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CONTENTS

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EDITORIAL

- Covid-19 Is Over- Lessons Learned And Unlearn: From The Eye Of The Department Of Medical Education Of A Medical School _____ 95
Farooq Ahmad

Original Articles

- 1- Multi-Drug Resistant Escherichia Coli And Their Sensitivity To Oral Fosfomycin In Urinary Tract Infections: A Single-Center Experience _____ 97
Iqbal Haider, Sana Ullah, Kalsoom Bibi, Hammad Naeem, Hamza Ali, Wazir Mohammad Khan
- 2- Diagnostic Utility Of Mean Platelet Volume In Patients Of Early Neonatal Sepsis _____ 102
Muhammad Idrees, Manzoor Ur Rehman, Sabahat Amir, Muhammad Ihtesham Khan, Muhammad Waqas, Inayat U Rahman
- 3- Perception Of Fourth-Year Medical Students Regarding Their Educational Environment In The Pediatric Unit Of Khyber Teaching Hospital _____ 106
Arshia Munir, Sabahat Amir, Farooq Ahmed, Usman Mahboob, Muhammad Aqeel Khan
- 4- Frequency Of Hyperuricemia In Type 2 Diabetes Mellitus Patients With BMI >23 Kg/M²- Study At A Tertiary Care Hospital _____ 111
Aqil Noor, Shaista Kanwal, Suleman Elahi Malik, Zafran Ullah, Tahir Ghaffar, Khalid Usman
- 5- Hypomagnesemia Causing Ventricular Tachycardia In Patients Presenting To A Coronary Care Unit _____ 116
Zahoor Ahmad Khan, Rahim Dil Khan, Charagh Hussain, Tariq Nawaz, Yasir Hakeem, Hameed Ullah
- 6- Efficacy And Safety Of Foleys Catheter For Uterine Tamponade In The Management Of Postpartum Hemorrhage At A Tertiary Care Centre In Peshawar _____ 121
Naila Bukhari, Tayaba Mazhar
- 7- The Diagnosis Of Tuberculous Meningitis By Detection Of Mycobacterium Tuberculosis Dna In Cerebrospinal Fluid Using Pcr Technique _____ 125
Ghulam Abbas, Nizam Ud Din, Adnan Zar, Asif Nabi
- 8- A Study Of Authoritarian Parenting Style And Aggression Among Adolescents _____ 129
Saima Arzeen¹, Naeema Arzeen¹, Mubashir Shah²
- 9- Frequency Of The Agenesis Of Palmaris Longus And Flexor Digitorum Superficialis Tendons Among Individuals _____ 132
Nazish Rafique, Anum Rafique, Hafsa Bint Bilal, Izzah Nawaz, Mohabbat Ali
- 10- The Efficacy And Safety Of Magnesium Sulphate For Neonatal Neuroprotection In Patients With Imminent Preterm Deliveries: Experience At A Tertiary Care Hospital _____ 137
Tayaba Mazhar, Shahzad Rauf, Asma Ambareen, Shahnaz Nadir

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- 11- Microbiologic Spectra And Their Antibiotic Susceptibility Patterns In Type 2 Diabetic Patients With Urinary Tract Infections (Utis) – A Hospital Based Study _____ 143

Aliena Badshah, Arooba Khan, Wazir Mohammad, Rabia Zaman, Zahid Ullah Khan, Iqbal Haider

- 12- Analysis Of Haematological Complications In Vivax And Falciparum Malaria In In-Door Patients In A Tertiary Care Hospital In Pakistan _____ 149

Saleem Iqbal, Jehan Sardar, Hamza Ali Khan, Ghulam Abbas, Badar Mehmood, Bakht Samar Khan

- 13- Chemical Analysis Of Different Brands Of Bottled Water With World Health Organization (WHO) Standards _____ 153

Adeela Mustafa, Hasnain Azam, Sarmad Ayaz Khan, Hoor Ul Ain, Faryal Gul, Muhammad Awais, Inayatullah

CASE REPORT

- 14- A Case Report - Jacob Syndrome (45X/47XXY Mosaicism) _____ 157

Suleman Elahi Malik, Nayab Munib, Javeria Javed, Zabia Jehandad, Iqbal Haider

- 15- Instructions for Authors _____ 160

- 16- Author's Agreement _____ 162

- 17- Editorial Policy _____ 163

COVID-19 IS OVER- LESSONS LEARNED AND UNLEARNT: FROM THE EYE OF THE DEPARTMENT OF MEDICAL EDUCATION OF A MEDICAL SCHOOL

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The latest report issued on 4/5/2023 by the WHO director General about announcing an end to the Covid-19 pandemic is based on the declining reports of new infections, declining hospitalizations and ICU deaths, and an increase in immunization rates throughout the world.¹ During these 3 years, every individual, in any position remained affected. More than 80 million were reportedly infected, more than 1 million died, hundreds of millions of dollars of financial losses incurred, psychological trauma inflicted over innumerable patients and their caregivers, thousands of hours lost in jobs, schools and other duties, educational deadlines for assessments missed, and many more such losses were observed. The WHO`s announcement of ending the Covid-19 emergency might bring new hopes for overcoming these.

From the perspective of educational institutions in general and medical education in particular, the departments involved in organizing the curricular activities faced the most challenges. These included revamping the timetables, changing the assessment schedules, arranging the online teaching activities for the first time, developing faculty and students, and in the meantime, protecting themselves and others from the deadly disease, especially in times when the vaccine was still unavailable.² The most important challenge I faced as the curriculum committee chair, was developing an online platform for the students. We used our customized learning management system for the faculty to upload their teaching material as a first attempt. Then, the faculty was trained to present their teaching content via that platform for a few weeks. After introducing the "ZOOM" platform, a proper interactive channel was established with the students, which also helped us to conduct online assessments. During the first 6 months of the start of the pandemic, most of the faculty was trained in using online platforms for teaching, assessment, and online meetings.

During the pandemic, teachers and students found new ways and means of teaching, learning, and assessments. The faculty also found ways of interacting locally,

regionally, and internationally to communicate with peers, students, and teachers and develop themselves by participating in online educational activities. We also learned how to participate in and conduct online conferences and workshops. Our institution developed policies for awarding and accrediting online CME/CPD hours for faculty and students.

One of the most important aspects of medical students, both undergraduate and postgraduate, was interruptions in their clinical training and research. Many types of assessments were delayed for this purpose, especially, postgraduate exit examinations were delayed for 6-12 months by the College of Physicians and Surgeons of Pakistan (CPSP). Many research papers published throughout the world regarding the challenges faced by medical students during the era of the Covid-19 pandemic found that the students felt deficient in learning clinical skills, missed the research deadlines, and got delayed their exit examinations.^{3,4} We do not know, how these deficiencies in their training may have affected their overall competencies when they will be working independently in the communities as clinicians.

The covid-19 pandemic has equipped medical institutions with the alternate system of teaching and training, assessments, and faculty preparedness in times of calamities, and has provided opportunities for students to avail teaching platforms other than those available in their institutions like YouTube, TED, Coursera, and others. It is hoped that in the future, the magnitude of the impact of such calamities will be much less over educational activities than the one we faced recently.

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al-health-regulations-(2005)-emergency-committee-regarding-the-coronavirus-disease-(covid-19)-pandemic?gclid=Cj0KCQjwmN2iBhCrARIsAG_G2i7ivr-LyYF1v80VkZ85wFSb-UhtMJ8ElrrAPbj4t0ULwoED-8vmGLxKcaAm6pEALw_wcB

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MULTI-DRUG RESISTANT ESCHERICHIA COLI AND THEIR SENSITIVITY TO ORAL FOSFOMYCIN IN URINARY TRACT INFECTIONS: A SINGLE-CENTER EXPERIENCE

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ABSTRACT

Objectives: To determine the frequency of Escherichia coli (E. Coli) with multi-drug resistance and sensitivity to oral Fosfomycin in urinary tract infections in a public sector hospital of Peshawar Pakistan.

Material and Methods: A descriptive cross-sectional study with a convenient consecutive sampling technique at the Department of Medicine Khyber Teaching Hospital Peshawar. A total of 179 patients were recruited in the current study. Detailed history and examination were carried out followed by routine baseline investigations. Under rigorous aseptic settings, two clean midstream urine samples from patients exhibiting symptoms of a urinary tract infection were collected. These samples were then promptly transferred to the hospital laboratory for routine evaluation and E.Coli inoculation on culture media. Once E.Coli was detected, it was tested for antibiotic sensitivity and resistance against the antibiotics mentioned. The multi-drug resistant (MDR) strains were isolated and their sensitivity was checked against oral fosfomycin. All the variables of data were recorded in SPSS version 20. Descriptive and inferential statistics will be utilized to elaborate study findings.

Results: The mean age in this study was 37 years with a standard deviation was ± 11.27 . Seventy-three (41%) patients were males and 106 (59%) patients were females. One hundred and eleven (62%) patients had multidrug-resistant E.Coli among which oral Fosfomycin was sensitive in 108(97%) patients and was resistant in 3(3%) patients presenting with urinary tract infection.

Conclusion: The multidrug-resistant E. coli strains are common in our setup. However, oral fosfomycin has documented sensitivity against these MDR strains of E. coli in the majority of UTI cases.

Keywords: Multidrug-resistant Escherichia coli, Drug Sensitivity, Fosfomycin, Urinary tract infection

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INTRODUCTION

Infections of the urinary tract account for a few of the foremost common microorganism infections worldwide¹. Females are affected more as compared to males². Presentation of UTI ranges from cystitis, pyelonephritis, and urosepsis. Different microorganisms cause infections of the urinary tract. Escherichia Coli, Enterococcus faecalis, Klebsiella, Pseudomonas, staphylococcus aureus, and proteus are the foremost common uropathogens. E. Coli is one of them, and it accounts for the majority of urinary tract infections (85% in the community and 50% in hospitals)³. With time and the environment, the bacteria's

resistance pattern changes. There are various resistance mechanisms, such as horizontal gene transfer and recombination of extrinsic DNA and genetic material modification⁴. Antibiotic resistance has grown significantly during the past few years against frequently used antibiotics⁵. Antibiotic resistance has been caused by innumerable factors like overuse and abuse of antibiotics⁶. The augmented trend of antibiotics for treatment has an impact on the bacteria's pattern of resistance. Emerging multi-drug resistant (MDR) E. coli strains make it inappropriate to use many antibiotics, including penicillin, cephalosporin, trimethoprim, quinolones, and gentamycin⁷. This has become a major problem even for uncomplicated UTIs where clearing the infection and lowering morbidity and mortality has become significantly more challenging as a result of the development of this resistance to routinely used antibiotics⁸. Research carried out at the Khyber Teaching Hospital Peshawar, E.Coli was the most frequent bacterial agent, occurring 77.9% of the time. Amikacin sensitivity was 93%. While a different study from the USA concluded that levofloxacin was equally effective for treating urinary

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tract infections as ciprofloxacin⁹. In a different study, 65% of *E. coli* isolates had multidrug resistance.

Antibiotics are the cornerstone of treatment for urinary tract infections¹⁰. It is crucial to know how common multidrug-resistant *E. coli* strains are as well as how susceptible they are to antibiotics. By blocking the enzyme phosphoenol pyruvate synthetase, a bactericidal drug known as fosfomycin blocks the first stage in the synthesis of the cell wall in both Gram-positive and -negative bacteria¹¹. A functioning L-a glycerophosphate transport system (GlpT) and the hexose-phosphate absorption system are the two separate transport mechanism systems that allow fosfomycin to enter the cells of bacteria that are fosfomycin-sensitive (UhpT). By preventing the production of N-acetylmuramic acid, it also prevents the creation of peptidoglycan. When used against both Gram-positive and Gram-negative bacteria, fosfomycin displays a broad range of activity. It may work better when used with antibiotics like fluoroquinolones and aminoglycosides. Eighty-nine percent of the bacteria were found to be responsive to fosfomycin, according to a study by Souza RB et al¹². In pregnant women with a urinary tract infection, the majority of multidrug-resistant patients and extended beta lactamase-generating organisms were found to be susceptible to fosfomycin¹³. In a different study that examined the sensitivity of fosfomycin in MDR cases and extended-spectrum beta-lactamase-producing organisms (ESBL); a single dosage of fosfomycin (3 gm) was shown to be equally efficacious for treating uncomplicated urinary tract infections as ciprofloxacin 500 mg for five days according to a randomized controlled trial that involved 260 individuals¹⁴. In vitro sensitivity of common pathogens of urinary tract infections to fosfomycin was evaluated by Anand et al. in 2019 and it was discovered that the bacteria were extremely susceptible to fosfomycin¹⁵. The goal of the current study is to determine the local prevalence of multi-drug resistant (MDR) *E. coli* strains and their susceptibility to oral fosfomycin, one of the antimicrobials with the least amount of documented resistance in the literature. It will assist in establishing it as an empirical oral therapy against *E. coli* in urinary tract infections in both admitted and outpatient patients, as well as being safe for use in pregnant women. In contrast to earlier studies in our area that looked for *E. coli* sensitivity to injectable antimicrobials, this study will ascertain *E. coli* sensitivity to an oral antimicrobial drug like fosfomycin.

The objective of this study was to determine the frequency of multidrug-resistant *E. coli* and their sensitivity to oral fosfomycin in urinary tract infections in the setting of a teaching hospital (KTH) in Peshawar, Pakistan.

MATERIAL AND METHODS

This descriptive cross-sectional study was conducted in one of the units of the Department of Medicine, Khyber Teaching Hospital, Peshawar for a period of six

months from July 18, 2020, to January 18, 2021. However, ethical approval was obtained earlier for this research work from Institutional's ethical authority with reference number 752/ADR/KMC Dated 30-01-2020. The sample size was 179 using open epi and having 65% proportion of the population as multidrug resistance, 95% confidence level, and 5% margin of error with the help of WHO software to determine sample size⁶. A convenient consecutive sampling technique was utilized to collect the data.

The inclusion criteria for this study were: All patients with culture-proven *E. coli* induced UTI (Urinary Tract Infection); patients of either gender with an age limit ranging from 18 to 60 years including pregnant women in all trimesters. To avoid confounding factors introducing bias in the study results, patients with diabetes, HIV/AIDS, a long-term steroid medication, and patients who used antibiotics within the previous 48 hours of presentation were excluded from the study.

After selection and consent, patients were asked to collect clean mid-stream urine samples. Two samples of urine were collected and then promptly transferred to the hospital laboratory for examination and inoculation on culture media for *E. coli*. The detected *E. coli* were then checked for resistance and sensitivities against the antibiotics mentioned. The MDR strains were isolated and their sensitivity was checked against oral Fosfomycin. This whole data collection was done under the supervision of one microbiologist having at least five years of experience in the field. All information was recorded. Data obtained were entered and analyzed by the statistical package for social sciences (SPSS) version 20. Mean \pm SD was calculated for numerical variables like age. Frequencies and percentages were calculated for categorical variables like gender, multidrug resistance, and oral Fosfomycin sensitivity. The sensitivity of oral Fosfomycin and multi-drug resistance was stratified among age and gender to see effect modification. The Post-modification Chi-square test was applied to keep the P-value \leq 0.05 as significant.

RESULTS

The age range of 100 patients (56%) was from 18 to 30 years and 79 patients (44%) were from 31 to 60 years. The mean age was 37 years with SD \pm 11.27. Seventy-three (41%) patients were male while 106 (59%) patients were female. Multidrug resistance among 179 patients was analyzed as 111 (62%) patients documented multi-drug resistance while 68 (38%) patients didn't have multidrug resistance. (Fig1) The sensitivity of oral fosfomycin with multidrug resistance of *E. coli* among 111 patients was analyzed as oral fosfomycin was sensitive in 108 (97%) patients and was resistant in 3 (3%) patients. (Fig2) Stratification of the Sensitivity of oral fosfomycin and multidrug resistance concerning various variables are documented in tables 1-4.

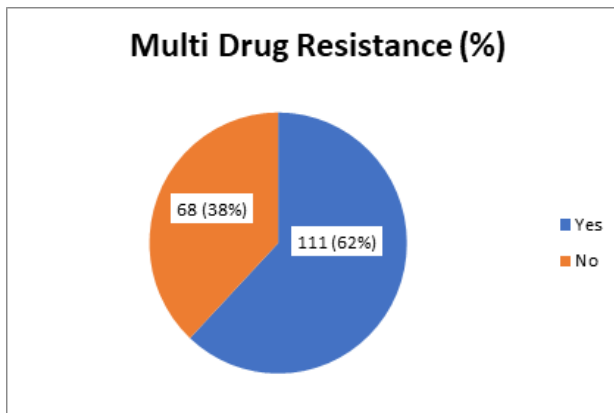


Fig 1: Multi-drug resistance of E. Coli (n= 179)

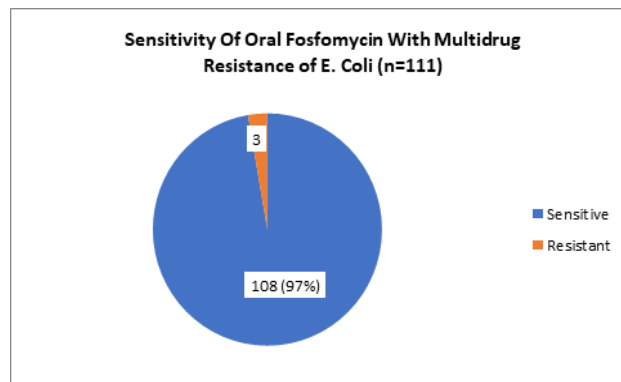


Fig 2: Sensitivity of Oral Fosfomycin against Multi-drug Resistant E. Col (n=111)

Table 1: Stratification of Multi-drug Resistance of E. Coli To Age (n=179)

Multidrug Resistance	18-30 years	31-60 years	Total	P value
Yes	62	49	111	0.9972
No	38	30	68	
Total	100	79	179	

Table 2: Stratification of Multi-drug Resistance of E. Coli To Gender (n=179)

Multidrug Resistance	18-30 years	31-60 years	Total	P value
Yes	62	49	111	0.8186
No	38	30	68	
Total	100	79	179	

Table 3: Stratification of Sensitivity of Oral Fosfomycin with Multidrug Resistance of E. Coli To Age (n=111)

Sensitivity	18-30 years	31-60 years	Total	P value
Sensitive	60	48	108	0.7022
Resistant	2	1	3	
Total	62	49	111	

Table 4: Stratification of Sensitivity of Oral Fosfomycin with Multidrug Resistance of E. Coli To Gender (n=111)

Sensitivity	Male	Female	Total	P value
Sensitive	45	63	108	0.7725
Resistant	1	2	3	
Total	46	65	111	

DISCUSSION

Urinary tract infections (UTIs) are among the most common bacterial infections worldwide and in Pakistan as a result of the invasion and growth of microbial agents in the urinary tract. Comparatively speaking, females experience urinary tract infections at a higher rate than males. There are several UTI manifestations, ranging from mild cystitis to pyelonephritis and septicemia¹⁶. According to our analysis, the mean age was 37 years, with an SD of 11.27. Male patients made up 73 (41%), while female patients made up 106 (59%). Multidrug-resistant E. coli was found in 111 (62%) patients, of whom 108 (97%) were sensitive to oral fosfomycin and only 3 (3%), who had urinary tract infections, were resistant to it. According to one study

by George G. et al, only 1% of E. coli has fosfomycin resistance¹⁷.

