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RETRACTED ARTICLES

J Med Sci 2024 January Vol: 32, No: 1

FREQUENCY OF THE KNEE POSTEROLATERAL CORNER INJURY IN COMBINATION WITH ANTERIOR CRUCIATE LIGAMENT INJURY

Riaz Muhammad, Syed Dilbagh Ali Shah

J Med Sci 2024 January Vol: 32, No: 1

MORTALITY AND LENGTH OF HOSPITAL STAY IN PATIENTS WITH LIVER CIRRHOSIS BASED ON THEIR MELD SCORE

Hamza Ali Khan, Nizam Ud Din, Saleem Iqbal, Ghulam Abbas, Muhammad Yousaf, Badar Mahmood Shah, Shah Umam
Department of Medicine, Khyber Teaching Hospital, Peshawar - Pakistan

EDITORIAL

DO WE NEED TO INCREASE THE PASSING PERCENTAGE OF MBBS STUDENTS IN PAKISTAN?

Lubna Kashif

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This article may be cited as: Kashif L. Do We Need To Increase The Passing Percentage Of Mbbs Students In Pakistan?. J Med Sci 2024 April-June;32(2):119-120

The importance of medical personnel in healthcare settings cannot be understated. Therefore, the best caliber of patient care must be reflected in the knowledge, abilities, and standards set for medical education. By establishing higher benchmarks, we enable physicians to meet the demands of their work, ongoing advancement, and creative approaches to healthcare delivery. Higher standards improve the mentality of educators and legislators and result in better-prepared healthcare workers. Recently, the accrediting and regulating organizations in Pakistan are endeavoring to improve the quality of medical education at the basic and postgraduate levels. For this purpose, the 50% set standard marks attainment is being challenged to increase it to 60-70%. This might create unrest among the medical students. This discussion aims to highlight the pros and cons of enhancing the set standard/benchmark of 50% in both theory and practical summative assessments.

Due to the introduction of Artificial intelligence platforms, the easy availability of teaching and learning opportunities, quick access to assessment items and vulnerabilities of the institutional questions banks to students, there is a fear that the 50% benchmark of passing might result in the following:

1. Diminished Credibility: Stakeholders may begin to question the legitimacy of medical education if a large number of students are passing with minimal effort.
2. Inflated sense of Achievement: Students may feel that they have achieved something without having to put in much effort if passing the medical exam becomes so easy, which may discourage them from staying up to date on the most recent advancements in knowledge.
3. Impact on Quality Care: A low passing score may result in less than optimal patient care since inadequate knowledge may cause the patient to receive the wrong diagnosis and treatment, which would be harmful.
4. International Recognition: Medical degrees are accepted around the world under predetermined criteria. A low pass rate could compromise the legitimacy of medical degrees from specific universities, hence limiting graduates' options for work and international education.

Therefore, it is justified that the set standards of 50% passing among the medical schools should be revisited in consultation with all the stakeholders and to develop mechanisms to enhance it carefully with the following intent:

1. Maintaining Professional Integrity: Raising the passing rate emphasizes the importance of the future doctors' role in society and instills in them a sense of obligation and responsibility. Increasing the pass rate underscores the significance of the future physicians' position in society and fosters a sense of duty and accountability in them.
2. Assuring Competency: Because medicine is so important, it demands a high degree of skill and competence. Increasing the bar guarantees that only people who possess a deep comprehension and aptitude will be allowed to practice medicine.

Raising the standard is only one aspect of improving the passing rate for the MBBS exam; another is demonstrating a dedication to patient safety, ethics, and excellence in healthcare.

In conclusion: It is critical to strike a compromise between upholding standards and making sure that everyone can still attend medical education. Any modifications to the passing rate ought to be closely observed in light of how they may affect the standard of instruction provided to aspiring physicians. A higher passing rate has the potential to inspire or deter students. Institutions must review their curricula and methods of instruction to get students ready for the new passing requirements.

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ORIGINAL ARTICLE

CLINICOPATHOLOGICAL CHARACTERISTICS OF CARCINOMA BREAST PATIENTS PRESENTING TO THE SURGICAL UNIT OF A TERTIARY CARE CENTRE IN PESHAWAR

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ABSTRACT

Objective: To determine the clinical and pathological features of patients with breast cancer presenting to the surgical unit of a tertiary care center in Peshawar.

Materials and Methods: This cross-sectional descriptive study was conducted in Khyber Teaching Hospital, Peshawar from 1st January 2022 to 31st December 2022. Cases referred to the surgical unit for workup of breast cancer were recruited into the study by non-probability purposive sampling. After taking a detailed history and physical examination, a true cut biopsy of the breast lump was taken and sent for histopathology, receptor studies, and Ki67 scoring. Cases that were diagnosed previously in other hospitals were excluded. Data regarding age, menopausal status, histopathological diagnoses, receptor status, and stage of cancer were recorded and analyzed using SPSS version 26. Mean and standard deviation were used for quantitative variables while frequency and percentages were used for qualitative variables.

Results: 230 patients with breast cancer were included in the study. The mean age of the study sample was 43±12.94 (range:17-85) years. 123 (53.5%) cases were premenopausal. Invasive ductal carcinoma was the most common diagnosis which was seen in 175 (76.1%) cases. Receptor status for estrogen and progesterone was positive in 135 (59.4%) and 107 (47.3.5%) cases respectively. 123 (53.3%) cases presented in the early stage of the disease while 34 (14.8%) cases were in the metastatic phase.

Conclusion: Breast cancer presents at an early age in our population. Half of the affected population is premenopausal. Receptor status for estrogen and progesterone was positive in almost half of the population. Invasive ductal carcinoma breast is the most common diagnosis in our setup. Almost half of the population presents with the early stage of the disease.

Keywords: Estrogen receptors, Invasive ductal carcinoma breast, Ki-67, Progesterone receptors.

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INTRODUCTION

Breast carcinoma is a malignant disorder of breast tissue. It usually presents as a palpable mass in breast tissue. Treatment depends on the stage, receptor status, and grade of the disease. With advancements in diagnostic modalities, it is now possible to diagnose the disease in the early phase which results in improved survival. [1] However, most of the patients present when the metastasis has already occurred, in which case, it is associated with poor outcomes. [2, 3] Worldwide, breast cancer is the most common malignancy of women and a leading cause of death. [4, 5] 2 million new cases are diagnosed every year globally. [2] Breast carcinoma is the most common malignancy in women worldwide including in Pakistan. [4, 5] Pakistan has the highest incidence of breast cancer where it represents about 40% of all tumors in women. [5, 6] According to surveys, it is the most common cancer in females of Khyber Pakhtunkhwa. [6, 7]

Disease prognosis depends on the age of presentation, stage, grade, and receptor status of the tumor cells. Patients below 40 years of age present with aggressive disease. [8] The tumor cells express estrogen receptors (ER), progesterone receptors (PR), or human epidermal growth factor receptor 2 (HER 2). [9] Expression of ER and PR is associated with better overall survival and vice versa. [10, 11] HER2 overexpression is associated with relapsing disease and poor survival. [12, 13] Ki-67, a marker of tumor proliferation, is associated with poor outcomes. [14-16]

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Younger patients tend to have high Ki-67 scores and thus poor outcomes. Mutated BRCA1 and BRCA2 genes cause aggressive disease and that too in younger age. [8]

The population of Pakistan is heterogeneous with diverse ethnic groups living in different provinces. The disease presentation varies from place to place depending on the socio-economic status of the population. Therefore, the current study is conducted to determine the clinical and pathological characteristics of patients with breast carcinoma in Peshawar.

MATERIALS AND METHODS

This cross-sectional descriptive study was conducted in the Surgical unit of Khyber Teaching Hospital, Peshawar from 1st January 2022 to 31st December 2022. Khyber Teaching Hospital is a 1300-bed tertiary care center in northwestern Pakistan.

All patients diagnosed with carcinoma breast at our one-stop clinic as well as the cases diagnosed on core biopsy in other centers and referred to us were included in this study through a non-probability purposive technique. Patients with incomplete work-up or inappropriately managed in the periphery were excluded from this study. TNM staging, receptor status for estrogen, progesterone, and Ki-67, and histopathological diagnosis were determined and recorded on proformas. Data was analyzed using SPSS version 26 and results were drawn accordingly. Mean and standard deviation were used for quantitative variables while frequency and percentages were used for qualitative variables.

RESULTS

230 cases of breast cancer were included in the study. The mean age of the study sample was 43±12.94 (range:17-85) years. Different age groups of the study sample are shown in Figure 1. The menopausal status of participants, histopathological diagnosis, and receptor status are shown in Table 1. Staging is shown in figure 2 and 3

Tis: carcinoma in situ. T1: tumor 2cm or less in greatest dimension. T2:>2 cm and <5cm, T3: > 5cm. T4: tumor of any size, extension to skin or chest wall. N0:no regional lymph node involvement. N1: metastasis to mobile ipsilateral node. N2: metastasis to ipsilateral axillary nodes fixed to one another. N3: metastasis to ipsilateral internal mammary nodes, M0 : No distant metastasis, M1: distant metastatic

Table No 1: Characteristics of study participants (n=230)

Characteristics		n (%)
Menopausal status		
Pre-menopausal		123 (53.5%)
Post-menopausal		107 (46.5%)
Diagnosis		
Ductal carcinoma in situ (DCIS)		11 (4.8%)
Invasive ductal carcinoma (IDC)		203 (88.3%)
Invasive lobular carcinoma (ILC)		12 (5.2%)
Mucinous carcinoma		1 (0.4%)
Squamous cell carcinoma		3 (1.3%)
Receptor status		
ER (n=227)	Positive	135 (59.4%)
	Negative	92 (40.5%)
PR (n=226)	Positive	107 (47.3%)
	Negative	119 (52.6%)
HER-2 (n=216)	Positive	48 (22.2%)
	Negative	168 (77.7%)
Triple negative	-	57 (24.7%)
Ki-67 (n=86)	Low grade (score <14)	21 (24.4%)
	Intermediate grade (score 14-20)	21 (24.4%)
	High grade (score >20)	44 (51.2%)

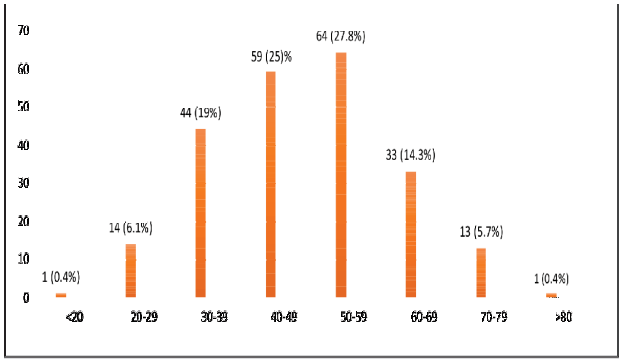

Fig 1: Age groups of breast cancer patients (n=230)

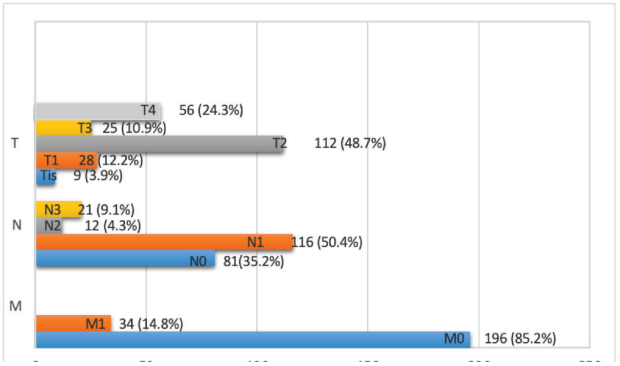

Fig 2: TNM staging of study participants (n=230)

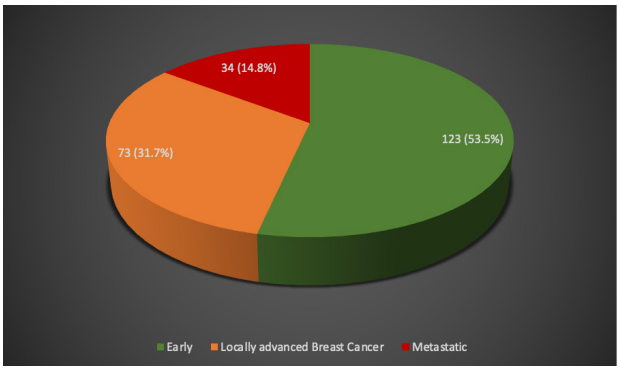

Fig 3: Clinical staging of study participants (n=230)

DISCUSSION

Breast carcinoma is the most common malignancy in women worldwide. It is associated with significant morbidity and mortality. In resource-limited countries like ours, it is a challenge for the healthcare system to cope with the high burden of disease. Although a national screening program seems to be an unattainable solution soon, the importance of breast self-examination is being highlighted in the breast cancer awareness programs at a national level in Pakistan.

In our study, the mean age of females diagnosed with breast cancer was 43 years (mode:44 years). Khan R et al recently reported a similar finding where the median age at diagnosis in breast cancer patients was 45 years. [4] Similar findings are reported by various local studies. [5, 7, 18, 19] In contrast to our national figures, the disease appeared at a much later age i.e. 60-70 years ago in the Western world. [8, 20-23] The reason for breast cancer presenting early in our setup is unclear. However, genetic and environmental factors may play a role.

It was observed in the current study that almost half the patients presenting with breast carcinoma were pre-menopausal. A similar characteristic is reported by Badar F et al from Agha Khan University, Lahore. [18] Invasive ductal carcinoma was the most common diagnosis in patients in our study. Similar data is reported by various local and international studies done so far where invasive ductal carcinoma was the most common type of breast cancer. [5, 18, 24-26]

TNM staging of the patients in the current study showed that 14.8% of cases were in stage IV of the disease. A study from Faisalabad showed that 21.7% of cases were in stage IV of the disease which is quite high compared to the figures in the current study. [5] We believe that the initiation of breast cancer awareness campaigns in Peshawar has encouraged a lot of females to seek medical consultation quite early in their disease.

Over the past few decades, tumor biology has been recognized as the most crucial element in determining its potential to spread. It is no longer the size but the receptor status that predicts not just the outcomes but also the response to treatment as well as the risk for recurrence. [3] ER and PR receptor status is associated with good outcomes while HER2 expression in breast cancers is associated with increased risk of relapse and poor outcome. [3, 27] In our study, ER and PR status was positive in almost half of the patients, only 22.2% of patients showed positive HER2 receptor status, while 24% of cases were triple negative. Similar expression patterns are shown by various local and international studies. [3, 16, 18] However, the Ki67 score in our study was >20 in about 50% of the patients, which is very high as compared to the 29.2% reported by Xueyang et al from China. [16]

In the current study, 53.5% of the patients presented with early disease while 31.7% with Locally advanced breast cancer (LABC). The increasing number of patients being diagnosed with early disease in our setup is attributed to the breast cancer awareness program initiated in Khyber Teaching Hospital. The literature suggests that the incidence of LABC is high in Asian countries as compared to Western countries where its incidence is 10-0%. [4] The reported incidence of LABC in Malaysia is 50-60%, and that in Singapore is 21%. [4]

The current study showed that about 14.8% of patients presented with metastatic disease. This is higher as compared to Western countries where about 5-10% of cases present with metastatic disease. [16] In another study done by Badar F from Lahore, about 4.3% of patients presented with metastatic disease which is quite below that reported in our study.[18] However, in a recent study done by Sohail et al, about 40.% cases presented with metastasis. [3] The reason for a higher rate of metastatic disease in our setup is attributed to late presentation to clinics and this in turn depends on lack of knowledge, high illiteracy rate, and poor socioeconomic status of our population.

CONCLUSION

Breast cancer presents at an early age in our population. Half of the affected population is premenopausal. Receptor status for estrogen and progesterone was positive in almost half of the population. Invasive ductal carcinoma breast is the most common diagnosis in our setup. Almost half of the population present with the early stage of the disease while a very scanty proportion of patients present with metastatic disease at diagnosis.

To tackle the high rate of metastatic disease and LABC, it is recommended to initiate campaigns to spread

awareness among the population regarding Breast cancer. The population should be motivated to report any lump in the breast. Initiation of a screening program for the BRCA gene in high-risk populations with a positive family history of breast cancer will further lessen the burden of disease.

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Authors Contribution:

Following authors have made substantial contributions to the manuscript as under

Authors	Conceived & designed the analysis	Collected the data	Contributed data or analysis tools	Performed the analysis	Wrote the paper	Other contribution
Sahar S	✓	×	✓	×	✓	×
Ali IS	✓	✓	×	✓	✓	×
Wahid A	×	✓	×	×	✓	×
Khan M	✓	✓	✓	×	✓	✓

Authors 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.

Ethical Approval:

This Manuscript was approved by the Ethical Review Board of Khyber Medical College, Peshawar. Vide No. 807/DME/KMC.

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ORIGINAL ARTICLE

FREQUENCY OF OBESITY IN PATIENTS WITH TYPE 2 DIABETES MELLITUS

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ABSTRACT

Objective: To determine the frequency of Obesity in patients with Type 2 Diabetes Mellitus in patients visiting the Outpatient department of Khyber Teaching Hospital, Peshawar

MATERIALS AND METHODS. This descriptive cross-sectional study was conducted in the Department of Medicine Khyber Teaching Hospital Peshawar after approval from the hospital's ethical committee. All type 2 diabetes mellitus patients fulfilling inclusion criteria, presented to medical OPD and ward were interviewed in detail. Relevant information like age, gender, height weight, etc. recorded using proforma. BMI was calculated using height and weight. Patients with RBS of more than 200 mg/dl and symptomatic were labeled as having diabetes (American diabetes association). Patients with a BMI of more than 25kg/m2 were labeled as having obesity (Asian Pacific criteria). Data was analyzed using SPSS version 20 and presented in tables.

RESULTS. The mean and standard deviation (SDs) for age were recorded as 56±9 years. Mean and SDs for height were recorded as 1.5± 0.8 meters. Mean and SDs for weight were recorded as 65±12 kilogram. Mean and SDs for random blood sugar were recorded as 238±77 mg/dl. Mean and SDs for BMI were recorded as 26±5. One hundred and eighty-nine (49.2%) patients were female and 195(50.8%) were male. Two hundred and seven (53.9%) patients were recorded as obese and 177(46.1%) were recorded as non-obese.

CONCLUSION. In our study, we found that the majority of type 2 diabetes mellitus patients were obese. Thus, by adopting a healthy lifestyle we can reduce and delay the onset and morbidity associated with diabetes mellitus.

KEYWORDS Diabetes mellitus (DM), Body mass index (BMI), Random blood sugar (RBS), Glycated hemoglobin (HBA1C).

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INTRODUCTION

Obesity is generally considered a pandemic, with potentially devastating concerns for human health. [1] Approximately one-fourth of adults in the United Kingdom were obese in 2006 compared with 7% frequency in the 1980s. [2] Worldwide more than 1 billion people have obesity and among them 650 million are adults. World obesity atlas 2023 predicts that more than half of the global population will be living with overweight and obesity in the next 12 years. [3] The percentage of obesity in Pakistan in 2023 is estimated to be 9.8 %.[4] Obesity has an adverse influence on mortality and morbidity. Obesity at the age of 40 years and older reduces survival by up to seven years for non-smokers and by thirteen years for those who smoke. Coronary artery disease (CAD) is the leading cause of death in people with obesity. [1]

Diabetes mellitus is viewed as an epidemic. [5] Centers for Disease Control and Prevention (CDC) approximates that 28 million US citizens have diabetes mellitus. This disease affects 9.3% of the US population and 12% of people over the age of 20 years. [6] Globally the number of people with diabetes mellitus (DM) has increased from 108 million in the 1980s to approximately 422 million in 2014. [7] In 2021 537 million adults will be living with diabetes and this number is predicted to rise to 643 million by 2030. [8] This worldwide pandemic mainly includes type 2 diabetes mellitus and is connected with inordinate longevity, obesity, inactive lifestyle, and growing urbanization. [9] According to the international diabetes federation, 26.7 % of adults in Pakistan are affected by diabetes in 2022 and rank third in the world. The prevalence increased to 30.8

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% in 2023. [10]

Obesity is a key modifiable risk factor for diabetes mellitus. [11, 12] Overweight body habitus and obesity have been linked with profound healthiness concerns comprising; Hypertension (HTN), lipid disorders, diabetes, stroke, degenerative joint diseases, gallstones, lung diseases, psychosomatic and emotional distress. [13, 14] Obesity has further been associated with poor control of hypertension, dyslipidemia, and hyperglycemia in patients with diabetes mellitus type 2. [15]

Obesity leads to insulin resistance, although the precise mechanism is not recognized. [16] The risk of diabetes mellitus 2 increases exponentially with an increase in the body mass index (BMI). [17]

Obesity affects not only the inception but also the progression of diabetes mellitus 2. [18] Patients with diabetes mellitus 2 who lose weight have improved glycemic control. [19] The intention to lose weight is linked with a decreased risk of all-cause mortality, irrespective of the target weight being achieved or not. [20] The relationship between diabetes mellitus and obesity has been augmented by the fact that people with diabetes mellitus put off weight much harder as compared to the general population. [21] It is anticipated that there will be a mounting burden of diabetes mellitus 2 among adults aged 20 years to 79 years. It is estimated that 86 % of type 2 diabetics are overweight, 52 % are obese and 8 % have morbid obesity in UK. [22]

This study aims to find the local frequency of obesity in patients with type 2 diabetes mellitus as local data on the subject is lacking. Diabetes is a common disease and the burden of disease is increasing day by day. The data will be helpful in the management of patients with type 2 diabetes in this part of the world by showing them local results. This will also be helpful for the health department to promote a healthy lifestyle, and that weight loss is associated with better diabetes control.

The objective of the study was to determine the frequency of obesity in patients with type 2 diabetes mellitus.

MATERIAL AND METHODS

This descriptive cross-sectional study was conducted at the Department of Medicine Khyber Teaching Hospital Peshawar after approval from the hospital's ethical committee (21 February 2022). The sample size was 384 using 52 % frequency of obesity in patients with type 2 diabetes mellitus, 95 % confidence interval, and 5 % margin of error on the WHO sample size calculator.[23] A non-probability consecutive sampling technique was used. Symptomatic patients with random blood sugar of 200 mg/dl or more were labeled as diabetic (American diabetes association criteria). Patients with a body mass index of 25 kg/m^2 were labeled as obese (Asia Pacific region criteria). Patients with either gender or age between 35 to 70 years were included in the study. Patients with chronic kidney disease, chronic heart failure, type 1 diabetes mellitus, and stroke were excluded from the study. The weight of the patients was measured with shoes and light clothes using the digital weighing machine in kilograms. Height was measured using a stadiometer in centimeters and converted to meters. The body mass index of every patient was calculated using the formula weight in kg/height in meter square. A sample of blood was sent to the hospital laboratory for measurement of random blood sugar using a Cobas machine. All patients' old record was checked and were labeled as diabetic only if random blood sugar was more than 200mg/dl and symptomatic (American Diabetes Association). All information was recorded using structured proforma. Data was analyzed using Statistical Package for Social Sciences (SPSS) version 20.0. Frequencies and percentages were calculated for categorical variables like gender, obesity, socioeconomic status, and education. Mean± standard deviation was calculated for numerical variables like age, weight, height, and body mass index. Obesity was stratified among age and gender, socioeconomic status, education, etc. to see effect modification. Results were presented in tables.

RESULTS

This study was conducted at the Department of Medicine Khyber Teaching Hospital Peshawar on 384 patients. The results are as below: 189 (49.2%) patients were female and 195 (50.8%) patients were male. Mean and standard deviation (SDs) for age were recorded to be 56 ± 9 years, for height 1.5± 0.8 meters, for weight 65± 12 kilogram, for random blood sugar 238±77 mg/d/dl and BMI 26±5. 207(53.9%) patients were recorded as obese and 177(46.1%) were recorded as non-obese (Table 1). 96 (25 %) patients were illiterate,154 (40.1%) patients had primary education,68 (17.7%) patients had secondary education,31 (8.1%) patients were having intermediate education and 35 (9.1%) patients were having higher level education status. 98 (25.5%) patients were having

Table No 1: Obesity in type diabetes

	Frequency	Percent
No	177	46.1
Yes	207	53.9
Total	384	100.0

Table No 2: Stratification of obesity with respect to gender

		Gender		Total	P value
		Female	Male		
Obesity Status	No	87	90	177	0.891
	yes	102	105	207	
Total		189	195	384	

There was no significant difference of obesity in patients with different socioeconomic status with p-values of 0.891(table no 3).

Table No 3. Stratification of obesity with respect to socioeconomic status

		Socioeconomic status			Total	P value
		less than 15000 Rs/ month	35000-15000 Rs/ month	more than 35000 Rs/month		
Obesity Status	No	49	79	49	177	0.293
	Yes	49	109	49	207	
Total		98	188	98	384	

There was no significant difference in obesity in patients with different education levels (table no 4).

Table No 4. Stratification of obesity with respect to education status

		education status					Total	P value
		Illiterate	Primary	secondary	intermediat	Higher		
Obesity Status	No	38	70	39	14	16	177	0.273
	yes	58	84	29	17	19	207	
Total		96	154	68	31	35	384	

There was no significant difference in obesity in patients with different education levels (table no 4).

monthly income less than 15,000 PKR,188 (49%) patients were having monthly income between 15,000 and 35,000 PKR and 98 (25.5%) patients were having monthly income more than 35,000 PKR. Stratification of obesity concerning gender, socioeconomic status, and education level is presented in the table below.

DISCUSSION

Obesity is a key modifiable risk factor for DM type 2. Obesity has been linked with adverse health consequences including; elevated blood pressure, lipid disorders, diabetes, cardiovascular diseases, osteoarthritis, lung diseases, and psychological problems. Moreover, obesity has been associated with raised blood pressure, high cholesterol levels, and deranged blood sugar readings in patients with diabetes. [15] In individuals with obesity, glucose-dependent insulin secretion is impaired and there is increased gluconeogenesis hence making them at greater risk of developing diabetes mellitus 2 and, at a younger age. The risk of type 2 diabetes mellitus increases exponentially with rise in the BMI. [17]

In this descriptive cross-sectional study, we have found that 53.9 % of patients with diabetes mellitus type 2 were obese. KH Yoo conducted a study in Asia, which showed that the number of individuals having both diabetes mellitus and obesity has increased and the pace of this trait is not slowing down.[24] Another research study by Fajarini R.A, and Sartika R.A revealed that approximately 64% of patients with diabetes mellitus type 2 were having obesity and this was related to inadequate nutrition knowledge, low education status, and long duration of diabetes mellitus, etc. [25] The frequency of obesity in this study was higher than our study. Risk factors for obesity were not included in our study. An additional article showed that as the prevalence of obesity increases, there is an increase in the prevalence of diabetes mellitus 2 as well. Obesity is not only an important risk factor for diabetes mellitus 2 but it also has an impact on the management of diabetes. [26] A research study from Sweden displayed that the frequency of diabetes is increasing globally and the incidence of obesity has amplified dramatically in recent years. Once type 2 diabetes mellitus develops, the presence of obesity will affect the progression of the disease as well as its management strategies. [27]

A study conducted in Chile revealed that the overall prevalence of obesity in diabetes mellitus 2 was 56.1 % and its frequency is increasing. [28] Results of this study were almost similar to our study and risk factors of obesity were also not included in this study. Another research article demonstrated that childhood disorders increase the risk of obesity during adulthood and in this manner, the risk of diabetes mellitus type 2 is escalated. [29] A paper published by H.U. F.B. Malik indicated that artificially sweetened drinks increase the risk of obesity and DM2. [30] A study from Saud Arabia established that 38 % of patients with type 2 DM were obese and out of that 23 % had mild obesity while 15% had severe obesity and most of the study population were females.[31] The Frequency of obesity in this study was much lower than in our study. The overall frequency of obesity was calculated in our study and different classes of obesity were not studied in detail. The research study by Mustafa Et al presented that obesity is a significant risk factor for impaired glucose tolerance and diabetes mellitus type 2. Approximately 70 % of individuals with impaired glucose tolerance eventually progress to diabetes mellitus 2. [32] The literature revealed that obesity is increasing in the general population and essentially the rate of diabetes mellitus type 2 is aggregating more rapidly predominantly in Asian countries. The risk of diabetes mellitus in these states is raised even at lower BMIs as compared to countries from other continents. [33] A study conducted in Pakistan revealed that 72 % of diabetes mellitus type 2 patients had obesity and most of the obese patients were females. [34] The frequency of obesity in this study was also higher than in our study. There was no significant gender-wise difference in obesity in our

study.

A Yemeni article demonstrated that 58% of patients with DM 2 were obese. The age and sex-matched weights were considerably higher in females than males. With increased incidence and prevalence, obesity, and diabetes mellitus type 2 have become a key global health problem.[35] The frequency of obesity in this study was comparable to our study, however, there was no significant gender-wise difference in obesity in our study. Further literature review described 52% frequency of obesity in type 2 diabetes mellitus patients. Diabetic patients with obesity were younger, had hypertension, lipid disorders, poorly controlled blood sugar levels, and had greater requirements for antihypertensive and lipid-lowering medications as compared to diabetics without obesity. [36] other aspects of metabolic syndrome were included in this study that were not mentioned in our study. Obesity has been acknowledged as a significant risk factor for diabetes mellitus 2 by causing insulin resistance and pancreatic dysfunction. These obesity-associated flaws tend to progress following an increase in body weight and can ultimately lead to deteriorating glycemic levels over time. Therefore, weight management is important for achieving good glycemic control in obese patients with diabetes. [37] The high prevalence of obesity is driving the diabetes mellitus 2 epidemic to startling levels and the role of primary care is emerging of utmost importance for the management of obesity in diabetes mellitus type 2. The response to anti-diabetic therapies improves with effective weight management measures. [38]

The major limitation of our study is that it was conducted in Khyber Teaching Hospital only and there is a lack of generalizability of our data to populations with different quality of life.

