3, after approval from the ethical review committee (Ref No. Riphah/IIMC/IRC/21/51).

A strict inclusion criterion was applied, all the patients selected in the study had GAGS > 19 (below 19 = mild acne) and the age limit of >12 years was followed. The married females, patients who had any topical or oral anti-acne medication 04 weeks prior to study were not enrolled in the study. The patients using medication for any other systemic illness were also excluded. After informed verbal consent, the patients in Group A were given oral intermittent Isotretinoin, once daily for 01 week, every 4th week for 04 months. Patients in Group B were given continuous Isotretinoin once daily for 04 months regularly. The clinical improvement was measured as difference in GAGS score calculated before (at baseline) and after the treatment (at the end of 04 months) using Global Acne Grading System (GAGS).

A standard proforma was used to record the personal profile, weight (to calculate dose of the drug), dose of Isotretinoin, GAGS scores, liver enzymes & fasting triglyceride level. The treatment side effects like dry chapped lips, dry skin, elevated triglycerides, and liver enzyme were also recorded at baseline, 01, 02 and 04 months of treatment.

The data was entered and analysed in SPSS version 21. Mean reduction in GAGS score was compared in both groups by using Paired t-test as the data was parametric.

Results

Out of 100 total patients, with 50 patients in each group, only one patient in group A was dropped due to raised triglycerides and transaminases.

The mean age of participants in group A was 19.8 ± 3.09 years and in group B was 19.86 ±3.23 years with mean weight of 59.14 ± 12.35 Kg in group A and 57.54 ± 9.12 Kg in group B. The gender distribution in both groups is shown in figure 1.

The mean GAGS score at the baseline was 29.94 ± 4.42 in group A and 29.84 ± 4.69 in group B. The GAGS score at 01, 02, and 04 months after the treatment with P-values comparison is given in table 1. The overall decrease in the GAGS scores were 17.44 ± 4.07 in group A and 19.09 ± 5.02 in group B with the P value of 0.006, table 1.

Most frequent side effects were dry skin and dry lips, reported by more patients in group B compared to group A, table II.

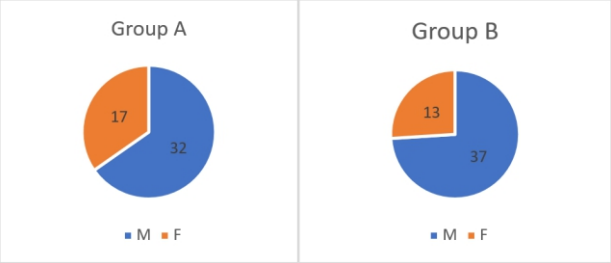

Fig:1 Gender Distribution in Both Groups

Table I: Global Acne Grading System Score (GAGS score)

Mean GAGS Score (Mean ± SD)	Group A (Intermittent Regime) (n=49)	Group B (Daily Regime) (n=50)	P Value
Baseline	29.94 ± 4.42	29.84 ± 4.69	0.328
01 month	24.37 ± 4.95	24.92 ± 4.91	0.578
02 months	19.37±4.38	18.96 ± 4.79	0.660
04 months	12.5 ± 3.07	10.84 ± 3.70	0.032
Overall reduction in GAGS Score (GAGS scores at base line – GAGS scores after 04 months)	**17.44 ± 4.07**	**19.09 ± 5.02**	**0.006**

Table II: Side Effects of Treatment

Side Effects		Group A (Intermittent Regime)		Group B (Daily Regime)	
		N	%	n	%
Dry Lips		3	6.12	20	20.0
Dry Skin		13	26.53	18	36.0
Triglycerides		1	2.04	0	0.0
Liver Enzymes		1	2.04	0	0.0
Others	Body aches	0	0.0	1	2.0
	Itching on face	0	0.0	2	4.0
	Scaling on face	0	0.0	1	2.0

Discussion

In this study, intermittent Isotretinoin regimen was found more effective with few & less severe side effects. At 04-month, acne severity was decreased, as measured by GAGS score, from 29.94 $\pm$ 4.42 to 17.44 $\pm$ 4.07 in intermittent Isotretinoin regimen group compared to daily Isotretinoin regimen group where GAGS score decreased from 29.84 $\pm$ 4.69 to 19.09 $\pm$ 5.02. This difference was significant with P-value of 0.006.

The concept of oral intermittent isotretinoin treatment is not new.[12] The comparative trials are lacking, except for few comparative studies there are mostly single group trials. Goulden et al. used the intermittent regimen in patients with moderately severe acne in 1997.[13] The efficacy of oral intermittent Isotretinoin therapy was later confirmed by Kaymak et al. in 2006. The study included all three categories of mild, moderate & severe acne patients. The results were promising in all the patients but a comparative group was missing.[14]

In another randomized controlled trial, conducted by Lee et al., in 2011, the conventional therapy of isotretinoin was compared with low doses continuous & intermittent therapy. A total of 60 patients were divided into 3 groups; in group A, the isotretinoin daily dose was 0.5–0.7 mg/kg/day, in group B the daily dose was 0.25–0.4 mg/kg/day, and the group C took the intermittent regimen at the dose of 0.5–0.7 mg/kg/day for 7 days followed by a 3-weeks break in every month. The treatment continued for a period of 6 months. The GAGS score was calculated in all the groups before and 6 months after the completion of treatment. The results suggested the better efficacy of low dose Isotretinoin in both continuous & intermittent regimens over the high dose therapy.[15] The sample size was less as compared to our study, but the outcome was comparable to our results regarding better efficacy of intermittent low dose therapy over conventional treatment regimen.

In a study conducted by Faghihi G et al., low-dose isotretinoin was compared with standard dose in 60 patients with moderately severe acne. There were two treatment groups, one received the regular dose of isotretinoin (0.5 mg/kg/day) and the other received low-dose isotretinoin (0.25 mg/kg/day), for a period of 06 months. The results were noted at 6 months and at 12 months after the completion of treatment. The improvement in acne score was more in low dose group and the most frequent side effects like xerosis cutis & loss of hair were 17% in the low-dose group vs 33.2% in the conventional dose group. The results are similar to our study in terms of outcome & lower incidence of side effects in the low-dose isotretinoin group.[16] The difference was of continuous vs intermittent dosing schedules, but the common thing was effectiveness of low dose either given as a continuous dose or as intermittent dosing schedule. The opposite findings were noted in a study conducted in India.[17] It was a comparative trial on a sample of 100 patients, with 50 in each group A & B. Group A was given isotretinoin at a low dose of 20 mg once daily for 4 months while group B was given the same dose but in intermittent regimen, once daily for 1 week out of every 4 weeks. The outcome was improvement in the global acne grading system (GAGS) score at 6 months in both groups. The study suggested that low-dose continuous treatment is most suitable for patients with moderate to severe acne vulgaris. The difference in the findings may be due to the reason that we calculated the dose according to the weight of patients in both groups which seems more appropriate & logical, while Sethi et al. used a fixed dose of 20 mg /day irrespective of the weights of the patients in both groups.

Mandekou-Lefaki et al., in 2003, conducted a comparative study on patients with different severity

of acne, using conventional therapy @ 0.5–1.0 mg/kg/day in one group & a low dose regimen @ 0.15–0.40 mg/kg/day in the other group, up to cumulative dosage of 120 mg/kg. There were total of 64 patients divided into 2 groups. The low doses were effective in terms of clinical improvement, safety profile & better effect on scars. The conventional therapy was having added advantage of less recurrences.[18] Although it was given in continuous regimen but here again the low dose was equally effective as compared to the conventional dose.

In another multicentre study by Akman et al, 66 patients with moderate to severe acne were enrolled into 03 treatment groups, two groups with intermittent unconventional dose in different regimen and one group with conventional dose for 06 months.[19]The group 1 received Isotretinoin for the first 10 days of each month, group 2 received each day in the first month, afterwards the first 10 days of each month for 5 months and for group 3 it was daily dose for 6 months. The dosage was 0.5 mg/kg/day in all groups. The follow-up was done for 12 months. There were statistically no significant differences in the outcome among all the treatment groups in patients with moderate acne, except for the significant difference in patients with severe acne, between group 1 and group 3. The conclusion was same as our study, intermittent isotretinoin treatment is an effective alternative in the management of moderate acne with a lower incidence of side effects.

In another study with patients of moderately severe acne vulgaris, a fixed daily dose of 20 mg of isotretinoin was given to half of the patients while the remaining half were treated with the alternate dose regimen for 24 weeks. Both the regimens were well tolerated by the patients but the alternate day regimen was more effective in treatment of moderate acne.[20]

There are many studies in favor of low dose intermittent Isotretinoin as an effective treatment for moderate acne vulgaris, and the results of our study are also consistent with efficacy of intermittent, low dose regimen with few & less severe side effects.

Conclusion

The oral intermittent Isotretinoin therapy is more effective as compared to continuous daily Isotretinoin therapy in patients with moderate to severe acne vulgaris.

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CONFLICT OF INTEREST

Authors declared no conflicts of Interest.

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DATA SHARING STATMENT

The data that support the findings of this study are available from the corresponding author upon request.

ORIGINAL ARTICLE

Effect of Intravenous Fluid Therapy on Postoperative Vomiting in Children Undergoing Tonsillectomy

Qudsia Rasool[1], Ayesha Nazir[2], Fizza Batool[3], Jawad Zahir[4], Anum Malik[5], Tabassum Aziz[6]

ABSTRACT

Objective: To compare the efficacy of 30ml/kg/hr Ringer's lactate with 10ml/kg/hr to prevent postoperative vomiting (POV) in children undergoing tonsillectomy in general anesthesia.

Study Design: A Randomized Control trial.

Place and Duration of Study: The study was conducted for a period of 06 months from 15th May 2017 to 16th November 2017 at Holy Family Hospital, Rawalpindi.

Materials and Methods: This study was conducted in the Department of Anesthesia at Holy Family Hospital after approving it from the hospital ethical board. Informed consent (written) was taken from 130 patients. Included patients were between 6 -12 years of age and belonged to American Society of Anesthesia Physical status (ASA class) I or II. They were divided randomly into 2 equal groups by using computer generated numbers. Group A got 10 ml/kg Ringer's lactate and Group B got 30 ml/kg Ringer's lactate as perioperative fluid from the time of induction till the surgery ended. Postoperative vomiting (POV) was recorded at 0, 4 , 8 , 12, 16 , 20 and 24 hours of surgery. Therapy was found to be effective if no episode of Postoperative vomiting was observed in 24 hours. Data was analyzed using SPSS 17.

Results: 30 ml/kg Ringer's lactate was found effective in preventing postoperative vomiting in 69% cases and 10 ml/kg Ringer's lactate prevented it in 15% cases. Post operative vomiting occurred in 85% cases in Group A in comparison with 31% cases in B Group. The difference between two groups was statistically significant (P<0.05).

Conclusion: Super hydration with 30 ml/kg Ringer's lactate is an effective way to reduce the frequency of POV in children undergoing tonsillectomy in general anaesthesia.

Key Words: *General Anesthesia, Nausea, Postoperative Vomiting, Super Hydration, Tonsillectomy.*

Introduction

Postoperative vomiting (POV) is one of the major concerns for patients undergoing general anesthesia (GA). [1,2] Incidence of POV is 30% in patients having surgeries in GA and may rise to 80% in high risk patients.[2,3] POV is the ejection of stomach contents through the mouth in the postoperative period. Risk factors for POV may include GA, female sex, use of intra-operative opioids [4], history of POV, duration of anesthesia and surgery, type of surgery (upper airway surgeries, abdominal or pelvic surgeries, breast surgery), smoking (decreased risk of POV with the use of tobacco) and age < 40 years.[5,6]

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Tonsillectomy is one of the most common surgeries done in children across the world.[7] The POV incidence is up to 73% without any antiemetic medications (prophylactic) in children undergoing tonsillectomy.[8] POV may result in increased rate of aspiration, patient dissatisfaction, delayed discharge and unanticipated hospital admission.[9,10,11]

Prevention of POV is very important for improvement of patient satisfaction and to enhance medical outcome. Nowadays, in the era of ambulatory surgery, it is necessary to prevent POV to speed up recovery.[12] There are various strategies used to decrease the incidence of POV in patients undergoing GA. Local anesthetic infiltration in addition to NSAIDS and paracetamol could serve as multimodal analgesia and thus decrease the incidence of POV attributed to postoperative pain. Pharmacological antiemetic includes benzamides (e.g metoclopramide), phenothiazines(e.g perphenazine), antihistamines(e.g dimenhydrinate), midazolam, steroids(e.g dexamethasone) and serotonin receptors antagonists (e.g ondansetron).[8]

Pharmacological prophylaxis for POV might not be cost effective and may also result in various side effects like agitation, bradycardia, dizziness, sedation, and extra pyramidal symptoms etc.[13]

Intravenous fluid therapy has shown a major role in decreasing the incidence of POV.[14] Lactated Ringer's solution is a crystalloid used in routine as per-operative fluid. A study conducted by Elgueta and colleagues have shown a decrease in POV using 30ml/kg as compared to 10ml/kg from 82% to 62% (relative reduction of 24%, P=0.026).[13]

Studies on decreasing the incidence of POV in the pediatric population scheduled for tonsillectomy using super-hydration (30ml/kg/hr) have been conducted internationally but no such study has been done in Pakistan yet. Aim of this study was to observe the antiemetic effect of super-hydration on prevention of POV in children undergoing surgical removal of tonsils (tonsillectomy), so that a cost-effective antiemetic strategy could be established and implemented in resource-stricken countries such as ours.

Materials and Methods

This RCT was conducted in the operation theatres of Holy Family Hospital, from 15-05-2017 to 16-11-2017. Sample size of 65 was calculated in each group with the help of WHO Sample Size calculator with the level of significance set at 5%. The patents included were children between the ages of 6-12 years belonging to either ASA class I/ II undergoing planned surgery (Tonsillectomy with or without adenoidectomy). Whereas patients with co-morbidities such as diabetes mellitus, obesity (BMI > 95th percentile for age and sex), mental retardation, Known GERD and those with history of antiemetic intake within 24 hours before surgery were not included.

After getting approval of the ethical committee of the hospital, an informed consent was received from all the parents, 130 patients were selected based on the above-mentioned criteria. All patients underwent preoperative evaluation by an anaesthetist before surgery. Patients were instructed to observe fasting according to the ASA guidelines. They were then randomly sorted into two equal groups by the computerized system.

Group A received 10ml/kg/hr Ringer's lactate during surgery.

Group B received 30ml/kg/hr Ringer's lactate during surgery.

No premedication was given. On reaching the operation theatre, standard ASA monitors such as pulse oximeter, ECG leads, and NIBP cuff were applied. General Anesthesia induction was done with sevoflurane at 4MAC in oxygen 100% as carrier gas at fresh gas flow rate of 6 L/min via a facemask.

After gaining an intravenous access, Atracurium 0.5 mg/kg and Nalbuphine 0.2 mg/kg were given intravenously. Tracheal intubation was done 3 minutes after giving muscle relaxant and maintenance of anesthesia was done with sevoflurane at 1 MAC with FiO2 set at 0.5%. Interventional therapy was started after induction. Patients as well as the anesthesiologists were blinded to the group assignment. Ringer's lactate was continuously given with the help of a pump with screen and solution bag hidden with a cover for maintaining blinding. On completion of surgery, all inhalational agents were turned off and FiO2 turned to 1. Reversal agent Neostigmine and glycopyrrolate 0.05 mg/kg and 0.001 mg/kg respectively, were given upon return of some degree of airway reflexes. Patient was extubated when criteria of tidal volume was fulfilled. After tracheal extubation, Ringer's lactate was stopped. When patients were sufficiently awake to maintain the airway without needing any assistance, they were shifted to the post-anaesthesia care unit (PACU). One parent was allowed to stay in PACU. In PACU patients were observed by a post graduate trainee, who was blinded to group allocation, for any episode of vomiting in post-operative period every four hours up till 24 hours. The episode of vomiting was recorded in the proforma specifically designed for the study. The frequency was recorded as 0 in case of no POV in 24hours, as 1 if one episode of POV occurred in 24hours and 2 if more than 1 episode of POV occurred in 24hours. The time span of hospital stay was also noted.

In PACU no additional I.V. fluid was given and the patient was allowed to drink liquid after 3-4 hours. If severe vomiting occurred, it was treated with first line drug Ondansetron 0.15mg/kg I.V. If vomiting persisted, a 2nd rescue antiemetic diphenhydramine 0.015mg/kg I.V. was administered. Patient was discharged a day after surgery. Data collection was

done on a structured proforma and SPSS (version 17) was used for the analysis. Mean with S.D was calculated for quantitative variables such as weight, height, and age in both study groups. Frequency & percentages were presented for qualitative variables such as gender and effectiveness of both groups. The Chi-square test was used to compare the proportion of vomiting between the two groups. A *P*-value of less than 0.05 was regarded to be statistically significant. Effect modifiers such as age and gender were controlled with stratification and following stratification chi square test was also applied.