Fosfomycin has a maximum urinary concentration of 4000 g/ml, is eliminated unchanged in the urine through glomerular filtration, and persists at quantities >100 g/ml 48 hours after a single 3-gram oral intake. Patients who are elderly, pregnant, or who have liver or renal impairment do not require dosage modifications¹⁸. Clinical trials have shown efficacy in AUC (Area under the curve) that is equivalent to ciprofloxacin, nitrofurantoin, trimethoprim-sulfamethoxazole, and fosfomycin exhibits a favorable safety profile. Guidelines and authorities from Canada, the United States, and Europe have all recom-

mended fosfomycin as a first-line treatment for AUC due to its in vitro activity against common uropathogens, including MDR isolates, as well as its favorable safety profile, which includes pregnant patients and drug interactions¹⁹. A study conducted by Matthews PC et al. elaborated that the MIC₅₀ (Minimum inhibitory concentrations for 50% of the isolates) for meropenem (0.5 g/mL) and nitrofurantoin (32 g/mL) were only in the susceptible range for *E. coli*. The only antibiotic that completely inhibited *E. coli*, 70% of *Klebsiella* species, 50% of *Pseudomonas* species, 40% of *Enterobacter* species, and 100% of those that produced extended-spectrum beta-lactamases was fosfomycin²⁰. It had a comparable impact on AmpC (Class C beta lactamases) and carbapenemase producers. The biofilms of 67% (n=141) *E. coli* and 74% (n=50) *Klebsiella* spp; were disrupted by fosfomycin. After 24 hours of incubation, fosfomycin disrupted 88% (n=27) *Pseudomonas* spp. and 36% (n=23) *Enterobacter* spp. at a concentration 2-fold dilution lower than the MIC. Fosfomycin effectively inhibited the biofilms that the MDR organisms under study here generated. The oral form of Fosfomycin was well tolerated by most patients despite the most commonly reported side effects like diarrhea, nausea, etc.²⁰ Unlike sulfonamide or quinolone, Fosfomycin is a safe alternative to β -lactams in the treatment of pregnant women with UTIs.

Our study is a single-centered observational research work with a limited number of patients. A large number of patients with longitudinal cohorts and multi-center randomized controlled trials across Pakistan are required for the generalization of these findings. Nonetheless, the findings are highly favorable and have a positive impact on practice-changing attitudes from the local perspective. However, prospective, longitudinal multicenter clinical trials are the need of time to generalize and validate these findings.

CONCLUSION

There is a high frequency of UTI due to multi-drug-resistant *E. coli* in our setup and the majority of these MDR *E. coli* infections are sensitive to oral fosfomycin.

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Ullah S: Data collection, compilation of results, formatting of the article

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DIAGNOSTIC UTILITY OF MEAN PLATELET VOLUME IN PATIENTS OF EARLY NEONATAL SEPSIS

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ABSTRACT

Objective: To determine the diagnostic utility of mean platelet volume in patients presenting with early neonatal sepsis.

Materials and methods: This validation study was conducted in the Department of the Pediatrics ward, Khyber Teaching Hospital, Peshawar. After seeking parental consent, a brief history of Neonatal Sepsis and co-morbidities was obtained. The patient's clinical record was reviewed for the presence of any of the conditions indicated in the exclusion criteria for this study. A questionnaire about the patient's demographics, disease duration, and treatment records was compiled. Samples were taken and examined of such newborns with consent from the patient's guardians (n=322). 4 ml venous blood was collected from each subject. 2 ml was used for blood culture, and 2 ml was used for Mean Platelet Volume estimation each at hours 0, 24, and 48. Data was collected and analyzed using the SPPS 24.

Results: A total of 322 newborns (154 males, 168 females) were enrolled. The Sepsis group as diagnosed by blood culture, had 201 cases while the control group had 121 participants. There was a significant difference (p-value less than 0.05) between the two groups for Mean Platelet Volume. The values for sensitivity, specificity, and negative and positive predictive values as compared to blood culture as the gold standard were 77.58, 55.31, 50.00, and 81.08 percent, respectively.

Conclusion: The mean platelet volume has high diagnostic utility in patients with neonatal sepsis.

Keywords: Mean platelet volume, neonatal sepsis, newborns.

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INTRODUCTION

Sepsis is a systemic disorder induced by a pathological response to infection¹. Sepsis is now realized as an out-of-control, severe infectious response or a complex infection-related illness^{2,3,4}. Bacteria are the most common pathogens for causing sepsis⁵. On the other hand, viral respiratory infections in sepsis are mainly symptomless^{6,7}. Intravenous antibiotics are recommended to treat sepsis within 1 hour of diagnosis⁸.

Sepsis causes a significant burden on the health care system as it is associated with deaths in children worldwide. It is reported that 22 instances of pediatric sep-

sis cases are observed per 100,000 newborns per year all over the world^{9,10}. Sepsis affects around 4% of all hospitalized children under the age of 18 and 8% of pediatric ICU patients in developed countries^{11,12}. The mortality rate for neonatal sepsis ranges from 4% to 50%¹²⁻¹⁴. Neonatal sepsis has a high rate of morbidity and mortality. It occurs between 1 and 5 times per 1000 live births worldwide¹⁵. In the United States, the rate of sepsis in neonates is between 0.2 and 1 for each 1,000 live births¹⁶. Early sepsis costs roughly 0.77/1000 live births. The rate for neonates above 34 weeks of gestation drops to about 0.5/1000 live births¹⁷.

Neonatal sepsis can take the form of newborn meningitis, septicemia, or a mix of the two. If sepsis occurs in the first six days of life, it is called Early onset, and that occurring from 7 days onwards is called late-onset¹⁸. Early-onset neonatal sepsis primarily begins within 72 hours of birth¹⁹. It can progress to multiple organ failures. In newborn sepsis, the signs and symptoms are often non-specific. As a result, the differential diagnosis is criti-

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cal²⁰. Some of the clinical findings are apnea, hepato-splenomegaly, cyanosis, abdominal distention, peripheral circulatory disturbance, tachypnea, diarrhea, vomiting, bradycardia/tachycardia, difficulty sucking, and hypotension²⁰⁻²³.

Blood, urine, and cerebrospinal fluid cultures are the diagnostic tests for sepsis. The growth of pathogenic bacteria in body fluids is the gold standard²⁴. The absence of growth does not rule out the diagnosis²³. Additionally, the sensitivity of diagnostic tests is affected by the limited blood volume available in neonates. According to research, blood volume for sampling is frequently low, resulting in more than 50% of incorrect results²⁵⁻²⁶. Another concern is that blood cultures have low specificity. Mean platelet volume is reported to predict mortality in sepsis patients and is increased in patients with sepsis²⁷.

Therefore, this research was performed on mean platelet volume compared to the gold standard blood culture. Due to the limitation of culture and increased rate of mortality of early-onset neonatal sepsis, it is vital to identify new perspectives. Studying this parameter may help develop local guidelines for the precise diagnosis, early intervention, and treatment of such burdensome conditions.

MATERIALS AND METHODS

The validation study was performed in Khyber Teaching Hospital, Peshawar. Ethical approval for the research was granted by the ethical board. Neonates attending to inpatient & outpatient departments were approached. After seeking parental consent, a brief history of Neonatal Sepsis and comorbidities was obtained.

A questionnaire about the patient's demographics, disease duration, and treatment record was compiled. After informed verbal & written consent from each patient's parents, samples of the selected neonates (n=322) have been collected and evaluated.

Inclusion criteria included Preterm neonates (28-36 weeks of gestation) of less than 72 hours of age and term neonates of less than 7 days. Exclusion criteria included neonates taking antibiotics and those whose mothers were treated with antibiotics for infections. For the control group, Inclusion Criteria included subjects with no clinical signs of sepsis, having normal MP, not treated with antibiotics, and hospitalized for hyperbilirubinemia and hypoglycemia. The exclusion criteria for control were the same as the case group.

4 mL venous blood was collected from each subject under aseptic conditions. A 2 mL was used for blood culture, and 2 mL was utilized for Mean platelet Volume estimation. Blood culture reports were assessed after 24-48 hours of incubation. Mean platelet volume was analyzed using NIHON KOHDEN MEK 6510 Auto Hematology Analyzer (Tokyo, Japan) at hours 0, 24, and 48.

SPSS 24 was used for data analysis. Standard deviation and Mean were used for continuous data. Blood culture results were taken as the gold standard. Sensitivity and specificity, positive predictive value, and negative predictive value were calculated for MPV. A p-value of less than 0.05 is considered statistically significant to reject the null hypothesis. A sample size of 322 was calculated in Goldberg's Equation through the WHO formula.²⁸

RESULTS

Newborns (154 males/47.82%, 168 girls/52.17%) were enrolled in the study. Sepsis and control groups had 201 and 121 neonates respectively. The demographic data are summarized in Table 1. For newborns, diagnostic variables are listed in (Table.2). A substantial variance was observed for MPV amongst the sepsis and control groups.

MPV was compared to the gold standard blood culture test for sensitivity and specificity. MPV shows 77.58% sensitivity

Table 1: Demographic characteristics of the participants

Demographics	Eons (201)	Control (121)
Gender- Male, n (%)	94 (46.76)	60 (49.58)
Gender – female , n (%)	107 (53.24)	61 (50.42)
Birth weight, g (mean ± SD)	2450±630	2735±895
Postnatal Hospitalization, days	5.5 (1-60)	4.8 (1-35)
Chorioamnionitis, n (%)	24 (11.94)	0.0 (0.0)
Cesarean section, n (%)	119 (59.2)	74 (61.15)
Early membrane rupture, n (%)	27 (13.43)	0.0 (0.0)
Mortality, n (%)	38 (18.9)	0.0 (0.0)

n: Number of Cases, EONS: Early onset neonatal sepsis

Table 2: Lab Values (MPV)

Demographics	Eons (201)	Control (121)
MPV (fL) (Median)		
0 hrs	8.2	7.7
24 hrs	8.3	7.9
48 hrs	8.8	7.6

Table 3: validation parameters of the study

Parameters	Sensitivity (%)	Specificity (%)	NPV (%)	PPV (%)
MPV	77.58	55.31	50.00	81.08

DISCUSSION

In the current situation of Pakistan, with limited resources and a high rate of neonatal infections, we must look at this problem with new perspectives. The diagnostic significance of mean platelet volume in early-onset neonatal sepsis has not been documented in the literature so far.

MPV reflects the pro-thrombotic and pro-inflammatory conditions. Active platelets have increased MPV

which means larger platelet size due to increased accumulation of thromboxane A2 and procoagulant surface proteins like glycoprotein IIIa and P-selectin. Since inflammation and a hyper-coagulable condition are associated with increased MPV in septic patients, MPV can be utilized as an integrated marker of both harmful processes in critical illness²⁹.

According to previous work, on the 1st and 3rd days of sepsis, MPV values were similar in sepsis infants with positive blood cultures³⁰. Conversely, Guida et al. found an overall elevation in MPV in patients with sepsis³¹.

Our findings suggest a significant diagnostic utility of MPV in diagnosing neonatal sepsis. It is aligned with the perceived conclusions by Tayman et al. and Arayici et al.^{30,32}. They suggested that MPV value in sepsis increase, while it goes down after proper therapy. Guclu E from Africa also suggested that MPV remains high in infants with sepsis³³. Pele-Velez et al presented the same findings that the MPV values are high in infants with neonatal sepsis³⁴. These researchers concluded from their research that MPV could be used to diagnose sepsis and monitor the effectiveness of antibiotic treatment.

CONCLUSION

Mean Platelet Volume has high diagnostic utility in the diagnosis of early neonatal sepsis. This parameter can be used in the diagnosis of this condition.

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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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PERCEPTION OF FOURTH-YEAR MEDICAL STUDENTS REGARDING THEIR EDUCATIONAL ENVIRONMENT IN THE PEDIATRIC UNIT OF KHYBER TEACHING HOSPITAL

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ABSTRACT

Objectives: The study aimed to assess the students' perception of the educational environment in the pediatric unit of Khyber teaching hospital using Dundee Ready Educational Environment Measures (DREEM).

Material and Methods: This cross-sectional, questionnaire-based study was conducted at the Department of Child Health Khyber Teaching Hospital Peshawar, Pakistan, from May to November 2019. The sample size included 220 students fourth-year students. The study instrument was the DREEM questionnaire, which has 50 items that assess five domains. There are 50 items with 5 subscales and the maximum score is 200. Descriptive statistics were used to calculate the mean and standard deviation of the DREEM and the five domains

Results: Of the 220 Students, 100 completed the questionnaire, resulting in a response rate of 45%. The total DREEM score was 113.14/200 (56.57%). The results showed that student's perception of their learning environment was 27.31/48 (56.89%), the perception of teachers was 25.45/44 (57.84%), self-perception of their academics was 18.97/32 (59.28%), their perception of the atmosphere was 27.7/48 (57.7%), and social self-perception was 13.7/28 (48.96%).

Conclusion: The study found that the atmosphere in the pediatric ward of Khyber Teaching Hospital was perceived positively by the students. However, the total DREEM score and points in the subdomains did not fall in the excellent category and remained one step below the highest rank. Therefore, there is room for improvement in the educational climate at the pediatric ward of Khyber Teaching Hospital.

Keywords: Dundee Ready Educational Environment Measures (DREEM), educational environment measures.

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INTRODUCTION

The main objective of medical education is to groom medical students irrefutable in the clinical world. Medical students' achievements and training depend largely on the quality of the medical learning environment¹. Therefore, to address the problems and issues in medical education, evaluating the educational setting can be helpful. Numerous researches on education have shown that medical students' perception of their academic environment is related positively to their learning². The clinical and

academic learning environment has a significant impact on medical students' approaches to acquiring knowledge, enhancing awareness and understanding, progress, and behaviors³. For improvement purposes, students' perceptions can form the basis and the educational environment can be modified and reformed⁴.

The students' perception of its academics and learning climate is of utmost importance and form the basis for redefining the educational curricula. These, in turn, can affect the student's motivation, success, emotional well-being, and contentment. Students' contentment with learning experiences is an essential element of quality learning, and when a high-quality, student-centered curriculum is provided, to the students then assessment and measurement of the educational environment with suitable tools/ instruments is necessary.⁵ The academic environment is best assessed by the DREEM instrument and provides a complete indication of the education process, the outcome of which is being used to enhance students'

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contentment and accomplishments⁶.

This study is intended to assess the academic learning environment of our teaching hospital pediatric ward and address undergraduate educational insufficiencies and find realistic solutions. The results may provide a baseline and starting point for changes in curricular developments. The objectives of the study were to assess the students' perception of the educational environment in the pediatric unit of Khyber teaching hospital using Dundee Ready Educational Environment Measures (DREEM).

MATERIAL AND METHODS

This was a cross-sectional, questionnaire-based study conducted in the Department of Child Health Khyber Teaching Hospital Peshawar, Pakistan. The study utilized the pre-validated and pretested Dundee Ready Educational Environment Measures (DREEM) questionnaire in the English language. The study was conducted from May 2019 to November 2019 and was approved by the Institutional Ethical research board of Khyber Medical College, Peshawar. All 220 fourth-year students who had completed their 4-week rotation in pediatric medicine were included. The purpose of the study and the questionnaire were explained to the students at the end of their rotation, and their participation was voluntary and anonymous.

Out of the 220 students, 100 responded, resulting in a response rate of 45%. The DREEM questionnaire

consists of 50 items that evaluate five domains. Each item is scored on a Likert scale ranging from 0 to 4 (strongly disagree = 0, disagree = 1, unsure = 2, agree = 3, and strongly agree = 4). Before analysis and interpretation, the following nine negative items - items 4, 8, 9, 17, 25, 35, 39, and 48 - must be rated in reverse. Details are provided in the Annexure.

The response sheet of DREEM was handed over to fourth-year MBBS students at the end of their pediatric ward rotation after approval was taken from Institutional Ethics Board. The questionnaire was filled by students voluntarily, the consent was implicit when questionnaires were returned filled and when questionnaires were returned blank, was presumed a non-consent.

Statistical analysis using descriptive statistics SPSS version 21 to calculate variables of DREEM. The mean and standard deviation were calculated for all of the items. The items with a mean score less than 2 suggested a need for change and the mean score more than or equal to 3.5 were taken as real positive.

RESULTS

Out of 220 Students, 100 filled the questionnaire, the total proportion of response was 45% and total DREEM score was 113.14/200 (56.57%) questionnaire showing that observation of students regarding their learning was 27.31/48 (56.89 %), perception of teachers was 25.45/44(57.84%), students self -perception of their academics 18.97/32 (59.28%), student perception of atmosphere 27.7/48(57.7%), students social self-perception was 13.7/28 (48.96%) (table 1 and 2)

DISCUSSION

The world now prioritizes a healthy educational environment, and the interpretation of the mean total DREEM score of this study depicted more positive than negative outcomes. The DREEM guidelines assign an excellent to

Table 1: Total mean score and Mean score and SD* of each subscale

Questionnaire	Mean + SD
Total score	113.14+-12.76
Learning (SPL)	27.31+-3.98
Teaching (SPT)	25.45+- 3.97
Academic (SASP)	18.97+-3.56
Atmosphere (SPA)	27.7+-4.606
Social self-perception (SSSP)	13.71+- 2.948

Table 2: Total score of DREEM and interpretation of the mean score

Total score	Max score	Percent of perception of mean score	Interpretation of mean score
Total DREEM score	200	56.57%	Positive perception 113.14/200
Students' Perception of Learning (SPL)	48	56.89 %	Positive perception 27.31 /48
Students' Perception of Teachers (SPT)	44	57. 84%	Positive perception 25.45/44
Students' academics self-perception (SASP)	32	59.28%	positive perception 18.97/32
Students' perception of the atmosphere (SPA)	48	39.5%	many issues need changing 18.97/48
Students' social self-perception (SSSP)	28	48.96%	Not a nice place 13.7/28

151-200 and 0-5 as poor^{7,8}.

Local as well as regional international studies reported a more positive score than negative. Jawaid et al, reported in a study conducted in three medical colleges of Dow Medical University using DREEM guidelines that a mean score of there was more positive than negative (114.4) which is comparable to our study.⁹ Similarly Madina University Faisalabad has a mean score which falls in the more positive than negative category (112/200).¹⁰ Higher mean scores were reported by Khan et al (124/200) and Uzma Z et al (120/200)^{11,12}. The scores of these institutes are higher than ours but still in the same category i.e. not considered as excellent but positive.

There are many international studies from south East Asia reporting positive scores. Students of Hormozgan University of Medical Sciences South Iran reported a mean score of 99.6 like our students.¹³ Pai et al from India reported a comparable score from a medical institution using DREEM¹⁴.