CONCLUSION

In our study, we found that the majority of type 2 diabetes mellitus patients were obese. Thus, by adopting a healthy lifestyle we can reduce and delay the onset and morbidity associated with obesity and diabetes mellitus.

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Authors Contribution:

Following authors have made substantial contributions to the manuscript as under

Authors	Conceived & designed the analysis	Collected the data	Contributed data or analysis tools	Performed the analysis	Wrote the paper	Other contribution
Khan S	✓	×	✓	×	✓	×
Ubaid M	✓	✓	×	✓	✓	×
Wazir Z	×	✓	✓	×	×	×
khan S	✓	×	×	✓	✓	✓
Khan IA	×	✓	✓	✓	×	✓

Authors 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.

Ethical Approval:

This Manuscript was approved by the Ethical Review Board of Khyber Medical College, Peshawar. Vide No. 91/DME/KMC.

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ORIGINAL ARTICLE

COMPARISON OF DIFFERENT CLINICAL OUTCOMES AMONG ASTHMATIC AND NON-ASTHMATIC COVID-19 PATIENTS IN AN INTENSIVE CARE UNIT SETTING

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ABSTRACT

Objectives: To compare the different clinical outcomes among asthmatic and non-asthmatic patients having COVID-19 in an ICU setting

Materials and Methods: A cross-sectional study was conducted in the Covid ICU of Hayatabad Medical Complex Peshawar from April 2021 to September 2022. WHO validated questionnaire was used among 220 study participants who were selected in this study. A modified questionnaire was tested for validation through a pilot study. A Cronbach alpha of less than 0.80 was considered acceptable. A significant P value was considered as < 0.05. SPSS version 22 was used for data analysis.

Results: Out of a total of 220 participants, 10.9% (n= 24) were asthmatic while 89.1% (n= 196) were non-asthmatic. The majority of participants were non-asthmatic male 118 (60.2%, p-value 0.86). Different comorbidities were seen in different patients, most of the non-asthmatic patients, 81 (41.3%, p-value 0.57) had more than one co-morbidity. Most of the non-asthmatic patients, 178 (90.8%, p-value 0.40) had consolidation on their chest X-rays while 23 asthmatics (95.8%, p-value 0.40) had consolidation on their chest X-rays. The majority of the non-asthmatic patients, 161 (82.1%, p-value 0.23) had high D-dimer levels. Ventilator use in the hospital was found in the majority of the non-asthmatic patients (183/93.4%, p-value 0.75) while, 22 asthmatic patients (91.7%, p-value 0.75) were found to be on a ventilator. The majority of non-asthmatic patients had high levels of serum LDH, D-dimer, and Ferritin. Twenty asthmatic patients (83.3%, p-value 0.21) had severe ARDS, and 169 non-asthmatic patients (86.2%, p-value 0.21) had severe ARDS. The number of days of hospitalization was found more among the majority of the asthmatic patients (23/95.8%, p-value 0.61) and in non-asthmatic patients, 176 (89.8, p-value 0.61) were admitted to the hospital for 20 days.

Conclusion: COVID-19 disease was found higher among non-asthmatic patients as compared to asthmatic patients. The presence of other significant comorbidities also increases COVID-19 infection severity.

Key Words: Asthmatic, Non-Asthmatic, COVID-19, Comorbidities, Ventilator.

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INTRODUCTION

Novel Coronavirus (SARS COV-2) resulted in a pandemic that was considered as most health-hazardous disease of the era after World War II. The coronavirus disease 2019 (COVID-19) has emerged as an extraordinary global threat. It is believed that COVID-19 is the third outbreak. Above 50,000 people have died, and over a million more have been infected globally. In March 2020, the WHO (World Health Organization) labeled the disease as a global pandemic.[1] Current research conducted on COVID-19

severity allergy disorders and asthma is conflicting.

The prevalence of COVID-19 in patients with asthma or allergy history is very low, according to a large case series study conducted in Wuhan on adults and children in China.[1] Similarly, in another study conducted in New York City, asthma was not found to be a predisposing factor for endotracheal intubation in COVID-19 patients.[2] COVID-19 results are linked to underlying disorders or circumstances that may alter immunity, exacerbating the illness.

Factors such as age (>65 years), patients with lung and kidney diseases, diabetes, cardiovascular disease, obesity, smoking, and suffering from HIV infection all are known as epidemiologic risk factors for COVID-19. In previous investigations, COVID-19 patients having asthma were linked to poor prognosis evident in data from UK Biobank and Seattle, but it was not linked to poor clinical results in Wuhan. Although allergic conditions like atopic dermatitis, asthma, and allergic rhinitis all are associated with the severity of viral respiratory diseases.[3]

COVID-19 has severe outcomes such as hospitalization or death among patients who have old age and have co-morbidities. Lung problems, such as respiratory failure and ARDS, are common causes of severe outcomes.[4] Coronavirus spreads through two different routes. Droplet inhalation, often known as the aerosol pathway, is the direct pathway via which infection occurs. Moreover, the infection can be spread through persons by contaminating objects by touching them, or by droplets through sneezing, coughing, or exhaling, providing a medium for infection spreading from contaminated objects to individuals, resulting in new cases, this is referred to as the indirect pathway.[5]

Frequent hand hygiene and social distancing are important, but they aren't enough to defend against viruses present in airway microdroplets emitted into the air by infected persons.[6] Although the chance of severe COVID-19 infection is thought to be higher in patients with asthma, particularly non-allergic asthma. Still, it is unclear whether asthmatic patients are vulnerable to SARS-CoV-2 infection. There is also less information on whether COVID-19 can cause asthma exacerbation and how to treat asthma exacerbation caused by COVID-19.[7] COPD, hypertension, diabetes, cancer, obesity, immune suppression, and kidney diseases all are associated with an increased risk of death in patients with COVID-19.[8] Studies have been conducted which reveal that asthma did not influence mortality, this study included 744 asthmatics and 8151 non-asthmatic.[9]

Due to a lack of data, no firm conclusions about asthma and clinical results could be drawn. In an analysis of 17,694 subjects, the researcher concluded that COVID-19 is not linked with an increased likelihood of asthma when compared to non-severe COVID-19 cases, and therefore it is not linked to increased deaths in COVID-19 patients. Asthma was not overrepresented among COVID-19 patients who required more intense therapy, had more severe clinical symptoms, or had a poorer prognosis.[10]

No study has been conducted in Pakistan to evaluate the associated factors linked with asthma and COVID-19. So, this study will not only provide local guidelines for the health care workers but will also provide lessons learned for the asthmatic patients suffering from recent COVID-19 infection. The objective of the study was to compare the different clinical outcomes among asthmatic and non-asthmatic patients having COVID-19 infection.

MATERIALS AND METHODS

This cross-sectional study was carried out from April 2021 to September 2022 at Hayatabad Medical Complex (HMC) in Peshawar, where all the patients suffering from COVID-19 disease in the intensive care unit of Hayatabad Medical Complex were selected. Using the WHO sample size calculator, the total sample size was 220 with 90.6% frequency of patients without asthma among all COVID-19 patients. Keeping a 95% confidence interval and 4% margin of error the sample size was calculated. Consecutive nonprobability sampling technique was used.

Selected patients were admitted to the intensive care unit (ICU) for COVID-19 infection in Hayatabad Medical Complex, Peshawar. Written and oral consent was taken from the attendants of the selected patients. They were guided for the study objectives and confidentiality of the data.

A modified questionnaire was being tested for validation through a pilot study. A Cronbach alpha of less than 0.80 was taken as acceptable. Inclusion and exclusion criteria were strictly followed to avoid biases. An ethical approval was taken from the ethical committee (No:125/HMC/B&PSC/2021) of Hayatabad Medical Complex-(HMC) Peshawar, Pakistan". SPSS version 22 was used for data analysis. Numerical variables were presented in the form of mean and standard deviation while categorical variables were presented in the form of frequency and percentages.

The chi-square test was applied by taking the type of group (Asthmatic & Non-asthmatic) as the outcome variable with all other independent variables. A significant p-value of ≤ 0.05 was taken as significant.

RESULTS

Out of a total of 220 participants, 10.9% (n= 24) were asthmatic while 89.1% (n= 196) were non-asthmatic. Almost 60% (n= 132) were male while 40% (N=88) were female. As Table 1(a) shows Out of all, 56.4% (n=124) were non obese while 43.6% (n=96) were obese. The majority of participants, 78.2% (n=172) had high white blood cell count, 20.9% (n=46) had normal white blood cell count and 0.9% (n=2) had low WBC level. Different co-morbidities were seen in the patients. 28.6% (n= 63)

had no comorbidity. 2.7% (n=6) had a history of allergy. 1.8% (n= 4) had cerebrovascular disease. 1.8% (n=4) had a history of coronary artery disease. 13.6% (n=30) had a history of hypertension. 8.6% (n=19) had a history of diabetes and the majority of participants 42.7% (n= 94) had more than one disease. The majority of patients 93.2% (n= 205) used CPAP masks during hospitalization.

The mean age of the participants was 58.9 ± 13.5, the Mean intubation time in days was 0.60 ±1.8, the mean total household income was 126095.4±559475.9 while the mean number of days of hospitalization was 9.9±9.8 respectively. These four were converted by dividing the range into three equal intervals of width in each class. The age of the participants was classified into three categories. The first category was 15-39 years and 2nd category were 39.1-63 while the third category was more than 63 years.

Intubation time in days was classified into three categories. The first category was 01-08 days and 2nd category were 8.1-16 days while the third category was more than 16.1 days. Total household income was classified into three categories. The first category was 0-300000 Pakistani rupees while the second and third categories were 3.1-600000 Pakistani rupees and more than 600000 Pakistani rupees, respectively.

Number of days of hospitalization was classified into three categories. The first category was 01-20 days and 2nd category were 20.1-40 days while the third category was more than 40 days as shown in Table 1(b).

The chi-square test to see the association of our dependent variable (asthmatic/non-asthmatic) among demographic variables and lab-based results as demonstrated in Table 2. The majority of participants were non-asthmatic male 118 (60.2%, p-value 0.86). The majority of the participants were non-asthmatic 98(50.0%, p-value 0.63) and their ages were between 39.1-63 years. Most of the non-obese were non-asthmatic 112(57.1%, p-value 0.50). Asthmatic were the same in both obese and non-obese people 10(50.0%, p-value 0.50). Different co-morbidities were seen in different patients, most of the non-asthmatic patients 81(41.3%, p-value 0.57) had more than one co-morbidity. The majority of the non-asthmatic patients 151(77.0%, p-value 0.48) had high white blood cell count as compared to asthmatic patients. Table 3 presents a comparison between asthmatic and non-asthmatic individuals concerning various clinical outcomes. The analysis encompasses the utilization of ventilators, noninvasive ventilation, non-rebreather masks, CPAP masks, serum LDH and ferritin levels, P/F ratio based on ARDS severity, invasive ventilation, intubation time, household income, and duration of hospitalization. Despite some variations observed, particularly in the utilization of noninvasive ventilation and serum LDH levels, statistical analysis yielded non-significant p-values, suggesting minimal differences between the two groups across these clinical parameters.

DISCUSSION

The objectives of this study were to determine the different clinical outcomes among patients with COVID-19 having asthma and having no asthma. The majority of them were non-asthmatic males 118 of them were 39.1-63 years old. Among them most were non-obese n=112. The majority of the non-asthmatic 81"had more than one co-morbidity. The majority of the non-asthmatic 151 patients had high leukocyte counts. Among these majority of the patients had high neutrophils count of 188, normal monocytes of 152(77.6%) eosinophil 194(99.0%), and basophils count of 196(100.0%), and low lymphocytes count of 189(96.4%, p-value 0.40). The majority of the non-asthmatic patients 164 (83.7%, p-value 0.57) had positive PCR reports with consolidation on their chest X-rays 178 (90.8%, p-value 0.40). Most of the non-asthmatic patients had high inflammatory markers i.e. D-dimer 161 (82.1%), serum LDH 189 (96.4%), and serum Ferritin 179 (91.3%, p-value 0.53).

Ventilator in the hospital setting was used by the majority of the non-asthmatic patients i.e. 183 (93.4%). In the hospital setting, non-invasive ventilation was used by the majority of the non-asthmatic patients which included Non-rebreather Mask 194 (99.0%) and CPAP 183 (93.4%). During hospitalization, the majority of the non-asthmatic patients 146 (74.5%) did not use invasive ventilation. Intubation days in the hospital were classified in which most non-asthmatic patients were intubated for 08 days 195 (99.5%). Stay in the hospital setting was also classified in which most of the non-asthmatic patients 176 (89.8) were admitted for 20 days. The severity of ARDS was seen in which majority of the non-asthmatic patients i.e. 169 (86.2%). Total household income was categorized in which the majority of non-asthmatic patients 195(99.5%) had an income of less than 30000 per month.

In our study, it was found that 118(60.2%) of the

Table No 1(a): Descriptive statistics of study population

	Categories	Frequency (Percentages)
Type of group	Asthmatic	24 (10.9)
	Non-Asthmatic	196 (89.1)
Gender	Male	132 (60.0)
	Female	88 (40.0)
Obese	No	124 (40.0)
	Yes	96 (43.6)

White Blood Cells	Normal	46 (20.9)
	High	172 (78.2)
	Low	2(0.9)
Neutrophils	Normal	7 (3.2)
	High	211 (95.9)
	Low	2 (0.9)
Lymphocytes	Normal	8 (3.6)
	Low	211 (95.9)
	High	1 (0.5)
Monocytes	Normal	170 (77.3)
	High	7 (3.2)
	Low	43 (19.5)
Eosinophil	Normal	217 (98.6)
	High	2 (0.9)
	Low	1 (0.5)
Basophils	Normal	220 (100)
	Nil	63 (28.6)
	Allergy	6 (2.7)
	Cerebrovascular disease	4 (1.8)
	Coronary artery disease	4 (1.8)
	Hypertension	30(13.6)
	Diabetes	19 (8.6)
	More than one	94 (42.7)
PCR test during Hospitalization	Negative	37 (16.8)
	Positive	183 (83.2)
Consolidation on Chest X-ray	Present	201 (91.4)
	Absent	19 (8.6)
D Dimer Level	Normal	37 (16.8)
	High	183 (83.2)
Ventilator used during hospitalization	No	15 (6.8)
	Yes	205 (93.2)
Non-invasive ventilation used during hospitalization	No	1 (0.5)
	Yes	219 (99.5)
A rebreather Mask used during hospitalization	No	1 (0.5)
	Yes	219 (99.5)
CPAP Mask used during hospitalization	No	15 (6.8)
	Yes	205 (93.2)
Serum LDH Level	Normal	7 (3.2)
	High	213 (96.8)
Serum Ferritin	Normal	20 (9.1)
	High	200 (90.9)
P/F ratio	Mild	11 (5.0)
	Moderate	20 (9.1)
	Severe	189 (85.9)
Invasive ventilation used during hospitalization	No	167 (75.9)
	Yes	53 (24.1)

Table No 1(b): Descriptive statistics for continuous variables

	Mean	Standard deviation	Min-Max(range)
Age in years	58.93	13.50	15-88(73.0)
Intubation time in days	0.60	1.88	0-24(24)
Total household income	126095.45	559475.96	0-8000000(8000000)
Number of Days of Hospitalization	9.98	9.80	01-62(61)

Table No 2: Comparison of Asthmatic and non-asthmatic with demographic and lab-based outcome

	Categories	Asthmatic group (%)	Non-asthmatic (%)	P-Value
Gender	Male	14 (58.3)	118 (60.2)	0.86
	Female	10 (41.7)	78 (39.8)	
Age categories in the year	15-39	1 (4.2)	17 (8.7)	0.63
	39.1-63	14 (58.3)	98 (50.0)	
	More than 63	9 (37.5)	81 (41.3)	
Obese	No	12 (50.0)	112 (57.1)	0.50
	Yes	12 (50.0)	84 (42.9)	
Co-morbidities	Nil	7 (29.2)	56 (28.6)	0.57
	Allergy	1 (4.2)	5 (2.6)	
	Cerebrovascular disease	1 (4.2)	3 (1.5)	
	Coronary artery disease	0 (0.0)	4 (2.0)	
	Hypertension	1 (4.2)	29 (14.8)	
	Diabetes	1 (4.2)	18 (41.3)	
	More than one	13 (54.2)	81 (41.3)	
White Blood Cell	Normal	3 (12.5)	43 (21.9)	0.48
	High	21 (87.5)	151 (77.0)	
	Low	0 (0.0)	2 (1.0)	
Neutrophils	Normal	1 (4.2)	6 (3.1)	0.84
	High	23 (95.8)	188 (95.9)	
	Low	0 (0.0)	2 (1.0)	
Lymphocytes	Normal	2 (8.3)	6 (3.1)	0.40
	High	22 (91.7)	189 (96.4)	
	Low	0 (0.0)	1 (0.5)	
Monocytes	Normal	18 (75.0)	152 (77.6)	0.52
	High	0 (0.0)	7 (3.6)	
	Low	6 (25.0)	37 (18.9)	
Eosinophil	Normal	23 (95.8)	194 (99.0)	0.19
	High	1 (4.2)	1 (0.5)	
	Low	0 (0.0)	1 (0.5)	
Basophils	Normal	24 (100.0)	196 (100.0)	
PCR Testing during hospitalization	Negative	5 (20.8)	32 (16.3)	0.57
	Positive	19 (79.2)	164 (83.7)	
Consolidation on Chest X-ray	Present	23 (95.8)	178 (90.8)	0.40
	Absent	1 (4.2)	18 (9.2)	
D Dimer level	Normal	2 (8.3)	35 (17.9)	0.23
	High	22 (91.7)	161 (82.1)	

Table No 3: Comparison of Asthmatic and non-asthmatic with clinical outcome

Variable	Categories	Asthmatic group (%)	Non-asthmatic (%)	P-Value
Ventilator used during hospitalization	No	2 (8.3)	13 (6.6)	0.75
	Yes	22 (91.7)	183 (93.4)	
Noninvasive ventilation used during hospitalization	No	0 (0.0)	1 (0.5)	0.72
	Yes	24 (100.0)	195 (99.5)	
Non-rebreather mask is used during hospitalization	No	0 (0.0)	1 (0.5)	0.88
	Yes	24 (100.0)	194 (99.0)	
CPAP mask is used during hospitalization	No	2 (8.3)	13 (6.6)	0.75
	Yes	22 (91.7)	183 (93.4)	
Serum LDH level	Normal	0 (0.0)	7 (3.6)	0.34
	High	24 ((100.0)	189 (96.4)	
Serum Ferritin Level	Normal	3 (12.5)	17 (8.7)	0.53
	High	21 (87.5)	179 (91.3)	
P/F ratio	Mild ARDS	0 (0.0)	11 (5.6)	0.21
	Moderate ARDS	4 (16.7)	16 (8.2)	
	Severer ARDS	20 (83.3)	169 (86.2)	
Invasive ventilation used during hospitalization	No	21 (87.5)	146 (74.5)	0.15
	Yes	3 (12.5)	50 (25.5)	
Intubation time in days	01-08	24 (100)	195 (99.5)	0.72
	08.1-16	0 (0.0)	0 (0.0)	
	More than 16.1	0 (0.0)	1 (0.5)	
Total household income	0-300000	24 (100)	195 (99.5)	0.72
	3.1-600000	0 (0.0)	0 (0.0)	
	More than 600000	0. (0.0)	1 (0.5)	
Number of Days of Hospitalization	01-20	23 (95.8)	176 (89.8)	0.61
	20.1-40	1(4.2)	17 (8.7)	
	More than 40	0 (0.0)	3 (1.5)	

non-asthmatic were male. Similarly, in China, an epidemiologic study conducted on COVID-19 confirmed 44,672 cases and did not find asthma as a severity risk factor.[11]As indicated by the hospitalization, 6.8% of patients didn't utilize ventilators while a larger part of patients 93.2% used ventilators during hospitalization. A study conducted in which the majority of the patients used ventilators during hospitalization stay (Similarly, this study shows that asthma prevalence is (10.9%) which is much lower than non-asthmatic patients.[12] Regarding co-morbidities, according to our study hypertension (14.8%), diabetes (41.3%), and cardiovascular disease (1.5%) were the main reported diseases. There was no asthma diagnosis in any of the subjects because of poor health hygiene more people were involved in more than diseases in Pakistan.[13]

CONCLUSION

Out of a total of 220 participants, 10.9% (n=24) were asthmatic while 89.1% (n=196) were non-asthmatic. Thus, our results indicate that COVID-19 in asthmatic patients is lower than those who have no asthma. It means asthma has no association with COVID-19. In asthmatic COVID-19 patients, there is less possibility of deaths and ICU admissions.

The significant presence of co-morbidities accompanying COVID-19 infection severity; however, asthma does not contribute as a risk for admission to ICU with COVID-19. The majority of non-asthmatic were obese and had high leukocyte count, positive PCR report with consolidation on chest X-ray, high inflammatory markers, and used non-invasive ventilation. The health system should prioritize high-risk groups that include (obese, old age people, co-morbid patients i.e. COPD, diabetes mellitus, as well hypertension), and understated ethnic-community and their group as they are at high risk of contracting illnesses.

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Authors Contribution:

Following authors have made substantial contributions to the manuscript as under

Authors	Conceived & designed the analysis	Collected the data	Contributed data or analysis tools	Performed the analysis	Wrote the paper	Other contribution
Ullah Z	✓	×	✓	×	✓	×
Ullah R	✓	✓	×	✓	✓	×
Khan MA	×	×	✓	✓	×	✓
Haq F	✓	✓	×	×	✓	×
Khan A	✓	×	✓	✓	×	✓
Khan MKS	✓	✓	×	✓	×	✓
Hussain I	×	✓	×	✓	✓	✓
Naeemullah	×	✓	✓	×	×	×
Ali F	✓	×	×	×	✓	✓

Authors 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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ORIGINAL ARTICLE

FUNCTIONAL OUTCOME OF UNCEMENTED TOTAL HIP ARTHROPLASTY IN POST-TRAUMATIC AVASCULAR NECROSIS OF FEMORAL HEAD IN YOUNG PATIENTS

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ABSTRACT

Objective: To determine the frequency of different outcomes of uncemented total hip replacement in young patients with avascular necrosis due to traumatic cause

Materials and Methods: This study was done in Khyber Teaching Hospital Peshawar, Pakistan from March 2022 to January 2024. 96 patients of the younger age group (20-45 years) consisting of both genders with uncemented total hip arthroplasty for AVN femoral head due to traumatic cause, were studied. Age, gender, side of hip affected by AVN, and pre-operative Harris Hip Score were noted. Functional outcomes of uncemented THA were determined in terms of improvement in post-operative Harris hip score was documented at 3 months postoperatively.

Results: A total of 96 patients, 80 (83.33%) men and 16 (16.67%) women underwent uncemented total hip arthroplasty. The age ranged from 20 to 45 years, with a mean of 40±7.02 years. Reasons for osteonecrosis included femoral neck fracture (50%), hip dislocation (36.46%), and acetabular fracture (13.54%). After 3 months of surgery, the Harris hip score improved and was excellent in 86.46% of patients, good in 8.33% of patients, fair in 5.2% of patients and none of the patients had poor scores.

Conclusion: The cementless hip prosthesis for the treatment of post-traumatic avascular necrosis of the femoral head in active and young individuals is a very good option. The results of cementless hip arthroplasties are good and encouraging in terms of functional outcome postoperatively.

Keyword: Harris Hip Score; Uncemented Total Hip Arthroplasty; Avascular Necrosis Hip

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INTRODUCTION

Avascular necrosis (AVN) of the femoral head is a prevalent cause of discomfort in the hip joint.[1,2] The incidence of AVN of the femoral head is growing, with around 15,000 to 30,000 new cases annually reported United States, but no similar statistics are known in Pakistan.[3] Men are more likely than women to develop the condition. Avascular necrosis is a disorder of bone due to disruption of blood supply.

When avascular necrosis affects the bones of a joint, it frequently results in the deterioration of the joint articular surface, which is followed by subsequent osteoarthritic alterations in the hip.[4]

The pathophysiology of AVN begins with a disruption of blood to the femoral head, resulting in the collapse of the femoral head and hip joint degeneration. Microscopic changes include the death of osteocytes, adipocytes, and hematopoietic cells after a varied duration of ischemia of the head of the femur, which is responded to by healing and remodeling.[5]

The nearby viable bone tissue having a normal blood supply initiates resorption of the dead bony tissue,

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resulting in subchondral bone weakness and the development of osteoarthritis.[6] Avascular necrosis can be traumatic or atraumatic in nature. Following trauma, microthrombi, and fat emboli develop, and intraosseous extravascular pressure increases which can cause vascular blockage to the femoral and hence deficient blood supply.[7] Nontraumatic causes of femoral head osteonecrosis are genetic susceptibility and a variety of other risk factors, such as corticosteroid use, alcohol misuse, hemoglobinopathy, Gaucher's disease, and coagulopathies.[8]

When the illness has progressed to Ficat and Arlet stages III and IV, total hip arthroplasty is the only viable therapy for AVN hip.[9-11] According to previous research, total hip arthroplasty (THA) in young patients appears to be having inferior outcomes than in senior subjects. Another source of concern is revision surgery owing to non-infective loosening of arthroplasty components caused by wear particles generated by different early generations of bearing materials which were unable to support the physical demands of younger people.[12] Furthermore, THA is frequently technically hard in post-traumatic patients because of prior procedures, muscle loss, scarring, and retained implants. As a result, orthopedic surgeons are hesitant to provide THA to extremely young patients. Nonetheless, as a result of new implant designs bearing modern technology and innovations in surgical procedures, implant survival has risen, and THA results in younger patients have improved.[13-16]

Despite the recent positive results on THA survival in the younger population, still, a paucity of data exists on postoperative outcomes of uncemented THA in young patients with AVN hip due to traumatic cause. This study intended to examine the quality of life in young adults by analyzing functional outcomes at short-term follow-up following uncemented THA for post-traumatic AVN hip in our population.

MATERIALS AND METHODS

From March 2022 to January 2024, this prospective study was conducted in Khyber Teaching Hospital Peshawar in Pakistan. The research comprised patients aged 20 to 45 years of both genders who had total hip arthroplasty for pot-traumatic hip avascular necrosis. Patients who had hip arthroplasty for hip AVN owing to any other cause, such as steroid or alcohol use, sickle cell disease, autoimmune illness, hypercoagulopathies, hyperlipidemia, Gaucher's disease, and so on, were excluded from the research.

The sample size was 96, calculated through the Raosoft sample size calculator taking the poor outcome of uncemented total hip replacements in post-traumatic avascular necrosis hip to be 4.16% using previous data.[17] The study 96 patients who had undergone uncemented hip replacements performed during this period and met the inclusion/exclusion criteria.

In all patients, cementless THA was done unilaterally. The reasons for arthroplasty were extreme discomfort and loss of functional hip joint. In all cases, plain radiography was utilized to make the diagnosis; in patients with a broken acetabulum, computed tomography scans were required. The study's subjects were all hospitalized in the orthopedic ward.

After discussing the operating technique, its complications, and the study's goal for the patients, written consent was acquired for both surgery and enrollment in the study. Age, gender, AVN hip side, type of trauma (dislocation, neck of femur fracture, acetabular fracture), disease duration, and functional outcome in terms of Harris Hip Score (pre-operative and post-operative) were all recorded. Harris's hip score total is 100 points. Scores of 90-100 were considered excellent, scores of 80-89 were considered good, scores of 70-79 were considered fair, and scores of less than 70 were considered poor functional outcomes.

Hip arthroplasty was performed using a modified Hardinge lateral approach. Before the skin incision, 1 gm of intravenous ceftriaxone was administered. In all cases, spinal anesthesia was employed. The uncemented total hip arthroplasty was performed following standard procedure. On the second day of surgery, each patient was mobilized using a walker. On the second postoperative day, standard physiotherapy was initiated.

On the third postoperative day, patients were discharged if no active complaints. Intravenous antibiotics were taken for 7 days before switching to oral antibiotics for the remaining 7 days. Stitches were removed on the 14th postoperative day. Follow-up was done at monthly intervals till 3rd postoperative month. In 3rd postoperative month, the Harris hip score will be determined again for each participant. All the data obtained were recorded and analyzed by SPSS-23.