Results

In this study an aggregate of 130 patients were enrolled and divided into 2 equal groups of 65 each, randomly with the help of computer-generated numbers. There was no notable contrast among the two groups in terms of mean age, weight, height, BMI, and gender distribution as shown in **[Tables I and II]**.

Fluid therapy with 30ml/kg/hr i.e the superhydration group or Group B was effective 69% in preventing POV whereas fluid therapy with 10ml/kg/hr i.e Group A was found to be only 15% effective. After application of the Chi square test, with a P value of less than 0.05 regarded as significant, the difference between the two groups was statistically significant as shown in **[Table III]**. POV occurred in 85% patients in A group as compared to 31% in Group B.

The data was again analyzed post-stratification for age and gender and the difference in frequency of POV was found to be statistically significant between the two groups **[Tables IV and V]**. Therefore, the data strongly indicates super-hydration to be an effective remedy against POV in young children.

Table I: Comparison of Age, Weight, Height and BMI between the Two Groups (n= 130)

Variable	Study Groups	Mean	Std. Deviation
Age/year	Group A	8.92 ±.02	1.99
	Group B	9.12 ±.11	1.89
Weight	Group A	35.65 ±.21	7.37
	Group B	36.43 ±.28	7.08
Height	Group A	130.48 ±.20	10.54
	Group B	131.37 ±.06	9.99
BMI	Group A	20.67 ±.49	1.64
	Group B	20.85 ±.79	1.47

Table II: Comparison of Gender Distribution between the Two Groups

Gender	Group A (n=65)		Group B (n= 65)	
	No. of Subjects	%Age	No. of Subjects	%Age
Male	39	60.00	28	43.08
Female	26	40.00	37	56.92
Total	65	100	65	100

Table III: Comparison of Frequency of POV between the Two Groups (n= 130)

Group	Frequency of POV* (%)			Total	P-Value
	0	1	2		
A	10 (15)	42 (65)	13 (20)	65	<0.01
B	45 (69)	19 (29)	1 (1)	65	
Total	55 (42)	61 (47)	14 (11)	130	

Frequency of POV*

0= no POV in 24 hours

1= 1 episode in 24 hours

2=>1 episode in 24hours

Table IV: Comparison of Frequency POV between the Two Groups; Stratified According to Age (n= 130)

Age	Group	Frequency of POV (%)			Total	P-Value
		0	1	2		
6-9 Years	**A**	8 (22)	22 (59)	7 (19)	37	<0.01
	B	24 (70)	10 (30)	0 (0)	34	
	Total	32 (45)	32 (45)	7 (10)	71	
10-12 Years	**A**	2 (7)	20 (71)	6 (22)	28	<0.01
	B	21 (68)	9 (29)	1 (3)	31	
	Total	23 (39)	29 (49)	7 (14)	59	

p value < 0.05 is significant

Discussion

Tonsillectomy is one of the commonest procedures in the paediatric age group[15] that is done under general Anesthesia[13]. POV is the most frequent complication occurring post operatively,[16] which not only is troublesome for patients but may result in longer hospital stay. The average frequency of POV is about 40% or higher in children aged three years and above [21.]

In our study, we observed a substantial reduction in POV with superhydration, 31% of the patients

Table V: Comparison of Frequency of POV between the Two Groups; Stratified According to Gender (n=130)

Gender	Group	Frequency of POV (%)			Total	P-Value
		0	1	2		
Female	A	6 (23)	16 (62)	4 (15)	26	<0.01
	B	27 (73)	10 (27)	0 (0)	37	
	Total	33 (52)	26 (41)	4 (6)	63	
Male	A	4 (10)	26 (67)	9 (23)	39	<0.01
	B	18 (64)	9 (32)	1 (3)	28	
	Total	22 (33)	35 (52)	10 (15)	67	

hThe jjp-value < 0.05 is significant*

experienced no episode of POV in the first 24 hours by use of 30ml/kg perioperative fluids as compared to 85% in the group with 10 ml/kg perioperative fluids. The use of antiemetic for treatment of POV was also much less in group with superhydration, 64% of the patients in the group with 10ml/kg perioperative fluid experienced one episode of POV and had to be given rescue antiemetics while 29% of the patients in the superhydration group experienced 1 episode of POV and required rescue antiemetics, similarly 20% of the patients in the group with 10ml/kg perioperative fluid experienced more than one episode of POV while only 1% of the patients in the superhydration group experienced more than 1 episode of POV. Similar results were generated after stratification for age, gender and BMI, thus the superiority of superhydration as antiemetic therapy was repeatedly established.

The reason behind the antiemetic effect of fluid therapy is not clear yet but it is hypothesized that supplemental intraoperative fluids reduce any preexisting deficit of intravascular volume due to compulsory fasting prior to surgery, so by maintaining fluid balance, it helps prevent vasoconstriction of the splanchnic vessels and possible mesenteric ischemia resulting in suppression of serotonin production -a strong mediator of both nausea and vomiting [17,18,21..]

Another mechanism through mediation by antidiuretic hormone (ADH) has also been suggested[21]. Anesthesia drugs bring about vasodilation resulting in hypovolemia (relative). The decreased negative feedback of stretch receptors located in the right atrium causes an increase in the levels of ADH which then results in higher frequency of POV.[21]

Superhydration not only serves a purpose to replenish the depleted stores of body water but also helps in keeping the body tissues well hydrated in the postoperative period. As they say, 'a dry throat is a sore throat'. The doctrine of Superhydration dictates that an adequate number of fluids is required to keep the saliva flowing. This makes swallowing easier and washes the throat and reduces the risk of infection and bleeding. For this purpose, it is mandatory to encourage oral intake of fluids as soon as the child is able to take oral feeds. This is only possible if there is minimal to none vomiting in the postoperative period.

In an earlier study, Elgueta et al. found a decrease of 82% to 62% in POV (p=0.02) in children receiving superhydration[13] as compared to children with restricted fluid undergoing tonsillectomy.

In another study, Magner et al[17] observed decreased incidence of POV in the group receiving 30ml/kg fluid as compared to the group receiving 10ml/kg (8.6% vs 25.7% P=0.01) in patients undergoing gynecological laparoscopic surgeries. They also observed a substantial fall in incidence of severe nausea in the group with 30ml/kg. Antiemetic use was alsoa decreased.

Schuster et al[18] also found decrease in frequency in POV by larger intra operative fluids used in adult patients undergoing laparoscopic gastric bypass surgeries. Goodarzi et al[19] also found intraoperative superhydration effective in reducing POV (in children undergoing strabismus surgeries). There was a reduction from 54% to 22% (P0.001) in the superhydration group. However, Dagher et al [20] observed no difference in reduction of PONV using 30 ml/kg or 10 ml/kg perioperative fluids in patients undergoing thyroidectomy.

Recently Ashok et al[21] found use of intra operative liberal fluid therapy to be effective in reduction of POV in children undergoing abdominal (lower) surgeries.[21] The incidence was markedly low in liberal group patients in comparison to the restricted group; 45.8% vs 27.4% (P=0.021).[21] The parents of liberal group were more satisfied in comparison to the restricted group (P=0.04).[21]

Some limitations of our study are worth mentioning. We did not use any prophylactic antiemetic for these patients. Tonsillectomies and other otolaryngological surgeries have a higher incidence of POV, so relying alone on fluid therapy might have led to somewhat increased incidence of POV as opposed to the incidence with the use of combination of prophylactic antiemetic and superhydration. However, these patients` parents agreed to this study protocol and had no objections. These patients were monitored for 24 hours and any episode of POV was treated as soon as possible. Based on our results, however, we consider that for this type of surgery, super-hydration on its own is not sufficient as the only antiemetic prophylactic strategy. Our last limitation is that we did not administer steroids which has a proven analgesic and antiemetic effect.

Considering fluid therapy as an antiemetic routine in combination with other strategies in future will be quite helpful especially in our settings where cost effectiveness matters a great deal. Also, it will lead to decreased use of other pharmacological agents and will help to avoid their side effects as well. This will also increase the level of satisfaction of patients and will help to decrease duration of hospital stay.

Conclusion

Super hydration with 30 ml/kg Ringer's lactate is an effective way to reduce the frequency of POV in children undergoing tonsillectomy in general anesthesia.

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CONFLICT OF INTEREST

Authors declared no conflicts of Interest.

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DATA SHARING STATMENT

The data that support the findings of this study are available from the corresponding author upon request.

ORIGINAL ARTICLE

Transverse Purse String Suture for Placenta Previa in the Presence of Previous Cesarean Section, Experience in Northern Borders Saudi Arabia

Ayman Khalil Othman Al-Tarifi, Nafees Akhtar

ABSTRACT

Objective: To evaluate the effectiveness of lower uterine segment transverse purse string suture in patients with placenta previa and previous cesarean section to preserve uterus.

Study Design: We conducted a descriptive cross-sectional study.

Place and Duration of Study: Maternal and Children Hospital, Arar in Northern Borders Saudi Arabia from 2016 to 2020.

Materials and Methods: We included patients with previous cesarean section and complete placenta previa where we had applied transverse purse string suture in the lower uterine segment to control hemorrhage after the failure of preliminary measures of uterotonics' usage and figure of eight sutures at the site of placental bed.

Results: Lower uterine segment purse string suture was applied in 40 patients during cesarean section after failure of preliminary measures, among them 13 patients were found to have placenta accreta spectrum including one with placenta percreta. In 37(92.5%) patients including all patients with placenta accreta spectrum except one patient with placenta percreta, hemorrhage was successfully secured, and the uterus was preserved. In three patients (7.5%) including one patient with placenta percreta, lower uterine segment transverse purse string suture failed to control hemorrhage and hysterectomy was performed.

Conclusion: Lower uterine segment transverse purse string suture is an effective intervention in controlling hemorrhage to preserve uterus in patients with placenta previa and previous cesarean section.

Key Words: *Complete Placenta Previa, Purse String Suture, Cesarean Section, Hysterectomy, Placenta Accrete.*

Introduction

Pregnant women with placenta previa and previous cesarean section denote a very high-risk group of obstetric patients for major postpartum hemorrhage and peripartum hysterectomy. In women with scarred uterus the normal placental migration fails to occur, and the differential growth of uterine areas is hindered, contributing to high incidence of placenta previa in such cases.[1-2] Moreover, it has been postulated that in a scarred uterus morbidly adherent or invasive placenta mainly results from deficiency of decidua basalis due to damage to endometrium. This secondary defect at the endometrium-myometrium interface enhances trophoblastic invasion in the area of a uterine scar. The incidence of adherent or invasive placenta in such cases ranges from 24% to 67%. With each increasing scar on the uterus, the risk of placenta previa as well as the risk of morbidly adherent or invasive placenta increases.[1,3-5]

Invasive placenta needs histopathology for its definitive diagnosis and actually this is a spectrum disorder that includes a range of abnormally adherent to deeply invasive placenta. The condition also varies in its extent, and it can be total, partial or focal. In fact, the severity of complications of this spectrum is directly proportional to the depth of placental invasion. Depending on the degree of invasiveness it can be morbidly adherent only when it invades decidua basalis and the villi adhere superficially to the myometrium, placenta increta when it penetrates into the myometrium or placenta percreta when it penetrates through myometrium to serosa where it can also invade the adjacent pelvic organs mostly the bladder.[6-7,11]

With the rising rates of cesarean section, assisted reproductive techniques and increasing maternal age, the incidence of placenta previa and placenta accrete spectrum will continue to increase in the

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future.[8,9] The appropriate management of these cases imposes a major challenge to experts in obstetric care. Obstetricians managing such cases should be well aware of all the modalities for controlling intraoperative and post-operative hemorrhage including timely decision for hysterectomy in cases of life-threatening uncontrolled hemorrhage.

Traditional methods to control excessive intraoperative hemorrhage at cesarean include pelvic devascularization, balloon temponade and different types of compression sutures like B-lynch, Cho suture or square suture and vertical parallel compression sutures [12-15]. None of such techniques has effectively decreased the rate of peripartum hysterectomy in patients with previous cesarean section and placenta previa particularly placenta accreta [8]. We here present a simple and effective technique of lower uterine segment transverse purse string suture to control intraoperative blood loss in such cases. This suture serves the dual purpose of directly occluding the vessels at the bleeding site as well as enhancing the function of weak myometrial fibers of scarred lower uterine segment by compressing them. The dual function of this suture controls the hemorrhage more efficiently and consequently the uterus can be preserved even in cases of placenta accreta spectrum. Our study evaluated the effectiveness of lower uterine segment transverse purse string suture in patients with placenta previa and previous cesarean section to preserve uterus.

Materials and Methods

In Northern Borders Saudi Arabia, from September 2016 we started applying transverse purse string suture, in those cases of placenta previa where we were unable to control hemorrhage. To see the effectiveness of the technique we conducted a descriptive cross-sectional study at Maternal and Children Hospital, Arar. Arar is the capital city of Northern Borders Saudi Arabia and almost all patients with placenta previa from the other cities of Northern Borders are also referred to Maternal and Children hospital, Arar for management. Ethical approval (H-09-A-51) for the study was taken from the local ethical research committee Northern Borders Health Affairs, Ministry of Heath Saudi Arabia. Data was collected from September 2016 till November 2020. The primary outcome was peripartum hysterectomy. Data were analyzed using simple mathematical computing techniques. Data was collected from medical records of patients by the primary surgeon and his colleague obstetrician. They found forty (40) patients who had undergone this technique. The inclusion criteria were as below:

1. Diagnosed with complete placenta previa antenatally
2. History of previous cesarean section
3. Where we had applied transverse purse string suture to control hemorrhage

Exclusion criteria included:

1. Patients with complete placenta previa without previous cesarean section
2. Patients at less than 32 weeks gestation

Though transvaginal ultrasound is considered preferable for diagnosis of placenta previa but due to its unacceptability by most of our patients in third trimester we diagnosed placenta previa by trans abdominal ultrasound in the presence of full bladder, aided by color Doppler imaging for signs of morbidly adherent placenta. Four major signs looked for placental invasion on ultrasound included: vascular lacunae, loss of normal hypoechoic retroplacental zone, retroplacental myometrial thinness and placental thickness.

Elective cesarean section was planned between 36 weeks and 37 weeks of gestation unless some emergency arose. Before cesarean section patients' hemoglobin level was strictly corrected to a level above 10g/dl. All patients were counseled in detail before surgery about the implications of the diagnosed condition, excessive intraoperative hemorrhage, risk of placenta accreta, need for blood transfusion, need to stay in high dependency area postoperatively, conservative surgical interventions to control hemorrhage as well as the risk of peripartum hysterectomy in case of uncontrolled hemorrhage. Written informed consent for cesarean section and hysterectomy was taken from all patients. Four to six units of blood were cross matched before surgery. The same primary surgeon applied the transverse purse string suture during cesarean in almost all these patients.

At the time of cesarean section abdomen was opened through Pfannenstiel incision at the site of previous scar. Intra-abdominal adhesions especially

adhesions between uterus and bladder, and signs of invasion including vascular engorgement of lower uterine segment were assessed and dealt with carefully [Fig 2]. Before incision on the uterus, bladder was well retracted down away from the uterus using sharp and blunt dissection. All patients received uterotonic drugs after the delivery of baby to control hemorrhage. Oxytocin 5 IU intravenous bolus along with infusion of 20 IU Oxytocin in 500 ml normal saline solution was started routinely in all cases, later on injection Methylergometrine and injection Prostagalndin F2 alpha were also used in cases where uterine atony occurred. Placenta was removed completely by cord traction or in piece meal. If the placental tissue was found adherent at the scar site, the edges of the incision were excised along with the adherent placental tissue. Once the baby and placenta were delivered the uterus was exteriorized. Figure of eight sutures were taken in the placental bed as needed. In cases where hemorrhage could not be controlled with these preliminary measures transverse purse string suture was applied at the lower uterine segment, passing the needle as below as possible above the line of bladder reflection with Vicryl (polyglactin) number 2 mounted on a large 75 mm needle using technique as shown in figures [Fig1 & 3]. The two ends of the suture were held tight with an artery forceps. After closing the uterine incision in two layers the two ends of the purse string suture were pulled and tied together tightly. Vagina was checked for blood loss. After ensuring the effective hemostasis, uterus was interiorized. An intraperitoneal drain was left in pouch of Douglas in all cases. In case of inability to control hemorrhage despite transverse purse string suture, decision of hysterectomy was made by two consultants. The removed placenta and uterus were sent for histopathology.

Intra operatively and postoperatively blood and blood products transfusion were performed according to RCOG guidelines “Postpartum Hemorrhage, Prevention and Management” and “Blood Transfusion in Obstetrics”. Postoperatively patient was kept in high dependency unit until stabilized. Ultrasound abdomen was performed on all patients on next day after surgery to look for any collection. Where the patients remained stable and without any complication urinary catheter was removed on next day of surgery and the drain was removed after 48 hours of surgery once the drain output was less than 100ml in 24 hours. Once stabilized patient was shifted to the post-operative ward. At the time of discharge from hospital, all patients were provided with a phone number at which they could contact in case they develop any complaints like fever, excessive vaginal bleeding or discharge, or wound infection.