Regarding the five subclasses of DREEM the highest calculated score in our study was 59.28% in the subclass Students' academics self-perception (SASP) and the lowest score of 39% in Students' perception of the atmosphere (SPA) where many issues are there which need changing. The above-average score in our study in the five domains of DREEM depicts positive perceptions of students about the clinical atmosphere. The clinical environment is rich in terms of the availability of real-life cases offering meaningful opportunities to participate in clinical activities like history taking, examination, and practicing their communication skills. The clinical environment provides effective, pedagogic, and organizational support for students to learn^{13,15,16}.

Students' perception of learning: Students perceived their learning as excellent when they are stimulated to contribute to the discussion in class and teachers are encouraging and learning is student-centered. In this study, students observed their learning positively. The rich clinical environment and the tutors help the student to socialize in the healthcare profession, creating a professional identity relating to the student's current and future roles in the healthcare system. Tutors are entrusted with responsibilities to foster students' learning, helping to develop students' attitudes, values, and professional competencies¹⁷.

Kohli et al suggested that the learning experience of students in a clinical setting can be improved by structured and systematic clinical teaching; advising teachers to plan clinical encounters according to curricular objectives, rather than an opportunist selection of cases.¹⁸

Students' Academic Self-perception (SAP) - The capacity to handle the workload of academics is called academic self-perception. Low scores have been reported

in this domain in most studies, suggesting the universal anomaly of curriculum overload, regardless of being conventional or novel curricula^{19,20}. Thus an obvious change is required in the curriculum; by bringing alteration in the content of the course as well as the way it is implemented¹⁸. The unstructured and hectic teaching may overwhelm clinical batches of students in any institute. In our study, the limited exposure to clinical clerkship, fewer theory classes, and the Paediatric professional exam being in the final year rather than 4th year exposes the students to a lesser workload which may have led to a higher score in academic self-perception.¹⁷

Students' Perception of Atmosphere (SPA) - In our study, the student's perception of the atmosphere scored less at 39% similar to a study by Kiran and Sean.²¹ The reasons given in the study were related to poor scheduling, anxiety, a non-motivating environment, and a dearth of prospects to develop social skills²¹. The increased workload of patient care in clinical units hinders even a competent teacher to teach undergraduate students. Thus ironically the chance of experiencing a hospital's real-life experience is lost²².

Students' Social Self-perception - in our study the students' social self-perception has a 48% score which is a bit lower than all other domains and this reflects the stress, burnout, or boredom due to inadequate or non-existing student support system. Our institution has just started a mentoring program; mentors among faculty are involved to develop student support. Stress can be reduced and support can be provided to students by a program involving peers and teachers in a mentoring program.²³ Raising awareness about offering social and academic support through mentors to students is indispensable in institutions. Poor support of students was reported in other studies as well.^{22,24} The students described a good social life as being in the company of their friends which made them happy and reduced stress. The concept of near-peers being mentors uses this concept. Evaluators should plan the curriculum in innovative ways to make it less huge, and engaging to avoid monotony and dullness for students^{25,26}. This is a very tiring and long debate since the impact on course outcomes will be unfavorable with the decreasing curriculum.

This study has a few limitations: The educational environment is an intricate combination of various elements, varies with each institute, and may not apply to others. Dundee Ready Educational Environment Measures (DREEM) has predetermined choices in the questionnaire while some of the factors in the pediatric ward environment in the local setup may have been left out. Therefore, further research is needed to find other factors in the local setup of the Paediatric department. Secondly, the questionnaire was very lengthy and this may be the reason for the less than 60% student response rate which

is a limitation of this study.

CONCLUSION

The students deemed the Paediatric unit's learning atmosphere at Khyber Teaching Hospital as more positive than less negative. This DREEM score is reassuring though not an excellent and perfect category. The clinical learning environment has the potential for further improvement at the pediatric ward of Khyber Teaching Hospital. The assessment by the students had more of a positive trend however improvement is required in all the five domains. The most trouble was with 'students' perception of atmosphere'. Specifically, students want many issues to be resolved and need changes in the atmosphere. A curriculum that incorporates both problem-based learning and evaluation may offer students engaging learning possibilities. Senior students may benefit from the support of instructors and close friends who serve as mentors.

Students' perception of the educational environment of other clinical years can be used to observe the effect of curriculum, to bring changes, and monitor these changes over the years. Students' learning is enhanced by a favorable academic environment thus further research is required to define the elements of a perfect clinical environment.

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Following authors have made substantial contributions to the manuscript as under

- Munir A:** Writing up, literature search
- Amir S:** Data collection, analysis, editing
- Ahmed F:** Basic idea, writing up the proposal
- Mahboob U:** Overall supervision and correction of document
- Khan MA:** Stistical Analysis and Reference writing

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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FREQUENCY OF HYPERURICEMIA IN TYPE 2 DIABETES MELLITUS PATIENTS WITH BMI >23 KG/M²- STUDY AT A TERTIARY CARE HOSPITAL

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ABSTRACT

OBJECTIVE: To determine the frequency of hyperuricemia in type 2 diabetes mellitus (T2DM) patients with BMI >23 kg/m²

Materials and Methods: This descriptive study was conducted from February 2020 to September 2021. All patients with Type 2 Diabetes Mellitus (T2DM) with body mass index (BMI) >23 kg/m² were assessed for hyperuricemia through Roche Cobas 6000 series C501 in MTI Hayatabad Medical Complex's laboratory.

RESULTS: Total number of patients was 300, out of which 60 % were males. The studied population has a mean age of 59 (SD = ±7) years, mean systolic blood pressure was 151 (SD = ±17) mmHg, mean duration of T2DM was 13 (SD = ±4) years, mean HbA1c was 10.9 (SD = ±2.5) %, mean BMI was 28.8 (SD = ±3.1) kg/m² and mean serum uric acid was 5.7 (SD = ±1.3) mg/dl. The overall prevalence of Hyperuricemia was 47% (36.7 % males and 62.5% females). Of those with hyperuricemia, 73 % were also found to have hypertension. Results showed that patients with hyperuricemia belonged to older age, and have higher Systolic blood pressure, raised BMI, and HbA1c. The mean differences were considered statistically significant with a p-value < 0.05 by using an independent sample t-test.

Conclusion: The current study demonstrated a higher prevalence of hyperuricemia in T2DM patients with BMI > 23 kg/m². Patients with hyperuricemia had a higher mean HbA1c, higher mean BMI, and raised systolic component of blood pressure.

keywords: BMI, Hyperuricemia, Hypertension, Type 2 diabetes mellitus, HbA1c

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INTRODUCTION

Diabetes mellitus (DM) is one of the major diseases globally with a rise in the estimated incidence, especially in developing countries¹. According to the estimates, there were 537 million people with diabetes worldwide in 2021, and by the end of 2045; these figures are expected to increase to 783 million. According to the International Diabetic Federation (IDF), 33 million of the population of Pakistan has diabetes, and it is estimated to increase to 62 million by the year 2045.²

In Purine metabolism, Uric acid (UA) is the final oxidation product. As insulin levels are raised initially in DM due to insulin resistance, these higher levels of insulin interfere with uric acid clearance by the kidneys, this decrease in clearance leads to higher levels of uric acid, and

patients with type 2 DM are thus more prone to uric acid injury³. Also, high serum UA has a major contribution to insulin resistance⁴. In the general population, hyperuricemia is being demonstrated as a risk for cardiovascular diseases by several studies. Some studies have also evaluated that hyperuricemia predicts the development of hypertension, metabolic syndrome, obesity, and T2DM⁵. Studies have also revealed that elevated levels of serum uric acid are associated with T2DM progression and play an important role in the development of coronary artery disease⁶. Some studies have also demonstrated the progression and worsening of renal disease with hyperuricemia in patients with T2DM. Moreover, it has also been found that complications of diabetes are more pronounced in those with elevated levels of serum uric acid compared to those with normal uric acid levels⁷. The high prevalence of hyperuricemia could be attributed to recent changes in lifestyle, diet, and increased life expectancy due to improved medical care⁸.

A survey was done in 2007–2008 (National Health and Nutrition Examination Survey), showing a 21 % prevalence of hyperuricemia in American adults, approaching 26% in African Americans.⁹ Woldeamlak et al's study

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showed hyperuricemia's prevalence of 31.5% in patients with T2DM. This study also revealed that elevated systolic blood pressure, increased waist circumference, and BMI \geq 25 Kg/m² were significantly associated with hyperuricemia.¹⁰ Other studies conducted by Wang J et al. from China, Woyesa et al. from Ethiopia, and Shah P et al. from Egypt showed the prevalence of hyperuricemia to be 32.2%, 33.8%, and 32.0%, respectively.¹¹⁻¹³ A study by Shah et al. from Pakistan on hyperuricemia in type 2 DM patients revealed a prevalence of 25%, with a higher frequency of hyperuricemia and mean BMI in females compared to males.¹⁴

Serum uric acid is one of the most ignored investigations in patients with diabetes, though its prevalence is rising. The rationale for the index study was to determine the prevalence of hyperuricemia in diabetic patients who had a BMI > 23 kg/m² in our local population and to study the various clinical and biochemical parameters associated with hyperuricemia, keeping in view that very limited studies are available and its strong association with cardiovascular diseases.

MATERIALS AND METHODS

This study was conducted in the OPD of the Department of Diabetes, Endocrinology and Metabolic Diseases, MTI Hayatabad Medical Complex (HMC), Peshawar. The duration of this study was from February 2020 to September 2021. It was a descriptive cross-sectional study approved by the institutional research & ethical committee of MTI HMC. Written informed consent was obtained from all patients. All the relevant information, including demographics (Name, age, gender, BMI, duration of Diabetes, HBA1C & Serum Uric Acid), was obtained on pre-designed Pro-forma. Patients aged 30 - 75 years, either gender, diagnosed with T2DM, and BMI > 23 kg / m² were included in the study by non-probability consecutive sampling technique. The following patients were excluded; critically ill patients (sepsis/septicaemia, diabetic ketoacidosis, hyperosmolar hyperglycemic state, acute kidney injury, MI or stroke), those having chronic kidney disease, chronic liver disease, and those using uric acid lowering drugs. Blood specimen for uric acid, complete blood count, renal function tests, liver function tests, and random blood sugar and HBA1c was collected and sent to the hospital laboratory. Data were stored and analysed by the statistical program SPSS. All the quantitative variables were analysed for mean \pm standard deviation. Frequencies and percentages were calculated for qualitative variables. Hyperuricemia was defined as a serum uric acid level of > 7 mg/dl in males and > 5.7 mg/dl in females.¹⁵ Association of Hyperuricemia was tested with gender, hypertension, BMI, and duration of diabetes using the Chi square test and independent samples t-test was used to compare mean levels between two studied groups. P-values less than 0.05 were considered statistically significant.

RESULTS

The total number of patients was 300, out of which 60 % were males. Fifty-Six (56%) participants were hypertensive. The overall prevalence of hyperuricemia in the current study was 47%. Table -1 reports the baseline characteristics of the studied population.

Table-2 shows the mean and standard deviation of quantitative variables. The studied population has a mean age of 59 (SD = \pm 7) years, mean systolic blood pressure was 151 (SD = \pm 17) mmHg, mean duration of T2DM was 13 (SD = \pm 4) years, mean HbA1c was 10.9 (SD = \pm 2.5) %, mean BMI was 28.8 (SD = \pm 3.1) kg/m² and mean serum uric acid was 5.7 (SD = \pm 1.3) mg/dl.

Table-3 describes the association of hyperuricemia with studied factors. Results showed that 36.7 % males and 62.5% females were having Hyperuricemia. Of those with hyperuricemia, 73 % were also found to have hypertension. Chi Square test give a significant association of outcomes with gender and hypertension with p value <0.05.

Table-4 demonstrates a mean comparison of quantitative characteristics between the two groups having normo-uricemia and hyper-uricemia. Results showed that patients with hyperuricemia belonged to older age, and have higher Systolic blood pressure, raised BMI, and HbA1c. The mean differences were considered statistically significant with a p-value < 0.05 by using an independent sample t-test, however, the duration of diabetes was found similar between normo-uricemia and hyperuricemia samples with p value=0.96, considered statistically insignificant.

Table 1: Baseline Qualitative Characteristics of Studied Samples (n= 300)

		%
Patient's gender	Male	60.0
	Female	40.0
Hypertension	Hypertensive	56.0
	Normotensive	44.0
Hyperuricemia	Normouricemia	53.0
	Hyperuricemia	47.0

Table 2: Baseline Quantitative Characteristics of Studied Samples (n= 300)

Characteristics	Mean	Standard Deviation
Patient's age (years)	59	7
Systolic BP (mmHg)	151	17
Duration of T2DM (years)	13	4
Patient's BMI (kg/m ²)	28.8	3.1
HbA1c (%)	10.9	2.5
Serum Uric acid (mg/dl)	5.7	1.3

Table 3: Association of Hyperuricemia with Studied Factors

Factors		Outcomes				p-value
		Normouricemia (n=159)		Hyperuricemia (n=141)		
		n	%	n	%	
Patient's gender	Male	114	63.3	66	36.7	0.01*
	Female	45	37.5	75	62.5	
Hypertension	Hypertensive	45	26.8	123	73.2	<0.01*
	Normotensive	114	86.4	18	13.6	
Duration of Type 2 DM	≤ 5 years	6	66.7	3	33.3	0.07
	5 to 10 years	66	68.7	30	31.2	
	≥ 10 years	87	44.6	108	55.3	
BMI Categories	23 to 27.4	129	97.7	3	2.3	<0.001
	(Overweight)	30	17.8	138	82.1	
HbA1c (%) Categories	≤ 7	3	100	0	0	0.017
	7 to 9.9	81	69.2	36	30.8	
	≥ 10	75	41.7	105	58.3	

*p<0.05 was considered significant using Chi Square test

Table 4: Mean Comparison of Studied Parameters with Hyperuricemia

Parameters	Normouricemia (n=159)		Hyperuricemia (n=141)		p-value
	Mean	SD	Mean	SD	
Patient's age (years)	57.4	5.3	60.5	7.5	0.017*
Systolic BP (mmHg)	131.2	13.3	151.5	13.6	<0.01*
Duration of T2DM (years)	12.6	4.6	12.6	3.3	0.96
Patient's BMI (kg/m ²)	26.6	1.9	31.4	1.7	<0.01*
HbA1c (%)	9.9	1.8	12.0	2.7	<0.01*
Serum Uric acid (mg/dl)	4.6	0.9	6.8	0.6	<0.01*

*p<0.05 was considered significant using Chi Square test

DISCUSSION

In the current study, we identified that 47 % of patients with T2DM and BMI >23kg/m² were found to have hyperuricemia, of whom 62.5% were females. Among those having hyperuricemia, 73.2% of them were hypertensive as well with a mean systolic blood pressure of 151.5 mmHg. This prevalence of hyperuricemia in the current study is higher as compared to two studies conducted one in China and the other in South West Ethiopia which showed a prevalence of 32.2 % and 33.8 % respectively. ^{11,12} Another study conducted by Fennoun H et al showed a prevalence of 26.5% which was much lower compared to the observed frequency in our study, However, the study showed a higher prevalence of hyperuricemia amongst female patients which is matching with findings in the current study.¹⁶ kumar et al study showed a higher prevalence of hyperuricemia of 66.67 % in patients with T2DM.¹⁷ Another study conducted by Mundhe SA et al showed the prevalence of hyperuricemia to be 25.3% which was much lower compared to our study. ¹⁸

These differences in the prevalence among different studies might be explained by differences in the participant's profiles such as dietary factors, genetic factors, geographical location, sample size, study design and methodology, and the use of different cut-off values for hyperuricemia. Moreover, our study included only those patients with T2DM who had BMI >23 kg/m².

Our study also demonstrated that patients with hyperuricemia had a higher mean systolic BP (151.5 vs 131.2 mmHg), higher mean HbA1c (12 vs 9.9 %), and higher mean BMI (31.4 vs 26.6 kg/m²) compared to the group of patients having normal uric acid levels. These differences in the mean between the two groups were statistically and clinically significant (p-value < 0.05). Similar findings were observed by Yoo et al. who showed that serum uric acid concentration was found to be independently correlated with hypertension.¹⁹ A study conducted by Arsera et al. revealed that hyperuricemia was associated with obesity.²⁰ Similarly, another study also demonstrated an association of hyperuricemia with a higher BMI.²¹ These findings were

comparable to our study. This may be due to the increased insulin resistance in patients with obesity.

The limitation of this study is that it was a cross-sectional study, where correlations between different factors are difficult to obtain. Only a prospective study could definitively confirm the associations and correlations between different patient characteristics and the serum uric acid levels. Further large-scale studies are required to study other parameters like hypertriglyceridemia, low HDL cholesterol, and alcohol consumption in association with hyperuricemia in order to have a better insight into understanding the underlying pathophysiology. This will help us in prevention and in time management as studies have already identified increased levels of uric acid as a risk factor for renal and cardiovascular diseases.

CONCLUSION

The current study demonstrated a higher prevalence of hyperuricemia in T2DM patients with BMI > 23 kg/m². Patients with hyperuricemia had a higher mean HbA1c, higher mean BMI, and raised systolic component of blood pressure.

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HYPOMAGNESEMIA CAUSING VENTRICULAR TACHYCARDIA IN PATIENTS PRESENTING TO A CORONARY CARE UNIT

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ABSTRACT

Objective: To determine the frequency of hypomagnesemia in patients with ventricular tachycardia.

Materials and Methods: It is a descriptive Cross-Sectional study conducted in the Department of Cardiology, MTI-HMC, Peshawar from 20 Sept 2020 to 20 Mar 2021 after approval from the Institutional Ethical Committee. Patients were managed according to the guidelines and hospital protocol. After stabilization, the data was collected. Age, sex, address, patient's history of diabetes, and hypertension were noted. Patients' serum was sent for serum electrolytes level and also serum magnesium level. Patients were labeled as hypomagnesemia and Hypokalemia as per operational definitions.

Results: The Mean and SDs for age were 57.52+9.155. The Mean and SDs for the serum level of potassium were 4.93+0.806. The Mean and SDs for the serum level of magnesium were 1.22+0.423. Thirty-four (18.4%) patients were recorded in the 35-50 years age group while 151 (81.6%) patients were recorded in the 51-72 years age group. 144 (77.8%) male patients and 41 (22.2%) female patients were recorded. Diabetes mellitus was present in 42 (22.7%). Hypertension was present in 37 (20.0%) patients. 9 (26.5%) patients had past five days' history of diuretics usage. 18 (9.7%) patients were recorded with Hypokalemia. Ninety-eight (53.0%) patients were found to have hyperkalemia. A total of 185 patients admitted to the CCU of our hospital having ventricular tachycardia were included in this study, out of which 70 (37.8%) patients having ventricular tachycardia were recorded with hypomagnesemia. 19 (38.8%) patients with diuretics induced Ventricular Tachycardia had hypomagnesemia and while remaining 51 (37.5%) patients with ischemic Ventricular Tachycardia and VT-RVOT respectively were recorded with hypomagnesemia (P Value = 0.875)

Conclusion: The data suggest that magnesium deficiency does occur in ventricular tachycardia with an increased incidence of cardiac arrhythmias.