RESULTS

There were 80 (83.33%) males and 16 (16.67%) females among the 96 patients who received uncemented total hip arthroplasty. Age ranged from 20 to 45 years,

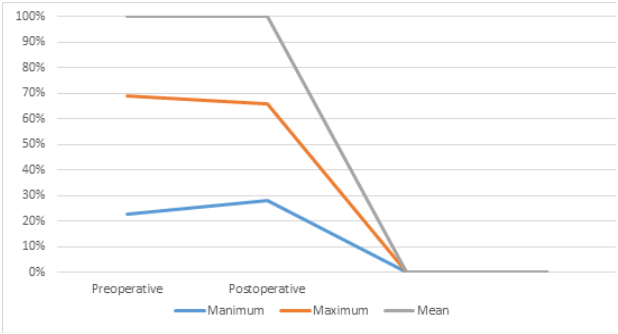

Fig 1: Harris Hip Score

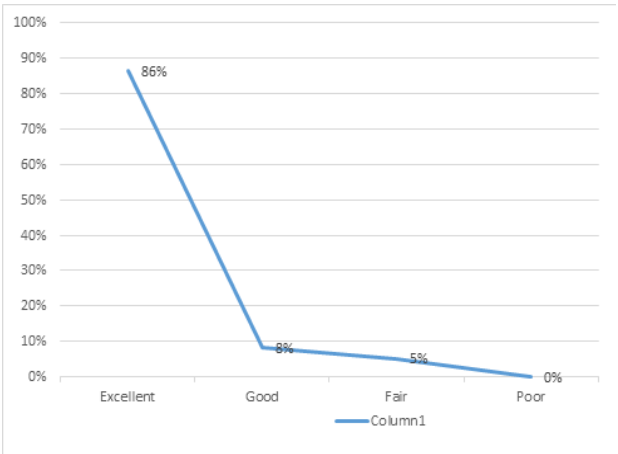

Fig 2: Postoperative Harris Hip Score Categorization

with a mean age of 40 years (SD 7.02). The majority of the patients (60%) had right hip joint involvement, whereas only 40% had left hip joint involvement. The neck of femur fracture (50%), hip dislocation (36.46%), and acetabular fracture (13.54%) were reasons for hip AVN.

Harris Hip Score varied from 30 to 60 before surgery, with a mean of 40, and from 70 to 95 after surgery, with a mean of 85 (Fig. 1). After 3 months of surgery, the Harris hip score improved and was excellent in 86.46% patients, good in 8.33% patients, fair in 5.2% patient and none of the patients had poor score. (Fig 2).

DISCUSSION

AVN of the femoral head is a disease that frequently culminates in femoral head collapse and secondary hip osteoarthritis. Many researchers have observed that preventative surgeries such as intertrochanteric osteotomy, core decompression, and superficial arthroplasty have poor long-term results.[18–21]

The major objective in young patients is to retain normal bone stock; however, THR is required when pain and loss of function are severe. THR in patients with high demands and a busy lifestyle poses the risk of early loosening and recurrent revisions. To address these issues, more robust bearing materials have been created.[22] For young active patients, large-diameter metal-on-metal resurfacing arthroplasty has been proposed as a bone-saving technique.

With more than ten years of data, there is still insufficient information to conclude if contemporary metal-on-metal resurfacing outperforms ordinary cementless THA. The presence of significant metal ion concentrations following the implantation of large-diameter metal-on-metal articulations raises severe concerns about their usage in child-bearing women. There have also been reports of symptomatic and asymptomatic pseudotumors.[23,24.]

Cementless fixation of prosthesis in THA retains the benefits of durability and ease of revision. Even with developments in cementing procedures, the early outcomes of cementless THA outperform those of cemented THA.

Salvati and Cornell[25] found a 37% failure rate following THA with cement in patients with AVN following the patients for an average time of 8 years. Stau er[26] in a similar study, discovered that the loosening rate of the femoral component was 50% after following the patients for a mean period of 10 years.

On the other hand, Lins et al.[27] followed the patients, who had undergone cementless THA for AVN hip, for a mean period of 60 months and found that 81% of femoral components and 97% of acetabular components remained stable. In the same investigation, two cases of deep infection were reported: one in the early postoperative phase and one in the late postoperative time. Even though 35% of the cases developed heterotopic ossification, none of them progressed to higher stages (stages 3 or 4). Piston et al.[28] found that 6% study needed revision THA after 7.5 years of follow-up of uncemented THA.

A study by Celebi et al.[29] shows that infection was present in one (3%) case while heterotopic ossifications were found in two (6%) cases after uncemented total hip replacement. The findings of the aforementioned trials indicate that cementless THA appears to be superior to THA with cement in AVN hip due to traumatic cause. In our study, uncemented THA was performed in all patients, with good results up to 3 months of follow-up. No intra-operative complications and no postoperative dislocations

or infections were reported in this study.

In our study, Harris's Hip Score varied from 30 to 60 before surgery, with a mean of 40, and improved to 70-95 after surgery, with a mean of 85. At 3 months of follow-up, the Harris hip score was excellent in 86.46% of patients, good in 8.33% of patients, and fair in 5.2% of patients. The results of our study are nearly comparable with a study by El-Etewy SS et al[6] where the mean Harris hip score improved from 40 (preoperatively) to 80 (postoperatively). Six patients (25%) had an excellent score, 14 (58%) had a good score 3 (12.5%) had a fair score, and one patient had 1 (4.17%) poor score.

CONCLUSION

The cementless hip prosthesis for the treatment of post-traumatic avascular necrosis of the femoral head in active and young individuals is a very good option. The results of cementless hip arthroplasties are good and encouraging in terms of functional outcome postoperatively.

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Authors Contribution:

Following authors have made substantial contributions to the manuscript as under

Authors	Conceived & designed the analysis	Collected the data	Contributed data or analysis tools	Performed the analysis	Wrote the paper	Other contribution
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Zeb A	✓	✓	×	✓	✓	×
Tahir M,	×	✓	×	✓	×	✓
Khan MW	✓	×	✓	✓	×	×
Hakeem A	✓	✓	×	✓	×	×
Hakim Y	×	✓	×	✓	✓	×

Authors 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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URINARY TRACT INFECTION (UTI) IN POSTMENOPAUSAL WOMEN WITH TYPE 2 DIABETES MELLITUS USING SODIUM-GLUCOSE CO TRANSPORTER 2 INHIBITORS (SGLT-2 I)

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ABSTRACT

Objective: To determine the frequency of urinary tract infection in postmenopausal women with type 2 diabetes mellitus using sodium-glucose co-transporter 2 inhibitors.

Material And Methods: This descriptive cross-sectional study was performed on 101 postmenopausal patients with type 2 diabetes mellitus using sodium-glucose co-transporter 2 inhibitors. Samples of blood and urine were sent to the hospital laboratory for analysis. Data was analyzed using SPSS version 20. The Chi-square test was performed after stratification.

RESULTS: The mean and standard deviation for age was 60.9±4.4. 24.8% of post-menopausal women with type 2 diabetes mellitus using sodium-glucose co-transporter 2 inhibitors were having urinary tract infections. The majority of these patients were illiterate or had primary education and the duration of diabetes was more than 10 years.

Conclusion: Urinary tract infection is a common problem in postmenopausal women with type 2 diabetes mellitus using sodium-glucose co-transporter 2 inhibitors. Patients with poorly controlled diabetes and increased duration of menopause have an increased risk of urinary tract infection.

Keywords: Urinary tract infection (UTI), Post-menopausal, type 2 diabetes mellitus (DM), sodium-glucose co-transporter 2 inhibitors (SGLT2Is).

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INTRODUCTION

Diabetes Mellitus type 2 is a metabolic disorder caused by a combination of two factors: inadequate insulin secretion and the decreased sensitivity of the tissues to the action of insulin.[1] DM predisposes to various infections by modifying the body's innate and adaptive immune systems.[2] Infections are more common and severe in patients with diabetes mellitus.[3] Urinary tract infection is one of the most common bacterial infections in Pakistan. Presentation of urinary tract infection varies from cystitis to pyelonephritis to septicemia.[4] There is emergent resistance to the commonly used antibiotics and locally conducted studies showed resistance to ciprofloxacin approaching to almost 50%.[5]

Patients with diabetes are susceptible to infections and their relapses. Diabetes mellitus with HbA_{1c} more than 6.5% are linked with the possibility of community and hospital-acquired infections.[6] Urinary tract infections (UTIs) are common in patients with diabetes mellitus, often caused by resistant bacteria and associated with increased severity and unfavorable prognosis.[7]

Cardiovascular diseases are one of the leading causes of death in women, increase radically after menopause, which can be attributed predominantly to the scarcity of estrogen and its cardioprotective properties.[8,9] SGLT2 inhibitors are commonly associated with beneficial cardiovascular and renal effects.[10] SGLT2 inhibitors have been described to decrease the risk of major adverse cardiovascular events and advancement of kidney disease in patients with diabetes mellitus.[11] The most commonly encountered adverse effects reported in a study conducted in Agha Khan University Hospital Pakistan were genitourinary infections with the frequency of urinary tract infections at 7% and genital tract infections at 3%.[12] Diabetes mellitus is linked with a greater risk of Urinary Tract Infections in post-menopausal women. The anatomy of the female urinary tract and menopause in women predispose to Urinary Tract Infections in diabetes.[13]

This study aimed to find out the frequency of urinary tract infections in diabetic postmenopausal women taking SGLT2 inhibitors and resistance to antibiotics in these patients. As both menopause and SGLT2 inhibitors are risk factors for UTIs in diabetic patients, this study will emphasize the judicious use of SGLT2 inhibitors in post-

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menopausal women.

The objective of our study was to determine the frequency of urinary tract infections in postmenopausal women with type 2 diabetes mellitus using sodium-glucose transporter 2 inhibitors.

MATERIAL AND METHODS

This descriptive cross-sectional study was conducted on 101 post-menopausal patients with type 2 diabetes mellitus in the endocrinology and diabetes department Lady Reading Hospital Peshawar from September 2022 to March 2023, after approval from hospital's ethical committee. Written informed consent was taken from all the patients. Sample size was calculated through the WHO sample size calculator using a 7 % frequency of urinary tract infection in type 2 diabetes mellitus patients using SGLT2Is, 95 % confidence interval, and 5 % margin of error.[12] Nonprobability consecutive sampling techniques were used. Patients with Symptoms of hyperglycemia i-e; polyuria, polydipsia with random blood glucose of more than 200 mg/dl or HBA1C of more than 6.5% were labeled as having diabetes mellitus. Symptomatic patients (urinary frequency, urgency, fever, and burning micturition) with more than 6 to 10 pus cells per high power field on urine microscopy and growth of microorganisms on urine culture were labeled as having UTI. SGLT2Is are oral anti-diabetic drugs used for the treatment of type 2 diabetes mellitus. Examples include empagliplozine, dapagliplozine, canagliflozine etc. Menopause is a point in time 12 months after a woman's last menstrual period. It usually occurs between 45 and 55 years of age. Postmenopausal Type 2 diabetes mellitus patients with or without complications, using sodium glucose co-transporter 2 inhibitors (irrespective of duration of use) were included in the study. Patients with active UTI, recurrent UTI, and Genital tract infection, functional and anatomical abnormalities of the urogenital tract were excluded from the study. Samples of blood were taken from all the patients and sent to the hospital laboratory for measurement of LH, FSH, and HBA1c. Samples of urine were sent to the hospital laboratory for microscopy and culture (Urine culture for fungus growth was not specifically mentioned but the positive cultures showing growth of bacteria did not show candida growth). All information was recorded in pro forma. Data was analyzed using SPSS version 20. Mean and standard deviation were calculated for continuous variables like age, HBA1c, LH, and FSH. Frequencies and percentages were calculated for categorical variables like urinary tract infection, residence, socioeconomic status, and education. Urinary tract infection was stratified against residence, socioeconomic status, and education to see effect modification. Post-stratification chi square test was applied keeping p value less than 0.05 as significant. Results were presented in tables

RESULTS

This study included 101 postmenopausal diabetic patients. The results are as follows,

The mean and standard deviation for age was 60.9±4.4, for HBA1c was 9.3±1.6, for LH was 34.5±4.0, for FSH was 62.3±10.3 and for diabetes duration was 9.7±3.0. Urinary tract infection was present in 25 (24.8%) patients while 76 (75.2 %) patients did not have urinary tract infection (table no 1). However, 46 (45.5 %) patients had a duration of menopause of less than 5 years, 33(32.7%) patients had a menopause duration of 5 to 10 years while 22(21.8%) patients had a duration of menopause of more than 11 years. 31 (30.7%) patients had monthly incomes less than Rs.15000, 47(46.5 %) patients had monthly incomes between Rs.16,000 to 35,000, and 23(22.8%) patients had monthly income of more than Rs.36,000. 52(51.5%) patients belonged to urban areas while 49(48.5 %) patients belonged to rural areas. 28 (27.7%)patients were illiterate,42(41.6%) patients had primary education,22(21.8%) patients had intermediate education and 9(8.9%) patients were having qualification of secondary level and above. 12(48%) patients with urinary tract infections had duration of menopause of more than 11 years with p value less than 0. 001. Therefore, with the increase in postmenopausal duration, urinary tract infection in patients taking SGLT2I increased with significant p-value (table 2).

There was no significant difference in urinary tract infection among patients with different education classes with p p-value of 0.09 (table no 2). There was a significant difference in urinary tract infection among patients with different socioeconomic classes with p-value of 0.01(Table no 2). There was no significant difference in urinary tract infection among those belonging to rural or urban areas (Table no 2).

24.8 % of post-menopausal type 2 diabetic patients who were using sodium glucose co-transporter 2 inhibitors suffered from urinary tract infection. The majority of these patients had a duration of menopause of more than 11 years were illiterate had primary education or belonged to the socioeconomic middle class.

DISCUSSION

Sodium-glucose co-transporter 2 inhibitors are among the commonly prescribed oral antidiabetic medications nowadays due to their efficacy and cardiorenal protective benefits. However, it has been observed that patient especially post-menopausal women who are using sodium-glucose co-transporter 2 inhibitors are at risk of urinary tract infections. This study suggests that 24.8 % of post-menopausal type 2 diabetic patients who were on sodium-glucose co-transporter 2 inhibitors developed urinary tract infections. A study done in Hayatabad Medical Complex Peshawar showed that 5.3 % of type 2 diabetes mellitus patients who were using sodium-glucose co-transporter 2 inhibitors got urinary tract infection.76 % of them were female and more than 86 % of patients were of age above 50 years[14].In this study urinary tract infection was common in women with a duration of menopause of

Table No 1: Urinary tract infection

	Frequency	Percent
yes	25	24.8
no	76	75.2
Total	101	100.0

Table No 2. Stratification of UTI with respect to duration of menopause, education status, socioeconomic status and residence.

URINARY TRACT INFECTION		YES	NO	P-VALUE
DURATION OF MENOPAUSE	LESS THAN 5 YEARS	7 (28%)	39 (51.3%)	0.001%
	6-10 YEARS	6 (24%)	27 (35.5%)	
	>11 YEARS	12 (48%)	10 (13.2%)	
EDUCATION STATUS	ILITERATE	5 (20%)	23 (30.3%)	0.09%
	PRIMARY	15 (60%)	27 (35.5%)	
	INTERMEDIATE	5 (20%)	17 (22.4%)	
	SECONDARY AND HIGHER	0 (0%)	9 (11.8%)	
SOCIOECNOMIC STATUS	LESS THAN 15000	4 (16%)	27 (35.5%)	0.01%
	16 TO 35000	18 (72%)	29 (38.2%)	
	MORE THAN 36000	3 (12%)	20 (26.3%)	
RESIDENCE	URBAN	14 (56%)	38 (50%)	0.6%
	RURAL	11 (44%)	38 (50%)	

more than 11 years.

A study performed in Thailand suggested that the incidence of urinary tract infection was 33.3 % among patients with type 2 diabetes who were using sodium-glucose co-transporter 2 inhibitors.

The major risk factors were female gender, old age, and lack of permanent jobs[15]. We studied only post-menopausal type 2 diabetic patients using sodium-glucose co-transporter 2 inhibitors. As the duration of menopause increased the frequency of urinary tract infection also increased. We did not specifically study the job, but those whose monthly income was less than Rs.35, 000 had an increased incidence of urinary tract infection. Another study conducted in South Korea showed that sodium-glucose co-transporter 2 inhibitors significantly increased the risk of urinary tract infection in type 2 diabetes mellitus patients when used as an add-on therapy to metformin as compared to sulfonylureas, DPP4 inhibitors, and thiazolidindione[16].

A meta-analysis of 52 randomized controlled trials revealed that sodium-glucose co-transporter 2 inhibitors increased the risk of genital tract infections in patients with type 2 diabetes. Among SGLT2Is Dapagliflozin significantly amplified the risk of urinary tract infection in a dependent manner[17]. Postmenopausal women were not specifically focused on in this meta-analysis. We studied SGLT2Is class in general rather than comparing specific SGLT2Is, regarding increased risk of urinary tract infection.

This study was conducted in Peshawar on post-menopausal women, therefore; it lacks generalizability of the results to the rest of the province, pre-menopausal women, and male patients.

CONCLUSION

Urinary tract infections are frequently seen in post-menopausal women with type 2 diabetes mellitus who use sodium glucose co transporter 2 inhibitors. Patients with poorly controlled diabetes and longer menopausal periods encounter an increased risk of urinary tract infection.

Care must be taken while prescribing sodium-glucose co-transporter 2 inhibitors to post-menopausal women with type 2 diabetes mellitus. Baseline urine microscopy should be done to rule out preexisting urinary tract infections. Further studies are needed to find out the risk factors of urinary tract infection in post-menopausal women on SGLT2Is.

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Authors Contribution:

Following authors have made substantial contributions to the manuscript as under

Authors	Conceived & designed the analysis	Collected the data	Contributed data or analysis tools	Performed the analysis	Wrote the paper	Other contribution
Ubaid M	✓	✓	✓	×	✓	×
Khan S	✓	✓	×	✓	✓	×
Wazir N	×	✓	×	✓	×	✓
Ullah I	✓	×	✓	✓	×	×
Rehman MU	✓	✓	×	✓	×	×
Ahmed I	×	✓	×	✓	✓	×

Authors 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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ORIGINAL ARTICLE

EXPLORING POTENTIAL CAREER CHALLENGES AND ASSOCIATED FACTORS INFLUENCING DENTAL STUDENTS, HOUSE OFFICERS AND RESIDENTS IN A PUBLIC SECTOR UNIVERSITY, KARACHI PAKISTAN - A CROSS-SECTIONAL STUDY

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ABSTRACT

Objectives: To find out dental students' opinions about their future career challenges in the dental profession, and to recognize factors associated with career challenges faced by dental students, house officers, and residents in a public sector university, Karachi.

Materials and Methods: A cross-sectional study was conducted at Sindh Institute of Oral Health Sciences on dental undergraduate, graduate, and postgraduate students currently enrolled at Jinnah Sindh Medical University in November and December 2023. Participants were asked to complete a closed-ended questionnaire on a 5-point Likert scale specifically designed to record relevant items about their career challenges. The data was then analyzed through SPSS version 24.

Results: A total of 163 people participated in the study with the majority being females (63.8%, n=104), the majority from second-year BDS (23.9%, n=39) with most scoring below 80% academically. Both parents had a university education (52.5%, n=171) and a monthly income of more than 80,000/=PKR (58%,n=94). The majority reported facing difficulty in securing a job in the government sector (74.2%), local postgraduate course (77.9%), postgraduate courses abroad difficult and expensive (68.1%) and quackery may affect their job prospects negatively(69.3%). The factors that showed positive association included "facing competition for government sector jobs" and "the difficulty of obtaining a job as a lecturer" at p-value=0.05.

Conclusion: Young dentists perceive finding jobs in the public sector and getting admission to postgraduate courses as difficult in comparison to getting hired at a private clinic. All these hindrances can be avoided by arranging job fairs and career counseling sessions for students and graduates.

KEYWORDS: Career Choice, Motivation, Goals, Specialization, Workforce

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INTRODUCTION

Dentists are an important member of the licensed health care workers. [1] It is essential for dental students to comprehend their career goals and expectations so that, when possible, students can be used in the delivery of healthcare. [2] Most of the prior research has indicated that dentists seldom alter their careers. [3] Both the decision to choose dentistry as a career and the practice of dentistry hold a significant place in the service of society. This choice could be crucial in a person's life and could have an impact on his or her own social and economic standing. [4]

Dentistry is a popular profession choice due to its ease of employment, self-employment, and well-compensation in comparison to other fields, but this might not be as simple as it seems. Several studies showed that when healthcare professionals first enter the workforce, they commonly encounter several challenges. [5-7] Any stage of

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a dentist's career can be challenging in terms of making career decisions, but at the moment, young dentists may be particularly worried about the lack of primary care jobs and the ongoing changes to hospital career pathways. [8]

A study was conducted in China, in which only a small proportion of final-year students, specifically 4.7%, expressed a high level of confidence in securing an ideal job opportunity upon graduation.

On the other hand, 40.9% stated that they did not find it challenging, while a majority of students, amounting to 54.4%, considered it difficult to find their desired job immediately after completing their studies. When asked about the main reasons for facing job search difficulties, the leading factor was the limited availability of employment opportunities, cited by 43% of respondents. Following closely was the lack of work experience, mentioned by 40.9% of students.

Having only an undergraduate degree was also the most significant obstacle, with 26.8% of students acknowledging its impact. [9] Similarly a study conducted among dental students at the University of Jordan, participants were asked whether they would pursue dentistry again as a career given a second chance. The findings revealed that 33.3% of the students, particularly those in their fifth year, expressed their reluctance to join the dental profession. The primary reasons cited for this decision included limited job prospects, high levels of stress, insufficient social interaction, and the challenging coursework associated with dentistry. [7]

Several studies in Pakistan have studied the attitudes and motivation of students to pursue dentistry as a career showing that the decision and career choice of the parent play a major role in selecting dentistry as a career. [10-13] Other than that stable job, the ability to help others and the nature of dentistry being challenging and interesting motivated students to follow it. [11]

Furthermore, two studies explored the challenges of fitting in and motivating dental students. They found that 51% of the students suffered from the imposter phenomenon leading to anxiety and depression. In contrast, the other study assessed the motivation to follow dentistry as a career reporting that 51.5% showed interest in further adding postgraduate degrees in dentistry. [12,13]

This shows the knowledge gap that exists regarding the career development of dental professionals in Karachi, Pakistan. Existing studies lack specificity, and details and fail to capture local background dynamics leading to de-motivation, burnout, and depression in dental students. To address this, a cross-sectional study will explore potential career challenges and associated factors faced by dental students, house officers, and residents and will bridge the knowledge gap that existing limited research has formed about challenges faced by them in the local context.

The study's insights will inform tailored career development strategies that will aid the students and residents in choosing a relevant path for professional growth and career choices.

MATERIALS AND MATHODS

A cross-sectional study was conducted at Jinnah Sindh Medical University, Karachi during November, and December 2023 through a structured questionnaire to collect data from the undergraduate dental students, house officers, and residents of the constituent dental institute, Sindh Institute of Oral Health Sciences (SIOHS).

The determination of the sample size for this study involved the application of selected statistical methods. The total target population at the Sindh Institute of Oral Health Sciences (JSMU) is 282 individuals.

To calculate the prevalence of potential career challenges and associated factors influencing dental students, house officers, and residents, which is estimated at 50%, [(17)] while maintaining a margin of error of 5% and a confidence level of 95%, a sample size of 163 participants was calculated using the reputable online calculator provided by Open Epi.

Inclusion criteria comprised undergraduate dental students (all 4 years), dental house officers, and dental residents of SIOHS of male and female genders aged between 18 to 30 years from any religion, caste, creed, and socio-economic background. While the teaching and non-teaching dental faculty were excluded. Furthermore, non-willing participants and interns graduating from other institutes were also not included.

The questionnaire consisted of section one of the questionnaire had screening questions related to the career challenges and associated factors influencing dental students, house officers, and residents will be included in section two of the questionnaire. The questionnaire consists of closed-ended questions.

It was developed after studying two articles published on the same topic. [(5,17)] A five-point Likert scale was used for these items. In addition, the questionnaire

inquired about the demographic data from study participants. Reliability and validity were calculated from the pilot study on 10% (16 participants) sample population after getting permission from the IRB. The face validity was adequate and Cronbach's Alpha was calculated to be 0.69 which was good.

Convenience sampling was followed, and students were approached in the departments of posting and classes and informed about the aims, and objectives of the study. Those who consented were asked to complete the questionnaire. Incomplete forms were removed as part of the protocol. Data was entered in the SPSS ver.26. and analyzed.

RESULTS

The study encompassed 163 participants aged 18 to 31, with a predominant representation of females (63.8%, n=104) with male to female ratio of 1:2. In terms of academic progression, a notable proportion was in the second year (23.9%, n=39), and the majority were single (88.3%, n=144). Academic performance predominantly fell within the below 80% range (50.9%, n=83), while a significant portion had parents with university education (52.5%, n=171). Monthly income distribution revealed a substantial majority earning more than 80,000 PKR (58%, n=94) (Table 1).

Table 2 shows the responses of dental students The survey responses reflect various sentiments among participants regarding their career prospects in dentistry. Notably, a significant portion (74.2%) expressed concerns about facing competition in securing a job in the government sector. Likewise, a substantial number (77.9%) perceived the process of enrollment in postgraduate training programs (residency) in Pakistan to be highly competitive. Additionally, a notable majority (68.1%) believed that obtaining admission into a postgraduate program abroad would be both competitive and expensive.

On the other hand, participants were less apprehensive about certain aspects, with 71.8% expressing confidence that lack of experience would not pose a significant obstacle in finding a new job. However, concerns about the potential negative impact of quackery on job opportunities for dentists were shared by a considerable proportion (69.3%).

Table 3 shows the association of different factors faced as career challenges by students, and graduates shows that there is a substantial increase in the perception of facing competition for government sector jobs from the first to the second year (44% to 82%, p=0.05*). Similarly, the belief in the difficulty of obtaining a job as a lecturer showed a significant increase in the second year compared to the first (41% to 54%, p=0.05*). While trends were indicating increased difficulty in finding jobs and establishing private clinics in later academic years, these differences did not reach statistical significance.

DISCUSSION

Dentistry is a skill-based profession requiring hard work over the years. Motivation and will to invest prime time of your life for progress and promotion in the field is the driving force. Previous, studies have discussed the motivational factors that affect their choice of this field. In the current study, we have explored the perceptions of students regarding problems they may face after joining dentistry which includes the job prospects, postgraduation opportunities, and work and life balance. Other than that, we have also, asked them about their opinion on the gender stereotypes in the field.

We found that most of the students thought that finding a job in a private clinic is relatively easy (59%) than securing one in the public sector (74%) or as an academic lecturer (54%). Furthermore, they thought that establish-

Table No 1: Demographic data of the participant

Variable	Distribution of Participants
Age	18-31 years of age(n=163)
Gender	Males=36.2% (n=59)
	Females=63.8% (n=104)
Year of study	First Year=16.6% (n=27)
	Second Year=23.9%(n=39)
	Third Year=17.8% (n=29)
	Fourth Year=15.3%(n=25)
	House Officers=17.2%(n=28)
	Residents=9.2%(n=15)
Marital Status	Single=88.3%(n=144)
	Married=2.5%(n=4)
	Engaged=9.2%(n=15)
Academic scores	Below 80%(n=83)
	b/w 80-90%(n=57)
	Above 90%(n=23)
Education of Parents	No school education=8(n=326)
	School education=32(n=326)
	College education=102(n=326)
	University education=171(n=326)
Monthly income	Less than 30,000 PKR=1%(n=3)
	30,000-50,000 PKR=12%(n=19)
	50,000-80,000 PKR=29%(n=47)
	More than 80,000 PKR=58%(n=94)

Table No 2: Comparison of responses from different career stages

Item	Positive Responses (%)	
	Agreed	Disagreed
Q1. I think I will have difficulty in finding a job in a private hospital / clinic	41.1	59
Q2. I will face competition in getting a job in the Government sector	74.2	25.8
Q3. It will be tough to get the job of a lecturer in any academic institute	54	46
Q4.It will be a challenge to establish my own private dental practice / clinic	63.8	36.2
Q5.The level of competitiveness is very high to get enrolled in the post graduate training program (residency) in Pakistan	77.9	22.1
Q6.It will be very competitive and expensive to get an admission into a post graduate program abroad	68.1	31.9
Q7. It will be very hard to get an internship in a reputable hospital.	38	62
Q8.It is difficult to achieve the balance of work and life	39.9	60.1
Q9.I perceive that financial instability may act as an obstacle while pursuing a career in dentistry	60.1	39.9
Q10.I believe societal expectations and stereotypes will influence gender disparities in the field of dentistry.	48.5	51.5
Q11.I believe that lack of experience in the field of dentistry will be a big obstacle in finding a new job	71.8	28.2
Q12.I believe the rise of quackery will negatively impact job opportunities for dentists.	69.3	30.7

Table No 3: Association between different factors affecting

Item	Positive Responses (%)						p-value
	1st Yr	2nd Yr	3rd Yr	4th Yr	House Officers	Residents	
Q1. I think I will have difficulty in finding a job in a private hospital / clinic	6	8	7	7	8	5	0.946
Q2. I will face competition in getting a job in the Government sector	7	20	15	13	12	7	0.001**
Q3. It will be tough to get the job of a lecturer in any academic institute	7	13	10	7	10	6	.101
Q4.It will be a challenge to establish my own private dental practice / clinic	8	17	13	11	9	6	0.274
Q5.The level of competitiveness is very high to get enrolled in the post graduate training program (residency) in Pakistan	10	19	15	12	14	7	.139
Q6.It will be very competitive and expensive to get an admission into a post graduate program abroad	7	17	12	12	13	6	.009*
Q7. It will be very hard to get an internship in a reputable hospital.	7	10	7	5	7	2	.789
Q8.It is difficult to achieve the balance of work and life	6	7	7	8	8	4	.633
Q9.I perceive that financial instability may act as an obstacle while pursuing a career in dentistry	9	16	10	10	10	6	.690
Q10.I believe societal expectations and stereotypes will influence gender disparities in the field of dentistry.	9	7	11	7	11	4	.05*
Q11.I believe that lack of experience in the field of dentistry will be a big obstacle in finding a new job	12	15	14	12	12	6	.838
Q12.I believe the rise of quackery will negatively impact job opportunities for dentists.	12	14	13	11	13	7	.785

ing a private clinic was relatively difficult (64%). In comparison, to the previous study conducted in the Kingdom of Saudi Arabia, they reported the preference of students to work in jobs in different areas. The results show that the majority wanted to work as dentists in the public sector (39.5%) followed by dentists in the private sector (24%). [14] Another study from KSA showed that students felt they would have difficulty in finding a job in the Ministry of Health (62%) and Armed Forces hospitals (61%) and establishing their clinic (64%). [5]

When asked about their chances to get admission in postgraduate courses we found that 78% agreed that it is difficult. Similarly, the previously mentioned studies

report the same. [5,14,15] One of the important findings from India from a study conducted during the COVID pandemic was the graduates wanted to switch their fields to business administration (47%) due to a reduction in employment opportunities (65%). [15]

The other findings from our study included that the participants did not feel that there was a disparity due to gender (51.5%) which hindered anyone from pursuing a career in dentistry. While majority agreed with the notion that experience is a required essential to thrive in the field (72%) and financial stability may hinder their choice to work in the field (60%). Furthermore, a majority agreed that quackery affects job opportunities in the field negatively (69.3%).