On discharge, from hospital each patient was called for follow up in outpatient department (OPD) within a week and then again at an interval of six weeks from the day of surgery.

Results

We applied lower uterine segment transverse purse string suture on 40 patients with complete placenta previa and previous cesarean sections. Among these, 26 patients had simple placenta previa while 13 patients had morbidly adherent or invasive placenta. Among the latter group patients with placenta accreta spectrum other than placenta percreta were analyzed in one group. The main characteristics of the study group are listed in table1. Majority of the patients have higher order cesarean sections with more than 4 cesarean sections.

In three patient's bladder injury occurred due to excessive adhesions and bladder injury was repaired by the urologist. One patient was picked with a large hematoma on ultrasound performed after 24 hours of surgery. Patient was taken to the operation theater and hysterectomy was performed. Second patient, who underwent hysterectomy in our study, had eight previous cesarean sections and uterus was removed due to excessive uncontrolled hemorrhage caused by persistent uterine atony while the third patient who ended up in hysterectomy, had placenta percreta. Among all patients with placenta accreta spectrum except placenta percreta, transverse purse string suture successfully controlled hemorrhage in this study [Table 2].

Most patients (24) had moderate major hemorrhage with blood loss between 1000-2000ml while 16 patients suffered severe major hemorrhage with a blood loss >2000ml. Almost all patients received blood transfusion intra or postoperatively or both. There were two readmissions one with fever due to urinary tract infection and one with wound dehiscence [Table 3]. No lochiometra was identified

on ultrasound performed before discharge from hospital as well as on ultrasound performed on follow-up in OPD.

By using this technique of lower uterine segment transverse purse string suture, overall, we were able to secure hemostasis and preserve uterus in 92.5% of patients with complete placenta previa and previous cesarean sections. Except placenta percreta, we successfully preserved uterus in all patients with placenta accreta using this simple technique.

Table I: Characteristics of Study Group

Characteristic	n (%)
Age 30-35 >35	13 (32.5) 27 (67.7)
Parity 1-4 >4	6 (15) 34 (85)
Number of Previous C.S 1-3 >3	10 (25) 30 (75)
Gestational age 	12 (30) 28 (70)
Type of Placenta previa Simple Placenta previa Placenta accreta spectrum other than percreta Placenta percreta	26 (65) 13 (32.5) 01 (2.5)

Table II: Primary Outcome: Peripartum Hysterectomy

Type of Placenta	Peripartum Hysterectomy n
Simple Placenta previa	02
Placenta accreta spectrum other than Percreta	0
Placenta Percreta	01
Total peripartum hysterectomies n (%)	03 (7.5)

Table III: Secondary Outcome: Complications

Complications	n (%)
Hemorrhage Moderate Major Severe Major	 24 (60) 16 (40)
Bladder Injury	3 (7.5)
Return to operation theater	1 (2.5)
Wound Dehiscence	1 (2.5)
Readmission	2 (5)

Discussion

Our study had found the technique of transverse purse string suture quite effective in controlling hemorrhage in patients with placenta previa in the

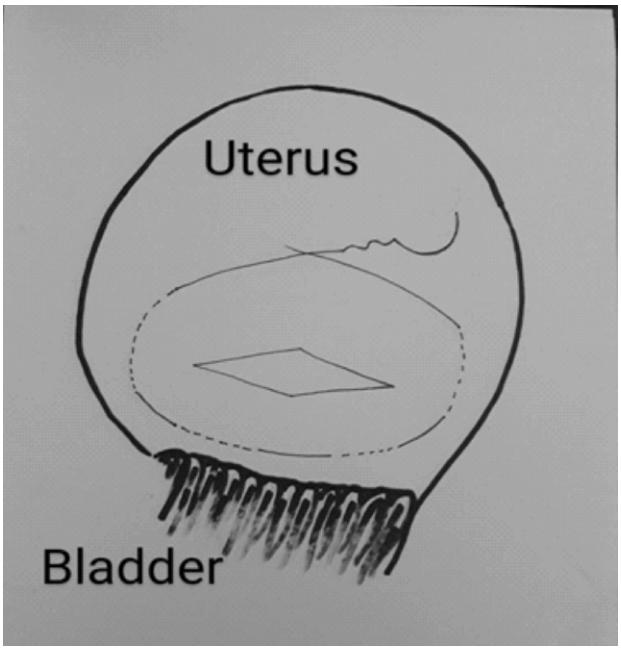

Fig. 1: Lower Uterine Segment Transverse Purse String Suture

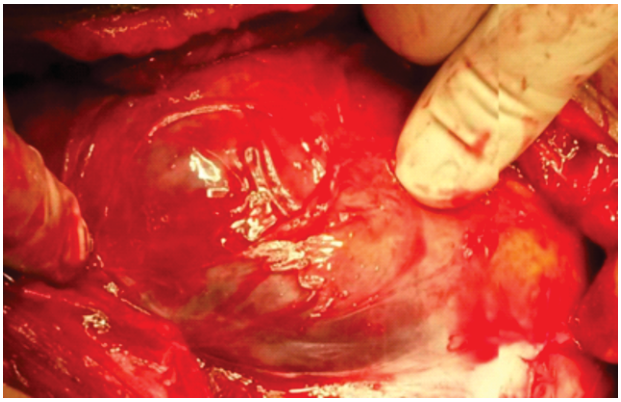

Fig. 2: Showing Bluish Bulge of Invasive Placenta

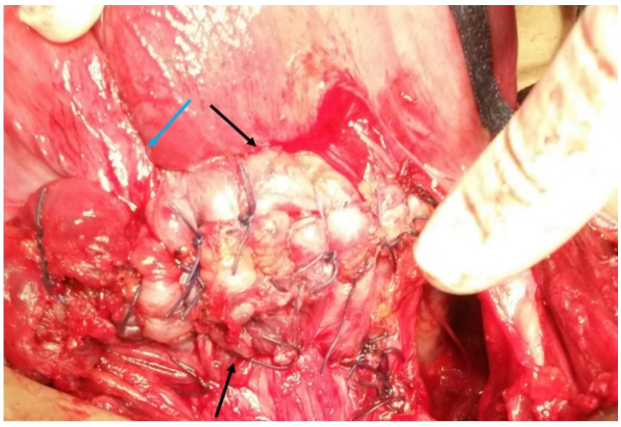

Fig. 3: Black Arrows Showing Line of Transverse Purse String Suture. Blue Arrow Showing Two Ends of Transverse Purse String Suture Tied Together

presence of previous cesarean section. Controlling hemorrhage in this high-risk group is a major challenge for even experienced obstetricians. We had preserved the uterus in 92.5% patients by using our technique in this high-risk group.

The abnormalities of placentation are grave conditions posing a major risk for peripartum hysterectomy, maternal morbidity, and mortality. Peripartum hysterectomy has its inherent risks of surgical complications, inability to conceive in the future, post-traumatic stress disorder in 64% patients and maternal mortality in 2.6% patients. Over the course of time several techniques have been demonstrated to control hemorrhage to preserve uterus in women with placenta previa, including compression sutures, balloon tamponade, pelvic devascularization and uterine artery embolization.[12-15] Our study particularly involved those women with placenta previa who had scarred uterus and it also focused on a subgroup of women with placenta accreta spectrum. Results of our study show that transverse purse string suture can effectively control hemorrhage and preserve uterus in women with complete placenta previa with or without morbid adherence, in the presence of a scarred uterus. We only had one patient with placenta percreta in our study but placenta percreta seems to be an exception, where it is safer to perform hysterectomy earlier to avoid excessive blood loss. Though the number of patients in our study is small only 40, the results seem to be very encouraging to imply this technique in women with placenta previa in the presence of a previously scarred uterus.

Uterine temponade using Bakri balloon, Sengstaken Blackmore tube or Rusch balloon is an easy technique that can be performed by an average on duty obstetrician even in a resource poor setting. The technique is very effective to control postpartum hemorrhage with a success rate reported up to 78% [14]. The efficacy of this procedure yet to be tested in the scenario of complete placenta previa and placenta accreta.

Systematic pelvic devascularization is performed by ligation of uterine artery, infundibulo- pelvic vessels and internal iliac artery. The ligation of bilateral uterine arteries is technically easy, safe and effective to reduce the uterine blood flow. Ligation of infundibulo-pelvic vessels further intends to reduce the uterine blood flow through utero-ovarian anastomosing vessels. Furthermore, ligation of bilateral internal iliac arteries, embraces a success rate of 40-80%, however by this stage the patient may have suffered significant blood loss and coagulopathy. Complexity of this procedure demanding substantial surgical skills and obligation of input from a vascular surgeon are additional hitches to this procedure. This procedure also carries the risk of injury to ureters and internal iliac veins [16,17]. Contrarily, pelvic arterial embolization carries a high median success rate of 89%, but the procedure involves an interventional radiologist and a well-equipped radiology unit. Arterial embolization is also not without risks and patients may develop post-embolization fever, vascular injury, infection, uterine and bladder ischemia.[18-20]

Several compression sutures have been devised to control hemorrhage and preserve uterus including B-Lynch suture, Cho suture or square suture, Hayman suture, vertical compression sutures and transverse compression sutures. Among these, B-Lynch suture mainly intends to control bleeding from uterine atony and the technique is more successful to cause compression of myometrial fibers of upper uterine segment to induce their contractility.[21] Cho suture technique involves placing square sutures to control bleeding from focal bleeding sites, but it may be difficult to apply such a relatively complex sequence of multiple sutures in the scenario of excessive bleeding.[22] Hayman applied a simply modified B-Lynch suture and additionally for placenta previa or accreta he suggested two transverse sutures at the level of isthmus or circular cervico-isthmic suture. This does not allow exploration of the uterine cavity and impairs the drainage of lochia.[23] On the other hand, vertical compression sutures applied for instance in the study by Mohammed and Muhammed in 2017 and later on by Raitu and Crisan in 2018 for placenta previa and accreta, showed excellent results with preservation of uterus in around 98% cases.[24-26] None of these studies involved such higher order cesarean sections as in our study where mean number of previous cesarean sections is 4. Moreover, potentially any compression suture passing through both anterior and posterior uterine walls by close opposition of the two uterine walls carries the risk of uterine syneche, adhesions,

impairment of uterine drainage and infection, ultimately resulting in problems related to menstruation and future conceptions. In our study, as the transverse purse string suture was passed only through the anterior uterine wall below the uterine incision and then tied above the uterine incision, it lacks such potential risks related to menstruation and fertility and the technique proved to be very effective by involving a large area of lower uterine segment both below and above the incision.

Our technique in this study is a modification of B-Lynch transverse compression suture demonstrated by B-Lynch C, et al in their study where they successfully secured hemostasis in cases of placenta previa.[27] In contrast, our study exclusively involved patients with scarred uterus and our technique is simpler, and thereupon can be rapidly performed even by an average on duty surgeon.

Our study has limitations of small sample size and absence of comparison group. We strongly recommend well-designed studies with larger sample size in future to look more closely at the effectiveness of this technique in such patients. We also recommend future studies to evaluate its long-term effects related to future conception and pregnancy outcome.

Conclusion

Despite the sample size being small, our results intimate the effectiveness of transverse purse string suture in a subgroup of patients very high risk for massive maternal hemorrhage who have scarred uterus inhabited with placenta previa and placenta accreta.

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DATA SHARING STATMENT

The data that support the findings of this study are available from the corresponding author upon request.

ORIGINAL ARTICLE

LARC Acceptance, Subdermal Implant Uptake, And Follow-Up Response in Women Seeking Contraceptive Advice

Rakhshanda Neelofar[1], Shama Jogezai[2], Fozia Muhammad Bakhsh[3], Safia Bibi[4], Pari Gul[5]

ABSTRACT

Objectives: To determine the acceptance of Long-Acting Reversible Contraceptives (LARC) and uptake of subdermal implants and follow-up response in women seeking contraceptive advice.

Study Design: Observational case series.

Place and Duration of the Study; Gynecology OPD and family planning center Bolan Medical Complex Hospital Quetta, January 02, 2018, to December 30, 2019.

Materials and Methods: Women found eligible for Long-Acting Reversible Contraceptives, amongst those seeking contraceptive advice, were included in this study after informed consent. The women found eligible were given the choice of Long-acting contraceptives. Women, who opted for Intrauterine Contraceptive Device were referred to the family planning center and those who accepted subdermal implants were sent to gynae minor operation theater after informed consent. Microsoft Excel was used for the analysis of data. Mean and standard deviation was calculated for quantitative data. Frequencies and percentages were calculated for qualitative data.

Results: A total number of 3670 women seeking contraception were advised long-acting reversible contraceptives. Whereas 1423(38.77%) accepted long-acting reversible contraceptives amongst the women who opted for it, 64.23% accepted subdermal implants and 35.76% opted for intrauterine contraceptive devices. Out of 1423 women who accepted long-acting reversible contraceptives, only 25% turned out for follow-up. Discontinuation of long-acting reversible contraceptives was observed in both subdermal groups (8.09%) and intrauterine contraceptive device groups (4.51%) during 1st year of initiation.

Conclusion: Acceptance of long-acting reversible contraceptives (LARC) and uptake of subdermal implants is reasonable among the women seeking contraceptive advice. These contraceptive methods may be offered as first-line contraceptives for most women provided that the cost barrier is eliminated.

Key Words: *Contraception, Family planning, IUCD, LARC, Subdermal Implants.*

Introduction

Rapid population growth remains a major concern in our country. In Pakistan, the annual population growth rate is 1.41% and the fertility rate is 2.55 children born/women.[1] High fertility rate and limited access to contraception are the main causes of rapid population growth. Pakistan's population growth rate has declined from 3% in the late 1980s to the present estimated level of 1.41% per annum but it remains unacceptably high. The prevalence of unintended pregnancies in Pakistan is reported to be between 16-46%.[2] The contraceptive prevalence rate is 34.2% in Pakistan.[1] In different parts of the country use of contraceptives shows uneven progress with high unmet needs for family planning.

Intrauterine contraceptive devices and subdermal implants are the most effective methods of long-acting reversible contraception.[2] The long duration of action of long-acting reversible contraceptives (LARC), (3 to 10 years) makes them highly desirable methods of contraception, as they do not require maintenance, once in place. Recent evidence shows that LARC methods are safe and convenient to use.[3,4,5] These methods are highly effective with a low failure rate and the additional advantage of being cost-effective in the long run.[3,7] The World Health Organization (WHO) estimates that only one unintended pregnancy occurs among every 2000-implant user in the first year of use.[8]

Currently, three LARC methods are available in

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Pakistan i.e., Cu-IUCD, the levonorgestrel intrauterine system, and the etonogestrel implant. FDA has approved the Cu-T380A for up to 10 years, the levonorgestrel intrauterine system for up to 5 years, and the etonogestrel implant for up to 3 years of continuous use. These methods do not contain estrogen and may be used in conditions where estrogen is contra-indicated like in women with uncontrolled hypertension, smokers aged >35 years, women with a personal history of a venous thrombotic event, or a family history of inherited thrombophilia.[9]

Unplanned pregnancy continues to be a major problem in Balochistan due to limited access to family planning services. Long-acting reversible contraceptive methods are less frequently used in Balochistan. By increasing the uptake of long-acting reversible contraceptive methods, the high rate of unintended pregnancies can be reduced. Keeping in view the low contraceptive prevalence rate and high unmet need, much is needed to be done by the state to avoid unintended pregnancies and associated complications. The capital investment in this regard needs to be increased to fill the gap between demand and supply. Data regarding acceptance and uptake of the LARC in Baluchistan was not available in the literature. The objectives of this study were to determine the acceptance of long-acting reversible contraceptives, subdermal implant uptake, and subsequent follow-up response in women seeking contraceptive advice at Bolan Medical Complex Hospital (BMCH) OPD. This study aimed to provide baseline data to the service providers and policymakers to plan appropriate steps to address the problem of rapid population growth. So, research was planned to determine the percentage acceptance of Long-Acting Reversible Contraceptives (LARC) and uptake of subdermal implants and follow-up response in women seeking contraceptive advice.

Materials and Methods

This observational study was carried out at Gynecology OPD of Bolan medical complex hospital Quetta. All women attending gynae OPD and family planning center for contraceptive advice from January 02, 2018, to December 30, 2019, were included. Women with risk factors for LARC were excluded from the study. All possible ethical issues were addressed, and approval was obtained from the Institutional Ethical Review Board prior to the conduction of the study. Informed consent was taken from respondents. Data was collected on the prescribed form by the researchers themselves. Women without any risk factors and genuine candidates for LARC were given the choice of Long-acting contraceptives. They were explained about cost, advantages, and possible risks of LARC. The patients who opted for IUCD were referred to the family planning center and those who accepted subdermal implants were sent to gynae minor OT after informed consent., IUCD was inserted in the family planning center by trained persons using the standard procedure under the supervision of the in-charge chief medical officer. Subdermal implants were inserted in minor gynae OT by consultant gynecologists, senior medical officers, and residents (under supervision) using standard methods. The women were called for follow-up after a month and then at 3 monthly intervals for 12 months to collect data regarding side effects of LARC (menstrual irregularities) and to record their compliance with the chosen method. MS Excel was used for the analysis of data. Mean and standard deviation was calculated for quantitative data. Frequencies and percentages were calculated for qualitative data.