Keywords: Cardiovascular Disease, Ventricular Tachycardia, Hypomagnesemia

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INTRODUCTION

Cardiovascular diseases are the most common cause of mortality in almost all countries around the world. In developed nations, one-third of all deaths are caused by cardiovascular disease¹. In a country like Norway, 79.9% of all admitted cases were cardiovascular-related.² According to epidemiology of the non-communicable disease in Pakistan 19% of all death are from cardiovascular cause³.

Electrolyte imbalance increases the risk of mortality in cardiovascular disease. Although magnesium balance is strictly controlled by the kidneys, hypomagnesemia is fairly common, especially in people with comorbid conditions⁴. Increased renal magnesium secretions, sometimes

increased by drugs, are a common finding in conditions such as diabetes mellitus⁴. Hypomagnesemia may lead to secondary hypokalemia and hypocalcemia, and severe neuromuscular and cardiovascular clinical manifestations.⁵ Also, marked cardiac and neurological signs and symptoms can be developed as a result of severe hypomagnesemia⁶. Also, the most commonly prescribed medication to the general population is proton pump inhibitors which have been shown to cause severe hypomagnesemia (70%)⁷. Furthermore, the patient with torsade de pointe promptly responded to magnesium replacement even if the pre-existing magnesium level is normal^{4,6}. The prevalence of extreme hypomagnesemia in an admitted patient is 0.3%⁸. It further becomes common in patients with ventricular arrhythmia. In one study, hypomagnesemia has been found in 38% of patients with ventricular arrhythmias.⁹ The patients with complex ventricular arrhythmias had lower serum magnesium levels than those with undisturbed sinus rhythm or unifocal ventricular ectopic beats, both on admission and on day 8 (0.68+0.13 vs. 0.77+0.14mmol/L, P=0.01, and 0.69+0.12 vs 0.79+0.14mmol/L, P=0.003, respectively).

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The rationale of my study is to find out the frequency of hypomagnesemia in patients with ventricular arrhythmia. Very few studies have been conducted in our setup to look for hypomagnesemia in this particular group of patients. The results can be added to the existing body of knowledge and owing to local evidence practitioners may improve their practices.

MATERIAL AND METHODS

After approval from the hospital ethical committee, those patients with ventricular tachycardia, both genders aged 35-72 years were included in this study. Ventricular Tachycardia was considered in all those patients in whom there was new onset broad complex regular tachycardia (> 120 bpm) with positive or negative concordance and AV dissociation.

Patients with a previously known case of chronic kidney disease or chronic liver failure and who used antiarrhythmic drugs like amiodarone were excluded from the study. The sample size was calculated by taking the frequency of hypomagnesemia in ventricular tachycardia patients of 38% with a margin of error of 7% and a confidence level of 95%, the sample size was n= 185 patients of ventricular tachycardia

Patients admitted in the CCU section of the cardiology department of the Hayatabad medical complex were included. Written Informed consent was from each participant and all the benefits were explained. Before starting to fill out the proforma, the patient was managed according to the guidelines and hospital protocol. After stabilization, the data was collected. Age, sex, address, patient's history of diabetes, and hypertension were noted. Patient serum was sent for serum electrolytes level and also serum magnesium level. The patient was labeled hypomagnesemia and hypokalemia as per operational definitions. All the data was collected by the doctor himself and was noted in a designated proforma.

Data were analyzed by using the SPSS version 23. Descriptive statistics were used to determine the Mean with SD for quantitative variables like age, serum level of potassium, and serum level of magnesium. Frequencies and percentages were calculated and presented for qualitative variables like gender, history of diabetics, history of hypertension, any type of diuretic usage in the previous 5 days, presence of hypokalemia, hyperkalemia, and presence of hypomagnesemia. Effect modifiers like age, gender, presence of diabetes, presence of hypertension, any

type of diuretic usage in the last 5 days, and potassium level were stratified against the presence of hypomagnesemia. Post-stratification Chi-square test was applied, and the significance level was set at < 0.05. All the data were presented using tables and charts.

RESULTS

This study was carried out on 185 patients at the Department of Cardiology, MTI-HMC, Peshawar.

Table 1 shows the mean ages and serum levels of potassium and magnesium. Thirty-four (18.4%) patients were recorded in the 35-50 years age group while 151 (81.6%) patients were recorded in the 51-72 years age group. 144 (77.8%) male patients and 41 (22.2%) female patients were recorded.

Diabetes Mellitus was present in 42 (22.7%) and hypertension was present in 37 (20.0%) patients. Diuretic usage was present in 49 (26.5%) patients. Hypokalemia was present in 18 (9.7%) patients. Hyperkalemia was present in 98 (53.0%). As per frequencies and percentages for hypomagnesemia in patients presented with ventricular tachycardia, 70 (37.8%) patients with ventricular tachycardia were recorded with hypomagnesemia.

Thirteen (38.2%) patients with Ventricular Tachycardia in the 35-50 years age group were recorded with hypomagnesemia and 57 (37.7%) patients with Ventricular Tachycardia in the 51-72 years age group were recorded with hypomagnesemia. P Value = 0.958. 57 (39.6%) male patients with Ventricular Tachycardia were recorded with hypomagnesemia and 13 (31.7%) female patients with Ventricular Tachycardia were recorded with hypomagnesemia.

P Value = 0.359. 16 (38.1%) diabetic patients having Ventricular Tachycardia were recorded with hypomagnesemia and 54 (37.8%) nondiabetic patients having Ventricular Tachycardia were recorded with hypomagnesemia. P Value = 0.969. 12 (32.4%) hypertensive patients having Ventricular Tachycardia were recorded with hypomagnesemia and 58 (39.2%) normotensive patients having Ventricular Tachycardia were recorded with hypomagnesemia. P Value = 0.448. (Table No. 2). 19 (38.8%) patients with the use of diuretics having Ventricular Tachycardia were recorded with hypomagnesemia and 51 (37.5%) with no use of diuretics patients having Ventricular Tachycardia were recorded with hypomagnesemia. P Value = 0.875. (Table No. 3).

Table 1: Descriptive Statistics of Study

Numerical Variables	Minimum	Maximum	Mean	Std. Deviation
Age	35	70	57.52	9.155
Serum Level of Potassium	2.1	5.3	4.932	.8066
Serum Level of Magnesium	.7	1.6	1.221	.4231

Table 2: Stratification of Hypomagnesemia with History of Hypertension

		History of HTN		Total	P Value
		Yes	No		
Hypomagnesemia	Yes	32.4%	58	70	0.448
		25	39.2%	37.8%	
	No	67.6%	90	115	
		37	60.8%	62.2%	
Total		100.0%	148	185	
		100.0%	100.0%	100.0%	

Table 3: Stratification of Hypomagnesemia with Past Five Days Diuretics Usage

		Past Five Days Diuretics Usage		Total	P Value
		Yes	No		
Hypomagnesemia	Yes	19	51	70	0.875
		38.8%	37.5%	37.8%	
	No	30	85	115	
		61.2%	62.5%	62.2%	
Total		49	136	185	
		100.0%	100.0%	100.0%	

DISCUSSION

In the present study, a total of 185 patients with Ventricular Tachycardia were included from the CCU. In this study, 70 (37.8%) patients having Ventricular Tachycardia were recorded with hypomagnesemia. Marked cardiac and neurological signs and symptoms can be developed as a result of severe hypomagnesemia⁶. Also, the most commonly prescribed medication to the general population is proton pump inhibitors which have been shown to cause severe hypomagnesemia (70%)⁷. Furthermore, the patient with torsade de pointe promptly responds to magnesium replacement even if the pre-existing magnesium level is normal^{4,6}.

The prevalence of extreme hypomagnesemia in admitted patients is 0.3%⁷. In one study, hypomagnesemia has been found in 38% of patients with ventricular arrhythmias and in this study, diuretics were the main cause of Ventricular Tachycardia which is in agreement with the findings of this study where 19 (38.8%) patients with diuretics induced Ventricular Tachycardia had hypomagnesemia.⁹ Patients with complex ventricular arrhythmias had lower serum magnesium levels than those with undisturbed sinus rhythm or unifocal ventricular ectopic beats, both on admission and on day 8 (0.68+0.13 vs. 0.77+0.14mmol/L, P=0.01, and 0.69+0.12 vs 0.79+0.14mmol/L, P=0.003, respectively) which as compared to the findings of our study mean for serum level of potassium was 4.93+0.806.

Magnesium is the second in abundance intracellu-

lar ion. The relationship between magnesium and the cardiovascular system, arterial hypertension, central nervous system, skeletal muscles, and pregnancy, is an already established knowledge. The main part of total body magnesium is concentrated in the bones, only 1% is in the serum while 31% is in the intracellular space diluted in the cytoplasm or conjunct to enzymes or ATP.

The usual daily magnesium consumption is 200-300 mg but only 1/3 of this quantity is absorbed through the small intestine. The magnesium renal excretion rate is approximately 100 mg per day. Normal values of serum magnesium are considered those between 0.75 and 1.5 mmol/L. Values below the threshold of 0.75 mmol/L are defined as hypomagnesemia which as compared to the findings of our study mean for serum level of potassium was 4.93+0.806.

A wide variety of methods have been used to measure magnesium in serum and intracellular space, but none was reliable. During the last decades by means of new techniques, the precise determination of magnesium concentration became possible. Magnesium depletion occurs when intracellular magnesium stores are depleted. Since there is no possibility to determine the levels of intracellular magnesium the physician is obliged to estimate the magnesium stores using the values of serum magnesium.

The main problem in the diagnosis of intracellular magnesium depletion is that it can coexist even with

normal serum values. This situation was confirmed with muscle biopsy in patients with normal serum magnesium values and evidence of magnesium stores depletion. However, the majority of patients with decreased total magnesium have low serum Mg as well. Thus, in clinical practice, patients with hypomagnesemia are considered as having intracellular magnesium depletion. The measurement of serum Mg is easy and considered the main method of estimation of the Mg stores. Another method for intracellular Mg estimation is the measurement of Mg concentration in red blood cells or in monocytes or the 24-hour Mg renal excretion. Approximately 1/3 of serum Mg is in conjunction with albumin and during hypoalbuminemia, false decreased values of Mg are encountered. Furthermore, although the serum Mg level is normal there could be intracellular depletion of Mg that can cause symptoms. Unfortunately, there is no quick and direct method of measuring the total Mg levels at the moment.

Hypomagnesemia as a side effect of diuretics is the most common cause of this disturbance. Loop diuretics and thiazides are involved in increased Mg excretion. Another common cause of hypomagnesemia is decreased Mg consumption in the elderly and patients with disturbances in intestinal absorption. In developing countries, Mg consumption is inadequate. Vegetables and fish are considered rich in Mg, while consumption of fatty food, salt, vitamin D, proteins and calcium increases the need for Mg. Patients with acute or chronic use of alcohol have Mg depletion due to osmotic diuresis by the alcohol. The same mechanism must be implicated in the development of Mg depletion in diabetic patients.

CONCLUSION

In conclusion, the data suggest that magnesium deficiency does occur in ventricular tachycardia with an increased incidence of cardiac arrhythmias. Therefore, it is recommended to retain normal Mg²⁺ levels in order to prevent the onset of this disease.

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AUTHOR'S CONTRIBUTION

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Khan ZA: Main Idea, Research proposal

Khan RD: Data Collection and writing

Hussain C: Data Collection, Review and proofreading

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EFFICACY AND SAFETY OF FOLEYS CATHETER FOR UTERINE TAMPONADE IN THE MANAGEMENT OF POSTPARTUM HEMORRHAGE AT A TERTIARY CARE CENTRE IN PESHAWAR

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ABSTRACT

Objective: To determine the efficacy and safety of Foley's catheter for uterine tamponade in the management of postpartum hemorrhage due to uterine atony.

Material and methods: This observational study was conducted in the tertiary care hospital i.e. Department of Obstetrics and Gynecology Khyber Teaching Hospital Peshawar. A hundred patients with non-traumatic post-partum hemorrhage were enrolled from January 2021 to 31st July 2022. After the failure of medical therapy, Foleys catheter was placed in the intrauterine cavity for twenty-four hours to achieve uterine tamponade to stop bleeding in patients with postpartum hemorrhage. All the variables including vital signs and the amount of blood collected in the bag attached to the Foley's catheter were noted and entered into a proforma. The main outcome measures were success rate in controlling hemorrhage, the time required to stop bleeding, and subsequent morbidity and technical difficulties. The average time taken to control bleeding was four minutes. Data were analyzed by SPSS 23.

Results: The age of the patients ranged from 20-36 years while gestational age and parity were noted to be 37-39 weeks and 1-6 respectively. Foleys catheter for uterine tamponade was found successful in 98% of our patients who had uterine atony. Bleeding was stopped in 98 patients with this procedure. The Foleys catheter used was of 16 Fr size which is commonly available in our labor room setup. The total amount of fluid filled in the Foleys catheter was 240ml. The mean duration in which the catheter was in situ was 12.5 hours. Three patients had infective morbidity.

Conclusion: The use of Foley's catheter for uterine tamponade in the management of postpartum hemorrhage is a highly successful procedure.

Key Words: Postpartum hemorrhage. Foleys catheter, uterine balloon tamponade.

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INTRODUCTION

According to the world health organization, in 2017 approximately 29500 maternal deaths occurred during the antenatal and postnatal period. ¹ Mostly low and middle-income countries were affected where about 810 deaths occurred on a daily basis from preventable perinatal complications. Post-partum hemorrhage (PPH) remains the leading cause of direct maternal deaths.² Risk factors include prolonged labor, injudicious use of oxytocin, multiple pregnancies, fetal macrosomia, grand multiparity, chorioamnionitis, retained products of conception, etc that cause uterine atony and result in PPH. ^{3,4} Most cases are managed medically while few cases need sur-

gical interventions. When medical therapy fails then uterine balloon tamponade, a non-surgical option has been reported as a successful and cost-effective intervention. It works by exerting pressure on the bleeding venous sinuses in the placental bed and physically blocks these sinuses/orifices. It secures clot formation and results in the cessation of bleeding.

While in the past decades, uterine packing has been used for uterine tamponade, currently WHO recommends balloon tamponade using a condom catheter. ⁵ Bakri Balloon Tamponade (BBT) has been found an effective tool in Turkey in recent studies. ⁶ The newer techniques are less invasive but underutilized. ⁷ Although it is not an established protocol as yet, the use of Foleys catheter for uterine atony has been in practice in our tertiary care hospitals and has been found successful. The Foleys catheter is commonly available and easy to insert with no probability of fluid leakage which is commonly seen in condom catheters due to damage. Once uterine tamponade is achieved using an intrauterine Foleys catheter, it has the additional benefit that the amount of blood loss is visible in the drainage bag attached to the Foleys catheter

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so if further intervention is required that will be detected earlier. This study was designed to highlight the effectiveness of Foleys catheter in the management of post-partum hemorrhage. It is hoped that the results of this study will draw the attention of our obstetrician to include the use of Foleys catheter in the standards of care for post-partum hemorrhage.

MATERIAL AND METHODS

This observational study was conducted from 1st Jan 2021 to 31st July 2022 in the Obstetrics and Gynecology Department at Khyber teaching hospital Peshawar. All admitted patients with normal vaginal delivery who presented with post-partum hemorrhage due to uterine atony were selected. A hundred patients were enrolled in this study. All those patients who had undergone cesarean section and those who presented with post-partum hemorrhage due to other causes than uterine atony were excluded. After obtaining informed consent, detailed history was asked and a complete clinical examination was performed. The vital signs like pulse and blood pressure were noted and monitored closely. Medical therapy was started promptly and when it failed then balloon tamponade was started.

Each patient was briefed about the procedure of Foleys catheter insertion and informed written consent was obtained. The trained doctor on duty assisted by her colleagues and nursing staff introduced the catheter to the uterine cavity. Four such catheters tied together are introduced into the uterine cavity and each bulb is inflated with 60ml of normal saline so a total of 240ml of fluid is used. The amount of blood collected in the bag was noted. During the procedure, complete aseptic techniques were observed. Before, during, and after the procedure, the patient's clinical condition was observed closely. After 24 hours 500 ml of dextrose water with 40 unit's Oxytocin was started and each bulb of the Foleys catheter was deflated one by one, at the end of the procedure 4 tabs of misoprostol 200 micrograms were kept per rectal. All the data was recorded in proforma designed for this study. The results were analyzed according to SPSS 23.

RESULT

The demographic profile is shown in Table 1. Seventy patients (70%) had hospital deliveries while 25 patients (25%) had a history of normal vaginal delivery at home. Only 2 patients had a normal vaginal delivery at private centers. The mean systolic blood pressure (SBP) was found to be 105 ± 5 mm Hg and the mean diastolic blood pressure (DBP) was 60 ± 4 mm Hg. Most of the patients were found with tachycardia which is a mean pulse of 110 ± 6 beats/ minute. Clinically all the patients were found with anemia (pale conjunctiva).

The Success rate to stop bleeding in patients with

Post Partum Hemorrhage with uterine atony using Intra uterine Foleys catheter is shown in Figure 3. The failure of Foley's catheter procedure to stop post-partum hemorrhage was found in two patients both of which ended up in Laparotomy followed by B-Lynch suture application and internal iliac artery ligation in one patient and the other ended up in subtotal abdominal hysterectomy. The average time noted to stop the bleeding was 4 minutes and the tamponade was placed in the uterus for 24 hours to stop bleeding. Results regarding technical issues and post-procedure infective morbidity are shown in Figure 4.