The second objective was to find out the factors associated with the opinions across different stages of the career and we found that only 2 items showed association significant at the level of 0.05 and 1 at the level of 0.001. The item "I will face competition in getting a job in the Government sector" showed the highest responses from 2nd-year students(n=20) which was significant at the level of 0.001. "It will be very competitive and expensive to get an admission into a post-graduate program abroad" and "I believe societal expectations and stereotypes will influence gender disparities in the field of dentistry" also showed positive association at the level of 0.05. These results cannot be compared with any previously published literature due to the scarcity of available material. [5,14,15]

The results from the current study showed that the students consider government jobs hard to secure along with postgraduate opportunities abroad. The financial limitations may hinder them to further pursue careers including postgraduate courses to upgrade their current skills. The same can be the reason behind establishing a private clinic. Another reason can be the lack of experience in the field to run a clinic as per their replies.

As indicated by our study several factors may result in a challenge for the newly graduated dentist. Thus, they require career counseling to help them work their way through the problems. They should be explained about local and international postgraduate programs, available and possible abroad job opportunities, and placement processes. They should also be informed about the available scholarship opportunities, requirements, and procedures. [16] This may also help them recognize the best specialty according to their interest. [17] In a similar vein, students see guest speaker events favorably because they give students firsthand knowledge of the practical side of the industry through the sharing of personal experiences and career recommendations, and because they allow for real-world learning opportunities. (19) Similarly, career fairs are tactics that help students better understand their career goals, increase their chances of landing a job, and network with industry professionals. (20,21) As a result, dental colleges should create career counseling programs, host guest speaker events, and plan career fairs to guarantee that their students are as prepared as possible for the workforce.

The outcome of all these efforts is skilled motivated professionals who can be part of the healthcare workforce providing quality treatment to the people at large. This will also decrease the burnout rate that dentists face which is the result of the professional being challenging and demanding with constant need to upgrade and improve your skills. [21]

CONCLUSION

The students in the current study perceive that it is difficult for them to secure a job in the public sector, set up their clinic, or secure an international postgraduate program. Though may get employed in local clinics lack of experience can affect all types of opportunities. To guide students to achieve success, career counseling can play a pivotal role. Hence, these services should be arranged for private and public sector students alike.

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Authors Contribution:

Following authors have made substantial contributions to the manuscript as under

Authors	Conceived & designed the analysis	Collected the data	Contributed data or analysis tools	Performed the analysis	Wrote the paper	Other contribution
Shah H	✓	✓	✓	×	✓	×
Ahmed S	✓	✓	×	✓	✓	×
Raza M	×	✓	×	✓	×	✓
Irshad M	✓	×	✓	✓	×	×
Muqri IA	✓	✓	×	✓	×	×
Fatima E	×	✓	×	✓	✓	×

Authors 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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ORIGINAL ARTICLE

ACCEPTANCE OF M-HEALTH AND ITS COMPLEXITY FOR THE PROVISION OF QUALITY HEALTHCARE SERVICES

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ABSTRACT

Objectives: To identify the factors affecting the adoption of mobile health, assess the perception of the role of mobile health in health care service, and compare the technology acceptability and complexity trend among Community Health Workers.

Materials and methods: A cross-sectional quantitative study was done using a two-stage sampling technique to collect the required sample from 308 Community Health Workers (CHWs) comprising 258 Lady health workers (LHW), 21 Community midwives (CMWs), 18 Lady health visitors (LHVs) and 11 Family welfare workers /councilors (FWWs/FWCs) of district Peshawar. Data was analyzed using SPSS version 22.

Results: The majority of CHWs agree that mobile phones are useful in communication with fellow health professionals, diagnostic and treatment support, and medical data collection. The majority of CHWs were, willing to adopt mHealth technology. CHWs believed that mHealth adoption could make their job easier and improve access to healthcare services. mHealth can also enhance disease prevention and awareness. Affordability, result orientation, and easy usage are the significant factors in the adoption of mHealth.

Conclusion: mHealth usefulness and acceptance role for awareness, and disease prevention are the most agreed factors in the view of community health workers. Highest PCA score recordings for "m-health make it more accessible, affordable for the general population".

Key Words: Community Health Workers, Unified Theory of Acceptance and use of technology (UTAUT), mHealth.

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INTRODUCTION

The health management information system is functional at the district level in Pakistan but most health units in peripheral areas are still reporting manually which results in delayed and incomplete reporting that affects the overall effectiveness in terms of mismanaged stock positions at service delivery points. m-Health has the potential to tackle such issues by remote data collection, capacity building of service providers, sharing of knowledge/ information among the field workers, disease tracking and epidemic alerts, etc. Such latest technologies have the capability of improving healthcare services [1].

m-Health has the potential to transform the health system, reduce the time /travel cost of health care, and contribute to the provision of quality healthcare services. mHealth can add to cultivating "gross national happiness" by generating a gladder, healthier, prolific population, and has the potential to renovate health service delivery [2].

The use of wireless technologies with electronic health refers to the use of mobile devices such as smartphones to deliver or obtain health care information and services.

WHO defines m-Health as medical and public health practice supported by mobile devices such as mobile phones, patient monitoring devices, personal digital assistants, and other devices .it involves the use of voice, SMS, and other functions [3]. The use of telecommunication technologies for better provision of health care services and sharing of health information with the needful. This definition does not restrict to the role of ICT in health care but also to the change of attitude and commitment to-

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wards the improvement in quality of health care services[4]. According to the World Health Organization mHealth is medical and public health practice supported by mobile devices such as mobile phones, personal digital assistants (PDA), patient monitoring devices, and other wireless devices. mHealth works through verbal communication, SMS, and other complex functions [3].

Scientific research illustrates that the provision of health care services by using ICT is generally termed as eHealth. Telehealth or telemedicine[4]. Telehealth is an umbrella term for both telemedicine and mobile devices for providing health services. Telehealth is the provision of health care services and health information exchange using information communication technology (ICT) among service providers as well as the community irrespective of social, cultural, time, and distance barriers[5]. In a broader sense, eHealth refers not merely to the use of communication technology in the health system but also to the mind trend, approach, and assurance for the provision of quality health care services using the ICT [6].

As the potential role of communication technology in improving the health care services in district Peshawar has not been investigated so far, the present study wants to replicate this study in the context of district Peshawar with a special focus on factors affecting the adoption of information communication technology (m-Health) in public health programs by CHWs working in district Peshawar, the expected role of m-Health on the provision of quality health care services, perception and preparedness of CHWs towards the adoption of m-Health and comparing the technology acceptability trend among Community Health Workers.

MATERIALS AND METHODS

A mixed method approach, qualitative approach, and quantitative are used in this research. A quantitative approach objectively seeks to measure the phenomenon, it uses numerical values and statistical analysis[7]. While the qualitative approach seeks to find meaning that people attach to specific phenomena, it goes beyond the quantification[8]. In the research instrument survey questionnaire adopted from the study of Dr. Patrick (2016)[9]. Quality of health services was healthcare delivered through m-health interventions that were acceptable.

The descriptive quantitative approach (aimed at measuring the research problem using numeric values and statistical analysis). A 5-point Likert scale was used to scale the responses in survey research. The data from the Likert scale was considered quantitative data and statistically analyzed[10].

The research instrument i.e. survey questionnaire consists of various sections, Section A captures general demographic information of respondents such as gender, age, district, designation, and duties. Section B assesses the current usage of mHealth within their healthcare domain, it is further inquiring the use of cellphones for routine work-related purposes, with the subsequent aim of finding the frequency of that specific use by community health workers, moreover, the respondents were asked about the ownership and purposes of other mobile devices usage. Section B investigates the current use of mobile health in the healthcare sector. Section C focuses on the potential adoption of mHealth by the primary health care professionals in district Peshawar, on the grounds of mHealth acceptability, capability, mHealth complexity, mHealth relative advantage, mHealth compatibility, m-Health trial ability, and m-Health observability.

As this research is based on theoretical frameworks such as the Capability Approach and the DOI model all the questions in sections B and C of the questionnaire are aligned with these models to assess the research objectives and questions.

A cross-sectional analytical study was conducted in 2019 Target Population was Lady health workers, LHWs (1277), CMWs (106), FWWs/FCWs (37/18) LHVs (88) working in the Peshawar district covering a population of 1120,5000, 5000-7000, 1400-1500 respectively.

The Sample size as calculated by the WHO online sample size calculator was 308 Community Health workers working in the public sector of Peshawar district, where the population size was 1526, p-valve of 50%, confidence interval of 95%, and margin of error 5%. 20% of each sample was taken from each group. Two-stage sampling techniques comprising Quota Sampling and Systematic Random Sampling procedures were adopted. The respondents from each category were selected by the following formula: Total Number of CHWs/sample size for each category.

Data was analyzed using SPSS version 22. Descriptive statistics and frequency distribution were calculated and components by Principal Component Analysis.

Principal Components Analysis (PCA) was conducted for the generation of the index for m-Health capabilities and diffusion of Innovation factors, which were used for determining the key factors that influence m-Health adoption.

DOI factors and mHealth capabilities acceptance were analyzed, where the dependent variable was mHealth capabilities acceptance and independent variables were DOI factors such as mHealth complexity, mHealth relative advantage, and mHealth compatibility. The overall indexes of the DOI factors and capability acceptance calculated via PCA analysis were used in this correlation analysis. Correlation analysis was performed to determine a significant relationship, between variables derived from the Diffusion of Innovation (DOI) and use of Technology and mHealth capabilities acceptance.

Pearson coefficient test was applied and ranges from negative 1 (indicates the perfect negative relationship) to positive 1 (indicates the perfect positive relationship between variables), whereas the value of 0 indicates no relationship between variables.

RESULTS

The mHealth capabilities and the results are reflected in Table 1 "Communication with fellow health professionals using a mobile phone" was the most highly ranked m-health capability and training health workers using mobile devices has received the least acceptance.

The higher-ranked m-Health capability according to data recordings reflects approval in favor of communication with fellow health professionals. Acceptance to send SMS to make people aware of different diseases stands on second number, monitoring and treatment of patients via mobile phones comes on third number with agree and strongly agree percentage recording of 54.6%, acceptance to use mobile for diagnostic support comes on fourth number with agree & strongly agree percentage of 53.3% and acceptance for treatment support comes on fifth number. Moreover, to have an overall index of the mHealth capabilities, the Principal Component Analysis (PCA) method was applied, which is a data reduction technique applicable to relatively large data series to create smaller components that can be interpreted easily. The highest PCA 0.727 is recorded for the use of mobile devices for diagnostic support which indicates that it has more impact (hence more importance) on the calculation of the m-Health capabilities acceptance index. The second-highest PCA index was calculated as 0.690 for the use of mobile devices for treatment support. Loading scores or PCA scores (listed in the loaded column) are weights by which each variable (in this case, m-health capabilities acceptance variables) is multiplied to get the main component index or score. Taking into consideration the m-health capabilities the overall m-health capability index is constructed as follows based on eight items (from questions 1.1 to 1.8):

mHealth capability acceptance index = 0.610 x Q 1.1 + 0.468 x Q 1.2 + 0.439 x Q1.3 + 0.489 x Q1.4 + 0.465 x Q1.5 + 0.501 x Q1.6 + 0.727 x Q1.7 + 0.690 x Q1.8

This index is a summary index that shows an individual score on m-health capabilities and will assist in determining the correlation coefficient to determine the relationship between m-health capability acceptance and the factors that may affect the acceptance.

PCA was carried out to find out the impact of the most significant construct on the mHealth complexities and the highest PCA score was found for health worker's desire to know how m-Health Works (table 2) 0.845, and the second high score was calculated as 0.80 for the factor that is Community worker would adopt mHealth because mHealth devices are easier to use. Overall m-health complexity index was constructed based questionnaire as follows (based on eight items from questions 2.1 to to2.8).

DOI-complexity = 0.692 x Q2.1+ 0.764 x Q2.2 + 0.709 x Q2.3 + 0.776 x Q2.4 + 0.845 x Q2.5+ 0.678 x Q2.6 + 0.636 x Q2.7+ 0.808 x Q2.8

The highest PCA value was recorded for the factor," mHealth makes my job easier" which highlights its importance that community health workers feel more at ease and enjoy their services if they are trained and provided with mobile phones for the execution of their routine tasks. Similarly, PCA scores for most of the relative advantage constructs are found higher which indicates that this program has more advantages if it is adopted and can contribute a lot of betterment to society (table 3). The overall relative advantage index based on six questions (from3.1 to3.6) is calculated as follows: DOI- relative advantage = 0.542 x Q3.1 + 0.822 x Q3.2 + 0.602 x Q3.3 + 0.787 x Q3.4 + 0.739 x Q 3.5 + 0.614 x Q3.6

The highest PCA factor is recorded for the factor, "m-Health is compatible with what is needed to execute daily tasks" and for "mHealth is compatible with duties". This indicates the importance of these factors with the mHealth compatibility. The overall compatibility index is calculated on 5 compatibility factors (from questions 4.1 to 4.5). DOI-Compatibility = 0.770 x Q 4.1 + 0.783 x Q4.2 + 0.569 x Q 4.3 + 0.739 x Q 4.4 + 0.638 x Q4.5

The results of correlation analysis showed that mHealth capabilities are significantly and positively correlated to compatibility. Whereas the correlation between mHealth capabilities m-Health Complexity and mHealth Relative Advantage are positive but insignificant as their p value is greater than the threshold level of 1, 5, or 10 percent level of significance.

DISCUSSION

The data regarding complexities of the m-Health acceptance shows that the majority of the CHWs disagreed that m-Health usage of mobile phones is difficult and most of them were willing to learn the use of mobile in m-Health, its phenomenon, and adoption because it is easier to use. However, those who were reluctant to use the m-Health application should be explored in debt. Based on research findings of the Wootton study,[13] the involvement of service providers in such activities is suggested to address the needs and quarries of disagreed and not sure proportion of community health workers and to make them comfortable with the use of m-Health by the provision of training, this effort can contribute to the self-efficacy of service providers, self-efficacy can be explained as apparent ease of use and apparent usability[14]. Perception of easy usage is identified as a predictor of M-Health diffusion into the system[15]. Thus, training could

Table No 1: Capabilities Acceptance (Ca) of Mobile Health

m-Health Capabilities	Strongly Disagree	Disagree	I am not sure	Agree	Strongly Agree	Agree+ Strongly agree+ Strongly Agree	Rank	Principal Component	
								Loading	
1 I would accept sending SMS to make people aware of different methods of disease prevention	13.6	**9.4**	22.1	49	5.8	54.8	2	.610	Percentage of total variation 76.2%
1.2 I would accept to collect medical/health data by means of mobile devices	8.8	17.9	25	38	10.4	48.4	7	.468	
1.3 I would accept to monitor and treat patients using mobile devices	7.1	13.3	25	39	15.6	54.6	3	.439	
1.4 I would accept communicate with fellow health professionals using mobile devices	8.1	10.7	20.8	40.9	19.5	60.4	1	.489	
1.5 I would accept to train health workers using mobile devices	12.3	17.5	24.7	34.7	10.7	45.4	8	.465	
1.6 I would accept tracking diseases and epidemic outbreaks using mobile devices	13	13.3	22.7	31.8	19.2	51	6	.501	
1.7 I would accept to use of mobile devices for diagnostic support	16.2	12.3	18.2	32.5	20.8	53.3	4	.727	
1.8 I would accept to use mobile devices for treatment support	12	14.9	19.8	37.3	15.9	53.2	5	.690	

Table No 2: m-Health complexity and willingness to learn the usage of m-health

m-Health Capabilities	Strongly Disagree	Disagree	I am not sure	Agree	Strongly Agree	Agree+ Strongly agree+ Strongly Agree	Rank	Principal Component	
								Loading	
2.1 I would not adopt mHealth because mobile devices are difficult to use	16.2	**30.2**	23.4	22.4	7.8	30.2	**7**	.692	Percentage of total variation %53
2.2 I would not adopt mHealth if mHealth applications are difficult to learn	17.2	34.4	12	26.3	10.1	36.4	**4**	.764	
2.3 I am Willing to Learn to Use Mobile	17.5	10.4	14.7	35.3	22.1	57.4	**2**	.709	
2.4 I am Willing to Use MHealth Apps	12.7	17.2	17.9	32.8	19.5	52.3	**3**	.776	
2.5 I Need To Know How MHealth Works	18.2	11.4	12.4	36.6	21.4	58	**1**	.845	
2.6 I will not cope with using mHealth devices	18.8	30.2	16.2	27.3	7.5	34.8	**5**	.678	
2.7 I will not cope with using mHealth applications	18.2	25.3	24	21.1	11.4	32.5	**6**	.636	
2.8 I would adopt mHealth because mHealth devices are easier to use	16.6	10.9	17.5	43.4	14.6	58	**1**	.808	

Table No 3: Relative advantage of m-Health

m-Health Capabilities	Strongly Disagree	Disagree	I am not sure	Agree	Strongly Agree	Agree+ Strongly agree	Rank	Principal Component	
								Loading	
3.1 mHealth is useful to me	12.7	**17.9**	11.2	35.3	23	58.3	**1**	.542	Percentage of total variation 61.6 % %61.6
3.2 mHealth will make my job easier	17.5	14.9	18.4	36.5	12.7	49.2	**6**	.822	
3.3 M-heath will reduce the amount of effort spent on executing some tasks	16.9	15.9	16	32.3	19	51.3	**5**	.602	
3.4 mHealth would enable me to reach a larger portion of the country's population	8.4	19.5	20	29.9	22.2	52.1	**4**	.787	
3.5 A larger portion of the population will benefit from healthcare services if mHealth is implemented	12.3	12.3	22.9	31.2	21.2	52.4	**3**	.739	
3.6 There will be an increase in prevention and awareness of diseases if mHealth is adopted	12	10.1	21.4	39.3	17.2	56.5	**2**	.614	

Table No 4: m-Health compatibility

m-Health Capabilities	Strongly Disagree	Disagree	I am not sure	Agree	Strongly Agree	Agree+Strongly agree	Rank	Principal Component	
								Loading	
4.1 mHealth is compatible with my duties	8.1	**14.6**	22.1	38.3	16.9	55.2	**1**	.770	Percentage of total variation %62.3 %62.3
4.2 mHealth is compatible with what I need to execute my daily tasks	9.4	13.6	23.7	36.4	16.9	53.3	**2**	.783	
4.3 mHealth is compatible with my experience with mobile devices	11.4	16.2	26.3	28.2	17.9	46.1	**5**	.569	
4.4 mHealth is compatible with my organizational working style	11	14	28.2	34.7	12	46.7	**4**	.739	
4.5 mHealth is compatible with my work ethics	7.5	22.4	20.2	30.8	19	49.8	**3**	.638	

Table No 4: m-Health compatibility

		capability	Complexity	Relative Advantage
Complexity	Correlation	.020		
	P Value	.727		
	N	308		
Relative Advantage	Correlation	.112*	.361**	
	P Value	.049	.000	
	N	308	308	
Compatibility	Correlation	.141*	.209**	.153**
	P Value	.013	.000	.007
	N	308	308	308

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

be the source of attaining self-efficacy which in turn can lead to the successful adoption of m-Health by CHWs.

The highlighted fact is that most of the community health service providers think that m-Health is useful to be adopted for the delivery of professional services, m-Health makes the job easier, and they also think that some tasks can easily be performed with the help of m Health, it makes easier to access the large portion of the population, and with the successful implementation of the project, large portion of population can be benefited from useful and timely services. Similarly, there was an increase in prevention and awareness of diseases with m-Health adoption by community health services providers such as LHWs, LHVs, CMWs, and FWWs, etc. The highest PCA value for the question' m-Health make it easier" highlights its importance that community health workers feel more at ease and enjoy their services if they are trained and provided with the facilities to deliver the services of health care through the adoption of mobile phones. Studies reveal that the relative advantage or usefulness of innovation is a very important factor in technology adoption[16].

The assessed variables of compatibility can be grouped into three categories that are organizational compatibility questions work work-related compatibility and experience-based compatibility questions [9]. According to Tornatzky, compatibility was divided into two categories, normative and practical compatibility. According to this, experience-based and work-related compatibility comes under practical, and organizational comes under normative compatibility[17]. Regarding m-Health friability, views of CHWs indicated that half of them want testing of m-Health before adoption, and more than half of CHWs are of the view that they adopt the m-Health and then evaluate the results. About 46% of respondents want to see clear and valid results of m-Health adoption before adopting it, and 49% said that they need to be shown where m-Health worked before. Whereas 41% of community health workers in Peshawar district said that they immediately adopted the m-Health without any query. More than half of the community health service providers such as LHWs, LHVs, CMWs, FWWs, etc. agree with the compatibility variables such that m-Health was compatible with their duties, execution of daily tasks, their experiences with mobile devices, organizational working style, and their work ethics. The high PCA value of 0.783 is calculated for the variable "m-Health was compatible with what needed to execute daily task" indicating that this variable has a strong impact on m-Health capability acceptance. This study reveals that the compatibility of technology depends on the diffusion rate of innovation and resistance to acceptance by service providers. An increase in compatibility of technology leads to an increase in diffusion of technology and a decrease in compatibility leads to acceptance resistance by service providers and vice versa[18].

CONCLUSIONS

m-Health usefulness and acceptance in awareness and disease prevention are the most agreed factors by the community health workers. Acceptance for m-Health capability "to communicate with fellow health service provider" was higher in the capability index for the use of mobile phones for health care purposes. The highest PCA score recordings for m-health made the job easier and improved accessibility for the community. The factors with high-loading PCA scores indicated that service providers are willing to adopt mHealth. Research recommends that comparison with other eHealth devices will make us understand how technology can be used for the betterment of the community and the service provider.

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Authors Contribution:

Following authors have made substantial contributions to the manuscript as under

Authors	Conceived & designed the analysis	Collected the data	Contributed data or analysis tools	Performed the analysis	Wrote the paper	Other contribution
Akhtar A	✓	✓	✓	×	✓	×
Khan IA	✓	✓	×	×	✓	×
Alam A	×	✓	×	×	×	✓
Gul R	✓	×	✓	✓	×	×
Shah AA	✓	✓	×	✓	×	×
Ullah N	×	✓	×	✓	✓	×

Authors 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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ORIGINAL ARTICLE

TRENDS OF ASPHYXIAL DEATHS AND ITS ASSOCIATION WITH VARIOUS DEMOGRAPHIC FACTORS REPORTED TO FORENSIC MEDICINE DEPARTMENT PESHAWAR; AN AUTOPSY-BASED RETROSPECTIVE STUDY

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ABSTRACT

Objectives: To find the frequency of reported asphyxial deaths to gender and pattern of injury reported. This study also intended to identify the causes and the association between age, area, and gender of the deceased with sexual assault-related asphyxial deaths.

Material and Methods:A retrospective chart review was conducted at the Department of Forensic Medicine and Toxicology Khyber Medical College Peshawar from 1st July 2018 to 30th June 2023 (5 years data). All the subjects who died due to asphyxia and were presented for autopsy at the department were included in the study. Cases with incomplete documentation and those referred from other districts were excluded from the study.

Results: Of the total 187 subjects, 66.8% (n=125) were males and 33.2% (n=62) were females with male to female ratio of 2:1. In the data, 57.2% (n=107) belonged to urban areas and 42.8% (n=80) were of rural areas. In total subjects, 88.8% (n=166) had immediate deaths, 6.4% (n=12) had delayed ones, and 4.8% (n=9) were undetermined. The most prevalent type of asphyxia was mechanical 113 (60.4%). The most common cause of asphyxia death was found to be hanging at 34.22%. However, of the 187 subjects, 5.3% (n=10) had intoxications, of which 1.6% (n=3) had tetrahydrocannabinol (THC), carbon monoxide (CO) and morphine poisoning each and 0.5% (n=1) had methamphetamine poisoning.

Conclusion: Our study concluded that asphyxial deaths were more prevalent in males in the middle-aged group. Asphyxial deaths were found more in urban areas than in rural areas. Mechanical asphyxia was the most common type of asphyxia while hanging was the most common pattern.

Key words: asphyxia, tetrahydrocannabinol, mechanical, traumatic, sexual, iatrogenic, and chemical asphyxia.

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INTRODUCTION

Asphyxia is a Greek word that means “absence of pulse” or “pulselessness.” [1] In actuality, it is a misnomer. Asphyxia is a disorder that prevents breathing from happening or results in low oxygen levels in inspired air, depriving the organs and tissues of oxygen and ultimately leading to unconsciousness or death. When pressure is applied to the neck or chest, obstructing the airway, and there is difficulty breathing, these are the classic symptoms of asphyxia.[2] The number and variety of medicolegal deaths have skyrocketed in recent years along with the rise in crime. The investigation of medicolegal fatalities necessitates that medical professionals probe certain aspects such as the cause, method, and timing of death to address certain questions. This can only be accomplished by a thorough autopsy.[3]

Some examples of unnatural causes of death include firearms, assaults with sharp and blunt weapons, bomb blasts, violent compression of the neck by hand

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or ligature, poisoning, heat injuries, and traffic accidents. Suicidal, accidental, and homicidal deaths can occur due to violent asphyxia including smothering, choking, drowning, hanging, ligature, and manual strangling. One of the most common methods of suicide is hanging, which involves the body being suspended by a rope that compresses the neck externally, with the body's weight acting as a constriction. [4] A rise in suicide by suffocation (52%) and poisoning 19% has been observed, where suicide by suffocation increased by 104% among those aged 45–59 years and rose steadily in all other age groups except those aged ≥70 years.[5] One Canadian report says that hanging is the second most common suicidal method while suffocation remains the first cause.[6]

Oxygen shortage first affects nervous tissues, and even a slight oxygen shortage might cause these tissues' functioning to be disrupted resulting in abrupt unconsciousness. The heart may beat for several minutes after breathing stops in all types of asphyxia. Mechanical asphyxia, pathological asphyxia, toxic asphyxia, environmental asphyxia, traumatic asphyxia, postural/positional asphyxia, and iatrogenic asphyxia are among the several forms of asphyxia.

Deprivation of oxygen for five to ten minutes can cause irreversible damage to the central neurological and circulatory systems, which can lead to asphyxia fatalities. The three main symptoms of asphyxia are cyanosis, increased capillary permeability, and petechial hemorrhage, which appear when breathing is mechanically blocked for 15 to 30 seconds. Conjunctival and facial petechiae, although nonspecific findings are considered hallmarks of asphyxial deaths. Even though they are neither predictable findings in all asphyxial deaths nor rare in natural, non-asphyxial deaths, the belief prevails that petechiae are suggestive of asphyxia.[7]

Petechial hemorrhages are typically found in the skin of the head and face, particularly in the lax tissues of the eyelids, conjunctivae, and sclera. [8] These are caused by blood leaking from tiny venules as a result of the venous system's increased pressure. Because they can emerge instantly in the face and eyes after a strong episode of coughing or sneezing, they are not indicative of suffocation.[9]

The victims' ages range from 10 to 80 years old, which is the extreme of any age range. The likelihood of events in both sexes is similar, and both are equally prone.[10] For children ages 5 to 14, drowning ranks as the sixth most common cause of mortality worldwide. More than 90% of drowning deaths take place in nations with poor and moderate incomes.[11] Death due to drowning, one of the causes of asphyxia, is one of the most difficult causes of death to prove at postmortem, especially when the body is not examined in a fresh condition.