Results

A total number of 3670 women seeking contraception, were advised long-acting reversible contraceptives. As shown in Table-I, LARC was accepted by 1423(38.77%) women and 2247(61.22%) refused it. Amongst the women who opted for LARC, 914(64.23%) accepted subdermal implants and 509(35.76%) opted for IUCD. Out of 1423 women who accepted LARC, 356(25.01%) turned out for follow-up, while 1067(74.98%) lost from follow-up. [Table-I] Discontinuation of LARC was observed in both subdermal groups [74 (8,09%)] and IUCD groups [23(4.51%)] during the 1st year of their initiation.

Discussion

Pakistan has the second-highest fertility rate in South Asia.[13] The contraceptive prevalence rate is low and the unmet need for family planning is very high in Pakistan (20%).[11] A study conducted by ASIF, M.F et al revealed that the use of contraception was lowest in Baluchistan with a contraceptive prevalence rate of 29 %.[12]

Table I: Acceptance, Uptake of Different Methods, Follow Up Response, and Discontinuation of LARC

Acceptance and Uptake of Different LARC Methods			
LARC Accepted	LARC Refused	IUCD Intrauterine Contraceptive Device	Subdermal IMPLANTS
1423 (38.77%)	2247(61.22%)	509(35.76%)	914(64.23%)
Follow up Response and Discontinuation of LARC			
Turned out for follow up	lost from follow up	Intra-Uterine Contraceptive Device (IUCD)	Subdermal Implants
356 (25.01%)	1067(74.98%)	23(4.51%)	74(8.09%)

During the study period, 3670 eligible women were included in the study. After thorough counseling by gynecologists, medical officers, and post-graduate residents, 38.77% of them accepted the LARC for birth spacing. The LARC acceptance was found higher in our study (38.77 %) than previously reported by the National Institute of population study (26%).[13] That reveals a slow rising upward trend in uptake of LARC over 7 years. A study conducted by Adedini et al also reported a slow but upward trend in uptake of LARC as in Malawi, the LARC uptake increased from 0.46% in 2004 to 9.76% in 2016 and in Zimbabwe, from 1.04% in 2006 to 8.51% in 2015.[14]

LARC was refused by 61.22 % of the study group due to fear of complications. The results of our study are comparable with the findings of a study conducted by Sedgh G et. al., who reported fear of side effects as a cause of unmet need in 25% of the Asian population.[15] Regarding subdermal implant uptake, it was found to be 64.23%. To our surprise, most women preferred subdermal implants over IUCD, as 35.76 % of the study population accepted IUCD. A study conducted by Khan et al also revealed that most of the women were reluctant to choose IUCD.[16] Subdermal implants are relatively new methods with fewer myths surrounding them. Jacobstein et al., also reported that an increase in the use of implants has largely improved the uptake of LARC in Africa.[17] Subdermal implants were mostly chosen by young women. The women in the study group were aged between 26-43 years and their parity ranged from para 3-11. The satisfactory uptake of the subdermal implants in this study can be attributed to the free provision of contraceptive commodities by NGOs during the study period. The cost was found to be the major constraint in the uptake of the subdermal implants. We have observed that the women who were initially interested in subdermal implants, knowing the cost of the implant never showed up. By eliminating the cost barrier, the uptake of LARC may be increased. As reported by Guiahi M that after the implementation of the Affordable Care Act (ACA) in America, the upfront cost of LARC is reduced which resulted in a substantial increase in uptake of LARC.[18]

Follow-up response was very poor, as only 25.01% turned out for follow up and 74.98 % were lost from follow-up. Due to poor follow-up response, the continuation rate could not be assessed but it may be assumed satisfactory from the fact that the women, who turned up for follow-up were having menstrual irregularities. The LARC discontinuation rate recorded during the study period was 8,09% in the subdermal implant group and 4.5% in the IUCD group. The results of our study are comparable with the results of a study conducted by Lendvay et al., who reported a 10% discontinuation rate among subdermal implant users[19] while the discontinuation rate among IUCD users reported in our study is lower than the rates recorded by another study conducted by Azmat SK et al. (4.5% vs 16.3%).[20]

The limitation of our study is that the women's satisfaction and continuation rate could not be assessed due to poor follow-up response, which may be due to lack of adaptation of a convenient and efficient mechanism for follow-up.

The health sector in Pakistan is facing many challenges due to a lack of effective planning and inadequate performance. The results of our study will provide information to the policymakers in decision-making regarding the provision of contraceptive services in our province. Keeping in view the poverty and poor access of women to health facilities, the provision of free commodities may further increase the uptake of highly effective LARC and decrease the number of unplanned pregnancies. High maternal mortality in our country especially in Baluchistan is mostly due to unintended pregnancies in women of high parity, in addition to lack of well-equipped health care facilities. Efforts are needed to improve women's access to contraceptives. There seems to be a dire need to train the health care providers and to reduce the upfront cost of the LARC. The capital investment in this regard needs to be increased and concrete actions must be taken to

control the population explosion. It will be beneficial to find out the trends and determinants of uptake of LARC in Baluchistan in the future.

Conclusion

Acceptance of long-acting reversible contraceptives (LARC) and uptake of subdermal implants is reasonable among the women seeking contraceptive advice. These contraceptive methods may be offered as first-line contraceptives for most women provided that the cost barrier is eliminated.

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The data that support the findings of this study are available from the corresponding author upon request.

ORIGINAL ARTICLE

Parent's Perception and Attitudes Towards Brushing Their Children's Teeth

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ABSTRACT

Objective: This study was aimed to assess parental perception and attitudes regarding dietary and oral hygiene habits of their children.

Study Design: Questionnaire Based Survey

Place and Duration of Study: Parents of children who visited a tertiary care dental hospital in Peshawar over a period of 1 year (July 2019 to June 2020) were encompassed in this study.

Materials and Methods: Parents of 352 children aged 1-6 years visiting a tertiary care hospital were asked to fill a questionnaire with Ajzen's Theory of Planned Behavior consisting of standard questions about intention, attitude, subjective norms, perceived behavioral control, indulgence, maternal oral health behavior and dietary habits and scored on Likert's Scale.

Results: Out of 352 interviewed, parents showed average attitudes, subjective norms, and perceived behavioral control (PCB) with mean scores of 4.61, 5.54,7.89 respectively.72.44% of the study sample confirmed weak intentions towards brushing their child's teeth. General multivariate regression model analysis revealed a significant correlation of attitudes, subjective norms, and PCB towards intention. However, strong intenders showed weak indulgence (mean 5.05). 87% of the parents were not accustomed with the fact that nighttime breastfeeding can cause caries.

Conclusion: Parents showed weak perception and intentions towards brushing their children's teeth twice daily which might endure a negative impact on their child's oral health and should be addressed while designing policies concerning oral health.

Key Words: *Caries, Intention, Indulgence, Perception, Subjective norms.*

Introduction

Early childhood caries (ECC) is a multifactorial disease in primary teeth of children aged 6 years or less presenting with any caries, cavitated or filled tooth surface in one or many teeth[1]. Conferring to various theoretical models at multilevel, the burden of ECC is multifactorial in origin and involves influences at individual, family and community levels and provides empirical evidence of social, cultural, ethnic, parental attitudes and knowledge of perceptions serving as major contributing factors towards the origin of this disease[2,3,4]. In general ECC is more prevalent in children with lower socioeconomic status in developed countries[5,6]. However, the reverse was reported in Pakistan[6]. Being multifactorial, ECC for instance is influenced by a variety of parental factors including parental own oral hygiene habits, parental distress, dysfunctional parental behaviors and especially an association between maternal and toddler's tooth brushing habits is reported[7,8]. A study reported that parental own oral heath related knowledge, attitudes and being proactive towards dental treatment of their children had a greater impact on caries score of the children then their own behaviors[9].

Theory of Planned behavior (TPB) has successfully explained a wide divergence in several health-related behaviors including behaviors related to oral hygiene care[10]. According to TBP, the very intention to perform a behavior is the actual predecessor of performing that very behavior for instance, tooth brushing. This intention to brush is then influenced by their attitudes toward brushing, subjective norms about brushing and perceived behavioral control

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towards tooth brushing.[11]

This study focuses on the objective of assessment of perception and attitude in the direction of brushing their children's teeth among parents visiting a tertiary care hospital in Peshawar.

Materials and Methods

This baseline survey constituted parents of 352 children, aged 1-6 years who attended a tertiary care hospital in Peshawar over a period of 1 year (July 2019 to June 2020). Patients above 6 years were excluded from the study. Sample size was calculated using G-Power with effect size of 0.03 and α-error of 0.05 using convenience sampling technique. Ethical ratification was obtained from the Ethical committee of Rehman College of dentistry (Ref. No. 19-11-032). Parents of the children attending Paediatric dentistry were briefed about the purpose of the study and an informed consent was taken from all who volunteered for participation.

A questionnaire was designed after a few revisions in an already validated interview in accordance to our study population[9]. All the questions were in accordance with the components of Ajzen's Theory of Planned Behavior highlighting their intention, attitude, subjective norms, perceived behavioral control, indulgence, maternal oral health behavior and dietary habits. Each component consisted of standard questions marked on Likert's scale from 1-5, with 1 highlighting a strong and highest number and 2-5 scores labelled as weak intentions.

Data analysis was done using SPSS version 22. To tabulate means, standard deviation and percentages of all the continuous variables, descriptive statistics were performed. Eta square was used to highlight the amount of dispersion and associations. Independent sample t test for parametric analysis and significance level was set at $P \leq 0.001$. 95% confidence interval was used for estimating a proposed range of values.

Results

Out of 352 parents who responded, about 46% believed that children are prone to caries and the majority of parents (91%) agreed to the fact that high intake of sugar can cause caries, while 60% highlighted fizzy drinks as one source of caries. Surprisingly, about 87% didn't know that caries can be caused by breastfeeding at night. Ambivalence was recorded regarding the idea of introducing sugary food to their children at meals time or between meals. Majority of the parents (69%) assumed that tooth brushing is only necessary after the eruption of all teeth in the mouth and in contrast to a minority of only 11% who considered tooth brushing important soon after the eruption of the first tooth in the mouth. While notably a high percentage (81.8%) was cognizant of useful effects of fluoride in the toothpaste as shown in Table I.

Table I: Frequency Distribution of Parent's Oral Hygiene Knowledge

	Yes n (%)	No/Don't Know n (%)
Are children more prone to caries?	163(46.3)	189(53.7)
Are caries caused by regular intake of sugar?	321(91.2)	31(8.8)
Do fizzy drinks cause caries?	214(60.8)	138(39.2)
Are caries caused by breastfeeding at night?	46(13.1)	306(86.9)
Should sugary food be taken along meals?	54(15.3)	298(84.7)
Should sugary food be taken between meals?	103(29.3)	249(70.7)
Is tooth brushing necessary after the eruption of the first tooth in mouth?	40(11.4)	312(88.6)
Is tooth brushing necessary after eruption of all teeth in mouth?	243(69)	109(31)
Are caries prevented by tooth brushing?	306(86.9)	46(13.1)
Are caries caused by fluoride?	64(18.2)	288(81.8)

Parents showed favorable attitudes (mean 4.61) and subjective norms for child's brushing (mean 5.54) and a strong perceived behavioral control for tooth brushing (mean 7.89). Parental indulgence for brushing showed an average mean of 5.05. While a mean of 12.03 for frequent maternal oral hygiene performance. 72.44% of the study sample confirmed weak intentions towards tooth brushing of their children's teeth as shown in Table II.

Table II: Range, Means and Standard Deviation (SD) For Sum of Scores for Attitude, Subjective Norms, Perception, Indulgence and Maternal Oral Hygiene Behavior

	Range (Max-Min)	Mean (SD)
Attitude towards brushing child's teeth	7 (9-2)	4.61(1.79)
Subjective norms for child's tooth brushing	7 (9-2)	5.54(1.91)
Perceived behavioral control for tooth brushing	14 (15-1)	7.89(3.09)
Parental indulgence for tooth brushing	7 (9-2)	5.05(1.98)
Maternal oral hygiene behavior	13 (18-5)	12.03(3.29)
Intention - Strong n(%) - Weak n(%)		 n=97(27.5%) n= 55(72.44%)

Note: Frequency(N) Of Parent's Intention to Brush Their Child's Teeth Twice Daily N (%)

Table III shows associations between intention and parental attitude and subjective norms were highly significant as revealed by independent sample t test (P<0.001) and mild significance with perceived behavioral control (P=0.006). In contrast there was no significant association found between indulgence and maternal oral hygiene behavior.

Table III: Independent Sample t Test for Parent's Attitude, Maternal Oral Hygiene Behavior And Perception By Intention To Brush Their Child's Teeth

	Strong Intention Mean (SD)	Weak Intention Mean (SD)	P- value
Attitude towards brushing their child's teeth	4.43(1.62)	4.68(1.85)	0.000**
Subjective norms for child's tooth brushing	5.55(1.92)	5.53(1.913)	0.000**
Perceived behavioral control for tooth brushing	7.8(3.12)	7.92(3.09)	0.006
Parental indulgence for tooth brushing	5.01(1.91)	5.06(2.01)	0.528
Maternal oral hygiene behavior	11.8(3.28)	12.09(3.305)	0.456

P=<0.001**

While keeping intention to brush their child's teeth as a fixed factor a multivariate GLM (General Linear Model) analysis was performed as shown in Table IV. The mean values provide evidence that intenders showed a more frequent attitude, subjective norms and perceived behavioral control. In contrast strong intenders showed weak indulgence and vice versa. All the components of TBP showed a significant discrimination between the two groups with partial eta squared apart from maternal oral hygiene behavior which failed to maintain a significant relationship in multivariate GLM analysis.

Table IV: Effect Size (Partial Eta Squared) For Parent's Attitude, Perception and Maternal Oral Hygiene Behavior by Intention to Brush Their Child's Teeth

	Strong Intention Mean (95%CI)	Weak Intention Mean (95% CI)	Partial Eta Squared
Attitude towards brushing their child's teeth	4.43(4.11-4.76)	4.68(4.45-4.91)	0.004*
Subjective norms for child's tooth brushing	5.55(5.16-5.39)	5.53(5.30-5.77)	0.000**
Perceived behavioral control for tooth brushing	7.8(7.17-8.43)	7.92(7.54-8.30)	0.000**
Parental indulgence for tooth brushing	5.01(4.62-5.40)	5.06(4.81-5.31)	0.000**
Maternal oral hygiene behavior	11.88(11.21-12.54)	12.09(11.69-12.50)	0.001

Note: Intention kept as fixed factor in multivariate general linear model.
P<0.001**

Discussion

To our acquaintance this study is the first to assess intentions of tooth brushing and its covariates amongst parents of children aged 1-6 years visiting tertiary care hospital in Peshawar. The results are consistent with previous studies showing that the TPB components, attitudes, subjective norms, and perceived behavioral control, were independent significant control variables of parental intention to

brush their children's teeth and supports TBP for prediction of oral health related behaviors as well as intention of the parents to superintend their child's oral health[12,13]. The appropriateness of the TPB model detected in this study harmonies with that of a meta-analysis of TBP concerning several health-related behaviors, which accounted for 44% of the contradiction in behavioral intentions.[14]

This study discovered that parents with strong intention to brush their children's teeth performed their own oral hygiene habits more frequently. However, these results were not significant in multivariate regression analysis concluding that parents' own oral hygiene performance was influenced by caudal perceptions and attitudes. According to theory of socialization[15], parental in specific mother's overt behavior has a significant influence on child's oral health behaviors implying this as a modelling process particularly in pre-school children.[16]

Results revealed that the parent's intention for brushing their child's teeth was motivated by their attitudes, perceived behavioral control and subjective norms in descending order. Strong intentions were thus owned by those parents who perceived promising consequences following regular tooth brushing in their children (good attitude) as well as parents who felt that they were capable of managing their children's teeth twice daily (strong perceived behavioral control) and who felt prescriptive pressure from family and people they knew regarding importance of tooth brushing (favorable subjective norms).These results were consistent with previous studies in which contribution of attitudes, subjective norms and perceived behavioral control towards parental intention was analyzed in the context of TBP[12,17]. In contrast, strong indulgent parents who believed that it is not worth a quarrel to force a child to brush when he doesn't want to brush reported weak intentions to tooth brushing. Therefore, an increased tendency of parental indulgence had a negative impact on their intention to brush their child's teeth twice daily. Marshman Z reported that despite parents being aware of the importance of tooth brushing in children in the United Kingdom, child's behavioral problems as well as parent's own stress regarding their whining and timid behavior are the actual barriers towards implementation of tooth brushing habits in their children.[18]

The behavioral mediators identified in this study can serve as substantial tools for designing community-based caries prevention programs. The level of the associations and the synchronization of the findings with TBP is an indicator of the reliability and validity of the results. However, when it comes to face-to-face interviews, social desirability, which is the tendency of survey respondents to answer questions in manner that is deemed to be more socially favorable than their true answers to escape negative evaluation, is one of the major documented problems [19]. It can take the form of “Over- reporting” a good behavior or “Under-reporting” a bad behavior. Therefore, the major limitation of this study was an inclination towards socially desirable which may be accredited to the very datum that parents were generally conversant about precautionary measures for caries anticipation.