Table 1: Demographic profile of patients enrolled in the study

Parameters	Range
Age	20-36 years
Gestational age in weeks	37-39 weeks
Parity	1-6
Booked patients	40%
Unbooked Patients	60



Fig 1: Instruments required for uterine tamponade



Fig 2: Four Foleys catheters tied together ready for insertion



Fig 3: After inflation of each Foleys catheter with 60ml of fluid tied together

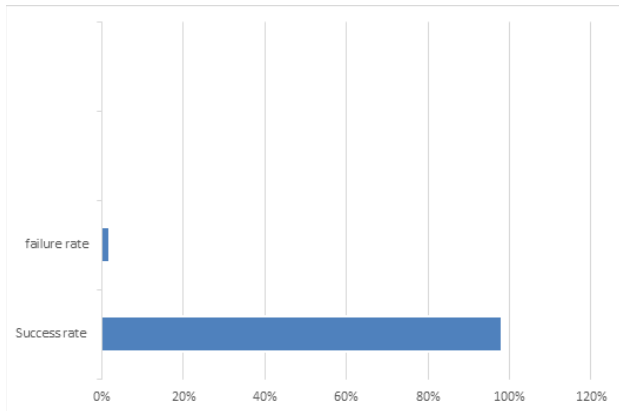


Fig 4: Success rate to stop bleeding in patients with Post Partum Hemorrhage with uterine atony using intra uterine Foleys catheter

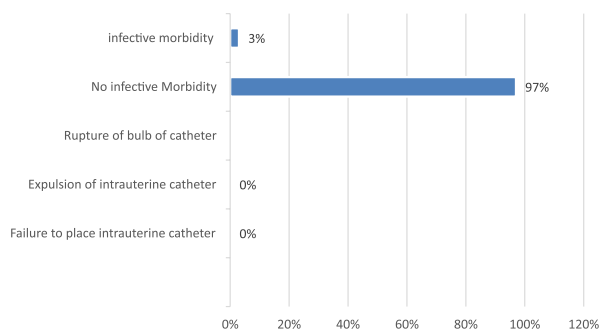


Fig 5: Outcome of intrauterine Foleys catheter in terms of Subsequent morbidity and technical difficulties

DISCUSSION

World over the leading cause of maternal death is post-partum hemorrhage. The developing countries suffer 99% of the burden while in Pakistan the prevalence of post-partum hemorrhage is 34%⁸. Different guidelines and protocols have been developed by the WHO and the American College of Obstetricians and Gynecologists (ACOG) to manage post-partum hemorrhage. The method of uterine tamponade has been recently added to the armamentarium for the management of post-partum hemorrhage. Various methods like Bakri, Sengstaken-Black more, Rush Balloon, and condom catheters are used worldwide⁹. In our setup, we are using the Foleys catheter for this purpose. Majumdar et. Al. found the Rush balloon to be successful in 51.1% of while it failed in 31.85% of cases where a hysterectomy was required to stop PPH¹⁰. Pingravey V et al found the Bakri Intrauterine catheter to be successful in 79% of the cases¹¹. Recently Gluten Ozgen reported the success rate for Bakri Balloon Tamponade (BBT) to be 91.3%₆. Thus, all these studies showed that uterine Tamponade can be lifesaving. In our setup, we need a less expensive and readily available method. Foley’s catheter met our needs. It is simple to use, less expensive, less invasive, and widely available. Also, our staff and even trained birth attendants are experienced in its general use. It does not require anesthesia but pethidine can be used as analgesia. We found it successful in 98 patients (98%) and 2 of our patients (2%) required surgical intervention to stop bleeding. RajniLohano et al found balloon tamponade with a condom catheter to be effective in 90.4% of cases¹². Another study reported a 94% success rate.¹³ The higher rate of success in our study can be due to the use of different catheters i-e Foleys catheter which has several advantages as mentioned before.

CONCLUSION

The use of a Foley catheter for uterine tamponade in the management of postpartum hemorrhage is a highly successful procedure. The successful use of Foleys catheter for uterine tamponade is worth noticing so that more research should be planned to focus on its use in new protocols. Thus, it should be included in the new guidelines for the management of PPH.

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Bukhari N: Main Idea, Research proposal

Mazhar T: Data Collection and writing

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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THE DIAGNOSIS OF TUBERCULOUS MENINGITIS BY DETECTION OF MYCOBACTERIUM TUBERCULOSIS DNA IN CEREBROSPINAL FLUID USING PCR TECHNIQUE

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ABSTRACT

Objective: To determine the frequency of positive mycobacterial PCR technique in cerebrospinal fluid (CSF) in patients with suspected tuberculous meningitis.

Materials and methods: A cross-sectional study was conducted in the Department of Medicine Khyber Teaching Peshawar KPK from June 2020 to June 2021 over patients above the age of 15 years having clinical suspicion of tuberculous meningitis with cerebrospinal fluid showing raised protein, increased lymphocytes, and low CSF sugar levels. After performing a lumbar puncture 2.5 ccs of CSF was collected in a special bottle and sent to the laboratory for detection of Mycobacterial Tuberculosis (MTB) DNA. Data were analyzed by SPSS version 26. Results were displayed in tables and graphs.

Results: Out of the total 100 patients, 49 (49%) were male and 51 (51%) were female. The mean age of the patients was 47.16 ± 16.5 years (16- 82 years). The mean CSF cell count was 626/ cm³, the CSF protein level was 188.5 ± 87 gram/dl and the mean CSF glucose level was 46 ± 10 mg/dl ranging from 30 to 66 mg/dl. Mycobacterial PCR was positive for mycobacterium DNA in 70% of patients and negative in 30% of patients. MTB PCR in cerebrospinal fluid showed a strong correlation with CSF protein levels (p-value <0.000)

Conclusion: Due to the high prevalence of positive PCR for the detection of MTB, every patient with a lymphocytic predominant picture of CSF examination and high protein should undergo MTB PCR testing for Mycobacterium tuberculosis.

Keywords: Mycobacterium tuberculosis, meningitis, polymerase chain reaction, cerebrospinal fluid

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INTRODUCTION

Tuberculosis is a common disease in developing countries. It is caused by mycobacterium which is an acid-fast bacillus. Tuberculosis primarily affects lung tissues but virtually any tissue or system of the body can be affected.^{1,2}

Tuberculosis meningitis is the most severe form with higher mortality and morbidity compared to other forms of tuberculosis. The diagnosis is always challenging because of its various presentations. In addition, there are diseases that closely mimic tuberculous meningitis, for example, partially treated pyogenic meningitis, fungal encephalitis, and lymphangitis carcinomatous.^{3,4} It commonly affects children and HIV-infected and other

immunocompromised individuals but can also be seen in adults.^{5,6,7} Tuberculous meningitis makes up about 10 % of all tuberculosis cases.⁸ Despite its appropriate treatment, TBM is still the major cause of death and neurological complications.⁹

Early diagnosis is challenging because of its non-specific symptoms and the low number of tuberculous bacilli in cerebrospinal fluids. The diagnosis remains difficult because it may mimic other causes of meningoencephalitis. Up till now, there were no diagnostic tools that could rapidly detect mycobacterium in cerebrospinal fluids with high sensitivity and specificity.⁴ Laboratory methods to improve the diagnosis of TBM are urgently needed.^{10,11.}

Modified Ziehl Neelsen stain, interferon-gamma released assay, and mycobacterium antigen detection assays have shown promise as new TBM diagnostic tests. The use of biomarkers to improve the diagnosis of TBM warrants further investigations.^{12,13} According to recent research the sensitivity and specificity of nucleic acid amplification tests or PCR tests are 82% and 99% respectively.¹⁴

The main purpose of this study was to determine

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the frequency of positive PCR assays in the diagnosis of TBM, to allow rapid diagnosis of TBM, and intervene accordingly.

MATERIALS AND METHODS

It was a cross-sectional descriptive study conducted in the medicine department from June 2020 to June 2021. The sample size was taken as 100 keeping a confidence interval of 95% and a margin of error of 5.87%, considering the prevalence of tuberculous meningitis as 10 % by using an online calculator of sample size. <http://www.raosoft.com/samplesize.html>.

The sampling technique was non-probability convenience sampling. Any patient above age 15 years whether male or female having a history of more than seven days of fever, headache, and showing neck stiffness on examination with CSF showing raised protein above 40 mg/dl, cell count more than 5 predominantly lymphocytes, glucose less than 60 mg/dl or less than 2/3 of concomitant blood glucose were included in the study. Patients with fever and headache of less than a week duration (as pyogenic meningitis and viral encephalitis usually present more rapidly), patients with normal CSF analysis, patients with predominant polymorph on CSF, and patients with hemorrhagic CSF were excluded from the study.

The study was approved by the institutional ethical and review board. Informed consent was taken from the patients or their close relatives. After the initial assessment of patients lumbar puncture was done under aseptic techniques following standard protocols.

CSF opening pressure was measured by using a manometer. CSF was collected in two special bottles, each containing about 2.5cc of CSF. One bottle was sent to the hospital laboratory for routine analysis while another sample was sent to detect Mycobacterial DNA. Data were collected through a specially designed proforma.

Data were entered and analyzed by the software statistical package for social sciences SPSS version 26. Frequency and percentage were calculated for nominal variables like gender, positivity, or negativity of TB PCR. Mean and standard deviation was calculated for numerical variables like the age of patients, CSF cell count, glucose, and protein levels. Pearson correlation coefficient was used to show the correlation between CSF PCR and CSF cell count, glucose, and protein levels, data were presented in the form of graphs and tables.

RESULTS

Out of the total 100 patients, 49 were males and 51 were females. The mean age of the patients was 47.16 ± 16.5 years. Different age groups are shown in figure 1.

The mean CSF cell count per cc was 626 with a standard deviation of ± 951 . The mean CSF protein level was 188.5 ± 87 gram/dl, ranging from 80 to 410 mg/dl. The mean CSF glucose level was 46 ± 10 mg/dl ranging from 30 to 66 mg/dl. Mycobacterial PCR was positive for mycobacterium DNA in 70% of patients while the remaining 30% of patients did not show mycobacterium DNA. MTB PCR in cerebrospinal fluid showed a strong correlation with CSF protein levels (p-value $< .000$) and CSF cell count (p-value 0.019) by using the Pearson correlation coefficient. Similarly, by using an independent sample t-test, positive MTB PCR was associated with a much higher level of CSF protein. (t value =4, degree of freedom =98 and p value= 0.000)

DISCUSSION

In our study, tuberculous meningitis was equally distributed among males and females. International studies have shown variable results. According to Enberg GM et al, the sex incidence was 47.9% male and 52.1% female.¹⁵ Fan et al also showed similar results.¹⁶ The results of both these studies are comparable to the results of our study showing almost equal sex distribution of tuberculous meningitis. In a recent study, Garg et al found a high

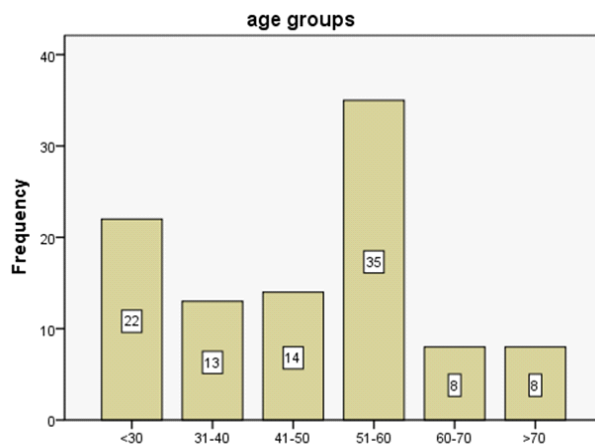


Fig 1: The frequency of tuberculous meningitis in different age groups

Table 1: Descriptive Statistics of numerical variables

	N	Minimum	Maximum	Mean	Std. Deviation
Age of patient	100	16	82	47.2	16.4
Cell count per cc in CSF	100	60	5000	625.9	950.8
Protein in CSF in mg/dl	100	80	410	188.5	86.7
CSF glucose in mg/dl	100	30	66	46.1	9.9

frequency of tuberculous meningitis in males. According to this study, 66% of patients were male and 34% of patients were females.¹⁷ No age is immune from tuberculous meningitis, though it is more common in children. In our study, it was more common in young people below 30 years of age and in middle-aged patients (41-60 years of age). The mean age of patients in our study was 47.16 years. Similar results have been shown by other authors.^{18, 19}

In tuberculous meningitis, the CSF cell count is increased ranging from 100 to 500 per mm³, with predominant lymphocytes.^{20, 21} Normal CSF contains 20-40 mg / dl proteins.²² In tuberculous meningitis, protein concentration is more than 100 mg/dl. In our study, the mean CSF protein was 188.5±87 mg/dl, (ranging from 80-410). This is in accordance with other local and international studies.^{20, 23} Protein is raised in tuberculous meningitis because of increased permeability of meninges and decreased absorption of proteins by arachnoid villi.²⁴

In our study, the mean CSF glucose was 46 mg/dl which was in accordance with the results of international studies. Tuberculous meningitis is characterized by low glucose usually less than 45 mg /dl or serum to CSF glucose <0.5.²⁵ In our study MTB PCR was positive in 70%. According to Sharma K et al MPCR had a sensitivity of 87% of suspected cases. Similarly, according to a systemic review by Muhammad A. et al, the sensitivity and specificity of mycobacterium PCR (MPCR) were 70-80% and more than 95% respectively.^{14, 26}

In a study conducted in Ho chi Minh city, Vietnam with the same sample size as in our study, the sensitivity of MTB PCR was 60% while it was 100 specific.²⁷

According to Patel et al, the sensitivity was significantly better for quantitative PCR as compared to microscopy (62% with a P value of 0.001) and specificity of 95% same as in our study (specificity 95% with P value= 0.01) confirming our results. This study was conducted in South Africa and the patients were predominantly HIV-infected.²⁸

CSF MTB PCR has been in use since the 90s. According to Kaneko et al, in Japan, this method of diagnosing tuberculous meningitis was 99% specific. A similar study was conducted in New Delhi, India by Shankar et al. according to him PCR was the most sensitive technique which detect 75% of highly probable cases similar to 70 (70%) of 100 cases confirming our results.^{26, 29}

In our study, there was a positive correlation between the presence of CSF mycobacterium PCR and components of CSF like protein and cell count. This has been observed by Manke et al.³⁰ The new methods of mycobacterium PCR called droplet digital PCR analysis have even shown increased sensitivity of more than 90 % and specificity of 100%. Thus, it may become the least invasive and rapid method for the diagnosis of tuberculous

meningitis.³⁰

CSF cultures of all patients including negative and positive were not followed for further confirmation. MTB PCR was only done with the traditional Real-time PCR method.

CONCLUSION

Due to the high prevalence of positive PCR for the detection of MTB in more than 2/3rd of patients, every patient with suspicion of Tuberculous meningitis should undergo MTB PCR testing for Mycobacterium tuberculosis along with the traditional routine analysis of CSF.

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Din NU: Data Collection and writing
Zar A: Review and proofreading
Nabi A: Data Collection

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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A STUDY OF AUTHORITARIAN PARENTING STYLE AND AGGRESSION AMONG ADOLESCENTS

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ABSTRACT

Objective: To examine the link between authoritarian parenting style and aggression among adolescents.

Material and Methods: In order to conduct the study, information was gathered from students with an age range between 13 to 21 years of educational institutions including high schools and intermediate colleges situated in Peshawar, Islamabad, and Rawalpindi. The Parenting Authority Questionnaire (PAQ) and the Buss and Perry Aggression Questionnaire (BPAQ) were employed. A sample of 200 individuals consisting of 98 boys and 102 girls was chosen for the present investigation

Results: The results of the study revealed a significant positive correlation ($r=0.23$) between authoritarian parenting style and aggression. This indicates that adolescents who perceived their parents to have an authoritarian parenting style exhibited higher levels of aggression compared to those who did not perceive their parents as authoritarian. However, the study did not find any significant gender differences in relation to either of these variables.

Conclusion: The Findings highlighted that dominating, harsh, and controlling parenting style (authoritarian) stimulated aggressive acts or behavior in youth which promoted more extreme cases in our society.

Keywords: Authoritarian Parenting styles, Adolescents, Aggression

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INTRODUCTION

Every child is a jewel in the eyes of their parents. Each parent endeavors to adopt the necessary skills and practices to raise a well-mannered and mentally strong child. These parental practices, or parenting styles, have an impact on their children at every stage of their lives. ¹ Empirical evidence suggests that aggression is a very severe mental health issue all over the world. ² It is associated with poor psychological health, social problems, and numerous other behavioral problems. ³ The concept of parenting styles introduced by Diane Baumrind as standard patterns/strategies of child rearing used by parents during training of their children. ⁴ According to parenting styles theory, parents used one of the three parenting styles such as authoritarian parenting style (rigid and strict with the kids), authoritative style (supportive and interactive with the kids), and permissive parenting style (no authority on the kids). ⁵ Similarly, the term aggression indicates the intentional act or behavior of hurting someone or objects physically and psychologically. ⁶

Literature has depicted mixed results regarding parenting styles and aggression. One study investigating parenting style and aggression suggested that parenting styles had a strong influence on children's aggression. For example, authoritative parenting styles were significantly positively correlated with children's positive behavior, whereas permissive and authoritarian parenting styles negatively impact the behavior of children. ⁷ Similarly, another research on a sample of high school students (both boys and girls) of classes 9th and 10th grades highlighted that children of parents with authoritarian and permissive styles exhibited more aggressive behavior than children of parents with authoritative parenting styles. ⁸

The aim of the current research was to explore the relationship between aggression and different parenting styles in adolescents. By conducting this study, a deeper understanding of the association between the variables under investigation can be gained. This will provide valuable insights into the impact that parenting styles can have on adolescents' aggressive behavior, which in turn can inform the development of effective intervention strategies. By investigating these phenomena, the research seeks to contribute to the growing body of knowledge in this area and shed further light on this important topic. ⁹ The main objective of this study was to explore the connection between authoritarian parenting style and aggression among adolescents. Furthermore, this study also explored the gender difference on study variables.

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MATERIALS AND METHODS

The study utilized a non-probability convenience sampling technique and approached a total sample of 200 adolescents with an age range between 13 to 21 years. The sample was drawn from schools and colleges located in Peshawar, Rawalpindi, and Islamabad. Data was further divided into two groups based on gender with girls (n=102) and boys (n=98). Educational levels were grade-10 (secondary school) (n=50), grade-12 (higher secondary school) (n=55), and Bachelor (university education) (n=95). Prior to data collection, permission was taken from the higher authorities of schools and colleges. Following the receipt of permission from the student's parents, they were approached and asked to provide their consent. The sample was then administered a booklet consisting of a demographic sheet, standardized questionnaires Parenting Authority Questionnaire (PAQ), and a Buss-Perry Aggression Questionnaire (BPAQ) were administered.^{10, 11} On SPSS-21, data were computed and analyzed. On study variables, Descriptive statistics, Pearson Product Moment Correlation, and t-test were applied.

RESULTS

The total sample for the study consisted of 200 participants with an age range between 13 to 21 years. The mean score for the Authoritarian Parenting style variable was (65.24 ± SD=13.42), while the mean score for the aggression scale was (89.76 ± SD=18.26). Furthermore, the current study found that the data was normally distributed and met the assumption for parametric testing. Table 1 indicates the significant positive correlation between parenting style and aggression (r=0.23, and a p: <0.05). Both scales are positively correlated, which shows that authoritarian parenting promoted aggression in adolescents. Table 2 indicates t values which show non-significant gender differences in Authoritarian Parenting style (t (198) =-0.39, (p: <0.05) and Buss and Perry Aggression Questionnaire [t (198)= 1.48 and p<0.05)].

DISCUSSION

The primary objective of the current study was

Table 1: Correlation Between The Scores of Adolescents on the PAQ and (BPAQ) (N=200)

Scales	BPAQ (r)
PAQ	.23**

**p <0.05

Table 2: Mean, SD, and t-values showing the Gender differences on PAQ and BPAQ scales (N=200)

Scales	Boys (n=98)				Girls (n=102)				
	M	SD	M	SD	95 % CI				
					t (198)	p	LL	UL	Cohens' d
PAQ	66.67	14.61	63.87	12.09	-.39	0.19	-0.93	6.53	0.20
BPAQ	89.23	18.66	90.26	17.94	1.48	0.20	-6.13	4.07	0.05

to examine the relationship between different patterns of parenting styles and tendencies toward aggression among adolescents. A sample of 200 male and female adolescents was selected from the cities of Rawalpindi, Islamabad, and Peshawar using a convenience sampling technique. Reliability analysis of the instruments showed that PAQ (α =.79) and BPAQ (α= .78) were reliable instruments.¹² It was hypothesized that authoritarian parenting style and aggression have a positive relationship. The findings of the study confirmed the hypothesis and showed that the authoritarian parenting style developed aggressive tendencies among children. These findings are consistent with the previous findings which suggested that harsh and highly controlled parenting is positively linked with adolescents' aggressive behavior.⁷ Therefore, Such type of parent-child-rearing practices stimulate negative behaviors in their personality which ultimately leads to the development of psychopathologies.