This study will add new data for the pattern of injuries in asphyxia deaths in Peshawar. Previously, no such study in this region has been conducted. The data would be helpful for Forensics, Public Health Experts, and Law Enforcement agencies to cover and cope with the evil of asphyxial deaths. The data further can be used to create awareness in the general public.

MATERIALS AND METHODS

A retrospective chart review was conducted at the Department of Forensic Medicine and Toxicology Khyber Medical College Peshawar from 1st July 2018 to 30th June 2023 (5 years data). All the subjects who died due to asphyxia and presented for autopsy at the department were included in the study. Cases with incomplete documentation and cases referred from other districts were excluded from the study.

Once the study had received institutional and ethical permission, the data for the study sample was gathered. The data was extracted using a pre-designed proforma. A section on demographics and closed-ended questions about autopsy cases presented at the Department of Forensic Medicine was included in the pre-designed proforma. v.20 of SPSS was utilized for analysis. Frequency and percentage analyses were used to describe categorical variables. Chi-square was employed to investigate correlations between different demographic characteristics and asphyxia-related mortality. A P value of less than 0.05 was considered significant.

RESULTS

Of the total 187 subjects, 66.8% (n=125) were males and 33.2% (n=62) were females with a male-to-female ratio of 2:1. The mean age of the subjects was 29.0+/- 14.1 years. Table 1 shows the ages in groups.

In the data, 57.2% (n=107) were related to urban areas and 42.8% (n=80) were of rural areas. In total subjects, 88.8% (n=166) had immediate deaths, 6.4% (n=12) had delayed ones, and 4.8% (n=9) were undetermined. The type of asphyxia encountered is described in Table 2, whereas Table 3 illustrates the causes of asphyxia.

However, of the 187 subjects, 5.3% (n=10) had intoxications, of which 1.6% (n=3) had THC, CO, and morphine poisoning each and 0.5% (n=1) had methamphetamine poisoning. Moreover, 1.6% (n=3) of subjects were having sexual assaults. The gender is compared with sexual assault in cases of asphyxia which shows a p-value of 0.035 which is statistically significant, whereas area compared with sexual assault shows a p-value of 0.61 which is statistically insignificant.

DISCUSSION

Asphyxial deaths result from the deprivation of ox-

Table No 1: Ages in groups with their frequencies

Age in groups	Frequency (n=187)	Percentage (%)
0-15 years	21	11.2
16-30 years	104	55.6
31-45 years	43	23.0
46-60 years	11	5.9
more than 60 years	8	4.3

Table No 2: Different types of asphyxia

Types	Frequency (n=187)	Percentage (%)
Mechanical	113	60.4
Traumatic	60	32.1
Chemical	7	3.7
Pathological	5	2.7
Iatrogenic	1	.5
Perinatal	1	.5

Table No 3: Different types of asphyxia

Causes	Percentages
Hanging	34.22%
Strangulation	13.9%
Drowning	6.95%
Suffocation	0.53%
Smothering	1.6%
CO poisoning	3.7%
Infections	2.1%
Traumatic	32.6%
Throttling	2.1%
Choking	0.53%

Table No 4: Association of asphyxia death with sexual assault and residence

Variables	Sexual Assault		p-value
	Negative	Positive	
Gender			
Male	125 (66.8%)	0 (0%)	0.035
Female	59 (31.5%)	3 (1.6%)	
Area			
Urban	105 (56.2%)	2 (1.1%)	0.61

ygen to cells, particularly affecting the brain, which serves as the central regulator of the body's physiological processes. These deaths are typically confirmed through autopsy-based studies, providing valuable insights into the patterns and demographics of such fatalities. Notably, a consistent male-to-female ratio of 2:1 is observed across various regions, including Brazil[12], Germany [13], and South Asian countries like Pakistan [(14)] and India. [15]

The higher frequency of asphyxial deaths among males can be attributed to societal roles, where males often serve as the primary breadwinners of their families. This societal pressure places them at a heightened risk of experiencing violence and stress, potentially contributing to the prevalence of asphyxial deaths among this demographic. Moreover, the age range most affected by such deaths typically falls between 16 to 45 years, aligning with findings from previous studies [(6,17)]. This period of life is often characterized by significant stressors, responsibilities, and challenges, which may predispose individuals to fatal outcomes related to asphyxia.

The dominance of asphyxial deaths within this age range suggests that individuals in their prime working and reproductive years may be particularly vulnerable to such incidents. The accumulation of stressors and challenges during this stage of life could potentially exacerbate the risk of fatal outcomes related to asphyxia.

Hanging was the most common cause of death in the study, preceding road traffic accidents, strangulation, and drowning, respectively, comprehensible to a study in Pakistan [4,16], but contrary to a study where drowning was the leading cause [18].

Mechanical asphyxia is the topmost cause, after that traumatic one either due to road accidents or falls. This is one of the worldwide causes of suicide by asphyxia in third-world countries. To settle that suicide by hanging is the easiest method whatever material is found in the vicinity. On the other hand, traumatic asphyxia mostly due to an RTA is because of a lack of traffic sense, rash driving, and inapplicable traffic rules.

The strangulation in the study, another type of mechanical asphyxia, is homicidal, and much prevailing in this part of the world. Strangulation cases were also found higher in honor-killing victims in a four-year study done by the Human Rights Commission[19]. Random cases of asphyxia due to pathological lung infection, suffocation due to congested inhabiting areas, or carbon monoxide poisoning because of burning or indoor gas appliances are the utmost causes. Smothering another type of homicidal manner by asphyxia [20] in which the nose or mouth is occluded with hands or materials like plastic bags or pillows existed in the study.

In the study, sexual assault was statistically significant with a p-value less than 0.05. Sexual assault prevailed in cases with homicidal asphyxia mainly by strangulation as in other studies [21,22] and drowning in one of the cases. Of the data, some intoxications were encountered in the serum that were of the recreational drugs or medicinal ones. Moreover, CO monoxide was present in the blood of the subjects who died due to gas appliances in closed encounters or burning of buildings, mostly in the winter compared with other studies [23,24]. Those having lung

infections died of pathological asphyxia and were having morphine poisoning because of the additional use of anti-tussive or homemade remedies containing opium. The recreational drugs like methamphetamines and THC met in the serology were due to use in social stress or gathering in bad company where its use might lead to violent activities, one of the effects as in studies [25,26]. The different patterns along with aspects like sexual assault and intoxication are discussed to imply the consequences shortly for the betterment of the community.

The study's limitations include reliance on recorded data, which may introduce information bias due to incomplete or inaccurate documentation. Additionally, the absence of personal interviews limits the depth of understanding of individual cases and may overlook important contextual factors contributing to asphyxial deaths. These limitations highlight the importance of future research efforts that incorporate qualitative inquiry to complement quantitative analysis. Efforts to integrate qualitative methods into future research endeavors can enrich our understanding of the complex interplay of factors influencing asphyxial deaths, ultimately informing more effective prevention and intervention strategies.

CONCLUSION

Our study concluded that asphyxial deaths were found more prevalent in males of the middle age group. Asphyxia deaths were found more in urban areas than in rural areas. Mechanical asphyxia was the most common type of asphyxia. Hanging was the most common pattern of asphyxia death. Moreover, 10 individuals were intoxicated with poisons and 3 individuals had a sexual assault. Gender was compared with sexual assault and was found to be highly significant.

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Authors Contribution:

Following authors have made substantial contributions to the manuscript as under

Authors	Conceived & designed the analysis	Collected the data	Contributed data or analysis tools	Performed the analysis	Wrote the paper	Other contribution
Nadeem F	✓	✓	✓	×	✓	×
Ahmad I	✓	✓	×	×	✓	×
Ali Ahsan	×	✓	×	×	×	✓
Khan MA	✓	×	✓	✓	×	×
Wasif M	✓	✓	×	✓	×	×
Afridi HK	×	✓	×	✓	✓	×

Authors 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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ORIGINAL ARTICLE

SLEEP HEALTH OF MEDICAL STUDENTS BEFORE THE ANNUAL OBJECTIVE STRUCTURED CLINICAL EXAMINATION (OSCE)

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ABSTRACT

OBJECTIVES: To determine the sleep health of medical students before the annual OSCE at Khyber Medical College Peshawar (KMC) / Khyber Teaching Hospital Peshawar (KTH).

MATERIALS AND METHODS: This descriptive cross-sectional study was conducted from April 6–14, 2022, in the Department of Medicine, KTH Peshawar. All students of final-year MBBS of KMC appearing in Final OSCE were included in the study after receiving informed consent. Students were classified as day scholars and hostelites. Levels of stress alertness, sleep efficiency, duration, and timing of sleep were checked in both genders, and all were categorized according to the SATED questionnaire.

RESULTS: A total of 245 students were included in this study, of which 148 were male and 97 were female. Among these students, 84 were day scholars, and 161 were hostelites. Thirty-two students were completely unsatisfied with their sleep, 45% were satisfied sometimes, 20.2% felt drowsy during most of their daytime, and 46.5% felt drowsy during some of the day. Males had significantly better sleep health (5.35 ± 2.0) compared to females (4.4 ± 1.9) with p value < .001. Males had significantly higher average satisfaction (0.99 ± 0.72, p =.027) and average duration (1.34 ± 0.69, p < .001) of sleep compared to females (0.77 ± 0.74, 0.93 ± 0.74, respectively).

CONCLUSIONS: Students' sleep health was considerably worse before the annual practical examination and this difference was somewhat higher among hostelites.

KEYWORDS: Sleep health, Sleep quality, medical students

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INTRODUCTION

The overall population suffers from sleep issues frequently, with medical students being especially vulnerable compared to non-medical students. Medical students have sleep disruptions more regularly.

The high frequency of sleep issues among medical students can be attributed to various factors, such as long study and class hours, clinical clerkships that require night-time labor, emotional stress, lifestyle implications, and extensive use of social media. [1]

It has been connected to an increase in workplace and automobile accidents as well as a higher risk of medical errors in doctors who are sleep deprived. [2] A study on Brazilian medical students reported 45.3% of students getting less than five hours of sleep the night before an examination. [3] Research investigations show heterogeneity in the sleep health of medical students before annual tests begin. An analysis of one particular case showed that the prevalence of sleeplessness was 32.9% before examinations and dropped to 27.1% afterward.[4] Before the start of the yearly examinations in Pakistan, medical students' sleep health reveals a propensity for students to sleep less on exam days.

Studies conducted at several Pakistani medical facilities have found that the average time people sleep before a test is less than recommended. It has been noted that compared to men, women appear to have less of a tendency to sleep. With an average of 4.74 + 2.57 hours of sleep before an exam, most students in this study conducted at Shifa College in Islamabad got less sleep on exam days. [5]

Another research of undergraduate students studying medicine and non-medicine in Islamabad and Rawalpindi in 2017 revealed that 50.4% of students who were not medical students and 67.3% of medical students were categorized as bad sleepers, respectively. The average score for inadequate quality of sleep was 6.386 ± 2.923. Medical students' ratings were noticeably higher, suggesting their sleep was lower quality. The quality of sleep was even poorer for medical students who were

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female. Yet, among students who were not medical students, there was no gender difference.[6]

Sleep health is defined by Buysse DJ as a multidimensional pattern of sleep-wakefulness, adapted to individual, social, and environmental demands, that promotes physical and mental well-being. Good sleep health is characterized by subjective satisfaction, appropriate timing, adequate duration, high efficiency, and sustained alertness during waking hours. [7]

The modern medical student's poor sleep environment and excessive screen time make this study essential. So, this study aims to determine the sleep health of medical students before going for an annual clinical examination. This study might help to enhance awareness of this important topic and encourage conversations and actions to support medical students' mental and physical health before their annual examinations.

MATERIALS AND METHODS

This descriptive cross-sectional study was carried out between 6th April and 14th April 2022 in the medical department of Khyber Teaching Hospital Peshawar after getting approval from the hospital ethical committee (Ref No. 176/DME/KMC dated 30/3/2022).

After taking informed written consent, all final-year MBBS students (n=245) of both genders were registered in the study. Students were classified as day scholars and hostelites. Levels of stress alertness, sleep efficiency, duration, and timing of sleep were checked in both genders, and all were categorized based on duration and severity. Sleep health was categorized according to the SATED (Satisfaction, Alertness, Timing, Efficiency, and Duration) questionnaire. [7, 8]

The SATED questionnaire assesses five aspects of sleep health that have been linked to several health results, including 1) satisfaction; 2) level of sleep alertness; 3) timing of sleep; 4) sleep efficiency; and 5) sleep duration. Five items make up the original questionnaire, each of which is concerned with how frequently a particular aspect of sleep health is met.

A score of 0 represents "never", 1 represents "sometimes", and 2 represents "always" for each item. The overall score is between 0 and 10, where 0 and 10 indicate the highest and lowest levels of sleep health, respectively. This questionnaire has been found reliable (Cronbach's $\alpha = 0.77$) and valid in the general population.

Statistical analysis was done using SPSS 22. Frequency and percentages were calculated for categorical variables, whereas mean and standard deviation were calculated for scale variables. P values below 0.05 were considered significant.

RESULTS

A total of 245 students were included in this study, of which 148 were male and 97 were female. 32.2% of students were completely unsatisfied with their sleep, 45% were satisfied sometimes, 20.4% felt drowsy during most of their daytime, and 46.5% felt drowsy during some of the day (Table 1). 19.6% of students were not getting 6 to 8 hours of sleep, 37.6 % were getting 6 to 8 hours occasionally, and 31.8% were taking more than 30% to fall asleep (Figure 1). Males have significantly better sleep health (5.35 ± 2.0) compared to females (4.4 ± 1.9), p < .001 (Table 2).

Male students had significantly higher average satisfaction (0.99 ± 0.72) and average duration (1.34 ± 0.69) of sleep compared to female students (0.77 ± 0.74; 0.93 ± 0.74, respectively; p =.027-p <.001 (Table 2).

Table No 1: Demographics and other characteristics of study participants

Parameters		Frequency	Percentage (%)
Age (years)	Mean ± SD	24.2 ± 1.1	
Gender	Male	148	60.4
	Female	97	39.6
Day scholar	Yes	84	34.3
	No	161	65.7
Hostelite	Yes	162	66.1
	No	83	33.9

Table No 2: Mean SATED Score stratified based on gender

	Male	Female	p-value
Overall SATED score	2.0 ± 5.35	1.9 ± 4.4	0.000
Satisfaction	0.72 ± 0.99	0.74 ± 0.77	0.027
Alertness	0.75 ± 0.92	0.67 ± 0.80	0.224
Timing	0.71 ± 1.16	0.77 ± 1.03	0.194
Efficiency	0.73 ± 0.94	0.75 ± 0.86	0.349
Duration	0.69 ± 1.34	0.74 ± 0.93	0.000

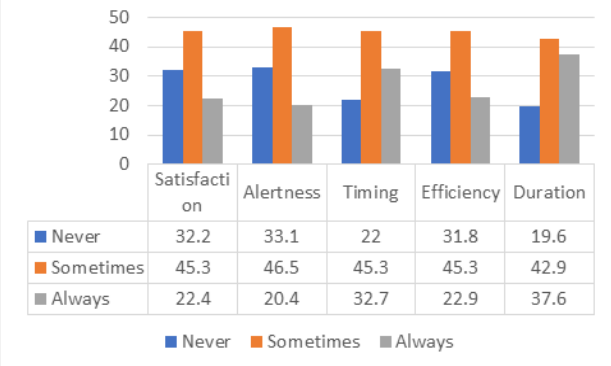

Fig 1: Percentage of sleep health as per SATED score among medical students

DISCUSSION

The medical profession is considered the most challenging, demanding, time-consuming, rewarding, and stressful. Medical students pass through long, intensive, and tiring academic years before becoming physicians. Frequent mid-term class tests and annual exams put an extra burden on undergraduate students. Therefore, they are more vulnerable to stress and sleep problems than students of other less tiring and less stressful disciplines. Our study aims to determine the sleep health of undergraduate medical students during their clinical examinations.

According to a study conducted in Brazil, 45.3% of medical students reported sleeping for less than five hours before an exam, indicating a poor sleep pattern before exams. [3] In another study in New Zealand by Falloon et al., short sleep duration (≤6 h) was reported by 22.7% of medical students. [9]

In our study, 20% of students felt drowsy most of the day, and 46.5% felt drowsy at some point during exam day. This suggests that sleep is drastically reduced before the annual exam. According to the National Sleep Foundation, one-fourth of medical students generally slept on average ≤6 hours per night, whereas 7–9 hours are recommended. [10]

Another study conducted in India found that 40% of study participants experienced a sleep onset delay of more than 30 minutes. [11] Our study found that 31.8% of people needed more than 30 minutes to fall asleep, similar to a study done in India. This study in India shows some students were taking pharmacological drugs to help them sleep better.

Another study was done in Iran, where sleep satisfaction was reported as "perfect" by only 14% of participants, and 86% of students were not completely satisfied with their study.[12] Our study showed that 77% of students were unsatisfied with their sleep. A meta-analysis was conducted in 13 nations, including Pakistan, China, and the United States. Medical students' average nightly sleep time, when pooled, was 6.3 hours, and 55% of students reported poor sleep quality. [13]

Our study shows that 37.5 % were getting 6 to 8 hours of sleep occasionally, and most days of the week, they slept fewer than 6 hours. Sleep insomnia was reported in 44.6% of medical students, as per Malik et al.[14] Another study conducted in Vietnam in which more than 1500 students participated through a web survey exhibited poor sleep quality in more than half of the studied population. Similarly, in a study by Tran et al. in Vietnam, 22% of medical students experienced a low-stress level, 63% had mild stress, and 15% had a high-stress level. [15] The main limitations of this study are that it is a uni-centered and single-subject-based study. We did not inquire about any pharmacological treatment students received before sleep.

CONCLUSION

Students' sleep health was considerably worse before the annual exam, and this difference was somewhat higher among hostelites. Health education programs should be created by the government and college administration to increase student awareness of the value of getting enough sleep before exams.

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Authors Contribution:

Following authors have made substantial contributions to the manuscript as under

Authors	Conceived & designed the analysis	Collected the data	Contributed data or analysis tools	Performed the analysis	Wrote the paper	Other contribution
Khan Z	✓	✓	✓	×	✓	×
Javed J	✓	✓	×	×	✓	×
Haider I	✓	✓	✓	✓	✓	✓
Khan I	✓	×	✓	✓	×	×
Khan HA	✓	✓	×	✓	×	×
Badshah A	×	✓	×	✓	✓	×

Authors 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.

Ethical Approval:

This Manuscript was approved by the Ethical Review Board of Khyber Medical College, Peshawar. Vide No. 176/DME/KMC. Dated: 30 03 2022

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ORIGINAL ARTICLE

KNOWLEDGE AND PRACTICES OF LABORATORY STAFF REGARDING COVID-19 INFECTION

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ABSTRACT

Objective: To determine the level of knowledge and practices of laboratory staff regarding COVID-19 infection.

Materials and methods: It was a Multicenter, Cross-sectional Descriptive, Questionnaire-based study done in the Pathology laboratory of Khyber Teaching Hospital and Hayatabad Medical Complex Peshawar. The participants were asked to fill out proformas after obtaining consent. The data was analyzed by SPSS. The normality of data was determined by the Shapiro-Wilks test. The difference in scores between demographic characteristics was determined by the Whitney U test and the Kruskal Wallis test. Kendall Tau determined the correlation between scores and demographics. b, point biserial and Spearman rho tests. A p-value of less than 0.05 was considered statistically significant.

Results: The age of 89 study participants ranged from 15-58 years (mean age of 34±9.6). The male-to-female ratio was 15.6:1. Mean knowledge and practice scores were 10.19±1.66 and 10.2±2.4. Knowledge and practices were good in all participants except that 42 (45%) participants denied avoiding going to crowded places. Mean knowledge score and practice score were higher in females (as compared to males) and in married participants (as compared to unmarried ones), but lower in undergraduates. There was no correlation between scores and demographic characteristics.

Conclusion: The laboratory staff had good knowledge of COVID-19 and observed good practices. This shows the commitment of healthcare workers in Pakistan towards themselves and society in the crucial situation of COVID-19 infection. The scores were not associated with gender, marital status, or education level.

Keywords: Knowledge, practices, COVID-19.

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INTRODUCTION

Coronavirus is reported to arise from Bats. [1, 2] The virus is called novel coronavirus, and the disease it causes is called Corona Virus Disease-19 (COVID-19). The disease was first discovered in December 2019 in Wuhan city of China. [3] Since then, it spread rapidly and affected every country in the world thus taking the form of a pandemic.It was on December 31st, 2019, that the first case of COVID-19 was reported by the World Health Organization (WHO). On January 30th, 2020, the WHO declared COVID-19 as a Pandemic.[1] The disease spread like fire from country to country and in just three months' duration, there were more than 125,000 COVID cases and over 4600 deaths all over the world.[1, 4] The death rate of COVID-19 is reported to be 2.3%.[5, 6] In Pakistan, the first case of COVID-19 was reported on February 26th, 2020. [7] The highest number of cases was seen in Punjab, followed in decreasing order by Sindh, Khyber Pakhtunkhwa, Balochistan, Gilgit Baltistan, and Islamabad, and the lowest prevalence was reported in Azad Jammu Kashmir. [7]

COVID-19 presents clinically as fever, cough, difficulty in breathing, and generalized body aches. In severe cases, the patients develop respiratory distress, coagulation abnormalities, and finally the patient enters a state of shock. [3, 5, 8] Most of the patients present with mild disease and recover without any treatment. About 20% of the patients get severe disease and they may end up in respiratory failure and shock. About 2% of cases are so serious that they do not survive and die. [9] It is highly infectious and spreads from person to person via respiratory droplets and close contacts. Till now, there is no definitive treatment for COVID-19. Therefore, the only way to prevent oneself is by adopting preventive measures to stop the spread of COVID-19 [4].

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The staff of the pathology department is involved in patient care and hence is constantly exposed to the risk of getting infections from body samples of patients. [4, 7, 10] The WHO has issued certain recommendations for healthcare workers regarding the control and prevention of COVID-19 among them. [11] Also, the WHO has conducted online training sessions for healthcare care workers to give knowledge and raise awareness among healthcare workers regarding COVID-19. Knowledge affects actions. So, knowledge about Covid 19 in healthcare workers affects their actions regarding adopting preventive measures. [1]

Lack of knowledge and poor practices among healthcare workers can increase the spread of disease not only among the staff at the workplace but also in the general population. [10] Therefore, it is necessary to take measures to stop the spread of infection among hospital staff. [7] A survey about the knowledge and practices of health staff regarding Covid 19 is a smart way to assess the behavior of the staff. The preventive measures recommended for the public in COVID-19 include covering the face with a face mask, hand washing (for a 20-second duration), keeping a six-meter distance from people, avoiding crowded places, and boosting one's immunity by taking vitamin C and healthy food. [9]

COVID-19 badly hit Pakistan. There were reports of infection among the healthcare workers in hospitals. It seemed necessary to know the knowledge and practices of healthcare workers. Therefore, we aimed to conduct this study to determine the level of knowledge and practices of laboratory staff in the Pathology department in Peshawar.

MATERIALS AND METHODS

It was a multicentric Cross-sectional Analytical Questionnaire-based study. It was done from 1st May 2020 to 30th June 2020. The study participants included the Paramedical staff of the Pathology department and blood bank of Khyber Teaching Hospital and Hayatabad Medical Complex Peshawar. Sampling was done by non-probability purposive sampling technique. The sample size was calculated to be 74 using an online sample size calculator by taking a confidence level of 95% and a margin of error of 5%. Ethical approval was obtained from the Ethical Review Board. The questionnaire was developed as per questions on the World Health Organization (WHO) website. [12] The questionnaire was validated by three expert researchers. The questionnaire had 12 questions about knowledge and 13 questions on practices concerning COVID-19. The questions were given marks to quantify the questionnaire. The questions in the Knowledge section had one mark for correct answer and zero mark for wrong answer. So, the minimum knowledge score was zero and the maximum knowledge score was 12. The questions in the Practice section had three options each, i.e., "no", "sometimes" and "yes", scored on a Likert scale as 0, 0, and 1 respectively. So, the minimum practice score was 0, and the maximum practice score was 13. A pilot study was done first on 9 participants and the questionnaire was modified based on results i.e., the questions were converted to easy language and simplified. Cronbach's alpha was calculated to determine the reliability of the questionnaire. [13] The Cronbach's alpha was 0.763 for the questionnaire. Informed written consent was obtained from the participants. They were handed over the proforma and requested to fill it. Online proforma through Google Forms was developed for those participants who were working in isolation departments and it was sent to them to be filled. The data was collected and analyzed using SPSS. Mean and standard deviation were used for quantitative data. Frequency and percentages were used for qualitative data. Mean scores for knowledge and practice were determined and compared among various demographic characteristics. Shapiro Wilks test was used and histograms were examined to determine the normality of the data. Mann Whitney U test and Kruskal Wallis test were used to determine the significance of the difference between mean scores in different demographic characteristics in the case of non-parametric data. Spearman rho correlation was used to determine the association between knowledge score and practice score. Point Biserial correlation was used to assess the relationship between knowledge/practice scores and marital status and gender. Kendall tau correlations were used to determine the relationship between score and qualification levels.

RESULTS

Demographic characteristics are shown in Table 1. Figure 1 and 2 shows the knowledge and practices of study participants respectively. Table 2 shows the scores of knowledge and practices across different demographic characteristics. Figures 3 and 4 show knowledge and practice scores about gender, marital status, and qualifications. Table 3 shows the correlation of the scores with demographic characteristics.

DISCUSSION

The healthcare workers in the laboratory are in close contact with the patients and their body specimens like blood, nasal swabs, and body fluids. This puts them at a higher risk of contracting COVID-19 as compared to the general population. Therefore, it becomes necessary for staff working in hospitals to ensure adequate preventive practices, which in turn depend on their knowledge about Covid 19. [7, 9] Therefore, the workers must have adequate knowledge which then influences their behavior in day-to-day activities in the workplace.