Vagueness about the timing of giving sugary snacks to their kids was recognized as an area of ambiguity. In accordance with previous study[20], the majority of mothers did not recognize nighttime breastfeeding as a contributory factor for caries. Parental ignorance in this matter must be catered with awareness programs regarding this rehearsal, nevertheless, cultural as well as religious traditions that cheers breastfeeding till 2 years must be well-thought-out.[21,22]

Conclusion

Overall parents reported weak perception and intention for regular tooth brushing behaviors. To motivate parents about their child's dietary and oral health related practices, their attitudes, subjective norms, and perceived behavioral control seems to be more important than their accurate oral health related information and should be addressed while designing oral health policies.

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CONFLICT OF INTEREST

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DATA SHARING STATMENT

The data that support the findings of this study are available from the corresponding author upon request.

ORIGINAL ARTICLE

Diabetic Nephropathy: Duration and Glycemic Control Affect the Outcome

Robina Mushtaq[1], Ambreen Ansar[2], Anwar Bibi[3], Musarat Ramzan[4]

ABSTRACT

Objective: The aim was to find out frequency of Nephropathy in subjects having type 2 Diabetes Mellitus; and to determine the effect of disease duration and blood glucose levels on the development of Diabetic nephropathy.

Study Design: Cross-sectional.

Place and Duration of Study: POF Hospital Wah Cantt, 1st January to 30th June 2018.

Materials and Methods: Two hundred and ten subjects were enrolled having Type-2 Diabetes for more than 5 years. A closed ended questionnaire was used to record information on disease duration, glycosylated hemoglobin level, blood pressure and albuminuria. The data was analyzed by SPSS v-19 and significance of results was studied by Chi-square test.

Results: Among 210 patients 126 were male and 84 were female. Out of 210 people under study 54.76% had Diabetic Nephropathy. Significantly a greater number of Diabetic Nephropathy was recorded among subjects having Diabetes for more than 10 years (p-values 0.03), and whose blood sugar levels were never controlled (p-values 0.000).

Conclusion: The frequency of Diabetic Nephropathy was found to be quite high. It was significantly higher among subjects having diabetes for longer duration and uncontrolled blood sugar levels. Therefore, it is essential to monitor these patients regularly to prevent complications and improve their health.

Key Words: *Albuminuria, Diabetes Mellitus, Diabetic Nephropathy, Glycated Hemoglobin A, Hypertension, Risk factors.*

Introduction

Diabetes mellitus is progressively becoming a worldwide epidemic, about 8% (350 million) people are having DM, and this would rise to above 550 million by 2035.[1] Diabetes Mellitus (DM) is a disease in which the body's ability to produce or respond to the hormone insulin is impaired, resulting in abnormal metabolism of carbohydrates and elevated levels of glucose in the blood. Type-1 Diabetes is due to autoimmune damage of pancreatic islets cells, while Type 2 diabetes develops when the body becomes resistant to insulin or when the pancreas is unable to produce enough insulin.[2,3]

Over time, high blood glucose can damage the body's blood vessels, both tiny and large. Damage to tiny blood vessels causes micro vascular complications; damage to large vessels causes macro vascular complications. Long-standing blood glucose level is responsible for impairment of different organs leading to visual, neurological, renal, and cardiovascular problems.[4,5]

DN remains an important common complication of diabetes. It is characterized by gradually increasing urine albumin excretion, accompanied by slowly rising blood pressure; the decline in glomerular filtration rate occurs late.[6,7] Diabetes harms the kidneys by causing damage to tiny blood vessels of filtering units. With time, high blood sugar levels cause these vessels to become narrow and clogged. Once the nephrons are damaged and reduction of functional renal mass reaches a certain point, the remaining nephrons begin a process of irreversible sclerosis leading to ESRD.[8,9] ESRD is the final stage of nephropathy, where kidney function has declined to the point that they can no longer function on their own; Patients will need expensive procedures to live.[10,11] The possibility of cardiac diseases increases as urine albumin excretion increases and as GFR decreases.[6] ESRD and cardiac problems lead to decreased life expectation in these patients.[7,12]

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According to the International Diabetes Federation (IDF), currently 7.5 million Pakistani populations are affected with DM[13], and almost 20% to 40% diabetics in the long run have kidney disease.[1] Lots of diabetics with impaired renal function are ignorant of their condition, resulting in delayed management and increased morbidity due to ESRD and cardiac diseases.[8] Only a few studies have been conducted in our country to establish the effect of diabetes duration and glycemic control on kidney functions. Well-timed testing of renal functions in patients having DM for longer duration would delay the development of kidney disease.[14] Early detection and management holdup the disease process and lessen the risk of ESRD, thus reducing the burden on health care delivery system. An easy approach to avoid or interrupt DN is adopting healthy way of living and good glycemic control. The aim was to find out frequency of Nephropathy in subjects having type 2 Diabetes Mellitus; and to determine the effect of disease duration and blood glucose levels on the development of Diabetic nephropathy.

Materials and Methods

A Cross-sectional study was conducted at POF Hospital Wah Cantt during 1st January to 30th June 2018. Sample size was 210 based on 95% confidence level, 5% precision and 16.4% [6] anticipated proportion, subjects were selected by purposive sampling. Prior permission to conduct this study was taken from the institutional review board. Informed consent was taken from patients before data collection. Patients having Diabetes for more than 5 years were included. Information regarding blood urea and creatinine levels, duration of Diabetes, HbA1c levels, family history, blood pressure and albuminuria was taken from the documents of selected patients by the researchers. A diabetic person having albuminuria and Hypertension for the last 6 months (confirmed from patients record file) was labeled as having Diabetic Nephropathy. Patients having blood pressure above 130/90 mmHg during last 6 months were labeled as having Hypertension. On the basis of HbA1c levels three categories of glycemic control were formed; always control (HbA1c level < 7% during last 6 months), sometime control (HbA1c level 7% - 8% during last 6 months) and never control (HbA1c level > 8% during last 6 months). The data analysis was done by SPSS v-19 and Chi-square test was applied to find out the relationship of diabetes duration and blood sugar levels with diabetic nephropathy (level of significance was 0.05).

Results

Mean age in this study was 55.77 ± 13.68 years. Out of 210 patients 126 (60%) and 84 (40%) were male and female respectively. Ninety-eight (46.7%) patients had Diabetes for 5-10 years and 112 (53.3%) patients had for >10 years. One hundred and thirty-seven (65.2%) patients had positive family history while 73 (34.8%) had no family history of Diabetes Mellitus. Sixty-two (29.5%) had HbA1c level below 7%, 123 (58.6%) had HbA1c level between 7% and 8% while HbA1c level of 25 (11.9%) patients was above 8%. One hundred and forty-six (69.5%) patients had blood pressure above 130/90 mmHg on average during last 6 months. One hundred and fifteen (54.8%) patients had albuminuria and Hypertension for the last 6 months (Fig. 1).

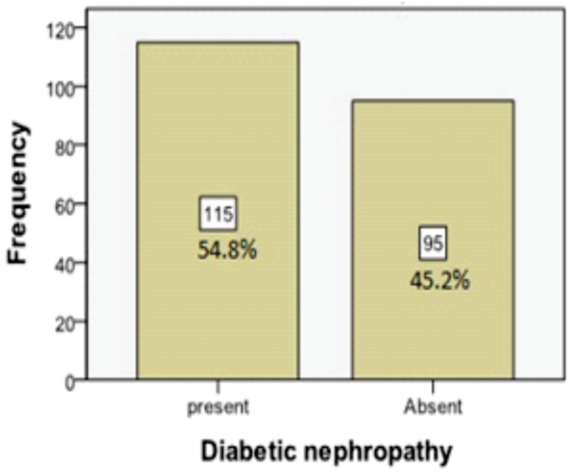

Fig. 1: Frequency (%) of Diabetic Nephropathy

Mean blood creatinine and urea levels were 1.99±1.65 mg/dL and 65.26 ± 29.62 mg/dL respectively. Frequency of diabetic nephropathy among male was 70 (55.5%) and females was 45 (53.5%) which is statistically insignificant (p-value 0.7). Seventy-nine (57.6%) patients with Diabetic nephropathy had family history of DM as compared to 36 (49.3%) who had no family history (statistically insignificant p-value 0.24). Nephropathy was reported notably more [69 (61.6%)] among patients having DM for more than 10 years, while frequency among those having DM for 5-10 years was [46 (46.9%), (p-value 0.033)]. The patients whose blood sugar levels were never controlled had high rate of

Nephropathy 21 (84%), in contrast to those having sometime [75 (61%)] and always controlled sugar levels [19 (30.6%)] (statistically significant p-value 0.000). Nephropathy occurred more in Hypertensive subjects [Table I].

Table I: Relationship of Diabetic Nephropathy with Different Variables

Variable	Attributes	Diabetic Nephropathy Frequency (%)	p-value
Gender	Male Female	70 (55.5%) 45 (53.5%)	0.7
Blood Glucose Level	Always control Sometime control Never control	19 (30.6%) 75 (61%) 21 (84%)	0.000
Duration of Diabetes Mellitus	5 – 10 years > 10 years	46 (46.9%) 69 (61.6%)	0.033
Hypertension	Yes No	88 (60.2%) 27 (42%)	0.015

Discussion

Diabetic Nephropathy is diagnosed if albuminuria and impaired renal functions persist for at least 3 months. Nephropathy is related to high mortality in common people as well as among diabetics. Early findings will let insistent actions to be taken to impede the progression of disease to ESRD.

The number of diabetics is constantly rising in Pakistan. Type 2 Diabetes can occur at any stage of life, even in children. However, it occurs most often in middle-aged and older people. In our study mean age of subjects was around 56 years, more than fifty percent subjects were having Diabetic Nephropathy; male and female were almost equally affected. The subjects having HbA1c levels persistently above 8% and diabetes for more than 10 years had significantly high frequency of Nephropathy.

The mean age of subjects was comparable to other studies made in Shanghai[15] (56 year), Pakistan[4] (55.2 year), and Tanzania[5] (45-60 year). In diabetics the organs are exposed to hyperglycemia. Intracellular hyperglycemia causes collection of unstable oxygen radicals, resulting in damage to blood vessels. Even with proper management and check on glucose level, diabetics can still develop renal pathological changes like glomerulosclerosis and chronic kidney disease. The first sign of nephropathy is presence of albumin in urine. Frequency of Diabetic Nephropathy (54.76%) was found similar to other studies by Khalid (43%)[10], Machingura (45%)[16], Wu (40%)[17], Parving (39%)[18] and Hasabi (45%) [19] this frequency was high as compared to the studies conducted in Pakistan[4] (20 %), Mediterranean region[6] (16.4%), China[15] (30.9%), USA[8] (33%), Saudi Arab[9] (10.8%), and India[20] (26.9%). The high rate in our setting may be because the patients are diagnosed late due to shortage of medical facilities, high expenditure, low health risk awareness among populations and more priority is given to communicable diseases.

Type 2 diabetes is now equally prevalent among men and women in most populations and the effect of sex on nephropathy is not well established. In our study male and female were almost equally affected, while in a study by Zhou et al[15] females had a significantly high rate of Diabetic Nephropathy. Uncontrolled Diabetes had increased the risk of development of Nephropathy. There was some evidence that improved glucose control delayed the progression of albuminuria. With decrease of 1% HbA1c level, there was a 37% decreased possibility of nephropathy [21]. In this study, the subjects having HbA1c levels persistently above 8% had significantly high frequency of Nephropathy (p-value 0.000). These results were consistent with other studies showing a relation of high HbA1c levels to the progression of Nephropathy; China[15] (P <0.001), USA[8] (P< 0.001), Ethiopia[3] (P< 0.002), Saudi Arab[9] (OR 1.17), India[22] (OR 11.8), and Zimbabwe[16] (OR 1.20).

The likelihood of Nephropathy among diabetics also increases with the duration of disease.[8] Regardless of check on blood glucose and Blood Pressure the incidence of albuminuria increases as a consequence of increasing survival and duration of diabetes. The frequency of DN was found to be significantly higher among patients having diabetes for more than 10 years (p-value 0.033). The relationship of long-standing DM and Nephropathy had been proved by many studies; from USA (p-value 0.001)[8], Pakistan (p-value 0.05)[4], Saudi Arab (p< 0.0001)[9], Zimbabwe (OR= 1.03),[16] and India (p = 0.046) [20] (OR = 4.69).[22] Hypertension is an invariable accompaniment of ESRD and control of hypertension reduces the risk of developing albuminuria. A substantial association was found between presence of albuminuria and

hypertension (p = 0.015); similar association had been studied by Shera et. al.[4] (p = 0.05), Al-Rubeaan[9] (p < 0.0001), Parving[18] (OR = 1.10), and Akheel[22] (OR = 2.06). Educating patients on health risks associated with Diabetes and changing their mode of living for better glycemic control can impede the disease process and lower the burden on health system of country.

Conclusion

The frequency of Diabetic Nephropathy is found to be quite high. It is significantly higher among subjects having diabetes for longer duration and uncontrolled blood sugar levels. Careful monitoring of diabetic patients can prevent complications and improve their quality of life. Educating patients regarding the risk factors can reduce the burden of kidney diseases.

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CONFLICT OF INTEREST

Authors declared no conflicts of Interest.

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DATA SHARING STATMENT

The data that support the findings of this study are available from the corresponding author upon request.

ORIGINAL ARTICLE

Willingness of Medical Students to Volunteer for Assisting Frontline Doctors During The COVID-19 Pandemic: A Cross-Sectional Study

Maheen Nazir[1], Alishba Ashraf[2], Sidra Hamid,[3] Zuhair Ali Rizvi[4]

ABSTRACT

Objective: To assess the willingness of medical students to volunteer for assisting frontline doctors during the COVID-19 pandemic.

Study Design: Cross-sectional study.

Place and Duration of Study: This study was conducted from 12th June 2020 to 20th July 2020 on medical students of Rawalpindi Medical University.

Materials and Methods: An online survey was conducted among 282 undergraduate medical students selected via convenience sampling. SPSS version 25 was used for analysis.

Results: More than half of the participants (52.1%) were unwilling to volunteer during the COVID-19 pandemic. Most of those who wanted to volunteer preferred to do so by providing indirect healthcare via telemedicine. The most popular reason for preferring to volunteer was an ethical inclination to help the frontline workforce. The main barriers towards volunteering included the possibility of being vectors for viral transmission, consuming personal protective equipment that healthcare personnel needed, and contracting COVID-19. No significant association was found between gender (p=0.567), age group (p=0.793), year of study (p=0.911), or boarder/non-boarder status (p=0.243), and willingness to volunteer.

Conclusion: The majority of medical students were unwilling to volunteer for assisting frontline doctors during the COVID-19 pandemic.

Key Words: *COVID-19, Medical Education, Medical Students, Pandemics, Volunteerism.*

Introduction

In late December 2019, Wuhan, a metropolitan city in China, experienced an outbreak of atypical pneumonia which was later be identified as a novel viral disease COVID-19.[1] On March 11, 2020, World Health Organization officially declared COVID-19 to be a global pandemic.[2] Governments imposed lockdowns to curb the spread of COVID-19 which brought educational activities to a halt.[3] Many medical colleges suspended on-campus classes as well as clinical rotations. The American Association of Medical Colleges (AAMC) supported the suspension of direct patient-medical student interaction during this period. [4]On the other hand, some were of the view that the services of medical students should be utilized during such times of crisis, with some medical schools offering final year students the opportunity to graduate early and start working on the frontlines.[5]

In Pakistan, Student Taskforce against COVID-19 started by final year medical students at Agha Khan University Hospital recruited over 500 members.[6] In April 2021, the Punjab government called upon third to final year medical students to volunteer in hospitals and quarantine facilities.[7]However, these recruitment drives were conducted without surveys on medical student views towards volunteerism during the pandemic.

Medical students are prospective clinicians in training who can be called for assistance if healthcare systems are overwhelmed in dealing with this pandemic. Students may also have apprehensions regarding joining the workforce against a deadly pandemic at a premature stage of their medical career. Therefore, the objective of this study was to assess the willingness of medical students to volunteer for assisting frontline doctors during the COVID-19 pandemic.