The study findings also revealed that there were no significant gender differences observed on both the Parenting Authority Questionnaire (PAQ) or the Buss-Perry Aggression Questionnaire (BPAQ). This is consistent with previous literature, which has yielded mixed results regarding gender differences in relation to these variables. For example, a study by Wang et al. found that children who experienced harsh parenting were more likely to exhibit aggressive behaviors. Similarly, a study by Tavakolizadeh and Behzadpoor found that a permissive parenting style was associated with higher levels of aggression in children.¹³⁻¹⁶ Nevertheless, the results of the study also indicated that due to technological advancements, both genders have equal opportunities to develop aggression as a result of experiencing parallel parenting styles. Furthermore, changes in social norms and increased media accessibility have provided boys and girls with numerous possible outlets for expressing their aggressive behaviors. For instance, Coyne et al. suggested that the increased use of technology among children has been linked to a higher incidence of aggressive behavior.¹⁷ Additionally, the study by Strasburger and Donnerstein found that exposure to violent media can also contribute to aggressive behavior in children and adolescents.¹⁸ These factors, coupled with changes in social norms, may be contributing to the prevalence of aggression among both boys and girls.

This study, like any other research, has limitations. One, is its cross-sectional design and for future studies, a longitudinal design should be considered to gain a more thorough understanding of the relationship between parenting styles and aggression among adolescents. An-

other limitation is the use of a specific age group as the sample. To fully comprehend the long-term effects of parental child-rearing practices on aggression, samples from different age groups should be selected at various stages of life. Moreover, other factors related to parenting such as parents' education, ethnicity, socioeconomic status, mother tongue, and religious belief systems should be investigated in future studies to understand their role in the development of aggressive behavior in children.

CONCLUSION

Based on the findings of the current study, it can be concluded that parents' authoritarian parenting style plays a significant role in the development of aggression in adolescents. Parents who are overly controlling and neglectful can contribute to the increase in negative behaviors in their children, which may ultimately lead to the promotion of deviant and criminal behavior in society. Therefore, it is essential to raise awareness about appropriate parenting styles and their long-term impact on children's lives for the development of a healthy future society.

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Arzeen N: Data Collection and writing

Shah M: Review and proofreading

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FREQUENCY OF THE AGENESIS OF PALMARIS LONGUS AND FLEXOR DIGITORUM SUPERFICIALIS TENDONS AMONG INDIVIDUALS

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ABSTRACT

Objective: To find out the frequency of hereditary absence of palmaris longus and flexor digitorum superficialis tendons among individuals visiting physiotherapy clinics of 2 hospitals in Pakistan.

Methods: This cross-sectional study was conducted in Government hospitals in twin cities (Islamabad and Rawalpindi), Pakistan from September 2018 to March 2019. For examination, a standardized clinical Schaeffer's test and three additional tests were used for the assessment of palmaris longus (PL), and a standardized simple, and the modified test was used for flexor digitorum superficialis (FDS). Data were analyzed by using SPSS 23.

Results: Out of 619 individuals, 51.7% were men and 48.3% women were examined. The mean age of males was 33.4 years \pm 14.5 and of females 35.9 years \pm 13.4. Palmaris longus muscle was absent in 49.3% of participants with bilateral absence being more common. Unilateral absence of the PL muscle was found to be more in the left hand. Its absence in the left hand was found more common in females than in males (11.7% females, 9.1% males). This research showed agenesis of PL is gender dependent. ($p < 0.05$), and no association was found among the standard FDS and PL tendon test, that is $r(617) = 0.046$, $p = 0.249$.

Conclusion(s): The absence of palmaris longus muscle is more frequently found in women and in the left hand. Agenesis of FDS is rare in individuals and has no association with agenesis of palmaris longus.

Keywords: Association, agenesis, humans, muscle, population.

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INTRODUCTION

"Musculus" and "little mouse" is the Latin name for muscle ¹. Muscle fibers are longitudinal, thin structures with the ability of extensibility. Every muscle in the body differs in its form and its representation according to its purpose or its attachment location ². One of the muscles, in our body, with maximum variations, is the superficially weak forearm flexor, the palmaris longus (PL) muscle ³. The absence of PL is found in 0.6% to 63.9% of individuals, with marked variations in its genesis found worldwide ⁴. Its common variations include complete absence unilaterally or bilaterally, abnormalities in the structure or the site of attachment of PL like inverted, central sited, triple head in-

verted, enlarged, or abnormal attachment to the adjacent structures specifically, tendons, fascia, ligaments, bones, etc^{5,6}. Various research has shown a close association between PL absence and many hand abnormalities like carpal tunnel syndrome (CTS), Volkmann's ischemic contracture, and Dupuytren's contracture ^{7,8}.

PL agenesis can be ruled out by clinical evaluation via standardized Schaeffer's test and through three other tests performed for more authorization ^{9,10}. The Palmaris longus, median nerve, and flexor carpi radialis are considered together as a landmark that is often used as an injection site of the carpal tunnel or to block the median nerve at the wrist. PL tendon protects the median nerve which passes deep under it. With agenesis of the PL tendon, the median nerve becomes exposed and most superficial in the wrist and eventually can be at risk of getting injured during any surgical procedure of the hand ¹¹.

The flexor digitorum superficialis (FDS) is another superficial flexor muscle of the hand. The FDS covers the bone's "radius/ulna" and gets divided into 4 tendons to the medial 4 fingers ¹². The FDS tendon of the fifth dig-

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it might be absent in most persons¹³. The FDS muscle can occasionally cause neurovascular disorders because of its different nature, such as neurovascular pressure caused by carpal tunnel syndrome^{14,15}. Studies show that in the case of agenesis of the FDS muscle in the fifth digit, carpal tunnel syndrome becomes fairly common, but the severity of the CTS is not associated with FDS tendon absence or presence¹⁶.

Different hand injuries evaluation can be done by the examination of the flexor digitorum superficialis muscle via clinical tests and observing the person if he/she could perform flexion of the involved finger. The tendons can be identified appropriately whenever several parts of the superficialis tendon are cut¹⁷. It has been documented that the FDS tendon is a very useful graft for reconstruction and hand surgeries¹⁸⁻²⁰. The FDS tendon is assessed via two different tests, that is standardized or simple FDS test which shows the independent role of FDS in the fifth digit. Another test is the modified FDS test which shows the dependent and mutual role of all FDS muscles in a hand^{21,22}.

While much research has been conducted worldwide, local data are scarce regarding the data related to the absence or presence of PL & FDS in the general population. The purpose of this research is to assess the frequency of genetic absence or presence of PL and FDS tendon among participants. This will provide baseline data for all the clinical practitioners including surgeons and help them in formulating better treatments for different hand problems.

MATERIALS AND METHODS

This cross-sectional study was conducted at Fauji Foundation Hospital and Pakistan Railway General Hospital, Rawalpindi, Pakistan for a duration of 6 months from September 2018 to March 2019. The study was approved by the Riphah Ethical Committee, Riphah College of Rehabilitation Sciences, Riphah International University, Islamabad, ref no: Riphah/RCRS/REC/00479.

The sample size of 619 was calculated through epitool in this study. Individuals, less than 60 years of age and both genders were included. Informed consent was taken. Participants having any diseases/abnormalities of the upper limbs or those who had undergone upper limb surgery were excluded from the study. The data was collected by performing Schaeffer's Test (Standardized Test) for PL and a simple test, along with a modified test for the FDS tendon. Additional tests that were performed included Thompson's test and Mishra's I and II test.

PL muscle examination was performed using the following methods:

1. Schaeffer's Test: flexion of the wrist and opposition of thumb to the little finger.

2. Mishra's I Test: flexion of the wrist and passive extension of the metacarpophalangeal joint.
3. Mishra's II Test: Performing thumb abduction against resistance while maintaining the wrist in flexion.
4. Thompsons Test: making a fist, then performing wrist flexion.

FDS muscle examination was performed using the following methods:

Clinical evaluation of the little finger FDS tendon was done by performing flexion of the little finger while keeping the wrist supine and other digits extended. For evaluation of the independent function of the little finger FDS tendon, flexion of the proximal interphalangeal joint (PIP) joint alone was considered positive. In the modified test, flexion of the PIP joint of the fifth digit along with the fourth digit was considered a dependent function of the FDS tendon of the fifth digit.

RESULTS

A total of 619 individuals (51.7% men and 48.3% women) with a mean age of male were 33.4 ± 14.5 and females of 35.9 ± 13.4 were examined. Amongst 619, 18.9% were laborers and 81.1% were non-laborers. According to hand domination, 94% were right-hand dominant and 6% were left-handed.

The study showed that the palmaris longus muscle was absent in 305 (49.3%), of which 22.7% were males and 26.4% were females. Bilateral hand absence was more common. It was absent bilaterally in 202 (32.6%) individuals, in which 29.4% were males and 36.1% were women, while unilateral absence was observed in 103 (16.6%) individuals (7.58% men and 9.04% women). Unilateral absent palmaris longus muscle was greater in the left-handed than in the right hand with 9.1% in males, and 11.7% in females. The absence of palmaris longus muscle in the right-handed was again greater in females as compared to males (7.0% females and 5.6% men). The p-value was 0.009 which is significant. It showed that the agenesis of the PL tendon in general is greater in women as compared to men. (Table 1)

About 77.8% of laborers showed the presence of PL, out of which 14.5% showed the bilateral absence of PL, 3.4% right-sided, and 4.3% left-sided absence. While 36.9% of non-laborers showed bilateral absence of PL, 7% right-sided and 11.8% showed left-side absence. The presence of PL was significantly greater in laborers ($p=0.000$) as compared to non-laborers.

In the case of the FDS tendon, 467 individuals were examined, with 79.4% being men. In 146 individuals (23.6%) individuals, there was a bilateral absence of flexor digitorum superficialis in the fifth digit. While unilat-

eral absence was noted as 0.96%. In the modified test of FDS, 139 (22.46%) individuals established a dependent FDS role in the fifth digit, and in (0.48%) individuals bilateral absence of the flexor digitorum superficialis function in the fifth digit. (Table 2) The current study showed that there is no association between the standard FDS and the

PL tendon's test, that is $r(617) = 0.046$, $p = 0.249$, which showed that the PL agenesis and standard FDS agenesis are independent of each other. (Table 3)

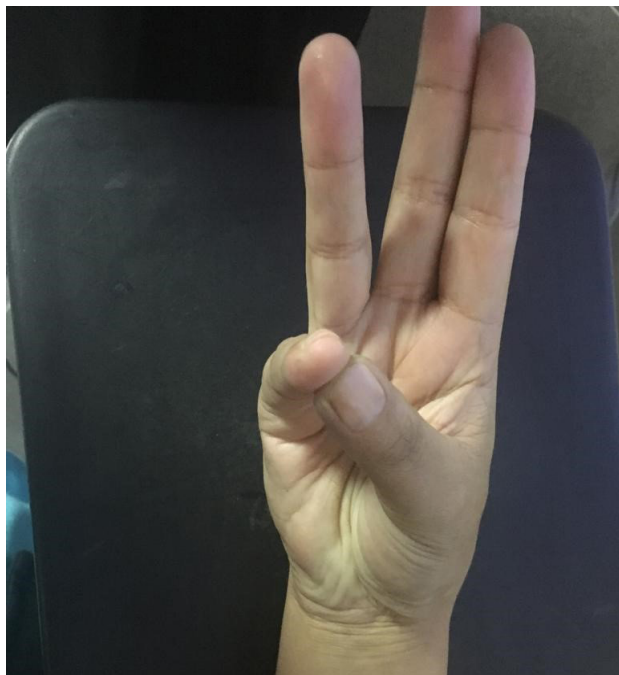


Fig 1: Schaeffers test, Showing agenesis of PL tendon



Fig 2: Absent FDS tendon in the little finger

Table 1: Distribution of Aggenesis of Palmaris Longus Muscle

		All Aggenesis	Bilateral Aggenesis	Unilateral aggenesis	Aggenesis on LF Hand	Aggenesis on RT Hand	
Gender	Male	Frequency	141	94	47	29	18
		% Within Gender	22.7%	29.4%	7.5%	9.1%	5.6%
	Female	Frequency	164	108	56	35	21
		% Within Gender	26.4%	36.1%	9.0%	11.7%	7.0%
Total		Frequency	305	202	103	64	39
		% Within Gender	49.3%	32.6%	16.6%	10.3%	6.3%

Table 2: Independent and Common function of FDS and its aggenesis to little finger

		Standard FDS Test				Modified FDS Test				
		Both Presence	Both Absence	RT Absence	LT Absence	Both Presence	Both Absence	RT Absence	LT Absence	
Gender	Male	Count	254	66	0	0	61	1	0	0
		% Within Gender	79.4%	20.6%	0.0%	0.0%	19.1%	0.3%	0%	0%
	Female	Count	213	80	1	5	78	2	4	2
		% Within Gender	71.2%	26.8%	0.3%	1.7%	26.1%	0.7%	1.3%	0.7%
Total		Count	467	146	1	5	139	3	4	0
		% Within Gender	75.4%	23.6%	0.2%	0.8%	22.5%	0.5%	0.7%	0.3%

Table 3: Correlation between PL and FDS

		Schaeffer's Test	Simple FDS Test
Schaeffer's Test	Pearson Correlation		0.05
	Sig. (2-tailed)		0.25
	N		619
Simple FDS Test	Pearson Correlation	0.05	
	Sig. (2-tailed)	0.25	
	N	619	

DISCUSSION

Several researches have been conducted in various geographical areas of the world to find out the frequency of palmaris longus absence. It is apparent from their findings that it differs greatly compared to the other muscle in the human body. A greater occurrence of PL agenesis (63.9%) was stated in the Turkish individuals & lowest occurrence (0.6%) was in the Korean individuals. Agensis of PL is lower in African and eastern Asian individuals (China) compared to individuals in Iran, Bahrain, India, Turkey, and North American Caucasians²³. Our study showed that the palmaris longus muscle was absent in 305 (49.3%), of which 22.7% were males and 26.4% were females. Bilateral hand absence was more common. It was absent bilaterally in 202 (32.6%) individuals, in which 29.4% were males and 36.1% were women.

Mai s. Sater et al. conducted a study in 2010 that showed that out of 1043 individuals, in 385 (162; 34.0% males, 223; 39.2% females) palmaris longus muscle was absent. The study also stated a marked correlation between PL muscle absence with gender and hand domination in the individuals. Bilateral absence was more common than unilateral absence and the majority was found in females. The left-hand absence was more common as related to the left hand ²⁴. This research is quite similar to the current research as it also shows bilateral absence (32.6%) more than unilateral absence (16.6%). In another research, 386 Egyptians were assessed, and the total frequency of the absence of PL (unilateral or bilateral) was 50.8% which is somewhat similar to current research findings which are 49.9%. The bilateral PL absence in 120 (31.1%) individuals (7.8% men and 23.3% women) whereas the unilateral absence was significantly lower than is 76 (19.7%) individuals (14.2% men and 15.5% women) as compared to current research 202 (32.6%) individuals (29.4% men and 36.1% women) and 103 (16.6%) individuals (7.58% men and 9.04% women) respectively. The general frequency of PL absence was (46; 11.9% men and 150; 38.9% women) in this research while it was (141; 22.7% men and 164; 26.4% women) stated its agensis typically in women ²⁵. In the current study agensis of FDS was 2.1% and there was no correlation between the absence of FDS to the fifth digit and the presence or absence

of PL. Concerning the FDS tendon, out of the 772 fingers studied, FDS was absent in 10 fingers (1.3%), had a dependent role in 544 fingers (70.5%), & an independent role in 218 fingers (28.2%). Evaluation of 467 hands showed its independent role of FDS and the study of 139 hands showed a dependent FDS role on the fifth digit. The previous research showed a total of 266, and the total frequency of the absence of PL was 27.5%. No individual found agensis of FDS to the fifth digit. Though, in 14 subjects (5.2 %) FDS tendon to the fifth digit was dependent. However, the frequency of agensis of PL in Indian individuals is relatively higher, and agensis of FDS to the fifth digit is still a rare phenomenon²⁶. Significant differences were examined among men and women agensis ($p < 0.05$) that is relatively significant; it showed that the agensis of PL tendon is greater in women as compared to men. The PL tendon was not relatively prominent in obese individuals so there is a necessity to palpate for confirmation its presence or absence.

CONCLUSION

Our research concluded that the palmaris longus muscle was unilaterally absent in 32.6% & bilaterally in 16.6% of individuals with a complete absence in 49.3%. The absent palmaris longus muscle was more frequently observed in women and on the left side. Comparison of agensis of PL, and FDS to the fifth digit was a rare phenomenon. No association was observed between agensis of PL and FDS.

Researchers recommend that further study be conducted on other types of disparities of this peculiar tendon.

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AUTHOR'S CONTRIBUTION

Following authors have made substantial contributions to the manuscript as under

- Rafique N:** Result Analysis
- Rafique A:** Article Writing
- Bilal HB:** Literature Search, Data collection
- Nawaz I:** Literature Search, Data collection
- Ali M:** Critical review

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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THE EFFICACY AND SAFETY OF MAGNESIUM SULPHATE FOR NEONATAL NEUROPROTECTION IN PATIENTS WITH IMMINENT PRETERM DELIVERIES: EXPERIENCE AT A TERTIARY CARE HOSPITAL

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ABSTRACT

Objective: The study aimed to find the effect of 4 grams of intravenous bolus antenatal dose of magnesium Sulphate on maternal and neonatal outcomes in preterm births.

Material and Methods: In a one-year cross-sectional descriptive study, patients with active preterm labor or those with planned preterm birth at 28-34 weeks of gestation were included. Antenatal magnesium Sulphate was administered as a 4gm IV loading dose over 30 minutes. The data was analyzed with SPSS (version 20), where mean \pm standard deviation was used for numerical variables and frequency and percentages for categorical variables. The sample size was 88. A P value < 0.05 is used as a threshold for statistical significance.

Results: The mean age of patients was 28.78 (\pm SD of 6.038) and the mean period of gestation remained 32.04 (± 1.868). Similarly, the mean cervical dilatation at which magnesium Sulphate was given was 6.591 (± 1.358), the mean baby's weight was 1.655 (± 0.508) kg, and the mean Apgar score at 5 minutes was recorded as 7.11 (± 1.208). Regarding the period of gestation of the patients, 15 (17.04%) were at 28-30 weeks, 26 (29.54%) were at 30–32 weeks and 47 (53.4%) were at 32–34 weeks. Out of 88 patients, normal vaginal deliveries were conducted in 61 (69.38%) whereas, 27 (30.68%) patients had cesarean sections. Neonatal seizures were observed in 3 (2.6%), intraventricular hemorrhage in 2 (1.754%), Periventricular leukomalacia (PVL) 1 (0.877%), and neonatal mortality in 5 (4.38%).