In the present study, the mean age of the study participants was 34±9.6 years. Similarly, in a study done by Huynh G in China, the mean age of the participants was 30.1±6.1 years [9]. In our study, there was male pre-

Table No 1: Demographics of the study participants (n=89)

Demographics	Values
Age (in years)	
(Mean±SD , Range)	34±9.6,15-58
Gender	
Males n(%)	84(94%)
Females n(%)	5(6%)
n(%)	
Education Level	
Undergraduate n(%)	20(22.4%)
Graduates n(%)	38(42.7%)
Masters n(%)	27(30.3%)
Post Graduate n(%)	4(4.5%)

Table No 2: Knowledge and Practices score

		Mean ±SD	Range	p-value
Knowledge score		10.19±1.66	5-12	-
Practice score		10.2±2.4	4-13	
Knowledge score	Males	10.16±1.69	5-12	.655*
	Females	10.7±0.5	10-11	
	Married	10.2±1.6	5-12	.648*
	Unmarried	10.32±1.57	7-12	
	Under-graduation	9.8±1.8	6-12	.574**
	Graduation	10.1±1.46	7-12	
	Masters	10.3±2.01	5-12	
	Post graduation	10.5±.57	10-11	
Practice score	Males	10.23±2.48	4-13	.561*
	Females	11.2±.5	11-12	
	Married	10.1±2.5	4-13	.361*
	Unmarried	10.9±1.5	8-13	
	Under-graduation	9.2±3.06	4-13	.180**
	Graduation	10.8±1.75	6-13	
	Masters	10.2±2.8	4-13	
	Post graduation	9±1.6	7-11	

*p-value determined by Mann Whitney U test

**p-value determined by Kruskal Wallis test

Table No 3: Correlation between knowledge, practice scores, and demographic variables

Correlation	Correlation coefficient	p-value
Between knowledge score and gender	.073*	.495
Between knowledge score and marital status	-.032*	.767
Between knowledge score and qualification	.112**	.211
Between practice score and gender	.087*	.419
Between practice score and marital status	-.153*	.155
Between practice score and qualification	.023**	.792
Between knowledge score and practice score	.459***	<.005

*Point biserial correlation coefficient

**Kendall tau-b correlation coefficient

***Spearman rho correlation coefficient.

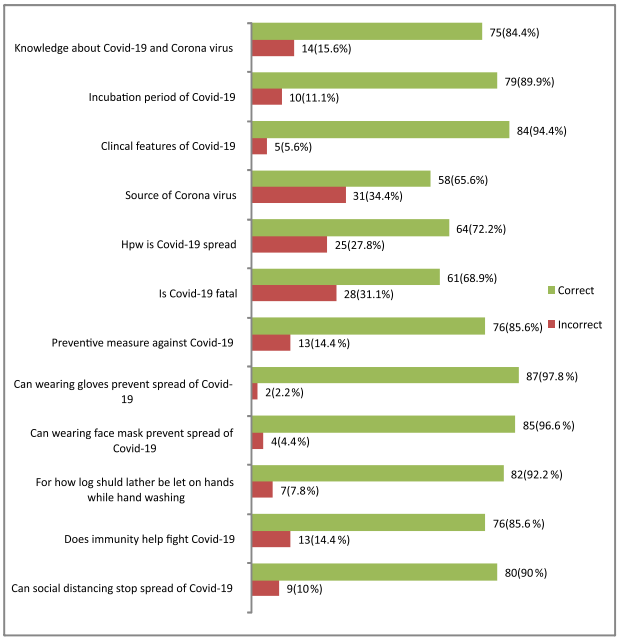

Fig 1: Knowledge of the study participants regarding COVID-19 (n=89)

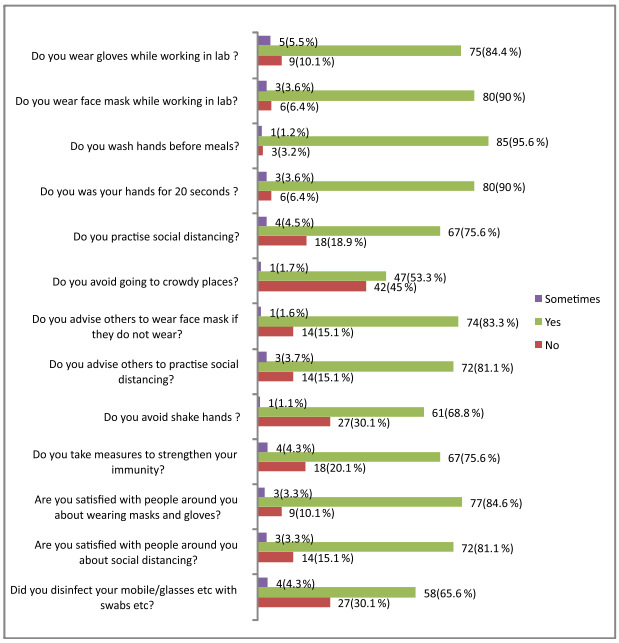

Fig 2: Practices of the study participants regarding COVID-19 (n=89)

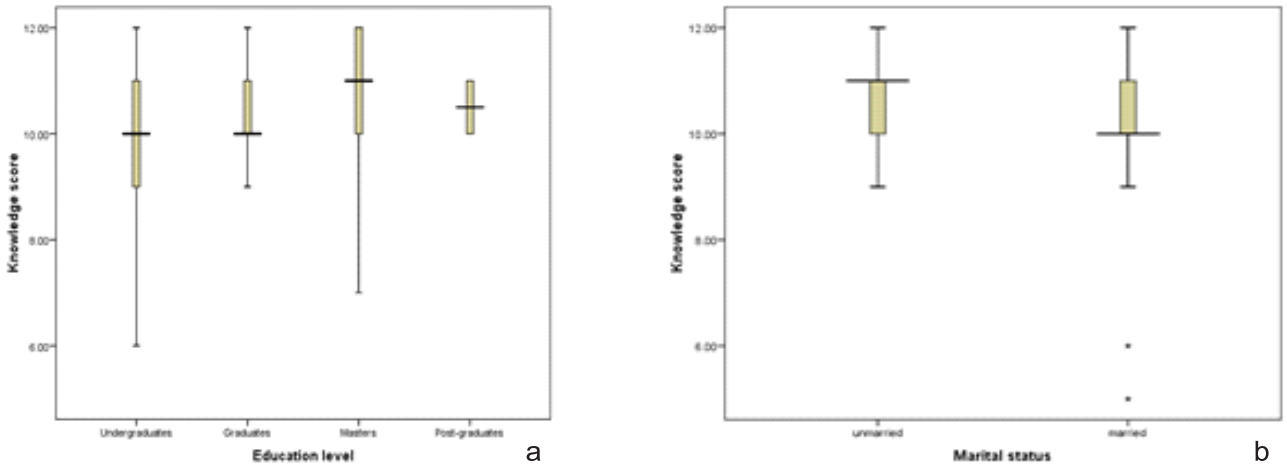

Fig 3: Knowledge scores concerning education level (a) and marital status (b)

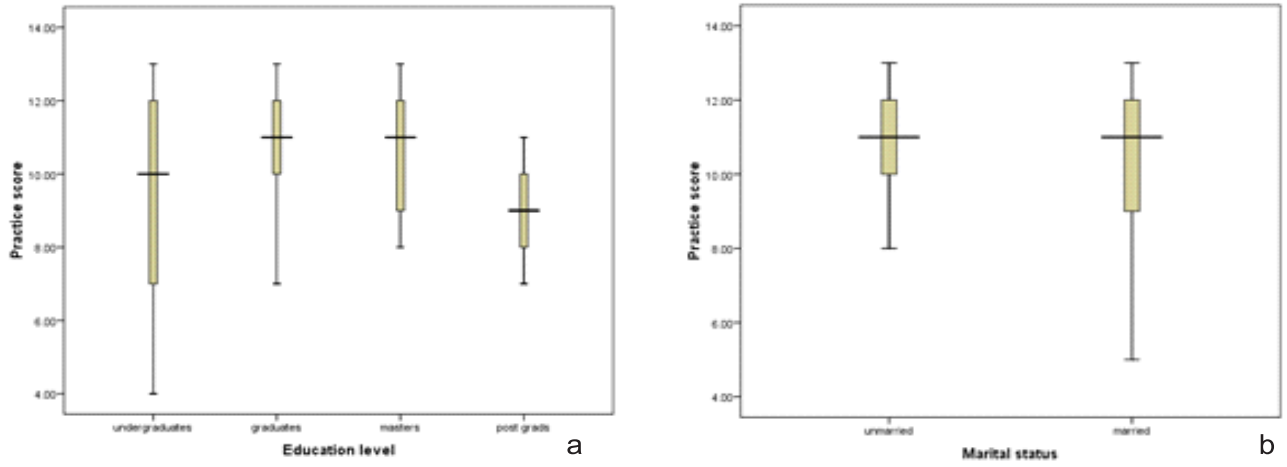

Fig 4: Practice scores concerning education level (a) and marital status (b)

dominance. On the contrary, a study by Huynh G showed female predominance. [9] A study done by Bhagvatula also showed male predominance. [1] In a study done by Hussain I in Peshawar, there was male predominance. [14]

In the present study, it was found that most of the study participants had a good knowledge of COVID-19, and they adopted good preventive practices during lab work. About 94% of participants were aware of the clinical features of COVID-19 and 92% knew that 20 seconds was the adequate duration of handwashing. About 90% of participants knew that social distancing was necessary to stop the spread of COVID-19, but only 75% of them practiced social distancing. Only 53% of participants avoided going to crowded places.

This is due to the social and cultural trends in this part of the world where avoiding social contact is considered disrespectful to others and people are inclined to show hospitality. In a study done by Zhong from China, it was reported that 96.4% of participants avoided crowded places, and 98% of participants used face masks. [3] Similarly, Giao et al. and Bhagvatula in their studies reported that most of the participants had sufficient knowledge regarding COVID-19. [1, 9] Saqlain in his study also reported a good level of knowledge and practices among the participants[7]. A similar finding is shown by a study from Nepal. [15]

The present study showed that the mean score of knowledge and practice was high. Giao et al from China also reported that the knowledge and practice scores were high in study participants. [9] In our study, the knowledge and practice scores were higher in females (as compared to males), in unmarried (as compared to married), and in those with higher qualifications, but all of these were not significant statistically.

The present study showed that the mean score for knowledge and practices was not correlated to marital status, age, and qualifications. However, Zhong et al from China found an association between poor practices and male gender [3]. Our study showed that there was a weak positive correlation between knowledge score and practice score (spearman rho coefficient=.459, p-value <.05). It means that as knowledge increases, so the level of good practices increases and vice versa. However, Huynh G reported a negative relationship between knowledge and practice scores. [9] Saqlain in his study showed a positive relationship between knowledge and practice score. [7]

During the COVID-19 pandemic, preventive measures are taken by countries to stop the spread of the pandemic. These include closing educational institutions, shutting down public transport services, making it necessary to wear face masks by the public, locking down the markets, etc. All these were done in the best public interest. Furthermore, the spread of awareness through social media and news was also done. It is necessary to educate the public as it will help them stop the spread of disease among themselves and the whole community. [9, 16, 17]

CONCLUSION

The majority of participants had good knowledge of COVID-19 and good practices too. However, the lack of social distancing among the participants is alarming and may become the cause of the rapid spread of disease in the community.

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Authors Contribution:

Following authors have made substantial contributions to the manuscript as under

Authors	Conceived & designed the analysis	Collected the data	Contributed data or analysis tools	Performed the analysis	Wrote the paper	Other contribution
Khan MI	✓	✓	✓	×	✓	×
Ali M	✓	✓	×	×	✓	×
Shafi M	×	✓	×	×	×	✓
Gul A	✓	×	✓	✓	×	×
Waseem H	✓	✓	×	✓	×	×
Hussain S	×	✓	×	✓	✓	×

Authors 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.

Ethical Approval:

This Manuscript was approved by the Ethical Review Board of Khyber Medical College, Peshawar. Vide No. 951/DME/KMC. Dated: 21 09 2020

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ORIGINAL ARTICLE

PLEURAL FLUID CULTURE USING BLOOD CULTURE BOTTLES AND STERILE SYRINGES IN PATIENTS WITH PARAPNEUMONIC EFFUSION

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ABSTRACT

Objectives: To determine the frequency of positive pleural fluid Culture by utilizing blood culture bottles and sterile syringes in patients with Para pneumonic effusions

Material and Methods: This prospective cross-sectional study recruited 386 patients with suspected para pneumonic effusion using a non-probability sampling technique from a single-center study setting of Lady Reading Hospital (LRH) Peshawar, KPK. The total duration of the study was six months. Sample selection was done using preset criteria. The data obtained on the validated questionnaire was analyzed using SPSS version 2.0.

Results: The age distribution among 386 patients was analyzed which showed 158(41%) patients ranging between 18-40 years old, and 228(59%) in the 41-70 age range. The mean age was 39 years with SD ± 10.33. Positive pleural fluid Culture was obtained from 44 percent while 56 percent were negative for any growth on pleural fluid culture. Furthermore, the 44% Positive pleural fluid Culture yielded organisms in 59% of blood culture bottles and 30% in sterile syringes.

Conclusion: Analysis of the data concluded that the blood culture bottles when used for pleural fluid culture yielded organisms more effectively as compared to the sterile syringes used for the same purpose, hence it can be evident that blood culture bottles have more sensitivity for pleural fluid organisms growth as compared to sterile syringes.

Key Words: Para-pneumonic effusions, Pleural fluid cultures, Blood culture bottle, Sterile syringes.

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INTRODUCTION

Para-pneumonic effusions cast a shadow upon lives across developed and under-developed worlds. The escalation of antibiotic resistance and the ongoing progress in pathological advancements have sparked a growing interest in both antimicrobial and emerging management protocols for treating pleural infections and empyema. [1]

In the vast symphony of human illness, pleural infections hum a somber tune, afflicting both adults and children with mortality and morbidity.[2]

Each year more than 70 thousand yield to empyema but identifying the causes for this is still an uphill task. [3] At present sterile syringes are used for pleural fluid analysis. Standard gram stain and culture procedures are not successful in detecting the microorganisms in almost 40 percent of the cases. Anaerobes are not detected using the current practice which makes us rethink the currently employed strategies. [3] Therefore, this approach is fast becoming unsuccessful. This has also led to the use of unwarranted antibiotics, which do more damage than benefit the patient.

Research studies have explored the utilization of blood culture bottles for joint aspirates, peritoneal dialysate, peritoneal fluid, and ascites, showing improved outcomes.[4,5] The identical approach was implemented for pleural fluids in instances of parapneumonic effusions, resulting in a higher pathogen identification rate of 20.8%

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when compared to sterile culture bottles in 53 bacterial parapneumonic effusions.[6,7]

This study aimed to assess, in patients with parapneumonic effusions in our local settings, the sensitivity of pleural fluid culture utilizing blood culture bottles versus sterile syringes. In our local context, we investigated the positive pleural fluid cultures that were obtained with both conventional 5 ml syringes and blood culture bottles. The objective was to find a more dependable way for the transportation of samples and then discover pathogens in cases of parapneumonic effusions in our local population. The objective of this study was to assess the sensitivity of pleural fluid culture using blood culture bottles as compared to sterile syringes in patients with parapneumonic effusions within our local settings.[3]

MATERIAL AND METHOD

This prospective study recruited 386 patients with suspected para pneumonic effusion using a non-probability sampling technique from a single-center study setting at Lady Reading Hospital Peshawar, KPK. Sample selection was done using preset criteria with a study duration of six months after approval from the institution's ethical board. The ethical approval was availed by notification (Ref# 333/ LRH/MTI) dated 25-04-2022. The study included; eighteen to 70-year-old patients of either gender requiring pleural drainage for Para pneumonic effusion as per protocol while the patients who were diagnosed with tuberculous pleural effusion, or patients having transudative pleural effusions or malignant pleural effusions were debarred from the study.

A prior written and informed consent about the nature of this study was taken. Chest radiography was used to confirm the presence and classification of the volume of pleural fluid (small, moderate, large, or substantial). Ultrasound-guided thoracocentesis was performed under aseptic conditions. A 21-gauge needle attached to a 50 ml syringe was used to collect pleural fluid. Two equal aliquots of the sample were placed in blood culture bottles and sterile syringes for culture analysis. Samples were transported to the Department of Pathology at room temperature within 30 minutes of aspiration and inoculated within an hour.

All the data were collected and recorded in a well-designed and validated questionnaire including baseline characteristics and laboratory values of pleural culture collected in culture bottles and syringes. Data were analyzed using SPSS version 20. Quantitative data (age, duration of symptoms) were described as mean ± standard deviation. Categorical data (gender, size of effusion, diagnosis, culture positivity) were expressed as frequencies and percentages. Culture positivity rates in blood culture bottles and sterile syringes were compared using the chi-square test. Stratification by age, gender, and other factors was performed followed by post-stratification chi-square tests with a significance level of 0.05.

RESULTS

The age distribution among 386 patients was examined, revealing that 158 (41%) individuals were aged 18-40 years, while 228 (59%) fell within the 41-70 age range.Top of Form The average age was 39 years with an SD (standard deviation) of ± 10.33. The gender distribution among 386 patients was examined, revealing that 57% were male, and 43% were female. Duration of symptoms among 386 patients was <2 weeks in 61, while 39% had a duration of symptoms >2 weeks. Among the patients, 197 had pneumonic effusion on the left side, while 189 exhibited pneumonic effusion on the right side. The size of Para pneumonic effusion among 386 patients was analyzed as 69(18%) patients had large pneumonic effusion, 147(38%) patients had moderate pneumonic effusion, and 170(44%) patients had small pneumonic effusion. Positive pleural fluid Culture was obtained from 44 percent and 56 percent were negative for any growth on pleural fluid culture. Moreover, over Positive pleural fluid Culture, the yield was 59% in blood culture bottles and 30% in sterile

Table No 1: Demographics of Study Participants

Variable	Frequency
AGE	
18-40 years	158(41%)
41-70 years	228(59%)
GENDER	
Male	220 (57%)
Female	166 (43%)
DURATION OF SYMPTOMS	
≤ 2 weeks	235 (61%)
> 2 weeks	151 (39%)
LOCATION	
Left	197 (51%)
Right	189 (49%)
YIELD	
Culture Bottle Positive	226(59%)
Sterile syringe Positive	114(30%)
SIZE	
Large	69(18%)
Moderate	147(38%)
Small	170(44%)

Table No 2: Stratification of Culture Reports

Pleural Fluid Culture	Culture Bottle	Sterile syringe	Total
Positive	226(59%)	114(30%)	340(44%)
Negative	160(41%)	272(70%)	432(56%)
Total	386	386	772

syringes. A p-value of < 0.0001 was documented for the positive pleural culture bottle method. See Tables 1 and 2 for details.

DISCUSSION

A pleural effusion, characterized by the abnormal accumulation of fluid in the pleural space, signifies an imbalance between the formation and removal of pleural fluid.[8] Bacterial parapneumonic pleural effusion (PPE) constitutes 40% of community-acquired pneumonia cases and is associated with elevated morbidity and mortality rates.[9] Streptococcus sp. emerged as the most frequently identified causative pathogen.[10] Pleural fluid is generated at an estimated rate of 0.2 mL/kg/h, while the clearance of pleural effusion occurs through the parietal pleura, capable of removing approximately 0.3–3 mL/kg/h.[11]

Among the 386 patients, the mean age was 39 years with SD ± 10.33. Out of these, 220 (57%) were male, and 166 (43%) were female. 69(18%) patients had large pneumonic effusion, 147(38%) patients had moderate pneumonic effusion and 170(44%) patients had small pneumonic effusion. 170(44%) patients had positive pleural fluid culture and 216(56%) patients had negative pleural fluid culture. Additionally, positive pleural fluid cultures were more prevalent in the culture and sensitivity bottles, accounting for 113 (59%), compared to the sterile syringe, which yielded 57 (30%).

Comparable findings were noted in another study conducted by Akhtar MN, wherein the average age of patients was 43.34±11.73 years[3]. The ratio of men to women was 1.5:1. Among our patients, 27 (30%) had empyema, and 63 (70%) had parapneumonic effusion. Compared to 26 patients using the sterile syringes, 48 patients had a positive aerobic infection in the blood culture bottle. Between sterile syringes and aerobic blood culture bottles, there was a statistically significant difference in the culture-positive rate (p-value=0.001).

The results obtained by Charoentunyarak S, align with our findings. They concluded that for isolating bacterial pathogens in parapneumonic pleural effusion and empyema thoracis, the blood culture bottle method worked better than the conventional sterile syringe method.[7] According to their research, the yield of pleural fluid culture using a conventional sterile syringe was 14.0%, but the yield utilizing blood culture bottles was 24.0% (P < 0.001).

The results of our study are further supported by a Canadian study conducted by Menzies SM et al, the inclusion of a blood culture bottle alongside standard culture elevated the percentage of patients with identifiable pathogens by 20.8% (from 20/53 or 37.7% to 31/53 or 58.5%) with a difference of 20.8% (p < 0.001).[12]The introduction of the second standard culture did not show a comparable enhancement in culture positivity (from 19/49 or 38.8% to 22/49 or 44.9%) with a difference of 6.1% (p=0.08). The frequency of bacterial isolation was not affected by the culture inoculum volume. The control fluids remained negative for culture.

Our study aligns with another conducted by Ferrer A et al, 15.5% of the total samples tested positive for microorganisms, and among the positive samples, 60% were associated with non-purulent pleural fluid.[13] In 23 samples (60.5%), single-organism growth was identified. Three (4.7%) fungi, 25 (39.7%) aerobic, 22 (35%) anaerobic, and 13 (20.6%) mycobacteria were among the 63 microorganisms that were isolated. Nine (36%) of the 25 positive samples were only positive in the blood culture bottles after excluding the samples that had mycobacteria growth.

Just one isolated organism—out of the twelve—did not proliferate in the anaerobic vial. Only two (8%) of the samples showed positive when cultured conventionally, but fourteen (56%) of the samples tested positive when cultured both ways. When blood culture bottles were used instead of the traditional transport and culture approach, a considerably greater rate of microbe isolation was attained. An underlying pathology was present in 63% of the individuals with empyema, with pneumonia being the most common. To sum up, it's appropriate to inoculate all samples—including non-purulent ones—into a sterile tube and an anaerobic blood culture vial for the microbiological analysis of pleural fluid.

Blood culture bottles present several advantages in sterile body fluid cultures, including enhanced sensitivity, accelerated growth, and the potential for a broader range of detectable pathogens.[14] These advantages hold promise for improving the accuracy of diagnosis and guiding the administration of appropriate treatment in cases of suspected infection. The noted increase in bacterial isolation rate, ranging from 29% to 49%, when employing a

blood culture bottle in bacterial peritonitis, surpassing the baseline positivity rate of 42-54% with standard culture, implies the potential for extending the use of this technique beyond blood samples.[15,16]

However, another study conducted by SkusaR et al, in contrast to the previously mentioned had a different take on blood culture bottles.[17]The conventional technique (sterile vial, solid, and broth media) and blood culture (aerobic/anaerobic) showed equivalent numbers of identified bacteria per specimen (1.29 and 1.41, respectively; p = 1.0). When compared to blood culture incubation (median 43.55 hours), the conventional approach showed a tendency towards a shorter time-to-result (median 28.62 hours) (p = 0.0722). Notably, there were significant differences in the number of bacteria discovered in polymicrobial infections (2.76 vs. 3.26) and the detection of anaerobes (13% vs. 36%), favoring conventional approaches (p = 0.0015; p = 0.035), especially in abdominal aspirations.

While this study shows promise, limitations prevent definitive opinion. Transport time might have affected results, and bacteria preferences for different media suggest the need for regional studies to pinpoint the exact benefit of blood culture bottles. A larger and multi-center investigation could also reveal if this method offers particular advantages in certain clinical scenarios, such as cases with prior antibiotics, specific effusion sizes, or varying degrees of sepsis.

Limitations of the study were transport time and potential media preferences of bacteria which warrant further investigation. Future multi-center studies with larger sample sizes could explore the specific benefits of blood culture bottles in different clinical scenarios, such as those involving prior antibiotics, effusion size variations, or varying degrees of sepsis.

CONCLUSION

Our study investigated the efficacy of blood culture bottles compared to sterile syringes for diagnosing bacterial pathogens in parapneumonic effusions. We found that blood culture bottles significantly improved the rate of positive cultures compared to sterile syringes. These findings align with previous research, demonstrating a consistent advantage for blood culture bottles in isolating bacterial pathogens. This improved sensitivity can lead to more accurate diagnoses and targeted antibiotic therapy.

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Authors Contribution:

Following authors have made substantial contributions to the manuscript as under

Authors	Conceived & designed the analysis	Collected the data	Contributed data or analysis tools	Performed the analysis	Wrote the paper	Other contribution
Javaid S	✓	✓	✓	×	✓	×
Iqbal Z	✓	✓	×	×	✓	×
Shafi M	×	✓	✓	×	×	✓
Hussain S	×	×	✓	✓	×	×
Naeem H	×	✓	×	✓	×	×

Authors 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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ORIGINAL ARTICLE

COMPARISON OF URINARY INTERLEUKIN-18 AS A BIOMARKER OF ACUTE KIDNEY INJURY WITH ROUTINE MARKERS IN INTENSIVE CARE UNITS OF TERTIARY CARE HOSPITALS OF PESHAWAR

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ABSTRACT

Objective: This study aims to determine the diagnostic utility of IL-18 for early diagnosis of AKI by comparing it with the routinely used marker serum creatinine.

Material and Methods: This validation study was carried out in the Department of Pathology, Khyber Medical College, Peshawar from September 2021 to February'2022. A total of 156 patients with Acute Kidney Injury were recruited from the intensive care units of three Peshawar tertiary care hospitals. Serum and urinary samples were taken at the time of admission and 48 hours after admission to estimate Serum creatinine level and urinary IL-18. Comparisons were made between the diagnostic utility of Urinary IL-18, and serum creatinine using the paired t-test. Sensitivity, specificity, positive predictive value, and negative predictive values were calculated.

Results: This study included 156 acute kidney injury (AKI) patients. The mean creatinine level on admission was 0.90 ± 0.26 mg/dl; after 48 hours of admission, it was 1.38 ± 0.70 mg/dl. Similarly, IL-18 on admission was 130.14 ± 61.31 pg/ml while after 48 hours it was 290.32 ± 136.50 pg/ml. IL-18 levels of ≥75 pg/ml with a positive predictive value of 100% and a negative predictive value of 29% can be used as a cutoff in the diagnosis of AKI in patients after 48 hours of admission.

Conclusion: Due to high sensitivity and specificity, Urinary IL-18 can predict AKI 24-48 hours before the onset of renal injury and can be used as an early marker for this purpose.

KEYWORDS: Acute kidney injury, IL 18, Urine, creatinine

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INTRODUCTION

A quick decline in function including both structural damage and loss of function is known as Acute Kidney Injury (AKI). [1] Possible causes of AKI include acute tubular necrosis, hypovolemia (because of hemorrhage, burns, sepsis, etc), urinary tract blockage, direct kidney injury and certain drugs. [2]

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Acute Kidney Injury is known for contributing significantly to increased morbidity and death, particularly in critically ill patients. [3] In routine, Serum Creatinine (SCr) and Urinary output are the two indicators used to detect a decline in renal function. [4] Reduction in glomerular filtration rate, declining acid-base, and electrolytes are also present. [2] Acute kidney injury per Kidney Disease Improving Global Outcome (KDIGO) is defined as an increase of SCr by 0.3mg/dl or more in 48 hours or an increase of SCr up to 1.5 times or more within the last 7 days.

SCr often predicts a poorer outcome, and the diagnosis of AKI may be overlooked if urine output is not measured. [4] However, it is known that they have limitations. SCr detects deterioration in renal function when it

has already deteriorated by 50 percent; it is only applicable when the human body is in a steady state (and not when renal function is declining) which can take a significant amount of time, particularly when a patient is in the ICU. [5] In addition, it does not correlate perfectly with GFR. It is affected by factors outside of renal function, such as the individual's muscle mass, drugs containing salicylates, and nutrition. [6] Also, SCr is a functional measure of kidney function and not a kidney damage marker. [7] In contrast, the urinary output is also influenced by extrarenal variables such as water intake and vigorous activity. [3]

When biological and molecular alterations lead to cell destruction, kidney disease ensues. 8 It is of the utmost significance to detect AKI early and accurately to provide rapid therapy and enhance the clinical outcome. Numerous developments have been made towards this end. Biomarkers can be used to detect the early onset of AKI and to plan its recovery. Urinary Interleukin-18 is one of these emerging biomarkers that can detect early deterioration in Kidney Function and avoid problems, therefore preventing a lifetime of dialysis or renal replacement therapy. 6

Interleukin-18 (IL-18) is a cytokine belonging to the IL-1 cytokine family. Various cells, including monocytes, macrophages, and proximal tubular epithelial cells, produce it. Initially generated as an inactive precursor of 23 kDa, it is converted to an active cytokine of 18.3 kDa by caspase 1. 9, 10 Intercalated cells in the distal convoluted tubule, connecting tubule, and collecting duct of the kidneys produce this cytokine. Post-injury, IL-18 begins to rise six hours after the damage and reaches its peak of around 25 times the normal value twelve hours later. 11 The significant diagnostic function of IL-18 as a predictor of severe AKI was identified for the first time in animal experiments. 12

AKI is among the top causes of death in intensive care units. To limit the problems associated with it, early detection and appropriate care are required, which is not attainable with our current biomarkers. This study aims to compare the use of urine IL-18 in the early diagnosis of AKI as compared to the gold standard SCr.

MATERIAL AND METHODS

This validation study was carried out at the Chemical Pathology Department of the Khyber Medical College, Peshawar from September'2021 to February'2022. Patients were recruited from the intensive care units of three Peshawar tertiary care hospitals: Lady Reading Hospital, Khyber Teaching Hospital, and Hayatabad Medical Complex, Peshawar. Using the WHO sample size calculator, the sample size was calculated to be 156. Non-probability sampling techniques were utilized.

After receiving approval from the Advance Study Review Board of Khyber Medical University, Peshawar, and Ethical approval from Khyber Medical College, Peshawar, the study was commenced. First, consent was taken followed by a detailed history from the patient along with general physical and systematic examination. Patients over the age of 18 who were critically ill, exhibiting AKI symptoms, and admitted to the ICU for fewer than four hours were included, while all the patients with a history of end-stage renal disease or chronic dialysis, post-kidney transplantation, end-stage liver disease or terminal cancer, patients on steroids and post-cardiopulmonary resuscitation were excluded from the study.

A detailed proforma containing the demographic information and symptoms of the patients was filled out. Blood and urine samples were collected at admission and 48 hours later. The blood sample was extracted aseptically from a vein, placed in a gel tube, centrifuged to separate serum, and kept between 2-8 C. SCr was estimated on a fully automated chemical pathology analyzer (Cobas 6000). The urinary IL-18 levels were tested at Khyber Medical University using an Enzyme-Linked Immunosorbent Assay (ELISA) kit that detects IL-18 in urine on an ELISA Plate Reader.

The data was analyzed on Statistical Package for the Social Sciences (SPSS) 26. For numerical data mean and standard deviation were calculated. Comparisons were made between the diagnostic utility of Urinary IL-18, and serum creatinine using the paired t-test. Consideration of a P-value of less than 0.05 was statistically significant. The sensitivity, specificity, positive predictive value, and negative predictive values were calculated. The area under the curve (AUC) was calculated from the receiver operating curve (ROC).

RESULTS

In this validation study, 156 acute kidney failure (AKI) patients were included. Table 1 shows the demographic characteristics of the participants.

Regarding comorbidities, 101(64.74%) had no associated comorbidities, 22 (14.10%) had diabetes mellitus, 11(7.05%) had hypertension, while 21(13.46%) had both hypertension and diabetes mellitus and 1 (0.64%) had cardiovascular disease.

Mean values of serum creatinine and urinary interleukin-18 levels on admission and after 48 hours are shown in Table 2.

The sensitivity, specificity, positive predictive value (PPV), and negative predictive value (NPV) of IL-18 at the time of admission and after 48 hours are shown in Tables 3 and 4.

By applying paired t-test, it was noted that on admission the creatinine – IL-18 pair was statistically significant with a p-value of <0.001, similarly after 48 hours creatinine and IL-18 were significant with a p-value of <0.001. (Table 5)

Figure 1 shows ROC showing sensitivity and specificity of IL18 on admission and after 48 hours. Our study showed an Area under the curve (AUC) of 0.91 at admission and 0.90 after 48 hours.