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Materials and Methods

This cross-sectional study was conducted on the undergraduate medical students of Rawalpindi Medical University from 12th June 2020 to 20th July 2020. Ethical approval was granted by Institutional Research Forum (ERC number: 81RMU/2020/IREF). Participants were recruited via non-probability convenience sampling before online classes commenced for our study population. The sample size was calculated to be 282 for an estimated population of 1050 students. Students enrolled in clinical years (3rd, 4th, 5th year) were included in the study. Pre-clinical year students (1st and 2nd year) were excluded.

Data was collected using a pilot-tested, online, self-structured questionnaire designed using Google forms which had questions and statements collected from various online articles.[8-11] The content and construct of the questionnaire were validated by a senior faculty member. It was disseminated in all official class WhatsApp and Facebook groups. The response rate was 100%. Confidentiality of the participants was maintained and informed consent was taken. The first part of the survey asked about demographic details namely age, gender, year of study, boarder/non-boarder status and whether students wanted to volunteer or not. The second section explored why the students were willing or unwilling to volunteer. The third section assessed the responses of students to nine general statements regarding volunteerism during the COVID-19 pandemic via the options of "Agree", "Disagree" and "Undecided".

Statistical software program SPSS version 25.0 was used for data analysis. Frequencies and percentages were calculated for categorical variables. The associations between variables were assessed using the chi-square test and binomial logistic regression analysis. Adjusted odds ratios and 95% confidence intervals were calculated. A p-value of less than 0.05 was considered significant.

Results

The cross-tabulation between demographic characteristics of the sample and willingness to volunteer is displayed in Table I. The mean age was 21.9±1.26 years. Out of the 282 participants, the majority were females (205, 72.7%) and non-boarders (177,62.8%). More students (147, 52.1%) were unwilling to volunteer to assist frontline doctors during the COVID-19 pandemic compared to those who were willing to volunteer (135, 47.9%). No significant association was found between gender, age group, year of study or boarder/non-boarder status, and the willingness to volunteer.

Table I: Association Between Demographic Characteristics and Willingness to Volunteer (N=282)

Demographic characteristics	Willing to volunteer		Chi-square value (df)	p-value
	Yes	No		
Age Group				
18-20	20(14.8%)	19(12.9%)	0.464 (2)	0.793
21-23	103(76.3%)	112(76.2%)		
24-26	12(8.9%)	16(10.9%)		
Gender				
Male	39(28.9%)	38(25.9%)	0.327 (1)	0.567
Female	96(71.1%)	109(74.1%)		
Year of study				
3rd Year	51(37.8%)	52(35.4%)	0.187 (2)	0.911
4th Year	44(32.6%)	49(33.3%)		
Final Year	40(29.6%)	46(31.3%)		
Nonboarder/Boarder status				
Non-boarder	80(59.3%)	97(66.0%)	1.363 (1)	0.243
Boarder	55(40.7%)	50(30.4%)		

Table II shows the ways by which students preferred to volunteer to assist doctors. The majority of students wanted to contribute by providing indirect health care via telemedicine at the university campus. Assisting with direct care of COVID-19 patients was the least popular choice.

Table II: Means by Which Students Preferred to Volunteer

Mode of contribution	n (N=135)	Percentage (%)
Indirect healthcare via telemedicine at the university campus	88	65.2
Others (e.g., providing child care for health care providers, food deliveries, procuring PPE for health care workers, etc.)	65	48.1
Assisting clinicians in outpatient departments	60	44.4
COVID-19 related research	55	40.7
Assisting clinicians in inpatient departments that do not involve COVID-19 patients	49	36.3
Assisting clinicians with direct care of COVID-19 patients	29	21.5

Figure 1 and Figure 2 show the reasons given by students for opting or not to volunteer during this pandemic, respectively. The most common reason for preferring to volunteer was an ethical inclination to assist their seniors in the health care field. The most common reason for not preferring to volunteer was the concern that students may transmit the infection to others, especially their parents and other family members.

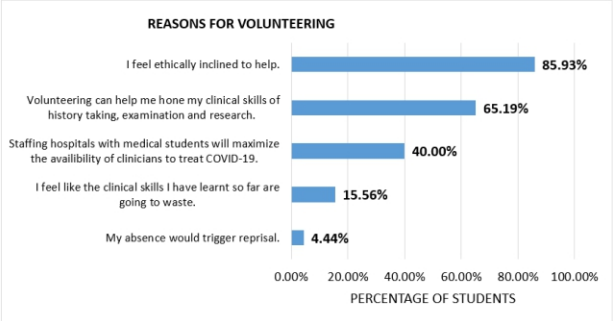

Fig. 1: Reasons Students Gave for Their Willingness to Volunteer

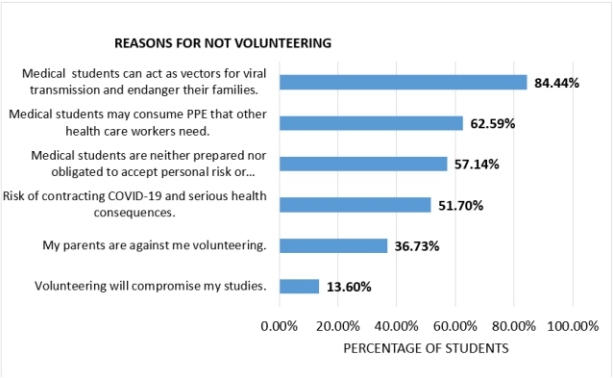

Fig. 2: Reasons Students Gave for Their Unwillingness to Volunteer

Most students were not in favour of giving final year medical students the option of graduating early to join the medical workforce (183, 60.9%, *p*=0.000). Among the 99 students who agreed, fewer students were from fourth year (25, 26.8%) and final year (27, 31.3 %) compared to third year (47,45.6%).

Table III shows the predicted probability, adjusted odds ratios and 95% confidence intervals from the binomial logistic regression analysis of the association between the response "agree" to the 9 general statements and "yes" response to the question assessing willingness to volunteer. Those who agreed with the statement "Students who volunteer should only be allowed to provide indirect care via telemedicine" were significantly less likely to say yes to volunteering (odds ratio=0.333, *p*=0.001, <0.05) compared to those who disagreed. Students who agreed with the statement "Volunteering for assistance in healthcare, whether online or in person, is a wise decision" were significantly more likely to say yes to volunteering compared to those who disagreed (odds ratio=3.295, *p*=0.000, <0.05). Most students (94.7%) agreed that pandemic management training should be incorporated into the syllabus irrespective of whether they wanted to volunteer or not (*p*=0.304,>0.05).

Table III: Binary Logistic Regression Analysis for The Association Between Response "Agree" and Response "Yes" To Volunteering

Statement	Willing to volunteer		*p-value*	Odds ratio	Confidence intervals
	Yes/ N(%)	No/ N(%)			
1. No compulsion in volunteerism			0.403	1.488	0.586-3.779
Agree	121(89.6)	134(91.2)			
Disagree	14(10.4)	13(8.8)			
2. No compulsion in tele-volunteerism			0.538	1.290	0.574-2.898
Agree	119(88.1)	128(87.1)			
Disagree	16(11.9)	19(12.9)			
3. Early graduation of final year			0.840	0.945	0.542-1.645
Agree	48(35.6)	51(34.7)			
Disagree	87(64.4)	96(65.3)			
4. Allow only telemedicine volunteerism			0.001	0.333	0.178-0.622
Agree	82(60.7)	122(83.0)			
Disagree	53(39.3)	25(17.0)			
5. Students are not workers			0.118	0.658	0.390-1.113
Agree	54(40.0)	84(57.1)			
Disagree	81(60.0)	63(42.9)			
6. Connect students with clinical work			0.168	1.544	0.832-2.866
Agree	106(78.5)	88(59.9)			
Disagree	29(21.5)	59(40.1)			
7. Volunteering is a wise decision			0.000	3.295	1.841-5.897
Agree	102(75.6)	63(42.9)			
Disagree	33(24.4)	84(57.1)			
8. Academic incentives for volunteers			0.725	1.109	0.624-1.970
Agree	90(66.7)	88(59.9)			
Disagree	45(33.3)	59(40.1)			
9. Pandemic management studies			0.304	0.549	0.175-1.722
Agree	128(94.8)	139(94.6)			
Disagree	7(5.2)	8(5.4)			

Discussion

Our study showed that more students were unwilling to volunteer during the pandemic (52.1%) and fewer were willing to volunteer (47.9%). Similar to our results, an Indonesian study reported that around 48.8% of the students were willing to volunteer.[12] In contrast to our results, many studies such as surveys from Uganda (80%), China (86%) and Germany (70%) reported that more students were willing to volunteer. [13,14,15] The varying government pandemic response and the severity of the pandemic at the time of data collection could be responsible for the global differences in the willingness to volunteer.

Among the students interested in volunteering, the majority wanted to assist with telemedicine services and only 21.5% of participants were interested in providing direct care to COVID-19 patients. This is similar to results from China and Nigeria where medical activities such as administrative work and telemedicine were more popular among students than direct care of patients.[14,16] The most common reason given by students for willingness to volunteer was an ethical inclination to help the frontline workforce during this pandemic. Similar surveys from Indonesia, China, and Brazil reported this sense of duty to be a major driving force behind the willingness to volunteer.[12,14,17]

Students did not wish to volunteer for three main reasons: the fear of being viral transmission vectors to their families, depleting personal protective equipment (PPE) that more experienced staff needed, and contracting COVID-19 themselves. This is in accordance with results from Indonesia and Poland where the fear of transmission of COVID-19 to relatives and contraction of the disease were major barriers towards considering volunteerism.[12,19] Their fears are justified as even graduate doctors faced severe PPE shortages during the pandemic.[20] Nearly 95% of the students agreed that pandemic management training should be incorporated into the syllabus which is the same percentage reported in a similar Nigerian study.[16]Since medical students are future clinicians, early incorporation of pandemic management in their curriculum is imperative to create a workforce that is well prepared for the current and potential future pandemic emergencies.[21]

The limitations of our study were the possible selection bias that occurred while sampling and that it only included participants from a single public-sector medical university. Studies that include both public and private sector medical institutes throughout the country should be conducted to obtain a more representative sample of medical students. Further studies should investigate the effect of important variables such as family income, reliance on information sources, previous volunteering activities, and knowledge about the infection and infection control measures on willingness to volunteer.

Conclusion

The majority of medical students were unwilling to volunteer to assist the frontline doctors during the COVID-19 pandemic.

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CONFLICT OF INTEREST

Authors declared no conflicts of Interest.

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Authors have declared no specific grant for this research from any funding agency in public, commercial or nonprofit sector.

DATA SHARING STATMENT

The data that support the findings of this study are available from the corresponding author upon request.

ORIGINAL ARTICLE

Knowledge, Attitudes and Practices of Clinical Physical Therapists Regarding Evidence Based Practice

Zoya Mehmood[1], Asmar Fatima[2], Bintal Wajeeh Satti[3], Huma Riaz[4], Suhail Karim[5], Tehmina Nazir[6]

ABSTRACT

Objective: To determine knowledge, attitudes and practices of Physical therapist towards Evidence Based Practice and to identify the barriers faced by them regarding their practice

Study Design: A Cross Sectional Study.

Place and Duration of Study: Physical therapists of Rawalpindi and Islamabad working in different clinical setups from 1st December 2020 to 20th May 2021

Materials and Methods: A Cross sectional survey was conducted and 205 Physical therapists were randomly recruited from Rawalpindi and Islamabad working in different hospitals to respond to a self-administered questionnaire. First part of the questionnaire was about demographics and the second part highlighted the Knowledge, attitude and clinical practice among physical therapists.

Results: The study results showed that majority of Physical therapists had a clinical experience of less than 10 years and only 19% had more than 10 years' experience. 47.3% Physical therapists had a clear understanding of Evidence based practice. They had a positive attitude towards its implementation; they are interested in enhancing their skills. 45% of them consider that evidence based clinical practice helps in decision making regarding patient care.

Conclusion: Physical therapists have sufficient knowledge and a suitable attitude towards the use of Evidence based practice but only a few of them incorporate it in their practice. Insufficient time for implementation of evidence-based practice is the most prevalent barrier.

Key Words: *Attitude, Decision making, Evidence based practice, Patient, Physical therapist.*

Introduction

Evidence based Practice is defined as "The Conscientious, Explicit and Judicious use of current best research available to make decisions about Individual patient care." [1] It has been extensively used by all health care professionals in different clinical setups. Many medical organizations and agencies had flourished this concept and provided guidelines for the consumers which are easily accessible all over the world through different Internet browsers like Google Scholar, PubMed. Physiopedia, Medline, books, journals and other resources.[2] Evidence-based practice is an essential component of clinical care. It is an effective tool to facilitate the process of rehabilitation, which remains in the domain of care provided by a rehabilitation doctor or a team on one-to-one interaction.[3] The driving force for evidence-based practice comes from payer and healthcare facility pressures for cost effectiveness, greater access of information, and greater consumer perception about treatment options. EBP demands alteration in education of students, more research oriented clinical practice and collaborative environment between health care providers and researchers.[4] Knowledge includes clear understanding of EBP that how it is recognized and formulated. They must be aware of different medical search engines and accessible to guidelines related to practice.[5] Nilsagard et al stated that health care providers are keen to enhance their skills, have self-directed learning so they can incorporate EBP in their daily practice.[6] Attitude shows how much Physical

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therapist are interested in learning and gaining skills and experiences regarding EBP and identifies clinical experience and scientific studies. A study conducted on Japanese Physical therapists determined that majority of them had knowledge about EBP and important factor was positive attitude, knowledge and behaviour of evidence-based practice and clinical guidelines was engagement in research activities.[7] Practice involves the use of clinical guidelines in daily practice, how the PTs face patient participation limitation in their clinical settings.[5] The idea of EBP signifies the alteration of health services from traditional treatment and facilities depending upon the perceptions and expertise to another zone of care totally relying on data-based, clinically related research work.[6] The inability to carry out any of these functions may constitute a barrier to the application of evidence in practice. Limited time for extracting and gathering research data and for its application to individual patient has been reported by many authors as chief concern that clinicians are unable to amalgamate relevant research in their mode of treatment. Limited access to data also has been proven to be another major concern.[6] According to the KAP study held in Australia most of the PTs read research literature at least monthly. A few of respondents reported critically appraising research reports.[7] It also states that fresh graduates value their EBP skills but they are powerless to implement these skills [8]The purpose of this study was to observe the knowledge attitude and practices of physical therapist in Rawalpindi and Islamabad as majority of the studies were conducted in other cities of Pakistan and its barriers were not identified.

Materials and Methods

A quantitative research based on Cross sectional survey was conducted from December 2020 to May 2021. Sample size was n=200 participants. This sample size was calculated by using Rao software for cross sectional survey with the confidence interval 95% and 5% margin of error. Non probability convenient sampling technique was used and 205 Physical therapists were recruited from Rawalpindi and Islamabad working in different hospitals and clinical settings to respond to self-administered questionnaire.[6]Informed consent was taken from all the physiotherapists prior to the participation in the study. Participants were recruited in the study based on inclusion criteria of; personals belonging to physiotherapy profession who had clinical experience of more than 6 months were allowed to participate in the study. A self-structured questionnaire was validated by conducting a pilot study and then modification were made upon recommendations of expertise in the field. The questionnaire comprised of 38 questions with 60 variables. This questionnaire was distributed into four sections. First section was about demographics having 8 questions. Next part was about knowledge of EBP among physiotherapists having 10 questions with majority responses like 1= Strongly Disagree, 2= Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree. The third section was about attitude towards integrating EBP in physiotherapy practice. Participants were asked to rate their response to a set of 10 statements from 1= Strongly Disagree, 2= Disagree, 3= Neutral, 4= Strongly, Agree 5= Agree. Final section was about the understanding and practice of EBP with 9 questions focussing on PTs practicing and final question was on barriers of EBP with responses 1= Most barrier ,2= Less Barrier ,3= Least Barrier. The data was analysed on SPSS-21(Statistical Package for Social Sciences)

Results

A cross-sectional survey was conducted in the Physical therapy departments of Islamabad and Rawalpindi hospitals. This survey recorded a response rate of (n=205) physical therapists. The results showed that 85(41.4%) were male and 120(58.5%) were female physiotherapist.80% physiotherapist had a clinical experience of less than 10 years and 19.2% had experience more than 10 years. 50.7% physiotherapists had BSPT degree as an entry level degree, 45.3% had DPT degree. 77.8% PTs have had participated in continuing educational courses.47% of physical therapists had clear understanding of EBP (Mean ±S. D=4.13±1.04).44% PTs had online access to different databases for gaining information about diseases and making treatment protocols (Mean±SD= 4.17±0.99). The other important factors are shown in Figure 1.