Conclusion: Magnesium Sulphate is a safe drug that plays an important role in protecting immature brains. Four-gram bolus is a sufficient dose as compared with infusion, which requires additional human resources and risks attached to prolonged infusions.

Keywords: Magnesium Sulphate, Preterm Deliveries, Neonatal Neuroprotection, Intraventricular Hemorrhage

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INTRODUCTION

Preterm labor is the leading cause of infant morbidity and mortality. The prevalence of preterm birth is increasing and so is cerebral palsy. 25% of all cases of cerebral palsy are in infants born at < 34 weeks of gestation. The risk of cerebral palsy is higher at early gestational ages and 30 to 50 % of children with CP are born preterm.¹ Magnesium Sulphate for fetal neuroprotection provides one of the first pre-natal evidence-based treatments to im-

prove the neurodevelopmental outcomes of children born at < 34 weeks of gestation. The most common pathological lesion associated with cerebral palsy in preterm infants is periventricular white matter injury. The NMDA (N-methyl-D-Aspartic acid) receptors on oligodendrocytes of white matter are potent neuroprotective agents. Magnesium Sulphate removes the harmful effects of hypoxic-ischemic brain injury by blocking the NMDA receptors acting as a calcium antagonist and reducing calcium influx into the cells^{2,3}. Between 24 and 32 weeks of gestational age, premyelinating oligodendrocyte progenitor cells are particularly vulnerable to hypoxic-ischemic damage, due to the interaction of immature blood flow autoregulation, immature vascular supply, and heart-rate-dependent cardiac output. Consequently, white matter injury occurs when other predisposing factors such as infections, inflammations, and disturbances in cerebral oxygenation overlap with the intrinsic vulnerability of the premature brain.

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Magnesium Sulphate given to mothers shortly before delivery reduces the risk of cerebral palsy and protects gross motor functions in those infants born preterm.⁴ The effect is greatest at early gestation and is not associated with adverse long-term fetal or maternal outcomes. This study is aimed at determining the effectiveness of Magnesium Sulphate in preventing fetal and maternal outcomes.

MATERIAL AND METHODS

This cross-sectional descriptive study is conducted at Khyber Teaching Hospital (KTH) in Peshawar, Pakistan. The study duration was from December 2020 to November 2021. All those patients included in the study who were admitted to the labor room with active preterm labor or \pm Preterm Premature Rupture of Membranes (PPROM) or those with planned preterm birth for fetal or maternal indication at 28-34 weeks of gestation. Imminent preterm labor is defined as a high likelihood of birth due to either active labor with cervical dilatation > 4 cm with or without preterm PROM or planned preterm birth for fetal or maternal indication. Women with severe preeclampsia and eclampsia with preterm labor are also included in the study.

Exclusion criteria are major fetal abnormalities or intrauterine fetal death, patients with relative contraindications for Magnesium Sulphate such as electrolyte disorders, and maternal cardiac or renal disease. Delivery was not delayed administering magnesium Sulphate to patients for fetal neuroprotection when there was a maternal or fetal indication for an emergency delivery. Informed consent was obtained from all patients. For women with imminent preterm birth between 28-34 weeks of gestation, Antenatal Magnesium Sulphate was administered as a 4gm IV loading dose over 30 minutes. The obstetrician and pediatrician drafted this protocol jointly. When the birth was delayed for > 12 hours after a bolus, it was recommended to repeat the bolus. However, in our study, there was no case of prolonged labor so a second bolus was not given.

Mothers and infants were monitored according to standard clinical guidelines. The protocol called for recording the pulse rate, BP, Respiratory rate, and tendon reflexes. Fetal heart rate was monitored throughout labor. Mothers and infants were followed up until hospital discharge. Five minutes Apgar score and neonatal well-being were assessed by the pediatricians. Nursery and Neonatal ICU monitoring was done in most cases. Monitoring for hypoxic-ischemic encephalopathy, irritability, and seizures noted in the neonates.

Intraventricular hemorrhage grading was done according to cranial ultrasound findings and Papiles criteria. Periventricular leukomalacia, which is hyperechoic lesions persisting to day 7 of life, was also recorded. Dependent variables were neonatal Apgar score, nursery, and NICU

admissions, monitoring for hypoxemic ischemic encephalopathy, frequency of occurrence of neonatal seizures, and neonatal cranial ultrasound findings of intraventricular hemorrhage.

Statistical data was analyzed by SPSS version 20. One-way ANOVA (Analysis of variance) was also applied. Mean \pm standard deviation was calculated for numerical variables and frequency, and percentages were calculated for categorical variables. The sample size was 88. P value < 0.05 is used as a threshold for statistical significance. Tukey $_b$ post hoc test was applied to check the interval / group-wise period of gestation difference.

RESULTS

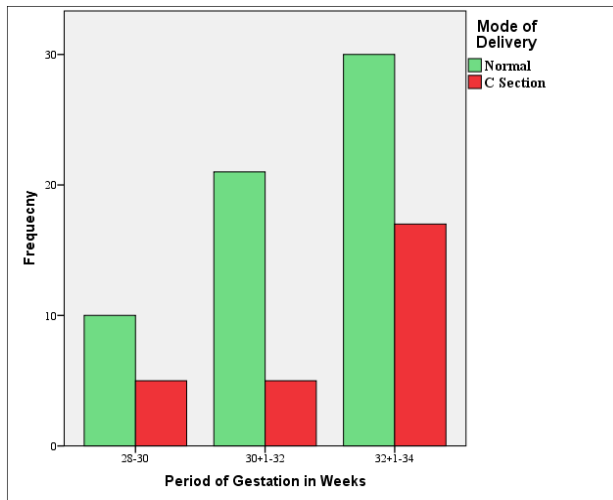
Out of a total of 114 neonates, 79 (69.2%) were resuscitated, and 76 (66.6%) were admitted to the nursery and NICU). Frequency of neonatal seizures observed in 3 (2.6%), intraventricular hemorrhage 2 (1.754%), periventricular leukomalacia (PVL) 1 (0.877%), and neonatal mortality 5 (4.38%). See table 1 and 2 for details.

With regards to the duration of admissions in nursery and NICU, 44 (57.8%) were retained for 48-72 hours, 19(25%) for 1-2 weeks, and 13 (17.1%) for 2-4 weeks. Sixteen parents and attendants didn't bring their neonates for follow-up. The rest of the cases were followed up for a month either by checkups in the Pediatrics unit or were contacted by mobiles for the neonatal outcome. Three neonates had seizures. One newborn who was delivered at 28 weeks had a seizure after 1st week of birth. Two others who delivered at 28⁺⁴ and 29⁺² weeks of gestation had fits after 3-7 days of birth. 2 cases of IVH were seen after 7 days of birth. Both were the same neonates who had fits. One case of PVL was seen in the newborn who delivered at 30 weeks of gestation. 5 babies expired. One was the case who had IVH. 4 babies expired in 3rd and 4th weeks of life due to chest infection and fever but didn't have seizures.

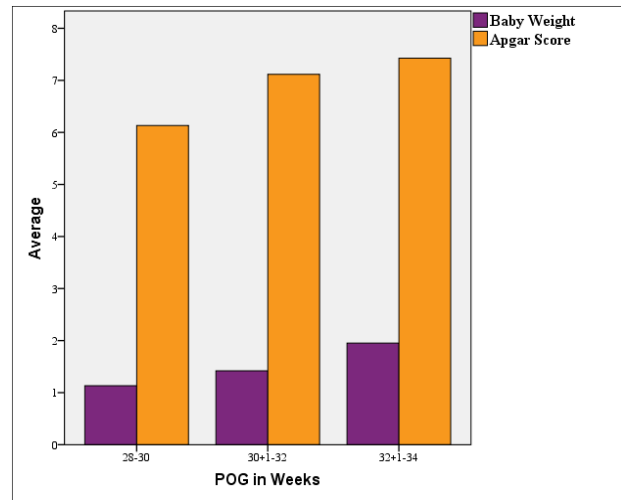
No major side effects were observed with Magnesium Sulphate use. However, two patients with eclampsia presented with disseminated intravascular coagulation. Side effects observed were hypotension 8 (9.09%), flushing and sweating (4.54%), palpitation 3 (3.04%), headache 2 (2.27%), nausea and vomiting 2 (2.27%) and hyporeflexia seen in one eclamptic case (1.13%). For the mode of delivery, indications of C- Section, and associate conditions see Figure 1 and Tables 3-5.

DISCUSSION

Magnesium Sulphate for fetal neuroprotection is the first prenatal evidence-based treatment and is given to mothers shortly before delivery as it protects gross motor functions and is associated with decreased incidence of echo-densities and lucencies i.e. periventricular leukomalacia on cranial ultrasound and cerebellar hemorrhage on



Picture-1 (A): Mode of Delivery in Relation to the Period of Gestation



Picture-1 (B): Baby's weight and Apgar score according to the period of gestation

Table 1: Maternal and Neonatal Demographics

Mean Period of Gestation (POG) (weeks)	Mean Age of Patients (years)	Mean APGAR Score	Mean Baby's Weight (Kg)	Mean Cervical Dilatation at Magnesium Sulphate administration (cm)
32.04 (±1.86)	28.78 years (±6.038)	7.11 (±1.208)	1.65 (±0.508)	6.591 (±1.358)

Table 2: Neonatal Apgar score in relation to POG and Cervical dilatation at which Magnesium Sulphate given

Period of Gestation (POG) (weeks)	Mode of Delivery		APGAR Score (mean ± SD)	Baby's Weight (kg) (mean ± SD)	Cervical Dilatation at Magnesium Sulphate administration (cm) (mean ± SD)
	Vaginal	Caesarean			
(POG)					
(N=88) 28-30	10 (16.4%)	5 (18.52%)	6.13 (1.598)	1.113 (0.3374)	6.8 (1.4757)
30+1 - 32	21 (34.43%)	5 (18.52%)	7.12 (0.711)	1.419 (0.3238)	6.913(1.3455)
32+1 - 34	30 (49.18%)	17 (62.96%)	7.43(1.137)	1.951 (0.4338)	6.303 (1.3106)

Table 3: Mode of Delivery in Patients with preterm delivery (n=88)

Period of Gestation (POG) (Weeks)	Mode of Delivery			
	Vaginal (Number/%)	Caesarean Section (Number/%)	Emergency C Section (Number/%)	Elective C Section (Number/%)
(N=88) 28-34	61 (69.38%)	27 (30.68%)	24 (88.8%)	3 (11.11%)

Table 4: Indications of Cesarean Sections in Patients with preterm delivery.

Indication of Emergency Cesarean Section	(N=24)
Eclampsia	5 (20.8%)
Severe preeclampsia with poor bishops	2 (8.33%)
Previous 2 or > C sections in preterm labor	4 (16.66%)
Breech presentation	3(12.5%)
Multiple pregnancy with malpresentation	3 (12.5%)
Chorio Amnionitis	2 (8.33)
Fetal distress	2 (8.33%)
Transverse lie	1 (4.16%)
Uncontrolled Diabetes and BOH	1 (4.16%)
Placenta previa	1 (4.16%)
Indication of Elective C Section (N=3)	IUGR 2 BOH and Raised SD Ratio 1

MRI. Clement Chollat performed meta-analyses of various Randomized Control Trials (RCTs) such as Magnesium Sulphate and neurological endpoints trial (MAGNET), use of Magnesium Sulphate in preterm deliveries (PREMAG), which to date reported that antenatal Magnesium Sulphate given to women at risk of preterm delivery is associated with significantly reduced risk of cerebral palsy (CP) in children exposed in utero with RR ranging from 0.61- 0.70 and no impact on mortality⁵. The Cochrane review of trials concluded that antenatal MgSO₄ therapy given to women at risk of preterm birth substantially reduced the risk of cerebral palsy (CP) in their children with a relative risk of 0.68 (95% CI 0.54-0.87). There was also a significant reduction in the rate of periventricular leukomalacia and substantial motor dysfunction (RR 0.61, 95% CI 0.44 – 0.85).^{6,7,8}

Pierre Emmanuel Bouet conducted a one-year study on 126 patients who had preterm delivery. He concluded that the mean period of gestation at Magnesium Sulphate administration was 29.6 weeks \pm 2.1 days (24 – 32 weeks). 60 (74%) received maintenance infusions. The main reasons for preterm birth were preterm labor, preterm rupture of membranes (PROM), peripartum hemorrhage, and preeclampsia.⁹

Rates of emergency delivery, abnormal CTG, general anesthesia, neonatal cord PH < 7.10 at birth, Apgar score < 7, neonatal external cardiac massage, and use of epinephrine were significantly higher in the group of women who didn't receive Magnesium Sulphate before birth.^{10, 11}

The gestational age at which Magnesium Sulphate administration has its greatest effect has been debated. An intervention immediately pre-delivery is more likely to be effective at earlier gestation as perinatal and neonatal factors are more prominent in the etiology of cerebral palsy (CP) in less mature infants. So, the number needed to treat will increase significantly with advancing gestational age.¹² This concept is supported by data from Rouse et al showing a significant reduction in moderate or severe CP in babies recruited at less than 28 weeks of gestation (RR 0.45, 95% CI 0.23 – 0.87) but not in those between 28 and 31 weeks of gestation.⁴

Constantine et al looked at those trials addressing outcomes at less than 34 weeks of gestation and concluded that the number needed to treat at < 30 weeks of gestation was 46 (95% CI 26-187) and rose to 56 (95% CI 34 – 164) before 32-34 weeks of gestation¹³. Conde- Agudelo et al and Mittendorf's study concluded that in women at risk of preterm delivery before 34 weeks of gestation, the number of mothers needed to prevent one case of cerebral palsy in their child was 52 (95% CI 31-159).¹⁴⁻¹⁶ Many related studies and trials included multiple pregnancies, those with PROM, chorioamnionitis, abruption, hypertensive disorders of pregnancy, and gestational diabetes mellitus.^{17,18,19} Rouse et al. excluded women with hypertension

or preeclampsia. This suggests that irrespective of the indication any infant delivering preterm might be expected to benefit from it. All used a loading dose of Magnesium Sulphate that varied between 4 and 6gm. Not all trials administered a maintenance infusion. These studies indicated persistent benefits of Magnesium Sulphate regardless of dose and support the use of low dose 4gm loading \pm 1 g/hr) maintenance dose for 12 h compared with high doses (6 gm loading dose + 2 gm hour maintenance for 24 hrs).^{20,21} J Bisht, Lawrence Impay concluded that from 22⁺¹ - 31⁺⁶ weeks of gestation, 4 grams is a sufficient dose because of lack of evidence of better outcomes with other dosages and infusions in conjunction with manpower and risk issues with prolonged infusions. Also, the loading dose is effective when given even one hour before delivery and the bolus dose can be repeated if birth is imminent after 12 hours.²² In our study mean cervical dilatation at which Magnesium Sulphate was given is 6.591 (1.3585) cm or an average of 4 hours before delivery. Mittendorf reported different doses in two arms of the study.¹⁵

Regarding timing of Magnesium Sulphate administration, Rous et al suggested discontinuing therapy if the delivery was not achieved in 12hrs.⁴ He excluded women who had more than 8cm cervical dilatation or less than 2 hours from delivery and women who were at risk of delivery more than 6 hours after stopping a further bolus was given.^{22, 23} Australian guideline suggests that ideally dose should be commenced at least 4 hours before birth but agrees that there may still be a benefit if given less than 4 hours before delivery.²⁴ Median time from randomization to birth in the Magnesium Sulphate group of these trials was between 1.6- 3.7 hrs. Antenatal administration enables the prompt transfer of Magnesium Sulphate. It should be commenced as close as possible to 4 hours before birth and if delivery is expected to occur sooner than 4 hrs still it must be administered as there is likely to be an advantage from administration within this time.^{24,25}

In our study, we found no major side effects as we didn't give the maintenance infusions except in severe preeclampsia and eclampsia cases. Its use is now recommended by the pediatrics and obstetrics society as well as by the strong recommendation of WHO for women at risk of imminent birth before 34 weeks. 4 gm bolus is sufficient because of a lack of evidence for better outcomes with infusion, in conjunction with manpower and risk issues with prolonged infusions.²⁴

CONCLUSION

Magnesium Sulphate is a safe and effective molecule that plays a key role in protecting the immature brain. Further large-scale multicenter trials are needed to signify the dose, duration, and effectiveness of this regimen.

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AUTHOR'S CONTRIBUTION

Following authors have made substantial contributions to the manuscript as under

- Mazhar T:** Main Idea, Research proposal
- Rauf S:** Data Collection and writing
- Ambareen A:** Review and proofreading
- Nadir S:** Data Collection

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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MICROBIOLOGIC SPECTRA AND THEIR ANTIBIOTIC SUSCEPTIBILITY PATTERNS IN TYPE 2 DIABETIC PATIENTS WITH URINARY TRACT INFECTIONS (UTIs) – A HOSPITAL BASED STUDY

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ABSTRACT

Objectives: To determine the microbiologic spectra and their antibiotic susceptibility patterns in type 2 diabetic patients with UTIs

Materials and Methods: This descriptive cross-sectional study was conducted in the Department of Medicine, Khyber Teaching Hospital, Peshawar from 1st July 2021 to 31st December 2021. Type 2 Diabetic patients with urinary tract infections were recruited in the study. Their urine cultures for sensitivities were carried out. The frequency of positive urine culture was stratified among age and gender to see the effect modifications. Antibiotic sensitivity and resistance patterns were stratified among male and female diabetic patients.

Results: Out of 150 patients, 125 were females and 25 were males. Twenty-seven (27) patients (24.3%) had positive urine cultures, out of whom 19 (70.4%) were females, and 8 (29.6%) were males. The most common organism found in females was *E.coli* (42%). Among male patients with positive urine cultures, *E.coli* was the most common organism isolated in 5 (62.51%). Cefixime had the highest resistance, with 21 (77.8%) of 25 culture-positive patients resistant to it. All the patients with positive urine cultures were sensitive to piperacillin/tazobactam, Meropenem, Doripenem, Cefepime, Aztreonam, and Tigecycline.

Conclusion: Diabetic females are more prone to UTIs with an increased prevalence of positive urine cultures as compared to diabetic men. The most common isolate was *E.coli*. The highest antimicrobial resistance was reported for Cefixime. All patients were sensitive to Meropenem, Tazobactam/Piperacillin, Aztreonam, Tigecycline, Doripenem, and Cefepime.