Table No 1. Demographic characteristics of the participants. n=156

Variable	Frequency	Percentage
Gender		
Male	94	60.3%
Female	62	39.7%
Age group		
18-25 years	38	24.4%
26-35 years	38	24.4%
36-45 years	30	19.2%
46-55 years	21	13.5%
>55 years	29	18.6%
Marital status		
Married	125	80.1%
Unmarried	31	19.9%
Education status		
Primary school	36	23.1%
Middle school	22	14.1%
High school	2	1.3%
College	18	11.5%
University	25	16.0%
Illiterate	53	34.0%

Table No 2: Mean creatinine and IL 18 level on admission and after 48 hours. (n=156)

	Serum Creatinine(mg/dl) on admission (n=156)	Serum Creatinine (mg/dl) after 48 hours (n=142)	IL18 (pg/ml) on admission	IL18 (pg/ml) after 48 hours
Mean	0.90	1.38	130.14	290.32
Std. Deviation	0.26	0.70	61.31	136.50

Table No 3: Predict AKI on admission: AUC=0.911 (0.844-0.977)

IL-18(pg/ml)	Sensitivity	Specificity	PPV	NPV
>50	83.33	12.50	86	27
>75	83.33	18.71	85	27
>100	58.33	29.86	83	22
>200	8.33	77.08	81	21

Table No 4 Predict AKI after 48 hours: Area under curve (AUC): 0.904 (0.831-0.977)

IL-18(pg/ml)	Sensitivity	Specificity	PPV	NPV
>50	100	2.78	100	34
>75	100	3.47	100	29
>100	83.33	10.42	81.25	27
>200	75.0	77.08	76.24	22

Table No 5: Paired t-test of serum creatinine and IL 18, on admission and after 48 hours. n=156 (Value < 0.001 is significant)

		Mean	Std. Deviation	P-Value
On admission	Serum Creatinine (mg/dl)	0.90	0.26313	0.000
	IL18 (pg/ml)	130.14	61.31245	
After 48 Hours	Serum Creatinine (mg/dl)	1.21	0.28540	0.000
	IL18 (pg/ml)	290.32	136.49869	

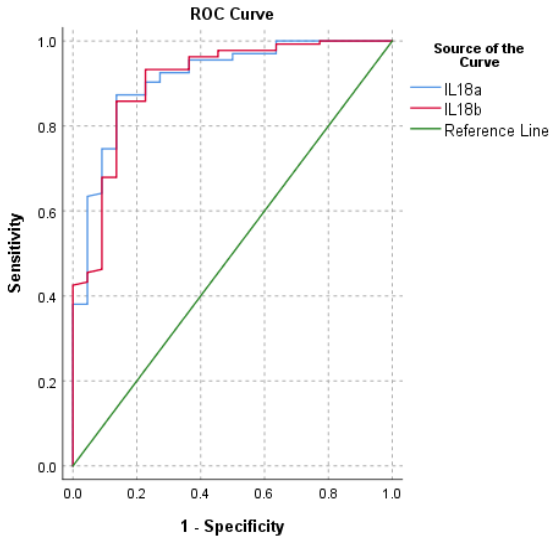

Fig 1: ROC curve showing sensitivity and specificity of IL18 on admission and after 48 hours.

DISCUSSION

AKI is one of the most important causes of death in ICU setups all around the world. To reduce the complications arising from it, early detection and prompt management are necessary which is not possible with the biomarkers that are currently in use in our setups. The current study presents the role of urinary IL-18 as a potential biomarker in early detection of AKI in patients from ICU setups and the role of IL-18 is compared with other routine biomarkers (SCr) in early detection of AKI.

We report an excellent AUC of 0.91 at admission and 0.90 after 48 hours for the prediction of AKI. This is nearly identical to a study carried out in intensive care units in Saudia Arabia which reported an AUC of 0.946 for IL-18 in predicting AKI. [13] In contrast, the largest research with IL-18 in an ICU population (528 patients) yielded an AUC of 0.55 despite observing the onset of AKI for 7 days. [14] A meta-analysis revealed that the pooled AUC for IL-18 in predicting AKI in all groups was 0.70, and 0.66 in intensive care settings which was also in contradiction to our study. [15] The discrepancy in results is most probably because these studies were carried out in different races of people as compared to ours. The ability of IL-18 to predict AKI was superior in our study (AUC:0.9).

The degree to which biomarker levels alter over time is critical. Various studies have reported that after cardiopulmonary bypass, or any other sudden injury the level of urine IL-18 increases rapidly at 4-6 hours, peaks at 12 hours, and remains elevated for up to 48 hours with a stable condition afterward. [16, 17] In our study we only determined urinary IL-18 levels at the time of admission and after 48 hours while serial measurements were not taken. Another study has a good correlation to our findings urinary IL-18 showed greater than 90% sensitivity and specificity for early prediction of AKI. [18]

It is critical to define the cutoff value for developing a diagnostic biomarker. Different cutoff values have been reported in the literature. Our study has also set a cutoff value for different periods. We exposed the diagnostic value of IL-18 in AKI patients from admission time to predict severe AKI. We obtained the best cutoff level for urine IL-18 to be ≥75 pg/ml during the admission time and after 48 hours as the most accurate for early diagnosis of AKI.

One of the limitations of our study is that it signifies the outcomes from a comparatively limited number of patients, although we have obtained data from three separate tertiary care facilities. Although our findings are clinically and statistically significant, they will need to be confirmed in a larger sample. Furthermore, the current cohort of patients was homogeneous, with no substantial AKI-related comorbidities. The findings of this study will need to be replicated in additional AKI scenarios where the etiology of AKI is complex, such as in individuals with diabetes and CVDs.

CONCLUSION

Our study suggests that IL-18 levels rise approximately 24-48 hours before full-blown AKI develops and can be rapidly measured. We obtained the best cutoff level for urine IL-18 at the time of admission and after 48 hours as the most accurate for early diagnosis of AKI. It is a helpful marker in Acute Kidney Injury and proves to be superior in earlier detection than Serum Creatinine as it may detect AKI a day or two earlier.

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Authors Contribution:

Following authors have made substantial contributions to the manuscript as under

Authors	Conceived & designed the analysis	Collected the data	Contributed data or analysis tools	Performed the analysis	Wrote the paper	Other contribution
Farooq M	×	✓	✓	✓	✓	×
Shafi M	✓	✓	✓	✓	×	×
Rafiq A	×	✓	×	✓	×	✓
Ullah I	×	×	✓	✓	✓	×
Rehman N	×	✓	×	✓	×	✓
Rahman S	×	×	✓	×	✓	✓

Authors 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.

Ethical Approval:

This Manuscript was approved by the Ethical Review Board of Khyber Medical College, Peshawar. Vide No. 274/PG/KMC. Dated: 27 08 2020

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ORIGINAL ARTICLE

NEW EMERGING PATTERN OF SENSITIVITY OF SALMONELLA TYPHI: A SINGLE CENTER EXPERIENCE

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ABSTRACT

Objective: To determine the current sensitivity patterns of Salmonella typhi in population of Khyber Pakhtunkhwa province of Pakistan.

Materials and methods: This descriptive study was conducted in Lady Reading Hospital, Peshawar, Pakistan. A total of 388 blood culture-proven salmonella typhi patients were included in the study. Patients whose culture reported salmonella typhi or paratyphi and above sixteen year of age were included in the study and those whose culture reported any other organism were excluded. All samples reported salmonella typhi.

Results: Among a total of 388 patients, 245 (63%) were male and 143 (37%) were female. The mean age was 28.61±14.87 years. Fever was the predominant symptom (99.5%), affecting mainly young patients (84%). Salmonella typhi showed 100% sensitivity to Imipenem and Meropenem, and 92% to azithromycin. S. typhi showed 95% resistance to ciprofloxacin, 92% to cefixime, and 86% to ceftriaxone. Multidrug-resistant (MDR) S. typhi was found in around 91.4% of blood cultures, whereas extended-drug-resistant (XDR) S. typhi was isolated from 91% of cultures.

Conclusion: Our study showed high percentage of XDR and MDR Salmonella typhi which is an alarming situation, especially in younger population of the province. The carbapenems showed 100% sensitivity whereas the commonly used antibiotics, like Ciprofloxacin and Ceftriaxone were mostly ineffective in vitro.

Key words: Salmonella typhi, typhoid fever, antimicrobial-drugs sensitivity, resistance, MDR-typhoid, XDR-typhoid,

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INTRODUCTION

Typhoid fever, caused by Salmonella typhi and paratyphi, is a major public health problem in the developing countries even in this modern era of medicine. [1] Risk factors for typhoid fever are food and water contaminated with feces from either acutely infected persons, persistent excretors of salmonella, or asymptomatic carriers. Poor sanitation, unhygienic condition and low socio-economic status also contribute to the spread of this infection. Around 12 to 20 million cases/year of typhoid and paratyphoid fever are reported, with high mortality of 129,000 to 223,000 in the developing countries. [2]

In the past, amoxicillin, ampicillin, chloramphenicol, and trimethoprim-sulfamethoxazole were the first-line agents for the treatment of typhoid fever for decades. However, gradually multidrug-resistant (MDR) S. typhi emerged in the mid-1970s, and after that fluoroquinolones, Ciprofloxacin/Ofloxacin became the standard drugs for the typhoid fever. [3, 4] Since 2000 and onwards there have been frequent reports of increased fluoroquinolones resistance of Salmonella typhi in the endemic regions of South Asia and Southeast Asia. [5] Ceftriaxone, cefotaxime and azithromycin then became the drugs of choice for complicated and uncomplicated typhoid fever. [6, 7] Ceftriaxone remained the drug of choice in the developing countries for almost one and a half decade before extensively-drug-resistant (XDR) strains of S. typhi were reported from Pakistan. The resistance was reported not only to amoxicillin, ampicillin, chloramphenicol, trimethoprim-sulphamethoxazole, and ciprofloxacin but also to ceftriaxone. Some of these XDR cases were even detected in patients travelling from Pakistan to the US. [8] These XDR strains of Salmonella, sensitive to carbapenems class of antibiotics and azithromycin has increased cost of treatment. Pakistan has been estimated to have the highest rate of Typhoid among the South Asian countries with 493.5 per 100,000 cases in 2018. [9]

Due to this continuously changing pattern of antimicrobial resistance of Salmonella, it is frequently needed to determine the pattern of salmonella resistance in the developing countries. Knowledge of the local antibiogram

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of Salmonella will be helpful in empiric therapy of typhoid patients in the outpatient settings. Therefore, we conducted this study in Lady Reading Hospital Peshawar (LRH), to determine the local sensitivity pattern of Salmonella typhi. LRH is the main tertiary care hospital in Khyber Pakhtunkhwa province of Pakistan with a large catchment area all over the province.

MATERIAL AND METHODS

This study was conducted in the Medicine department, LRH Peshawar. A Sample size of 388 was calculated by WHO software, keeping a confidence interval of 95% and margin of error 5%. Consecutive sampling technique was used. Ethical approval was taken from the departmental and institutional research committees prior to the study. Patients, of either gender, were included from April 2023 to August 2023. All patients whose blood culture reported Salmonella typhi and whose sensitivity was tested were included in the study. Patients below 16 years of age, and those with mixed culture reports were excluded.

Multi-drug-resistant (MDR) Typhoid was defined as resistance to three first line antibiotics (ampicillin, chloramphenicol, and co-trimoxazole). Extensively -drug-resistant (XDR) typhoid was defined as resistance to the three first-line drugs as well as quinolones plus third-generation cephalosporins.

Samples of 10 ml each of venous blood were taken in the culture bottles, aseptically, according to guidelines, transported to the hospital laboratory and incubated in "Automatic Bactec Blood Culture analyzer". If S. typhi was present in the blood, this automatic analyzer machine would detect it and this blood was then be inoculated on MacConkey Agar, blood agar, and sometimes Salmonella Shigella agar. Disposable blood culture plates were used. The blood was incubated for 24 hours for growth. When organism was grown on media, then biochemical tests were done for bacterial identification. Then sensitivity test is applied to this growth on Muller Hinton Agar and biochemical & sensitivity plates were incubated for 24 hours at 37^0C. The sensitivity of the isolated S. typhi was checked for the antibiotics like Imipenem, Meropenem, Azithromycin, Ceftriaxone, Cefixime, Ciprofloxacin, Co-trimoxazole, Chloramphenicol, and Ampicillin.

After the bacterial identification by the hospital microbiologist, results were reported according to the sensitivity patterns to various antibiotics.

Blood culture Data of the 388 patients was collected from the hospital Health Information and Management System (HMIS) of the pathology department after the approval of the Institutional Review Board. Patients` medical record number, age, sex, symptoms, blood culture and sensitivity to different drugs was recorded on a predesigned Performa. Data was then entered and analyzed by SPSS version 23. No formal consent was taken from the patients as the data was collected from the HMIS of the hospital and the identity of the patients was kept confidential.

RESULTS

A total of 388 culture-positive patients of Salmonella typhi were included, 245 (63%) male and 143 (37%) female. Age ranged from 15 to 80 years; mean age was 28.61±14.87 years, as shown in Table 1. Almost all (99.5%) patients presented with fever, affecting mainly young patients (84%), as shown in Table 2. Culture and sensitivity pattern of Salmonella typhi revealed 100% sensitivity to Meropenem and Imipenem, 92% to azithromycin and only 0.8% to ampicillin, as shown in Table 3. Salmonella typhi showed 95% resistance to commonly prescribed drug ciprofloxacin and 92% resistance to cefixime. MDR (multidrug resistant) Salmonella typhi was found in around 91.4% of blood cultures, whereas XDR (extended drug resistant) Salmonella typhi was isolated from 91% cultures.

Table No 1: Descriptive statistics of typhoid fever patients (n=388)

Variables	Minimum	Maximum	Mean	Std. deviation
Age in years	15	80	28.61	14.87
Duration in days	1	14	6.75	2.52
TLC* /cm	3245	11300	6401.46	1693.54
Hemoglobin G/dl	9.8	15.4	13.42	0.84
Creatinine mg/dl	0.32	1.80	0.78	0.18
ALT** IU/dl	25	165	58.34	18.33

*TLC: Total leucocyte count. **ALT: Alanine aminotransferase.

Table No 2: Demographic and Clinical features of patients with Typhoid fever (n=388)

Variables	Frequency (Percentage)
Gender	
Male	245 (63%)
Female	143 (37%)
Age group	
15-20 years	135 (34.8%)
21-40 years	191 (49.2%)
41-60 years	42 (10.8%)
61-80 years	20 (5.2%)
Total	388 (100%)
Symptoms	
Fever	386 (99.5%)
Abdominal pain	228 (58.8%)
Headache	215 (55.4%)
Cough	137 (35.3%)
Vomiting	107 (27.6%)

Table No 3: Salmonella typhi Culture sensitivity pattern to antimicrobial drugs (n=388)

Drugs name	Sensitivity	Resistance	Intermediate
Imipenem	388 (100%)	00 (0.0%)	00 (0.0%)
Meropenem	388 (100%)	00 (0.0%)	00 (0.0%)
Azithromycin	357 (92%)	09 (02.3%)	22 (5.7%)
Ceftriaxone	50 (12.9)	334 (86.1%)	04 (1.0%)
Cefixime	28 (7.2)	356 (91.8%)	04 (1.0%)
Ciprofloxacin	19 (4.9)	368 (94.8%)	01 (0.3%)
Co-trimoxazole	80 (20.6)	302 (77.8%)	06 (1.5%)
Chloramphenicol	13 (3.4)	375 (96.6%)	00 (0.0%)
Ampicillin	03 (0.8)	384 (99.0%)	01 (0.3%)

DISCUSSION

Multi-Drug-Resistant (MDR) and Extensive-drug-resistant (XDR) salmonella typhi is causing significant health problem and threat mostly in the developing countries including Pakistan since 1980. In our study we found profound resistant to Ceftriaxone (86.1%), Ciprofloxacin (94.8%), Cefixime (91.8%), Co-trimoxazole (77.8%), Chloramphenicol (96.6%), and ampicillin (99.0%). Resistance to Azithromycin was only 2.3%. No resistance was found to Imipenem and Meropenem and they yielded a 100 % sensitive result.

These are very alarming results with high percentage of MDR and XDR typhoid. In November 2016, the first outbreak of XDR typhoid in Pakistan was reported in Karachi, Sindh province. [10]

The National Institute of Health Islamabad reported a total of 5741 cases of XDR enteric fever, between January 2017 to June 2021 in Sindh; the highest numbers of cases (69.5%) from Hyderabad district. During the same period 14,360 XDR Enteric fever cases were reported in Karachi.[11] A study in Islamabad showed 94.4% strains of S. typhi resistant to Ofloxacin, Ciprofloxacin and Levofloxacin. [12] A 47% XDR strains of S. typhi with almost 50% resistance to ceftriaxone was found by Shah et al. [13] Another study showed XDR salmonella typhi strains all over Pakistan as reported from Sindh, Punjab and Khyber Pakhtunkhwa, and federal area of Islamabad. [14]

Our study showed similar results, which were shown by other studies across Pakistan. [10-14] In south Asia, Pakistan has the highest reported MDR and XDR.

The Chinese Center for Disease Control, in February 2022, reported an outbreak of 23 XDR Salmonella typhi, the 4.3.1.1.P1 genotype cases due to contaminated water in the suburbs of Beijing, which is also predominant in Pakistan XDR cases. [15] Similarly, more than 60 travel-associated cases of XDR Salmonella typhi from Pakistan have been reported in the United Kingdom and United States. [16, 17] MDR strains of salmonella typhi are found all over the world. Recently, many outbreaks of MDR typhoid occurred in Africa, China, South Asia, and South East Asia. [18, 19] Though, cases of MDR are reported from different Asian and African countries but they reported negligible numbers of XDR cases. A study conducted by Mannan found a low MDR in Chittagong Bangladesh. [20] MDR isolates were found in Southern India in 4 (0.9%) cases by Iyer et al, and the isolates were 100% susceptible to third-generation cephalosporin and azithromycin in pediatric population. [21]

A similar study conducted over 10 years from 2011 to 2020 involving 1010 culture proven enteric fever cases in Chennai India found multidrug resistance of 2.12%. Resistance to fluoroquinolone was high (95%) but resistance to chloramphenicol, co-trimoxazole and ampicillin was less than 3%. [22] A meta-analysis by Khatami et al. of the articles on enteric fever published between 1983 to 2019 reported a 2.9% resistance to ciprofloxacin, 48% resistance to nalidixic acid, 37.9% to ampicillin, 3.5% to Co-trimoxazole. Resistance of S. typhi to other drugs included chloramphenicol (27%), cefepime (7%), cefixime (5.8%), imipenem (2.7%) and meropenem (2.2%). [23] According to them, the antibiotic resistance of salmonella typhi was rising over that period of time.

The incidence and prevalence of resistant salmonella typhi in Pakistan is very high and increasing day by day with the passage of time as compared to the neighboring and regional countries. There are several factors involved in the increasing cases of MDR and XDR in Pakistan. Most important factor is over-the-counter availability of all sorts of antibiotics; the paramedical staff treats such patients inadequately; and even the patients self-medicate themselves.

Antibiotics are prescribed in ineffective dosage, and duration of treatment is less than the recommended one. In remote areas of the country, typhoid fever is over-diagnosed and treated on the basis of obsolete Typhidot and Widal tests. Even in cities and tertiary care hospitals, most of the suspected typhoid fever patients are treated empirically without doing blood cultures, which is the gold standard test. Patients usually stop the treatment without completing the recommended duration of treatment once they are afebrile. If this trend continues, it will lead to further resistance and will make the treatment of enteric fever very difficult.

The government and health care authorities need to implement prompt and effective measures to control over-the-counter availability of antibiotics, injudicious use of antimicrobials, promote antibiotic stewardship program, provide safe drinking water to the community, improve sanitation and arrange for Typhoid conjugate vaccine. Collaboration with World Health Organization (WHO) is required for joint efforts against this emerging health threat.

This was a single center study with comparatively small sample size. Multi-center studies are needed to address the problem in the country and for determination of local anti-bio-gram for the Salmonella typhi.

CONCLUSION

The present study showed high percentage of MDR and XDR Salmonella typhi which is an alarming situation in the management of typhoid fever, especially in young population. Carbapenems showed 100% sensitivity whereas the commonly used antibiotics showed resistance in most cases.

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Authors Contribution:

Following authors have made substantial contributions to the manuscript as under

Authors	Conceived & designed the analysis	Collected the data	Contributed data or analysis tools	Performed the analysis	Wrote the paper	Other contribution
Iqbal N	✓	×	✓	×	✓	×
Afridi MAR	✓	✓	×	✓	×	×
Awan MB	×	✓	✓	✓	✓	✓
Atiqullah	✓	×	×	×	✓	×
Muhammad L	✓	✓	✓	✓	×	✓

Authors 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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ORIGINAL ARTICLE

KNOWLEDGE OF NUTRITIONAL SUPPLEMENTS AMONG UNIVERSITY STUDENTS OF PESHAWAR, KHYBER PAKHTUNKHWA, PAKISTAN

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ABSTRACT

Objectives: To find out the knowledge of students, and the frequency and reasons behind nutritional supplement use among university students of Peshawar

Materials And Methods: A descriptive cross-sectional study was conducted using a convenient sampling method. Data was collected from September 2022 to February 2023. The sample size was approximately 383, determined using the WHO sample size calculator, and a prevalence of 50%. Students aged 18-25 years were included in the study.

RESULTS: Results showed that among university students, 58.5% use dietary supplements. 41.17% of males and 70% of females were found using dietary supplements, with a higher prevalence among females. The reasons for using dietary supplements varied, with 34.46% using them to improve diet, 19.84% to treat medical conditions, 20.89% to enhance the immune system, and 7.89% for weight management. Additionally, some students believed that dietary supplements were essential for their health (71.28%), while others did not consider them essential (18.02%). The majority of participants agreed that these supplements have beneficial effects, such as improving cognitive ability, preventing illnesses, aiding in recovery, enhancing athletic performance, promoting skin and hair health, building muscle mass, and improving appetite

Conclusion: It was found that the use of nutritional supplements was high among students, especially females. The primary reasons for using these supplements included improving diet and enhancing the immune system.

Keywords: Nutritional supplements, University students, diet, immune system

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INTRODUCTION

Every person needs a balanced diet that contains an adequate amount of all the necessary nutrients recommended for healthy growth and efficient daily activities and functions. Without balanced nutrition, the body is more susceptible to fatigue, infections, diseases, and reduced activity. When a person doesn't get enough nutrients or needs more than the usual amount of nutrients, they can use Nutritional supplements to fulfill their nutritional requirements. The most common reasons adults gave for using dietary supplements were to "increase overall health" (45%) and "maintain health" (33%). [1] In the United States, the use of dietary or nutritional supplements is widespread and steadily expanding. Dietary supplements may be taken by elderly people in an attempt to prevent or cure chronic disease, treat aging symptoms, or extend life. In the United States, 52 % of people used Nutritional supplements in 2011–2012. [2]

Many surveys have been conducted to determine the prevalence of nutritional supplements in Asian countries. According to the reports, NS use was 11.0 % among males and 16.4 % among females in Japan in 2003, and 45.8% among older individuals in 2008. [3, 4] A survey was done to evaluate the use of dietary supplements at King Abdul-Aziz University, Saudi Arabia. One-third of the 954 KAU students who completed the poll utilized DSs (42.9 % women vs 25.7 % men). [5] In the period 2010–2012, 45.96 % of South Korean adults used NS. [6]

Only 0.71 percent of the Chinese population reported using NS in the previous month, indicating that the general level of NS use is low. This percentage was much lower than the global prevalence of dietary supplement use. [7] It is found that the percentage of dietary supplement usage in Iran is 34% which makes up one-third of the population and the most common supplement used is iron

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(12.9%). [8] Regarding the prevalence of DS in Pakistan, a study was conducted to investigate the prevalence, opinions, and attitudes concerning dietary supplements (DS) use among pharmacy students in Karachi, Pakistan. The prevalence of Dietary Supplement use was 48.2 percent, with 51 percent of males and 47.3 percent of females using it. [9] Pakistan, a developing country, faces many basic health problems, one of which is inadequate amount of nutrients in individuals mainly due to poor diet. The purpose of this research was to determine the knowledge of the use of Nutritional supplements and their prevalence in university students of Peshawar and their perspective regarding this use.

MATERIALS AND METHODS

After approval from the ethical review committee of Khyber Medical College, Peshawar, this descriptive cross-sectional study was done among the university students of Peshawar. Data was collected between September 2022 to February 2023. A convenient non-probability sampling technique was used for sampling. Students between the ages of 18 to 35 were included in the study. The sample size was calculated using the WHO calculator by putting 50% prevalence. The calculated sample size was 383. Data collection was done through a questionnaire which was validated through pilot testing. Data was analyzed by using SPSS version 22.

RESULTS

Our study found that the prevalence of dietary supplements was 58.5% among university students of Peshawar. Of these, 63 (39.9%) were male, and 161 (60.1%) were female, So, the female prevalence was greater than male. Our study found that 71.28% of people had the perception that the use of Dietary supplements is essential for their health and 18.02% did not consider supplements to be essential. While 10.70% did not know much about it. By running the chi-square test, we found that there is a significant association between gender and the use of dietary supplements as a value of 0.000 is less than a significant value of 0.05.

DISCUSSION

Our study has found that the prevalence of dietary supplements is 58.5% which is near to that among Belgrade university undergraduate students in Serbia, 55.7% while it is greater than university students in Croatia (30.5%). [10 and 11] In China, the prevalence was 0.71.[12] In Iran the prevalence of DS use is 37% and 34% respectively. [13] In Karachi, 48.2% of pharmacy students enrolled in college surveys used Dietary supplements. [9] According to our study, supplement use among female students (70%) is more than among male students (41.17%). In contrast to our studies, male students of the University of Tennessee were found to have a higher history of supplement use compared to women, with 34% and 18% respectively[14] Female students outnumbered male students in supplement use at Belgrade University [10], which is consistent with our study findings. The prevalence of dietary supplement use didn't differ significantly between males (17.1%) and fe-

Table No 1: Knowledge of Dietary Supplements Use

		Count	Table N %
Dietary supplements can improve a person's learning and cognitive abilities.	Agree	302	82.9%
	Neutral	104	27.2%
	Disagree	38	9.9%
Low intake of vitamins and minerals can cause chronic diseases such as cancer.	Agree	136	35.5%
	Neutral	113	29.5%
	Disagree	134	35%
Vitamins can help recovery from fatigue and weakness.	Agree	335	87.5%
	Neutral	38	9.9%
	Disagree	10	2.6%
Supplements can enhance athletic performance.	Agree	295	77%
	Neutral	75	19.6%
	Disagree	13	3.4%
Supplements can promote skin and hair health.	Agree	325	85%
	Neutral	43	11.3%
	Disagree	7	1.8%
Vitamin supplements can provide stamina and energy.	Agree	295	77.1%
	Neutral	74	19.3%
	Disagree	14	3.6%
Dietary supplements can improve your appetite.	Agree	228	59.5%
	Neutral	123	32.1%
	Disagree	32	8.4%
Supplements can help you to keep your vision normal.	Agree	262	72.8%
	Neutral	92	24.0%
	Disagree	29	7.5%
Vitamins can reduce stress.	Agree	127	33.1%
	Neutral	177	46.2%
	Disagree	79	20.7%
Supplements can help you sleep better.	Agree	178	46.6%
	Neutral	148	38.7%
	Disagree	56	14.7%
Extra vitamins and minerals can retard aging.	Agree	142	45.2%
	Neutral	141	36.8%
	Disagree	69	18 %

Table No 2: Association of gender Using Dietary Supplements

Gender of study participants	Do you use or have used any type of dietary supplements?		Total	P-value
	Yes	No		
Male	63	90	153	0.001
Female	161	69	230	
Total	224	159	383	

Table No 3: Relationship of supplement use with skin, hair health and body aches

Gender of participants	Are you satisfied with your hair and skin health		Have you ever experienced body aches and joint pain		P-value
	Yes	No	Yes	No	.001
Male	92	61	67	86	
Female	80	150	163	67	

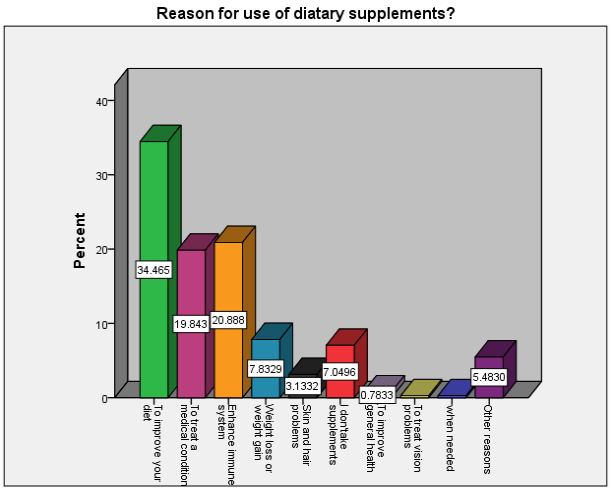

Fig 1: Reason of use of Dietary supplements.