46% Physical therapist found EBP necessary in daily practice (Mean±SD=4.32±0.803).43.8% Physical therapists are very keen in learning skills because it has increased quality of care (Mean±SD=4.33±0.82).

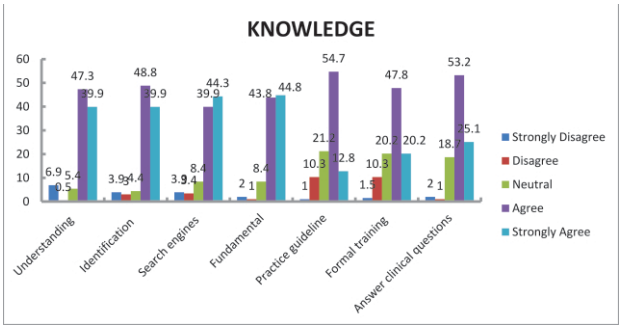

Fig. 1: Percentage of Knowledge of Evidence Based Practice among Physiotherapists

For some PTs previous work experience is more important than research findings in making treatment protocol (35.5%) and some prefer research on experience (16.7%) as shown in graph no 2.54% Physical therapists implemented EBP in daily practice (Mean±SD= 3.76±0.85) but PTs workload is increasing and is causing hurdle in keeping up to date with evidence (Mean±SD= 3.76±0.89) as shown in Figure 3.

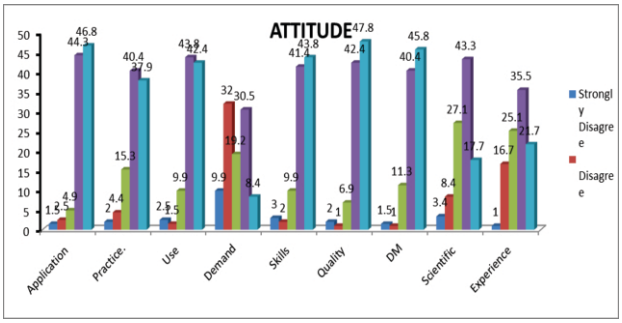

Fig. 2: Shows Percentage of Attitude of Physiotherapists towards Evidence Based Practice

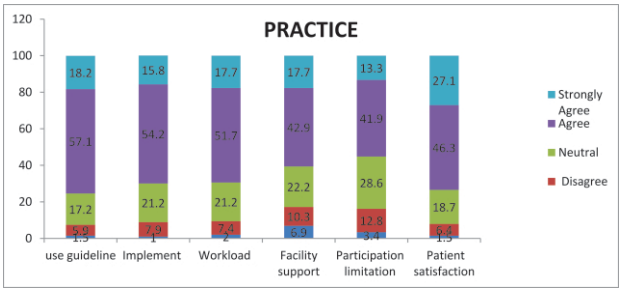

Fig. 3: Shows Percentage of Practice of Evidence based Practice among Physiotherapists

Insufficient time is the common obstacle faced by the physical therapists (63. 1%). Other barriers are shown in Table I.

Discussion

Majority of physical therapists are knowledgeable about Evidence Based Practice and have a positive outlook towards integration of EBP. The positive attitude of PTs towards EBP in their practices is found to be associated with sufficient knowledge. This is a 1st comprehensive study assessing EBP among PTs in twin cities working in various government and private hospital and clinics.Female constituted the majority of study respondents, correlating with the participants of study conducted in South Africa by Taukobong et al on knowledge, Attitude and Practice about health promotion amongst PTs in South Africa. Mostly physical therapists had a clear understanding of EBP as reported by Ross Iles and Megan Davidson.[7] PTs were gaining information from online databases about diseases and their treatment Protocols. Another study conducted by Diane U Jette et al stated that majority (70%) physical therapists were of the view that they had sufficient information and knowledge about the databases like MEDLINE and CINAHL.[9] This study results favored current study results as majority of physiotherapists are aware of Evidence based practice in Pakistan. Most of the contributors had a positive attitude as they agree and strongly agree that application and use of EBP in day to day practice is obligatory.[10] This current study findings are in coherent with other studies conducted elsewhere, in which physiotherapists considered the role of EBP as important in promoting the health of their patients as reported by Shirley et al regarding strong implementation of EBP.[11] They believed that EBP helps in CDM patient care so they show interest in increasing use of EBP and improving

Table I: Barriers Regarding Evidence Based Practice

No	Barriers Towards EBP	Most %	Least%
1	Insufficient time	63.1	37
2	Lack of information resources	26.6	73.4
3	Lack of research skills	25.1	74.9
4	Poor ability to critically appraise the literature	23.2	76.9
5	Lack of generalizability of the literature findings to my patient population	24.6	75.3
6	Incompetence to implement research findings to specific patients with unique sign and symptoms	24.6	75.3
7	Lack of understanding of statistical analysis	24.6	75.3
8	Lack of mutual support among my co-workers in my workplace	26.1	73.9
9	Lack of interest	27.1	72.9

the skills necessary to incorporate EBP into their practice.[12]Physical therapists had identified a significant role to play in patient care and prevention yet had realized a wide gap exists between their ideal and actual levels of involvement as said by Johansson et al. in 2010.[13]The results of this study signify that further studies are needed to assess the content of EBP in the curriculum of the different medical institutions. Focus should also be put on knowledge and use of EBP integration at undergraduate, graduate and continuing professional development levels. Lack of time has been one of the major barriers perceived by the physical therapists in twin cities of Pakistan. In a study carried by Susanne Heiwe et al, it has also been found as a most common barrier that has increased over time.[3]There is a need of organization which regulate practice guidelines for PTs, so that they can implement EBP in their daily clinical practice. Institutes, rehabilitation centers and hospitals should have access to online databases.

Conclusion

Physical therapists of twin cities have a clear understanding of Evidence based Practice and they are interested in enhancing their skills for patient's betterment and its implementation. Insufficient time is the most common barrier in applying EBP during clinical practice.

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ORIGINAL ARTICLE

Comparative Evaluation of Peer Assisted Learning and Teacher Assisted Learning Using Small Group Discussion

Uzma Mussarat[1], Fatima Ehsan[2], Abeerah Zainub[3], Muhammad Hamza Bin Saeed[4], Uzma Hassan,[5] Saira Jahan[6]

ABSTRACT

Objective: To compare Peer assisted learning (PAL) and teacher assisted learning (TAL) in small group format comprising undergraduate dental students.

Study Design: Comparative cross-sectional study.

Place and Duration of Study: This study was conducted in Islamic International Dental College, Islamabad, from January 2019 to June 2019.

Material and Methods: Four batches of 2nd year BDS comprising of 75 students were randomly divided into two groups. Dental Material topic was selected for an interactive two-hour session, where one group was taught by teacher and other through peer. Session was followed immediately by a short test comprising of multiple-choice questions of single correct answer to assess students' performance. Moreover, a Likert scale-based questionnaire was used to identify the perception of students about these sessions. Comparison of MCQs test scores among the two groups was done using independent sample t test while Mann- Whitney test was applied for the Likert based questionnaire. For data analysis SPSS version 23 was used.

Results: Test results (marks) of TAL had a mean value of 13.72±1.55 and PAL as 12.34±2.3 with a significant p value of 0.01. Analysis of Likert scale-based data revealed that in PAL session competency level, grasping of concepts, student teacher interaction and motivation were significant factors, whereas level of interest and difficulty, time management, student participation and clinical correlation of the concerned topic were.

Conclusion: Teacher assisted learning was found to be better as compared to Peer assisted learning in our set up in terms of test scores and students' perception. Nonetheless, PAL can be utilized as an important supplement in online synchronous teaching especially during current pandemic situation.

Key Words: *Peer Assisted Learning (PAL), Small group discussion (SGD), Students' feedback, Students Scores, Teacher Assisted Learning (TAL).*

Introduction

Peer assisted learning (PAL) has gained significant momentum over recent years as a novel pedagogical learning methodology that is based on exchange of knowledge among individuals who are at similar social grouping and are not professional teachers.[1,2] Peer assisted study sessions is derived from the model of Supplemental Instruction, can be termed as peer-assisted learning that encounters a type of academic sustenance interference widespread in higher education as stated by Dr. Deanne Martin in 1973.[3] This concept of Peer Instruction was then incorporated by Eric Mazur at Harvard University in the 1990s in an attempt to improve his student's conceptual understanding with promising results[4]. Educators from a variety of countries have later used this method in diverse context to engage hundreds of thousands of students in active learning.[5,6] Over the past decade PAL has been a topic of interest for the researchers in the field of medical education which undergoes continuous reforms in teaching learning methodologies according to learning outcome of the students. With the incorporation of PAL in various developed countries as an adjuvant learning strategy, an increase in the participation of students in the learning process was observed along with enhanced critical thinking capability[7]. Majority of these researches used PAL at undergraduate level for skill based learning involving psychomotor skills.[7,8] Commonly adopted teaching methodologies are

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interactive lectures, small group discussions (SGDs), problem based learning (PBL) and practical demonstration in basic medical/dental Sciences.[9] In most of the developing medical universities a hybrid educational system is on its way with increasing attempts to shift from the traditional rote learning to more active student centered conceptual system.[10]

The literature review has shown that discussion with each other enhances cognitive development, motivation and confidence among students and build a deeper understanding of what they are learning.[11,12] This methodology is based on the theories of social constructivism and cognitive congruence where theorists suggest that learning is not a solitary struggle.[5] The general consensus woven is that compared to traditional lecture-based pedagogy, Peer Instruction has led to increased academic self-efficacy as in large-sample studies of PAL reporting lower failure rates even in tough courses.[13] In comparison to the traditional lecture method, PAL is rich with opportunities for feedback from student-to-student, teacher-to-student, and student-to-teacher enriching collaborative learning.[14] Recent local studies in this regard comparing effectiveness of peer assisted and facilitator assisted learning have mainly focused on clinical/practical subjects,[15,16] so to further explore the acceptance and perceived usefulness of PAL in basic dental sciences, we compared it with teacher assisted learning in a small group setting.

Materials and Methods

This comparative cross-sectional study was conducted at Islamic International Dental College, Islamabad from January 2019 to June 2019. Written approval for research study was obtained from Islamic International Medical College of Riphah International University under Reference number: Riphah/IIMC/ERC/19/307. Informed consent of learners was obtained for participation in the study. Non-probability Convenience sampling technique was used for this grouping. Second year students attending regular classes of Dental Materials were included in the study while qualified doctors acting as tutors and dental students of 1st yr, 3rd yr and 4th yr were not included in the study. Each class has four batches (i.e., A, B, C and D comprising of 15-19 students in each) with a total of 75 students. Two of the batches (C &D) were selected for PAL and the other two batches (A & B) assigned for TAL.

A two-hour session of SGD, which was part of their regular timetable was selected for this purpose. Students were informed beforehand about the trial and four of the students (two for each batch) were selected on voluntary basis as peer tutors. One week prior to the activity the topic was taught to these four selected peer tutors. Students in PAL group (C & D) were taught in two different rooms by these peer tutors under the supervision of teacher and for the students of TAL (A & B) SGD was arranged for the same topic in traditional way, in two separate rooms where subject specialists conducted the discussion. Subject selected for this trial was Dental Materials of Basic Dental Sciences. Assistant Professor of the DM chose the topic as well as designed the assessment, comprising of 15 MCQs of one correct option category including C1 (recall) and C2 (comprehension) level questions. In both the groups test was conducted after the discussion along with a Likert Scale based feedback questionnaire[10]. Three subject specialists vetted these MCQs to validate their construct. Students perceptions about peer assisted learning were congregated by using a questionnaire with a Likert scale that was self-constructed based on relevant literature and was validated by three medical educationist . Test Marks (i.e., quantitative data) were analyzed using independent sample t-test. Likert Scale based feedback responses were statistically analyzed using Mann-Whitney U test through SPSS 23.

Results

The class of 2nd year BDS comprised of 75 students and among them 69 (92%) participated in the study. A total of 37 out of 69 (53%) students were part of the Teacher Assisted Learning (TAL) group, while 32 (47%) students were part of PAL group.

Data analysis shown in Table I depicted that test results (obtained marks) of students in teacher assisted learning group had Mean±S.D as 13.72±1.55 while test scores of students in PAL group had Mean±S.D as 12.34±2.34 with the $p<0.05$ which was significant.

Question category-based data analysis shown in Table II depicted that in C1 level questions, TAL group had 20 correct responses out of 37 total responses (56%) as compared to PAL group who had 14 correct responses out of 32 (44%) and it was statistically

Table I: Comparison of Test Marks Between TAL & PAL

Groups	Test Marks (Mean±S.D)	Significance (p value)
TAL (A+B)	13.72±1.55	0.01 = <0.05
PAL (C+D)	12.34±2.34	

significant (p<0.05). Statistical analysis for C2 category showed that 37 participants of TAL attained 21 correct responses (59%) in comparison with PAL, where out of 32 only 13 responses were correct (41%) and it was not significant as p>0.05.

Table II: Comparison of Correct Responses Based on Question Category

Question Category	Group	Mean	Std. Deviation	Significance (p value)
C1	TAL	7.3784	.92350	0.001
	PAL	6.2813	1.63104	
C2	TAL	6.4054	.76229	0.158
	PAL	6.1250	.87067	

Likert-scale based feedback questionnaire showed that there was a significant difference between TAL and PAL in terms of teacher competency (p =0.002) , student teacher interaction (p=0.023), addressing queries (p =0.001) and motivation (p =0.034) while this was not significant (p>0.05) as far as lesson enjoy ability (p =0.054), clinical correlation (p =0.065), time adequacy (p =0.406) and participation (p =0.814) was concerned.

The frequency distributions of both the groups' responses as well as questions have been shown in the Fig.1 and Fig. 2.

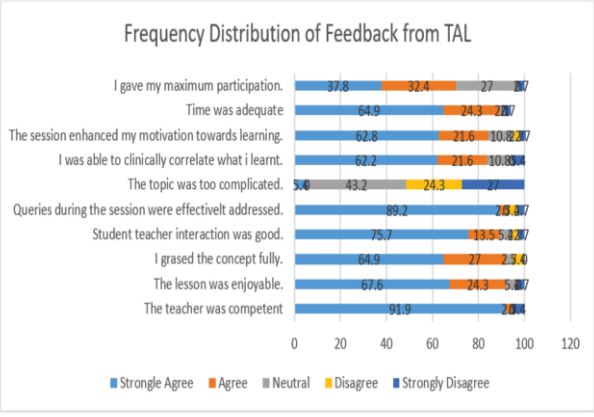

Fig. 1: Frequency Distribution of Feedback from Teacher Assisted Learning Group

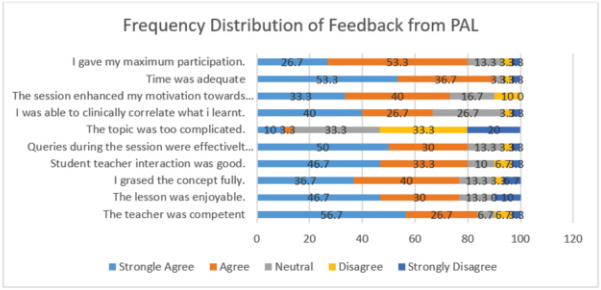

Fig. 2: Frequency Distribution of Feedback from Peer Assisted Learning Group

Discussion

PAL is embraced by medical educationalists for many years in the developed world with growing global acceptance all around[17]. Despite many advantages, we still need to ascertain how to maximize its suitability in our context and cultural background. Present study results show a significant difference in favor of TAL as compared to PAL when comparing overall student assessment scores. These findings may be due to the fact that teaching by experienced faculty or teachers to instruct their students enhance the comprehension and success among students. Our findings are in accordance with a study conducted at Dental Institute of Karachi with final year undergraduate students on the subject of orthodontics. In this study author narrates that comparing overall mean change in test scores of students, significantly better results were revealed by Expert assisted learning as compared to PAL.[19] Similarly, another local study is conducted in Foundation University Islamabad on 1st year medical students comparing PAL in small groups with all students as an adjunct to traditional large group lectures. Scores of PAL sessions were not better than EAL sessions in this study.[15] However student's views regarding these PAL sessions were not included in these studies. Better scores obtained by students of TAL group in our study may be elucidated due to the fact of acquaintance in our students with traditional faculty lead tutorials, where external encouragement act as a guiding factor in provoking critical thinking among students as compared to self-motivation which is integral part of peer tutoring.

Results of present study are in line with a study conducted by Hodgson and Bearman, who narrates that students' performance after teaching from subject specialist was better as compared to peer-

learning.[22] In contrast, during this study MCQS categorization based on C1&C2 level of cognition, C2 category result (depicting lower order thinking) but a step ahead than simple recall (C1) exposed no significant difference in the PAL and TAL test scores. These findings are in favor of a study conducted on dental students in the University of Sharjah which evaluated the role of PAL in team-based learning. A meta-analysis issued by Rees et al revealed that there was no difference in students taught by peers with those taught by faculty.[16] Results obtained from students survey and focus groups suggested that it was a valuable strategy for enhancing students' learning.[18] This encourages to initiate attempts for incorporating PAL as a supplemental teaching strategy. Regarding student's feedback they were more comfortable with the facilitator rather than their peer tutor. So far in most of the international studies PAL has a greater or equal impact on student learning. This could partly be explained by the fact that students experience a college culture which is still quite formal, and teacher centered. Further PAL here is still in its developmental stages and rather new for students.[13] Keeping in mind the racial difference it was observed in an American study that Asian students preferred listener role as compared to white Americans and were less comfortable in class discussions (Eddy et al, 2015) She highlighted that in jumping towards active learning where classrooms are transformed from facilitator centered to student centered we need to focus on students dynamics to understand their experiences and the various barriers to participate equally in classroom discussion.[20] Findings of present research based on Likert scale analysis including competency of teachers, addressing queries, student teacher interaction and motivation level during class are supported by a study conducted at Islamic International Medical College by Afsheen Zafar which accentuates the role of an expert or subject specialist in academic set up. She adopted an innovative approach of PAL in large class format highlighting that teacher's feedback and background collaborative learning still remained the most valued aspect of this format.[21]

We cannot deny the social interactive theory which emphasizes the role of social interaction among students of same age group in educational set up. Hence our study result favors the finding of Menezes et al who also found in his study that interest is expressed in both styles of knowledge acquisition (PAL versus traditional) where 57% students recorded no difference in learning in both styles of learning and 80 % notified no difference in teaching.[8] Nonetheless, there is more research needed to fully measure the potential benefits of PAL in our local set up especially in today's era of blended learning. We need to find ways of utilizing this PAL in synchronous teaching which may help to alleviate faculty load in addition to enriching students learning.

Study limitations

This study could be improved if the sample size, total no. of PAL sessions and more assessment results would be added to generate a valued and effective response.

Future Work

More extensive research and training on the process of PAL for acceptability and better results.

Conclusion

Teacher assisted learning is proved to be more inspiring approach for student learning as compared to Peer assisted learning in our set up based on test scores and students' perception. Nevertheless, PAL can be applied as an imperative support and valuable learning tool in upraising student's performance especially as a supplement in online synchronous mode of teaching in medical and dental institutes

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MATERIAL FOR PUBLICATION

The material submitted for publication may be in the form of an original research (Randomized controlled trial – RCT, Meta-analysis of RCT, Quasi experimental study, Case Control study, Cohort study, Observational Study with statistical support, etc.), a Review Article, a Case Report, Recent Advances, New Techniques, Debates, Book/CDs Review on Clinical/Medical Education, Adverse Drug Reports or a Letter to the Editor. Survey Articles and Studies more than five years old at the time of submission are not accepted for publication in JIIMC. Non-English articles are not accepted for publication in JIIMC.

ORIGINAL ARTICLES should report original research of relevance to clinical medicine and may appear either as papers or as short communications. The original paper should be of about 2000-2500 words excluding abstract and references. The abstract should be structured of about 250 words. Three to 10 keywords should be mentioned at the end of the abstract as per MeSH (Medical Subject Headings). There should be no more than four tables or illustrations. The data should be supported with 20 to 25 locals as well as international references. More than 50% of the references should be from the last five years.

SHORT COMMUNICATIONS should be about 1000 words, with a non-structured abstract, two tables or illustrations and 5 references.

CLINICAL CASE REPORT should be of academic value and provide relevance of the disease being reported as rare or unusual. The word count of the case report should not be more than 800 words with 3- 5 key words. The abstract should be non-structured of

about 150 words (case specific) with a maximum of 5 references. It should not include more than 2 figures and one table.

REVIEW ARTICLE should consist of structured overview of relatively narrow topic providing background and recent development with reference of original literature. An author can write a review article only if he/she has written a minimum of three original research articles and some case reports on the same topic. Review articles should be of 2500 to 3000 words with a non-structured abstract of 150 words and minimum 3 key words.

LETTERS TO THE EDITOR should normally not exceed 400 words, have no more than 05 references and be signed by all the authors-maximum 3 are allowed. Preference is given to those that take up points made in contributions published recently in a journal. Letters may be published with a response from the author of the article being discussed. Discussions beyond the initial letter and response will not be entertained for publication.

OBITUARIES should be of about 250 words.

EDITORIALS are written by invitation.

DISSERTATION/THESIS BASED ARTICLE An article based on dissertation/thesis submitted as part of the requirement for a postgraduate degree (M. Phil, FCPS, MS) can be sent for publication after it has been approved by the institution's ethical review board/committee and the college/university evaluation committee/board. The data should not be more than five years old. Thesis/dissertation-based articles will be assessed by proper review process. Once accepted for publication, disclosure will be made that 'it is a Dissertation based article.'

GENERAL ARCHIVAL INSTRUCTIONS

The manuscript should be typed in MS Word. Each manuscript should include a title page (containing email address, cell numbers, institution, and postal address of the corresponding author), abstract, key words, text, acknowledgements (if any), references, tables (each table, complete with title and footnotes) and legends for illustrations and photographs. Each component should begin on a new page. Sub-headings should not be used in any section of the script except in the abstract.

TEXT ORGANIZATION

All manuscripts except Short Communication and Letter to the Editor should be divided into the following sections.

ABSTRACT

Abstracts of original article should be in structured with following sub-headings:

- Objective
- Study Design
- Place & Duration of Study
- Materials & Methods
- Results
- Conclusion

Four elements should be addressed: "why did you start?", "what did you do?", "what did you find?" and "what does it mean? “.” Why did you start?" is addressed in the objective. "What did you do?" constitutes the methodology and could include design, setting, patients or other participants, interventions, and outcome measures. "What did you find?" is the 'results', and "what does it mean?" would constitute the conclusions. Please label each section clearly with the appropriate sub-headings. Structured abstract for an original article, should not be more than 250 words. At least 3 key words should be written at the end of the abstract. Review articles, case reports and others require a short, unstructured abstract. Commentaries do not require an abstract.

INTRODUCTION

Write this section with references as per following instructions:

1. Give background information about the subject matter and the issues your study intends to address. Only strictly pertinent references should be cited, and the subject should not be extensively reviewed.
2. Describe what is known (in the literature) and what is not clear about the subject with reference to relevant literature thus identifying the literature gap.
3. You write the rationale (justification) of your study.
4. Finally, you mention the objective of your study

MATERIALS AND METHODS

Methodology is written in past tense.

Follow this sequence **without headings:**

- Study design
- Place and Duration of Study
- Sample size
- Sampling technique
- Mention about permission of the ethical review

board and other ethical issues addressed.

- Inclusion and Exclusion Criteria
- Data collection procedure-
- Type of data: parametric or nonparametric
- Data analysis: including Statistical Software used, and statistical test applied for the calculation of p value and to determine the statistical significance. Exact p-values and 95% confidence interval (CI) limits must be mentioned instead of only stating greater or less than level of significance. All percentages must be accompanied with actual numbers.

RESULTS

These should be presented in logical sequence in the text, tables, and illustrations. All the data in the tables or illustrations should not be repeated in the text; only important observations should be emphasized or summarized. No opinion should be given in this portion of the text.

DISCUSSION

This section should include the author's comments on the results. Write in present tense, active voice except for results, which are written in past tense. It should be written in following sequence:

- First, very briefly summarize, Interpret and discuss main results and don't merely repeat the results.
- Discuss key studies relevant to your study.
- Compare your work with other's work.
- Describe limitations of your study.
- Suggest future work if necessary.

CONCLUSION

Conclusion should be provided under a separate heading. It should be in congruence with the objective. No recommendations are needed under this heading.

REFERENCES

References must be written in Roman Number and in the Vancouver Style only. References should be numbered in the order in which they are superscripted in the text. At the end of the article, the full list of references should give the names and initials of all authors (unless there are more than six when only the first six should be given followed by et al). The author's names are followed by the title of the article; title of the journal abbreviated according to the style of the Index Medicus (see "List of Journals Indexed", printed yearly in the January issue of Index Medicus); year, volume, and page number, e.g., Hall, RR. The healing of tissues by C02 laser. Br J. Surg: 1970; 58:222-225. References to books should give the names of editors, place of publication, publisher, and year. The author must verify the references against the original documents before the article. References to papers accepted but not yet published should be designated as "in press" or "forthcoming"; authors should obtain written permission to cite such papers as well as verification that they have been accepted for publication.

TABLES AND ILLUSTRATIONS

Tables and illustrations should be merged within the text of the paper, maximum number of tables and illustrations should not exceed four, and legends to illustrations should be typed on the same sheet. Tables should be simple and should supplement rather than duplicate information in the text; tables repeating information will be omitted. Each table should have a title and be typed in double space without horizontal and vertical lines on an 8 ½" x 11' paper. Tables should be numbered consecutively with Roman numerals in the order they are mentioned in the text. Page number should be in the upper right corner. If abbreviations are used, they should be explained in footnotes and when they first appear in text. When graphs, scattergrams, or histograms are submitted, the numerical data on which they are based should be supplied. All graphs should be made with MS Excel and be sent as a separate Excel file even if merged in the manuscript. For scanned photographs the highest resolution should be used.

S.I.UNITS

System International (SI) Unit measurements should be used. All drugs must be mentioned in their generic form. The commercial name may however be mentioned within brackets, if necessary.

PHOTOGRAPHS AND FIGURES

Figures and Photographs should only be included when data cannot be expressed in any other form. Figures and photographs must be cited in the text in consecutive order. Legends must be typed on the same paper. Legends for photomicrographs should indicate the magnifications, internal scale, and method of staining. Figures should be numbered in Arabic numbers.

OBLIGATORY FILES

Obligatory supporting documents for all types of Manuscripts except the letter to editor, without which JIIMC will not accept the manuscript for initial processing.

- Cover Letter
- JIIMC Checklist
- JIIMC Conflict of Interest Performa
- JIIMC CopyRight and Undertaking Agreement
- IRC Certificate
- Bank draft as initial processing fee (Original bank draft send in JIIMC office)

Template of these files is available in the download section.

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Any funding source for the research work must be informed at the time of submitting the manuscript for publication in JIIMC. Any associations that might be construed as a conflict of interest (stock ownership, consultancies, etc.) shall be disclosed accordingly. Examples of financial conflicts include employment, consultancies, stock ownership, honoraria, paid expert testimony, patents or patent applications, and travel grants, all within 3 years of beginning the work submitted. If there are no conflicts of interest, authors should state that. All authors are required to provide a signed statement of their conflicts of interest as part of the author's declaration.

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- Author is supposed to declare the funding source as acknowledgement at the end of the manuscript.
- Author will describe the role of the study sponsor (s), if any, in study design; in the collection, analysis, and interpretation of data; in the writing of the report; and in the decision to submit the paper for publication.
- If there is no Methodology section, the role of the funding source should be stated as an acknowledgment.
- The corresponding author should confirm that he/she had full access to all the data in the study and had final responsibility for the decision to submit for publication.
- JIIMC publishes FINANCIAL DISCLOSURE & ROLE OF THE FUNDING SOURCE statement for each article.

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2. Have been involved in drafting the work or revising it critically for important intellectual content; and
3. Have given final approval of the version to be published; and
4. Agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

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Each manuscript submitted to JIIMC is assessed by an editor for an initial assessment (internal peer review). The article is checked for similarity Index with plagiarism detection Software, "TURNITIN". Manuscript suitable for publication is forwarded to two external peer reviewers to evaluate the suitability of the article for publication based on its quality, novelty, and relevance. A time frame of minimum 2 weeks are given to the reviewer to send their suggestions to the editor. If a reviewer is unable to meet the time frame agreed upon or he declines to review the manuscript, the manuscript will be sent to another reviewer. The editor may ask reviewers to make recommendations regarding acceptance or rejection of manuscripts, but the editor must be the one who makes the decisions. The editor may reject manuscripts without outside review, for example if the subject matter is outside the purview of the journal, a manuscript on the same topic is just about to be published, the quality of the manuscript is poor, or criteria for the submission of manuscripts are not met.

MANUSCRIPT EVALUATION/PEER REVIEW PROCESS

Submission, Screening, and Triage

- Each manuscript submitted to JIIMC is checked by the editorial office for mandatory documents, including author's copyright and undertaking agreement, ethical approval letter and article evidence. Manuscripts with incomplete or deficient mandatory documents or not prepared according to the JIIMC instructions for authors are returned to authors for correction prior to further processing.
- After initial scrutiny the manuscript is assessed by an editor for its originality, significance, and suitability as per scope and format of the journal.
- At this stage the editor may reject the manuscript if deemed unsuitable for the journal, the quality of the manuscript is poor, the subject matter is outside the scope of the journal or criteria for the submission of manuscripts are not met.
- The article is checked for similarity Index with plagiarism detection software, "TURNITIN". Articles exceeding the limit of similarity as per HEC policy are returned for clarification and/or correction.
- Revised manuscripts are assessed on the appropriateness of response to recommendations during initial review. Once the editor is satisfied with the suitability of the manuscript, it is forwarded to subject experts for external peer review.

Peer Review

- Manuscript suitable for publication is forwarded to two external peer reviewers to evaluate the suitability of the article for publication based on its quality, novelty, and relevance.
- A time frame of minimum 4 weeks is given to the reviewer to send their suggestions to the editor. In case of delay by the reviewer, a reminder is sent to the external reviewer.
- If a reviewer is unable to meet the time frame agreed upon or he declines to review the manuscript, the manuscript will be sent to

another reviewer.

Final Decision

- The editor may ask reviewers to make recommendations regarding acceptance or rejection of manuscripts and gives weightage to the recommendations given by them, but the editor must be the one who makes the decisions.
- Suggested revisions by the reviewer are sent back to authors for corrections/revision and resubmission within 04 week. Authors are required to send a covering letter mentioning the details of corrections/amendments and revisions.
- If reviewers and editors are satisfied with the changes, the manuscript is accepted and assigned to the future issue for publication.
- The editor/copy editor reserves the right to edit the accepted article as per format of the journal.
- The editor may reject manuscripts without outside review, for example if the subject matter is outside the purview of the journal, a manuscript on the same topic is just about to be published, the quality of the manuscript is poor, or criteria for the submission of manuscripts are not met.

POLICY ON RESEARCH AND PUBLICATION ETHICS

JIIMC promotes research integrity and adherence to the basic values of research including honesty, objectivity, openness, and accountability. The researchers interested to submit their manuscripts to JIIMC are expected to follow the culture of responsible research. JIIMC follows the core practices of COPE and deals with the research and ethical misconduct as per COPE guidelines. We also follow the guidelines of International Committee of Medical Journal Editors (ICJME), World Association of Medical Editors (WAME) and Higher Education Commission of Pakistan (HEC) to meet the standards of publication ethics.

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- JIIMC expects from the research authors to ensure the safety and protection of the research participants by adhering to national and international guidelines.
- The authors of research articles will submit testimony related to any issue with human and animal rights that may be inherent in their submissions.
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doubtful aspects of research.

Informed Consent and Confidentiality of Research Participants

- In case of research on human subjects, in addition to an ethical approval certificate an undertaking that "informed consent to participate" was taken from adult participants and/or from parents/guardians of participants under 16 years of age will be submitted by the authors. This should also be mentioned in the material and methods section.
- Consent must be obtained for all Case Reports, Clinical Pictures, and Adverse Drug Reactions.
- Authors should avoid identifying patient information, including patients' names, initials, or hospital numbers, in written descriptions, photographs, and pedigrees unless the information is essential for scientific purposes and the patient (or parent/ guardian) gives written, informed consent for publication.
- Consents might be required by the editor on images from participants in the study. Consent form must be made available to Editors on request and will be treated confidentially.
- Informed consent should be obtained if there is any doubt that anonymity can be maintained, e.g., masking the eye region in photographs of patients is inadequate protection of anonymity."
- Masked Study Participants- If identifying characteristics are altered to protect anonymity, such as in genetic malformations, authors should provide written assurance to the editors that alterations do not distort scientific meaning.
- Authors are suggested to follow the CARE guidelines for case reports.

ANIMALS' RIGHTS POLICY

- Research conducted on animals is published in JIIMC. The research contributors are expected to strictly follow the national and international guidelines for the care and use of laboratory animal in research.
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- *To verify compliance with the above policies, the authors must fulfill the following requirements:*
- Ethical review committee/board's approval certificate indicating that the study protocol was in accordance with international, national, and/or institutional guidelines.
- Declare that the experiments on animals were conducted in accordance with local Ethical Committee laws and regulations as regards care and use of laboratory animals.
- A signed letter certifying that legal and ethical requirements were met with regards to the humane treatment of animals described in the study.
- Mention in the Methods (experimental procedures) section that appropriate measures were taken to minimize pain or discomfort, and details of the care provided to the animals.

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An addendum is decided on the significance of the addition to the interpretation of the original publication. Addenda do not contradict the original publication, but if the authors inadvertently omitted significant information available to them at the time of submission. This material will be published as an addendum after peer review.

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