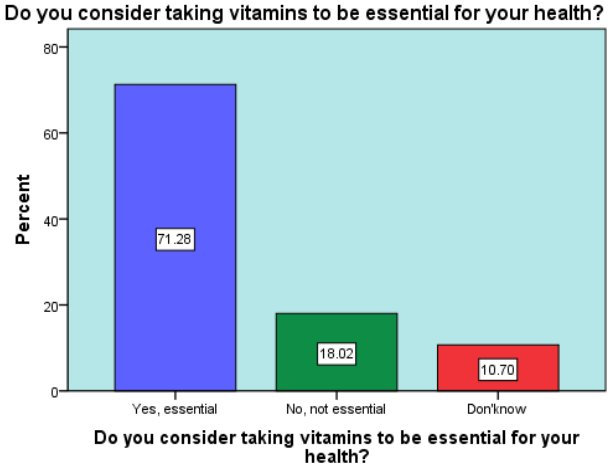

Fig 2: Perception of Dietary supplements

males (16.7%) in a nationwide study in Japan. [15]

Regarding the reason for the use of Dietary supplements, our study found that 34.46% use dietary supplements to improve their diet. 19.84% use dietary supplements to treat a medical condition. 20.89% use dietary supplements to enhance their immune system. 7.89% use dietary supplements for weight loss and weight gain. 3.13% use dietary supplements for skin and hair problems. 0.8% use dietary supplements to improve general health. 0.3% use dietary supplements to treat vision problems. 0.3% use dietary supplements when needed. 5.48% use dietary supplements for other reasons. The commonest reason for using DS in Croatian students was to maintain good health, however, to meet energy needs, to lose weight, to treat and prevent different diseases were some others. [11] In a study among pharmacy students of Saudi Arabia, it was found that 25.1% of the students agreed that regular DS use prevents chronic diseases and 4.1% thought that DSs may prevent cancer.[16] Most of the respondents in a study in China believed that dietary supplements could prevent or improve nutrition-related diseases during pregnancy. [17, 18] The reasons to use these are somehow consistent with our results. Our studies found that the majority of the population agrees or strongly agrees with the beneficial effects of dietary supplements such as dietary supplements can improve a person's learning, prevent illnesses such as cancer, and osteoporosis, help recovery from fatigue, and enhance athletic performance, promote skin and hair health, build muscle mass, improve appetite, provide stamina and energy, and keep your vision normal

Our study found that 71.28% of people are of the perception that the use of Dietary supplements is essential for their health and 18.02% do not consider supplements to be essential.

CONCLUSION

This study sheds light on the prevalent use of nutritional supplements among students. The primary reasons for using these supplements included improving diet, enhancing the immune system, treating medical conditions, improving skin health, hair health, and generalized body aches It underscores the need for further research to explore the motivations behind this trend as well as its potential impact on the health and well-being of students. Education and guidance on the safe and appropriate use of supplements are essential to ensure overall health.

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Khan A	✓	×	✓	×	✓	×
Noor B	✓	✓	×	✓	×	×
Khan H	×	✓	✓	✓	✓	✓
Nawaz AB	✓	×	×	×	✓	×
Mustafa A	✓	✓	✓	✓	×	✓
Ahmad W	✓	✓	×	✓	×	×
Ahmad H	×	✓	✓	✓	✓	✓

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AUTOIMMUNE PANCREATITIS ASSOCIATED WITH PANCREATIC PSEUDOCYST: A CASE REPORT

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ABSTRACT

Autoimmune pancreatitis is a sub-type of chronic pancreatitis. It has 2 further types; type I and II. Type I is associated with IgG4 disease. We describe a case of chronic pancreatitis that ultimately turned out to be IgG4 disease.

A 45-year-old female with no co-morbidities presented on 18th November 2022 with epigastric pain, left hypochondrium pain, vomiting, and fever for 5 days. She had previously been admitted twice to the hospital with similar complaints and was diagnosed with acute pancreatitis.

Examination revealed tenderness in the epigastrium and left hypochondrium; Laboratory investigations revealed serum Lipase 405 U/L, serum Amylase; 178 U/L, Lipid profile. cholesterol; 242 mg/dL triglycerides; 218 mg/dL HDL; 42 mg/dL LDL; 169 mg/dL. HbA1c; 9.53%. and IgG4 level; 1657mg/liter. CT abdomen with pancreatic protocol showed a cystic lesion in the body and tail of the pancreas suggestive of an infected pseudocyst or localized acute pancreatitis.

The patient was diagnosed with type 1 autoimmune pancreatitis and a multidisciplinary team (MDT) was taken on board for further management. The patient was not deemed appropriate for percutaneous or endoscopic drainage of the pseudocyst. She therefore underwent distal pancreatectomy and splenectomy. The biopsy showed features favoring mucinous cystic neoplasm of the pancreas with no evidence of malignancy. On immunohistochemical stains, the reactivity pattern was positive for ER, inhibin, and CD 10 which highlighted the ovarian stroma and cytokeratin. The patient was discharged on 25th November 2022 on supportive treatment.

Key Words: Autoimmune pancreatitis; IG G4 related disease; Pseudocyst

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INTRODUCTION

Autoimmune pancreatitis (AIP) is a characteristic form of chronic pancreatitis. It is further classified into two types based on histopathology. Type 1 AIP is identified as a pancreatic manifestation of the multiorgan syndrome, now called IgG4-associated disease, and is histopathologically associated with lymphoid plasma cell infiltration, storiform fibrosis, and abundant IgG4 cells.[1] Type 2 AIP, also known as idiopathic ductal centered chronic pancreatitis (IDCP), is histologically defined by the presence of granulocytic infiltrates of the ductal wall (granulocytic epithelial lesions - called GELs), but without IgG4-positive cells.[2] IDCP is a specific disease of the pancreas associated with inflammatory bowel disease, commonly ulcerative colitis. [3]

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Jaundice, weight loss, and new-onset diabetes are the most common symptoms in these patients. Both subtypes of AIP are characterized by diffuse and focal enlargement of the pancreas and are markedly responsive to steroids. [4] Poor response to glucocorticoids raises doubts about alternative diagnoses because the clinical and imaging features of AIP and pancreatic adenocarcinoma can be very similar and can present a significant diagnostic dilemma even for experienced radiologists. [5]

CASE REPORT

A 45-year-old female patient was admitted from the general medicine outpatient department (OPD) on 18th November 2022 with the chief complaints of epigastric pain, left hypochondrium pain, vomiting, and fever for 5 days. Detailed history revealed that her epigastric pain was radiating to the back associated with low-grade intermittent fever with no rigors or chills and had nonprojectile multiple episodes of vomiting associated with intake of food. Moreover, the patient had been admitted twice previously to the hospital with similar complaints and was diagnosed as acute pancreatitis but no cause could be identified during the previous admissions. She had no other comorbid conditions before this admission and had no history of weight loss.

General physical examination of the patient was unremarkable. On systemic examination, she was well-oriented with normal cardiovascular and respiratory examination. The abdomen was soft but there was tenderness in the epigastrium and left hypochondrium with audible bowel sounds. The patient's investigations are tabulated in Table 1.

An ultrasound of the abdomen and pelvis revealed a contracted gall bladder with normal wall thickness and no gallstones. The pancreas appeared bulky with a cystic lesion in the body and tail measuring 6.2x5.5cm. The cyst could not be separated from the pancreas; hence computerized tomography scan was advised for further clarification.

CT abdomen with pancreatic protocol showed a 7.5x6.2x6.0cm hypodense bilobed cystic lesion in the body and tail of the pancreas with internal mildly enhancing thin-walled septation with mild to moderate fat stranding seen in the peripancreatic and perilesional area with few subtle nodules in the surrounding mesentery. These findings were attributed to infected pseudocyst or localized acute pancreatitis. A comparison made with the previous scan showed no interval change in the disease process.

The patient was diagnosed with type 1 autoimmune pancreatitis based on raised IgG4 levels, chronic and recurring nature of pancreatitis, non-resolving pseudocyst, and good response to systemic steroids. A multidisciplinary team (MDT) including radiology, gastroenterology, and surgery departments was taken on board regarding the pancreatic pseudocyst.

The patient was not deemed appropriate for percutaneous or endoscopic drainage of the pseudocyst because of its large size and chronic nature. It was ultimately decided to operate on her; she underwent distal pancreatectomy and splenectomy because the pseudocyst involved both the body and tail of the pancreas. Since the splenic vein runs in the gastro-splenic ligament falling directly behind the pancreas, surgical resection of the body and tail of the pancreas would lead to resection of the splenic vein too; hence splenectomy was also performed. The biopsy showed features favoring Mucinous cystic neoplasm of the pancreas with no evidence of malignancy. On immunohistochemical stains, the reactivity pattern was positive for ER, inhibin, and CD 10 which highlighted the ovarian stroma and cytokeratin and WT1 was negative.

The patient was discharged on 25th November 2022 on supportive treatment and was counseled regarding the nature, course, and prognosis of the disease.

Table No 1: Laboratory investigations of patient

S. No	Investigation	Value
1.	White Cell Count (WBC)	10,600/cmm
2.	Hemoglobin (Hb)	14g/dl
3.	Mean Corpuscular Volume (MCV)	81fL
4.	Platelet count	376,000/cmm
5.	Random blood sugar (RBS)	346mg/dl
6.	Glycosylated hemoglobin (HbA1c)	9.53%
7.	Serum amylase	178 U/l
8.	Serum lipase	405 U/l
9.	Blood urea	14.3 mg/dl
10.	Serum creatinine	0.65 mg/dl
11.	Total bilirubin	0.22 mg/dl
12.	Alkaline phosphatase (ALP)	105 U/l
13.	Alanine aminotransferase (ALT)	43.7 U/l
14.	Serum calcium	9.51 mg/dl
15.	C-reactive protein (CRP)	7.5 mg/L
16.	Sodium (Na)	136 mmol/l
17.	Potassium (K)	5.3 mmol/l
18.	Chloride (Cl)	105 mmol/l
19.	Total cholesterol	242 mg/dl
20.	Triglycerides (TGs)	218 mg/dl
21.	High density lipoproteins (HDL)	42 mg/dl
22.	Low density lipoproteins (LDL)	169 mg/dl
23.	Lactate dehydrogenase (LDH)	190 U/l
24.	Serum uric acid	2.2 mg/dl
25.	IgG4 levels	1657 mg/L

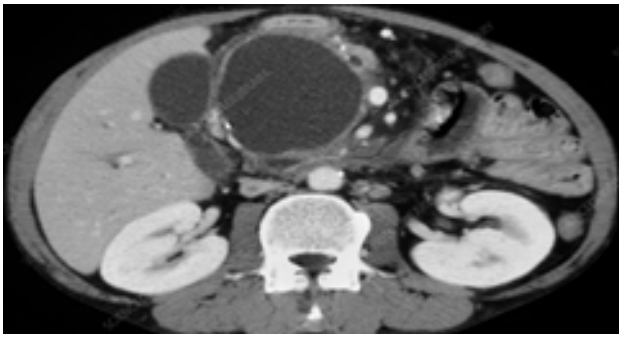

Figure 1: Contrast-enhanced CT scan abdomen revealing pancreatic pseudocyst

DISCUSSION

Before the establishment of the concept of autoimmune pancreatitis (AIP), this form of pancreatitis was recognized as lymphosclerosing pancreatitis or nonalcoholic ducto-destructive chronic pancreatitis due to its unique histologic features. The 2001 discovery that serum IgG4 concentrations were specifically elevated in AIP patients led to greater acceptance of this new entity. The classic form, called type 1 AIP, is associated with elevated serum IgG4 levels and tissue infiltration by IgG4+ plasma cells.[6] IgG4-independent type 2 AIP was identified by histologic features of neutrophilic infiltration into the epithelium of the pancreatic duct (granulocytic epithelial lesion - GEL). [7]

The pathological synonym for type 1 AIP is lymphosclerosing pancreatitis (LPSP), which is associated with predominantly lobular 'storiform' fibrosis, phlebitis obliterans, and infiltration by numerous IgG4+ plasma cells.[8] A diagnostic feature of AIP type 2 is GEL with or without lobular neutrophil infiltration.[9]

AIP type 1 mainly affects adult males and accounts for >90% of patients over 40 years of age. Males are predominant, with a male-to-female ratio of 3-4:1. [10] The main initial symptom is obstructive jaundice due to enlargement of the pancreatic head or thickening of the walls of the bile ducts. [11] These findings are similar to those found in pancreatic cancer and indeed 2–3% of pancreatic head lesions surgically excised for suspected malignancy were found to be type 1 AIP on histological examination. [12] Unlike pancreatic cancer, jaundice in patients with type 1 AIP improves rapidly with steroid therapy or sometimes resolves spontaneously.

In more than half of cases, pancreatic enzyme levels are slightly or moderately elevated. [13] Diabetes mellitus is a common complication, occurring in about half of patients, most of whom have type 2 diabetes. Steroid therapy may improve glucose intolerance in some patients with improvement in pancreatitis but may worsen diabetes in others, particularly in older patients.[14]

Elevated serum IgG4 (> 135 mg/dL) occurs in more than 90% of patients. It is the most sensitive and specific diagnostic test for AIP type 1 with a sensitivity of 95%, specificity of 97%, and accuracy of 97% for pancreatic cancer diagnosis.[15]

An important radiologic finding is uneven narrowing of the pancreatic duct, which can be detected using endoscopic retrograde cholangiopancreatography (ERCP) or magnetic resonance cholangiopancreatography (MRCP). [16] The former is more sensitive, while the latter is more widely used for diagnosis because of its less invasive nature. Complete obstruction of the main pancreatic duct with distal duct dilatation, which is common in patients with pancreatic cancer, is uncommon with type 1 AIP.

Characteristics of ultrasound, computed tomography (CT), and magnetic resonance imaging (MRI) include diffuse or focal pancreatic enlargement, peripancreatic capsular border, late phase enhancement of contrast-enhanced images, and abnormal signals intensity of MRI. Diffuse expansion of the pancreas, along with loss of cobblestone structure on the pancreatic surface, is a common feature of type 1 AIP in all imaging modalities. [17]

To date, many diagnostic criteria for AIP type 1 have been proposed in Japan, Korea, and the United States (based on the Mayo Clinic HISORt).[18] Oral steroid administration is the standard treatment for type 1 AIP. Typically, patients are started on prednisolone at 30-40 mg or 0.6 mg/kg daily for 2-4 weeks, and clinical signs, serology, and imaging data are closely monitored.[19]

Relapse can be defined as the recurrence of symptomatic or radiographically detectable disease in the pancreas as well as in extrapancreatic organs. A biochemical or serological relapse is not considered a relapse in itself.

Treatment by excision is not recommended for type 1 AIP. However, a surgical approach is unavoidable in small cases where malignancy cannot be completely ruled out even in large pancreatic centers. Surgery may also be considered for large pseudocysts that are rarely associated with type 1 AIP.[20] Benign mucinous cystic neoplasms of the pancreas have the potential to develop into aggressive cancers, surgical resection is recommended in younger patients. [21]

CONCLUSION

AIP type 1 is a pancreatic manifestation of a disease involving IgG4. Serological, imaging, and histological examinations are required to make a diagnosis. Distinguishing AIP from pancreatic neoplasm presents diagnostic difficulties as there is clinical and radiographic overlap, and it should always be remembered that biopsy is the gold standard for diagnosis.

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3 Authorship

According to the ICMJE criteria, authorship is based on 4 criteria; (1) conceptualization and designing, (2) AND, data collection, (3) AND, writing and critical review,

(4) AND, taking responsibility for the authenticity and integrity of all the research process. All those designated as authors should meet all these 4 criteria. The co-authors should declare their roles and contributions to the research process explicitly. Those who do not meet all 4 criteria should be ACKNOWLEDGED only. If agreement cannot be reached about who qualifies for authorship, the institution(s) where the work was performed, not the journal editor, should be asked to investigate. If authors request removal, addition, or change in the sequence of an author after manuscript submission or publication, journal editors should seek an explanation and signed statement of agreement for the requested change from all listed authors and the author to be removed or added. The corresponding author is the one individual who takes primary responsibility for communication with the journal during the manuscript submission, peer review, and publication process. The corresponding author typically ensures that all the journal's administrative requirements, such as providing details of authorship, ethics committee approval, clinical trial registration documentation, and disclosures of relationships and activities, are properly completed and reported. The maximum number of authors for any manuscript must not exceed 6. If the number of authors exceeds this number, an explicit rationale for their role must be provided, which will be decided by the committee comprising the chief editor, executive editor, and managing editor.

4 Submission of manuscript

The manuscript should be submitted through the journal website which is using the Online Journal System (OJS) along with the Institution research and ethics board (IREB) certificate. The article should have the following format:

4.1: The abstract should be structured with a word count of not more than 250 words.

4.2: The fonts should be Calibri, with size 12, and spacing of 1.5, with justified margins in MS office format.

4.3: The whole document should not be more than 3000 words (excluding references and appendices).

4.4: The number of figures and tables should not exceed 5 in the whole document.

4.5: The pictures and tables should be black and white in color.

4.6: Copied pictures and tables from other sources will not be entertained unless written approval from the original researcher and publisher is provided

4.7: Only that article will be considered for publication where the data is collected during the last 5 years.

4.8: Fifty percent of the references must be from the last 5 years. The introduction section must not have more than 30% of the total references.

4.9: any article having a similarity index of more than 50% will be declined altogether. For those having a similarity index of more than 19% but less than 50%, the authors will be given one chance to correct the manuscript.

5 Institutional Research and Ethics Board (IREB) certificate

Under no circumstances, an article will be accepted if approval from the relevant ethical board/committee is not taken before the start of the research. The board/committee should assess the proposal of research in both ethical and technical aspects before giving a certificate of approval.

6 Conflict of interest

To ensure transparency in the research conduction, writing, and publication, the authors, peer reviewers, and editors have to declare conflicts of interest regarding financial aspects, academic competitions, and relationships during the writing, reviewing, and publishing of the manuscripts. Details of sponsors along with their roles and access to data should be clearly stated.

7 Confidentiality

The editorial board in no way should publicize the work of a researcher in any form unless it is published. They should not publicize the comments and critiques given by reviewers. Similarly, the reviewers are bound to keep the confidentiality of the work of researchers during and after the review. The work of researchers and the critique should never be discussed or exemplified in forums. The confidentiality of the researchers should be maintained in every possible way when the documents are sent for review. However, our review process is open (non-blinded) in the first phase, as per the policy of the journal. In this case, the policy is displayed on the journal`s website for the researchers. Reviewers must not retain the manuscript for their personal use and should destroy paper copies of manuscripts and delete electronic copies after submitting their reviews. If a manuscript is rejected, it should be deleted from the editorial system. If an article is published, the manuscript along with its reviews and other relevant documents should be retained for a period of 3 years and then deleted. The only situation where confidentiality needs to be breached is when a situation of fraud or misconduct is found during the review process or after publication. Still, the authors and sometimes the reviewers, have to be notified.

8 Correction and retraction of articles

The guidelines for the correction and retraction of articles are as follows:

8.1: A specific page is allocated in the journal (both electronic and printed) that will be used for news related to corrections in articles published in previous journals.

8.2: The editor should also post a new article version in the journal with details of the changes from the original version and the date(s) on which the changes were made.

8.3: Previous electronic versions will prominently note that there are more recent versions of the article (that will be placed at the end of the abstract). Similarly, the authors or others should cite the more recent version.

8.4: If the error is judged to be unintentional, the underlying science appears valid, and the changed version of the paper survives further review and editorial scrutiny, then retraction with the republication of the changed paper, with an explanation, allows full correction of that research paper.

8.5: If a serious violation of credibility or quality of a research paper is found after the publication, the article has to be retracted after approval of at least 3 members of the editorial board in consultation with the chief editor. The whole process will follow the guidelines presented by Committee on publication ethics (COPE).

8.6: The retracted article should be notified on the website and the word “retracted” should be mentioned along with the title of the article.

9- Correspondence

Correspondence for submitting an article in JMS will be through a corresponding author. The duties of a corresponding author have already been presented in a previous section. Correspondence regarding debating an article is given high value and a separate page for letters to the editors has been allocated. Derogatory and demeaning letters are screened and letters that promote debates and critique are encouraged to be published. However, correspondence about the articles published in the last 1 year will be included only.

10- The fee submission process

A processing and publication fee of Rs. 10,000/-(Pakistani) for local authors and $ 250 (US) for international authors have been approved by the competent authority. The fee should be submitted as bank draft/ online payment through the account (IBAN) no: PK56NBPA0388004048685170 (Branch code: 0388 / National Bank of Pakistan, University campus branch,

Peshawar, Pakistan) as follows:

01. Article processing fee of 3000/- PKR at the time of submission of the article. This amount will be non-refundable.

02. Article publication fee of 7000/- PKR at the time of acceptance of article after external review. This amount will be refundable if the article is rejected for any reason.

03. For international authors, the amount of 250 US dollars will be accepted after both internal and external review. Researchers belonging to countries other than Pakistan are advised to submit the fee after the whole process of review is completed and the article is accepted for publication.

04. There will be no fee exemption in any circumstances, including members of the editorial board.

11 Roles of the editorial board, editors, and members

The editorial board of JMS is following the Higher Education Commission (HEC) policy for research journals. The roles of the editorial board for JMS are mentioned below:

11.1: The roles of the Editorial Board are:

11.1.1: To offer expertise in their specialist area

11.1.2: To review submitted manuscripts

11.1.3: To advise on journal policy and scope

11.1.4: To work with the Editor to ensure the ongoing development of the journal

11.1.5: To identify topics for special issues of the journal or recommend a Conference that would promote the journal, which they might also help to organize and/or guest edit

11.1.6: To attract new and established authors and articles

11.1.7: To submit some of their work for consideration, ensuring that they adhere to Conflict of Interest rules and stating their relationship to the journal. This is very important as the journal cannot be seen to publish only papers from members of the Editorial Board.

11.1.8: Editorial Boards must have a regular communication forum with other boards of similar nature, either face-to-face in person (depending on their country of origin, funding availability, etc.) or as more journals are doing today, communicating by teleconference, Skype, or other web platforms.

11.2: The Patron:

The Patron is usually the Dean of the institute and is overall in charge of the journal, who needs to be kept informed of the decisions taken by the editorial board. The patron is the final authority to approve the decisions and policies of the editorial board.

11.3: The Chief Editor:

11.3.1: The criteria for selection of Chief Editor are:

i. Expertise and experience in the specialist field related to the journal

ii. Publication record of several articles and /or books (usually in / related to the specialist field)

iii. Being a reviewer for an international peer-reviewed journal

iv. Senior research position with equivalent experience in research and scholarship

v. Enthusiasm to undertake the Editor role

vi. Preferably a diploma, master or doctoral degree in Education and Research

It is not necessary to fulfill all the criteria to become a chief editor.

11.3.2: The roles of the Chief Editor are:

i. The key role of a journal`s chief editor is to promote scholarship in the specialist field associated

with the journal, whilst also promoting the journal as the best journal to publish in. For any journal, the editor will need to encourage new and established authors to submit articles and set up a reliable panel of expert reviewers. Editors are also responsible for offering feedback to reviewers when required and ensuring that any feedback to authors is constructive.

ii. Editors should also familiarize themselves with the Committee on Publication Ethics (COPE) 'Code of Conduct and Best Practice Guidelines for Journal Editors'.

iii. Depending on how the journal is managed and how it is structured, an Editor may have to make all the decisions regarding which articles to accept or reject for publication.

11.3.3: Managing editor:

i. The roles of managing editor are:

ii. To help the chief editor to achieve the above-mentioned goals

iii. To communicate with the authors, reviewers, publishers, and other agencies for the smooth running of the journal

iv. To regularly evaluate the research work

v. Communicate with funding and regulating agencies (HEC and others) for grants and accreditations.

11.3.4: Executive editor:

The roles of the executive editor are:

i. To evaluate the research articles presented for publication

ii. To help the editorial board in policymaking

iii. They help the editorial board in smooth publishing

iv. To communicate with reviewers and collaborate with external agencies for relevant purposes

11.3.5: Section editors:

Section editors are allotted different responsibilities. Some of these are mentioned below:

i. Bibliography

ii. Proof-reading

iii. Academic writing reviewing, grammar, and spell checking

iv. Dissemination of articles for review

v. Contact with publishers under the supervision of the senior editorial team

vi. Training of future reviewers, young members, other faculty members

vii. others

11.3.5: Editorial advisory board:

Editorial advisory board members consist of national and international senior academicians, researchers, clinicians, and others to help the current editorial board in designing, implementing, and evaluating policies regarding upgrading the quality of research work. These people also share best practices to help the editorial team to refine their research work.

12 Policy regarding recruitment and continuation of the editorial board

The policy for recruitment and continuation of the editorial board is based on the guidelines discussed in the previous section. The chief editor, managing editor, and executive editors are recruited by the patron in-Chief. Members are then selected by them from amongst the faculty who have an aptitude for research, and their names are endorsed by the patron. The tenure of the editorial board is decided by the Patron after a period of 3 years whether to continue or recruit a new team or member. The editorial advisory board members are recruited for an indefinite period by the editorial team of JMS.

13 Plagiarism policy

The journal is following the plagiarism policy of the Higher Education Commission of Pakistan, and for this purpose, a plagiarism standing and review committee has been established under the chairmanship of the Chief Editor of JMS along with 4 members amongst se-

nior faculty. The committee has been given the authority to review research papers and plagiarism complaints related to published work in the journal.

14 Allegations of research Misconduct

The policies of the COPE, WAME, and ICMJE serve as the foundation for the policy of research misconduct in our journal.

Before submitting, authors must carefully read the journal's author guidelines and research ethical principles and adhere to them.

While authors have the right to recommend potential reviewers for the peer-review process, all potential reviewers will have their credentials and potential conflicts of interest carefully examined before they are invited to review.

A manuscript that is undergoing peer review or a published article may be the subject of a report of research misconduct. The application and management process for claims of author misconduct should go as follows:

14.1: An article submitted or to be published in the JMS if allegedly suspected of scientific misconduct, an official complaint for the same must be received by the office of the managing editor via email, contact@jmdsci.com. For instance, in case of plagiarism, the copied section should be underlined and the original and suspected sections should be explicitly pointed out. The complaint must specify the particular matter and details of the misconduct.

14.2: an investigation will be carried out by the editorial board and the corresponding author of the suspected article will be kept in contact. An explanation will be asked from the corresponding author in this respect. If the misconduct is accepted, the managing editor will take the following steps:

In the case of published articles, retraction might be considered.

In the case of unpublished articles, the review process may stop or continue depending on the changes suggested to the corresponding author.

If the corresponding author does not respond in the stipulated time or the response is unsatisfactory, the article may be declined or retracted.

14.3: Before reaching any conclusion in case of retraction of an already published article, the editorial team will be in consultation with the experts within or outside the institution.

14.4: If during the review process, suspicion of gifted authorship is identified, the editor in charge of the article may ask the corresponding/principal author about the role of the authors, and if the response is found to be unsatisfactory, the review process may stop or the article may be declined altogether.

15 Appeal and complaint process

The JMS follows the recommendations of COPE regarding the appeal and complaint process (https://publicationethics.org/appeals) as follows:

15.1: The authors may ask the managing editor for inquiring about the status of the article through the official email of the JMS (contact@jmedsci.com) citing their official article ID.

15.2: The author may contact the managing editor for inquiring about the reason for the rejection of articles during the review process by the above email link.

15.3: Sometimes, the authors may re-upload an article as a new submission if they have modified the article as suggested by the editors

15.4: For withdrawal of an article during the review process, the corresponding author will write

a request through the OJS to the relevant editor for retraction.

15.5: Reconsideration of the decision will be conducted only at the discretion of the managing and chief editors.

16 Contact information

The office of the managing editor or chief editor should be contacted anytime during working hours or can be contacted through their emails for correspondence.

17 Archiving and Data Repository

- In accordance with our open-access policy, we permit the self-archiving of published papers after their publication in JMS. Without requesting permission from the journal or publisher, authors are free to archive their academic works in PDF format at any time and retain ownership of the intellectual property. However, a yearly subscription is required to access the print edition of the entire magazine issue, which can be stored in libraries in the country and overseas for 500 US dollars or 5000 Pakistani rupees respectively.
- In the "Archives" tab of the website (https://jmedsci.com/index.php/Jmedsci/issue/archive), you can access every issue of the journal from the past.
- Writers of articles that appear in JMS have the right to deposit their accepted manuscript in institutional or centralized repositories and can immediately make it publicly accessible after doing so provided that the journal is attributed as the original place of publication and that correct citation details are given.
- The real-time data backup of the whole server for the Journal of Medical Sciences (JMS) is created on the remote VPS (Virtual Private Server) of Khyber Medical College(KMC). Parallel mirror Imaging (PMI) is also created on the JMS server. JMS Publishing has further made sure that the metadata of all its open-access journals is compliant with well-known repository services and their digital crawlers may regularly collect it for record and preservation

References

ICMJE recommendations

COPE guidelines

SCOPUS

This document is prepared in January 2020 to be used by an editorial board, reviewers, researchers, and faculty as a guide to making them aware of policies and procedures for publishing, conducting, writing, reviewing, and evaluating the research published in JMS. This document is developed by including the recommendations of ICMJE (2019) and COPE guidelines and in case of any conflict, lack of clarity, and ambiguity, the recommendations of the latest ICMJE recommendation and COPE will prevail.

KHYBER MEDICAL COLLEGE, PESHAWAR - PAKISTAN