Keywords: Antibiotic susceptibility; Diabetes mellitus; Urine culture and sensitivity

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INTRODUCTION

Diabetes mellitus is a chronic disease affecting a large population across the globe.¹ The estimated prevalence of diabetes mellitus in Pakistan is 7 to 11% and is expected to cross 15% by the year 2030.² UTIs are a common ailment caused by bacteria. Women are considered more susceptible to urinary tract infections, with more than a 50% chance of every woman experiencing a single UTI during her lifetime.^{3,4}

UTIs, mainly asymptomatic bacteriuria, are three times higher in the diabetic population than in the average population. This finding is probably due to the excretion

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of glucose in urine and neurologic dysfunction of the urinary bladder.^{5,6} Lature LH et al. concluded that the prevalence of positive urine culture among diabetic patients was 11%.⁷ *E coli*, *Klebsiella*, and *Proteus* species were isolated in 54.5%, 18%, and 18% of cases respectively.⁸ Murad MC et al. concluded that the prevalence of positive urine culture was 12% among diabetic patients.⁸ *E coli* was the most common pathogen isolated from the urine of diabetic patients in 26% and 55.1% of UTIs in Japan and India respectively.⁹ He K et al. concluded that 70.47% of diabetic patients with asymptomatic UTIs were positive in mid-stream urine cultures, while 44.1% of patients with symptomatic UTIs had positive urine cultures.¹⁰ They also concluded that the rate of a positive culture in males was lower than in females (38.2% vs. 51.2%, $p < 0.05$). Male patients were found to have fewer gram-negative infections than females (53.8% vs. 89.3%, $p < 0.001$) and more gram-positive infections than females (30.7% vs. 9.8%, $p < 0.01$).¹⁰

This study will provide local statistics on the sensitivity pattern of different bacteria, which will modify future

recommendations and help to prevent irrational empirical use of antibiotics. Our study aims to ascertain the yield of urine culture and sensitivity (C/S) reports in diabetic patients. It will enable us to determine the common organisms grown in culture reports of both male and female diabetic patients. It will also enable us to determine the common drug sensitivities of these organisms so that in the future, patients can be started on such antibiotics even if culture reports are pending or inconclusive.

MATERIAL AND METHODS

This descriptive cross-sectional study was conducted in the Department of Medicine, Khyber Teaching Hospital, Peshawar, from Jul 1, 2021, to Dec 31, 2021. Non-probability consecutive sampling technique was used. One-hundred and fifty male and female diabetic patients with urinary tract infections on urine routine examination were recruited in the study using an 11% prevalence of positive urine culture in diabetic patients.⁷ This sample size was calculated using the WHO calculator for sample size calculation keeping a 95% confidence interval and 6% margin of error (sample size increases as margin of error decreases). Patients with a history of antibiotic intake in the last week and pregnant women were excluded from the study. The conditions mentioned earlier can act as confounders and introduce bias if included in the study.

After approval from the hospital research and ethical committee, all diabetic patients having urinary tract infections fulfilling the inclusion criteria were included in the study. Written informed consent was taken from all the patients after explaining the purpose and benefits of the study.

All information regarding the name, age, gender of the patient, and duration of diabetes was recorded on pre-designed proforma. Complete history and clinical examination of all patients were carried out. All baseline investigations were carried out, including fasting and random blood sugars.

All the data was stored in the Excel office and analyzed in SPSS (statistical package for social sciences)

version 22. Mean and standard deviations (SD) were calculated for quantitative variables like age, fasting blood glucose level, and random blood glucose level. In contrast, percentages and frequencies were calculated for categorical variables like gender and proportion of positive urine cultures and their respective sensitivities and resistance patterns. The frequency of positive urine culture was stratified among age and gender to see the effect modifications. Post-stratification, Chi-square test, was $p < 0.05$ as statistically significant.

RESULTS

Our study included 150 patients, of which 125 (83.3%) were females and 25 (16.7%) were males. The total number of patients with positive urine cultures was 27 (24.3%), out of which 19 (70.4%) were females and 8 (29.6%) were males. Out of 125 females, 19 (15.2%) had positive urine cultures, while 8 (32%) of 25 male patients had positive urine cultures. The highest number of culture-positive females was between 51 and 60, i.e., 9 (47.4%). Most of the culture-positive males, i.e. 4 (50%), were in the 61-70 age group.

The urine culture sensitivities of patients with positive urine cultures are shown in Table 1, and antibiotic sensitivity and resistance patterns of male and female patients are demonstrated in Table 2.

DISCUSSION

Women are considered more susceptible to urinary tract infections, with more than a 50% chance of every woman experiencing a single episode of urinary tract infection in her life time.¹¹ The prevalence of urinary tract infections increases with age, and its rate doubles in women aged greater than 65 years as compared to the overall rate seen in the female population.¹² The reasons for the higher rate of infection in this age group vary by health status, with certain factors like catheterization increasing the chances for infections, and pathogens are most likely responsible for this.¹³ Increased sexual activity is consid-

Table 1: Urine culture sensitivities of patients with positive urine cultures

	Urine Culture		Grand Total (n)
	Gender (n)		
	F	M	
Citrobacter species	2		2
E. coli	8	5	13
Klebsiella	3	1	4
Morganella Morganii	1		1
Pseudomonas	3	2	5
Staph. aureus	2		2
Total	19	8	27

Table 2: Antibiotic sensitivity and resistance patterns of male and female diabetic patients

S#	ANTIBIOTICS	S		R	
			Female (n)	Male (n)	Female (n)
1	Ciprofloxacin	2	5	6	14
2	Levofloxacin	2	5	6	14
3	Cefixime	2	4	6	15
4	Amoxicillin	2	8	6	11
5	Co-Amoxiclav	7	17	1	2
6	Fosfomycin	7	17	1	2
7	Nitrofurantoin	8	15	0	4
8	Doxycycline	7	14	1	5
9	Cefuroxime	4	12	4	7
10	Ceftazidime	5	8	3	11
11	Co-trimoxazole	5	10	3	9
12	Amikacin	4	15	4	4
13	Gentamicin	4	17	4	2
14	Streptomycin	7	14	1	5
15	Ceftriaxone	7	11	1	8
16	Cefoperazone/sulbactam	8	16	0	3
17	Piperacillin/tazobactam	8	19	0	0
18	Meropenem	8	19	0	0
19	Doripenem	8	19	0	0
20	Cefepime	8	19	0	0
21	Aztreonam	8	19	0	0
22	Tigecycline	8	19	0	0

ered a significant risk factor for UTIs in younger women, and recurrence within six months is common.¹⁴ UTIs create a massive societal and personal burden, with many medical visits in the United States being related to them.⁴ In the United States alone, around 8 million annual UTIs have been documented.⁵

Our study indicates that almost one fourth of our patients had positive urine cultures, which is supported by many studies. One study reported that the prevalence of asymptomatic bacteriuria in diabetic patients is from 8-26%.^{15, 16} A meta-analysis was published in 2011 reporting a 12.2% prevalence of asymptomatic bacteriuria in patients with diabetes mellitus in contrast to 4.5% in healthy individuals taken as controls. Hence, we can conclude that UTIs are more common in diabetic patients than in non-diabetics.^{6, 17} This fact is also supported by an observational study conducted in the UK which found that the incidence rate of UTI was 46.9% per 1000 people with diabetes compared to 29.9% for non-diabetics.^{6, 18} An American database study in 2014 found that UTI was more common in diabetic patients of both genders than non-diabetics (9.4% vs. 5.7%), respectively.^{19, 20}

According to our study, 83.3% of our patients with

UTIs diabetics were females, and 16.7% were males, which indicates that more females with diabetes get UTIs as compared to men with diabetes. These findings are supported by a cohort study including more than 6000 patients who were part of 10 clinical trials.²¹⁻²³ A case-control study of Washington state health suggested that pyelonephritis was 4.1 times more prevalent in pre-menopausal diabetic women than in non-diabetic women.^{26, 27} Multiple explanations exist for the increased prevalence of UTIs in people with diabetes compared to non-diabetics.²⁴⁻²⁸ High glucose concentrations inside the renal parenchyma can also promote bacterial growth and proliferation, increasing the risk of complications such as emphysematous pyelonephritis.^{29, 30} Many impairments in the immune system, including innate, cellular and humoral immunity, may contribute to the pathogenesis of UTI in diabetic patients.³¹⁻³³ People with diabetes having asymptomatic bacteriuria demonstrated lower interleukin 6 and 8 levels compared to non-diabetic patients.³⁴ Autonomic neuropathy leading to dysfunctional voiding and urinary retention results in decreased bacterial clearance, contributing to bacterial growth.²⁰⁻²² Our study demonstrated that 83.3% of our patients with UTIs were females and 70.4% of our study's culture-positive patients were also females. These findings

are seconded by a study conducted in Saudi Arabia.³⁴

The highest number of culture-positive females was found between 51-60 years of age group (47.4%), while the highest number of culture-positive males (50%) was found between 61-70 years of age group. These findings are supported by a study conducted at NRI Medical College and hospital, India.³⁵ Another multicenter study conducted at 12 clinical sites spread throughout major cities of Pakistan supports these findings.²⁵

E.coli was the most isolated organism from our patient's urine cultures (48.1%), followed by *Pseudomonas* (18.5%) and *Klebsiella* (14.8%). A study conducted by Murad MC et al. had similar findings where *E.coli* was the most common organism isolated, i.e., in 54.5% of cases.³⁰ *E.coli* was also found to be the most common organism isolated, followed by *Klebsiella* in a study conducted in Kuwait.³¹

According to our study results, Cefixime had the highest resistance reported (77.8%), followed by ciprofloxacin and levofloxacin (74.1%). These findings are supported by a retrospective study conducted in Dublin from 1999 to 2009.³³⁻⁴⁰ A study conducted in Turkey suggested the same, and the reason for resistance to these antimicrobials might be the high use of these antibiotics.³⁴ Diabetic patients are more likely to harbour resistant organisms as a cause of UTIs. It also includes fluoroquinolone-resistant pathogens.^{41,42} There are several explanations for this; use of antibiotics for un-confirmed UTIs without a urine test and only based on symptoms of dysuria or peri-urethral burning, multiple courses of antibiotics, premature stopping of antibiotics after symptomatic relief, quackery, late presentation to a certified health care professional among many others. Injudicious use of urinary catheters is also a leading cause in centers where protocols and guidelines are not followed.³⁶

The cause-and-effect relationship between diabetes and its associated factors could not be studied due to its cross-sectional design. It was conducted at one center, which can lead to selection bias and affect the generalizability of the study. We also did not study the effect of confounding factors like socioeconomic class and education. Other factors like malnutrition and viral infections, e.g. HIV, which might be associated with diabetes, were not recorded. Activity, alcohol, and substance abuse consumption were also not adequately assessed.

CONCLUSION

Diabetic females are more prone to UTIs as well as an increased prevalence of positive urine cultures as compared to diabetic men. The most common isolate

was *E. coli*, followed by *Pseudomonas* and *Klebsiella*. The highest antimicrobial resistance was reported for Cefixime, followed by ciprofloxacin and levofloxacin. Most patients were found sensitive to Cefoperazone/Sulbactam, and all patients were sensitive to Meropenem, Tazobactam/Piperacillin, Aztreonam, Tigecycline, Doripenem and Cefepime.

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AUTHOR'S CONTRIBUTION

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Badshah A: Designed the study, data collection, manuscript writing, statistical analysis

Khan A: Manuscript writing, reference writing

Mohammad W: Conceived the idea, final editing

Zaman R: Data collection

Khan Z: Literature review, data collection

Haider I: Critical appraisal, supervision

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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ANALYSIS OF HAEMATOLOGICAL COMPLICATIONS IN VIVAX AND FALCIPARUM MALARIA IN IN-DOOR PATIENTS IN A TERTIARY CARE HOSPITAL IN PAKISTAN

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ABSTRACT

Objective: This study was aimed to determine the frequency of hematological complications in patients suffering from vivax and falciparum malaria.

Material and methods: After getting approval from the hospital E&RC, all the patients above 14 years who presented with malaria, were included in the study. Blood was collected from the patients for the malarial parasite. Malaria was diagnosed on the basis of thick stain while subtype vivax malaria was on the basis of thin stain. All the data was collected on a purposefully predesigned proforma.

Results: A total of 350 patients were included in our study, males 250 (71.4%) while females 100 (28.6%). The mean age of our patients was 55.1 years (ranging from 15 to 70 years). The most common hematological complications in our patients suffering from malaria were Thrombocytopenia (69%), anemia (65%), Leukopenia (39.14%), Neutrophilia (29.14%), and Lymphopenia (31.71%).

Conclusion: Hematological complications are prevalent in patients with Vivax and Falciparum malaria in our population and these are some of the diagnostic markers of these conditions.

Keywords: Hematological complications, malaria

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INTRODUCTION

Malarial is a parasitic disease, Plasmodium protozoa which is the causative agent, is transmitted by the bite of an infected female Anopheles mosquito. About 350–500 million people get the disease annually, the majority of the cases are caused by *P. vivax* or *P. falciparum*. about 1.1–2.7 million people die annually due to severe malaria. Malaria accounts for the fifth leading cause of death due to infectious diseases globally, but it is the second leading cause of death in African Countries. ¹ The development of resistance of the parasite to the available drugs and resistance of the vector to insecticides are the main reasons for failed Malaria control programs. ²

It is a quite common infection in Asia and Africa, where a lot of people suffer from malaria throughout the year. ³ Plasmodium vivax is the second commonest cause of malaria globally, but it is the leading cause of malaria in Pakistan. ⁴ Though, the infection is seldom fatal but it puts a significant economic burden on the population. The Hypozoite form of Plasmodium vivax may remain dormant in the liver for many months and may cause recurrent malaria. ^{5,6} The plasmodia after entering the blood, penetrate into the red blood cells, feed on intracellular proteins and hemoglobin, and metabolize the glucose inside the RBCs 70 times faster than the RBCs themselves, leading to lactic acidosis and hypoglycemia. The plasmodia suppress hemopoiesis and lead to the lysis of infected and uninfected RBCs, which are cleared by the spleen at an increased rate, leading to splenomegaly and anemia. Bone marrow suppression may also occur. Anaemia may occur in 25% of patients, while thrombocytopenia occurs in about 50-68% of patients. Some of the patients may have features suggestive of hemolysis, some develop bone marrow suppression and up to 05% of patients may have elevated WBCs. ⁷ Compared to vivax, Falciparum malaria has a higher degree of parasitemia and impaired general

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health condition, affecting consciousness, splenomegaly, anemia, and increased creatinine level.^{8, 9} Although, pancytopenia is caused more commonly by plasmodium falciparum infection, it can present as an initial manifestation of plasmodium vivax infection as well. Such patients deserve special attention, as they may have poor clinical outcomes.¹⁰ Rarely, pancytopenia can present as an initial manifestation of vivax malaria. Fortunately, the uncomplicated vivax malaria shows a very good response to oral chloroquine with 100% efficacy.¹¹⁻¹³ Vivax malaria should be eradicated vertically through Primaquine for 14 days.¹⁴⁻¹⁶

The main aim of our study was to determine the hematological complications of vivax and falciparum malaria in patients admitted to the Department of Medicine in Khyber Teaching Hospital. If these causes are identified and treated well in time, the morbidity and mortality in our patients will be reduced.

MATERIAL AND METHODS

We conducted this descriptive cross-sectional study after approval from the Committee for Ethical Review of Research involving Human Subjects of Khyber Medical College, Peshawar in the Department of Medicine of Khyber Teaching Hospital, Peshawar, from June 2020 to December 2021. All patients, >14 years of age, having pancytopenia, who agreed to be included in the research, were included in the study. Patients having a history of blood transfusion and patients who declined consent for research were excluded from the research. Consecutive sampling was done from admitted patients. Data was collected on a proforma. Five ml of blood was collected from a vein of patients with aseptic techniques and sent to the main laboratory of the hospital. Peripheral smears and thick and thin slides were prepared. An automated, CELL-DYN 1800 hematology analyzer was used to determine Hematological parameters. Malaria parasite density was calculated by using the standard formula of counting the asexual parasites against 200 white blood cells. Data included demographic variables like age, gender, and socioeconomic status of patients. All the data was entered into Excel and analyzed. Standard deviations and Mean were calculated for numerical variables while percentages and frequencies were calculated for categorical variables.

RESULTS

A total of 350 patients were included, with a mean age of 55.1 years ranging from 15-70 years), 1.2:1 was the ratio between male and female patients. In our study, 250 (71.4%) patients were males, and 100 (28.6 %) were females. See Table 1 for details of hematological parameters, table 2 for the frequencies of both vivax and falciparum malaria, and table 3 for the frequencies of different hematological parameters in patients included.

Table 1: The mean values of hemoglobin, leukocyte, and platelet counts.

	Total number	Mean	Std. Deviation
Hemoglobin of patient in G/dl	350	8.8667	1.77
Leukocyte count	350	2.843×10 ³	3.31
Platelet count	350	77.25×10 ⁹	2.90

Table 2: Frequency of vivax and falciparum positive and negative patients

Type	Frequency	Percent
Vivax positive	184	52.6%
Falciparum positive	81	23.14%
Mix infection	63	18%
Malaria parasite not seen	22	06.28%

Table 3: Hematological abnormalities in our patients

Hematological Abnormalities	Present	Absent	Percentage
1. Thrombocytopenia	241	109	69%
2. Anemia	227	123	65%
3. Leukopenia	137	213	39.14%
4. Neutrophilia was present in	102	248	29.14%
5. Lymphopenia	111	239	31.71%

DISCUSSION

In our study, *P. vivax* was seen in 52.6%, *P. falciparum* was seen in 23.14%, while mix infection was present in 18% of our patients as compared to 53%, 49.6% and 42.7% as reported by Lin E et al, but Marine G et al has reported mixed infection in 10.75% of patients by real-time PCR showed in one area, 12.7 % in eastern French Guiana but 1.4% in western French Guiana.^{17, 18} Thrombocytopenia was present in 69% of our patients, 73% in Plasmodium Falciparum patients and 65% in plasmodium vivax patients. The mean platelets counts were $77.2 \times 10^9 / \text{Cmm}$ (± 2.90 SD). Thrombocytopenia was present in 84% and anaemia in 67% patients. An inverse correlation has been reported between lymphocyte count, platelet count, and *P. falciparum* and *P. vivax* parasite density.¹⁹ The commonest hematological abnormality in patients suffering from malaria is thrombocytopenia caused by increased platelet destruction due to circulating immune complexes and splenomegaly.²⁰⁻²² An inverse relationship has been described between Thrombocytes and parasitemia density in peripheral blood as the degree of malaria parasitemia increases the platelet level decreases, so thrombocytopenia indicates the severity of malaria.²³⁻²⁵ Anaemia is the second most common hematological abnormality in patients suffering from *P. falciparum* compared to *P. vivax*. Our findings closely match the findings reported by Jain and Kaur and Shah et al, but differ from other studies re-

ported from UAE, in which there was no significant difference in the frequency of anemia between *P. vivax* (63%) and *P. falciparum* (67%) patients, and frequency of anemia in the two malaria groups was also almost equal i.e. 61.9% in *P. Vivax* and 56% in *P. falciparum*.²⁶⁻²⁹ Increased mechanical destruction of the parasitized RBCs, reduced production of RBCs in bone marrow, and phagocytosis of parasitized RBCs are the main causes of anemia in patients suffering from malaria.

Neutrophilia was present in 29.14% of our patients suffering from falciparum malaria. This finding is much lower than the figure of 65.8% in *P. Vivax* and 48% in *P. falciparum* infection reported by another study.³⁰ Lymphopenia, in our study, was much lower in frequency than reported by Abro AH from Dubai where about half of the patients had this abnormality.²⁸

Some of the limitations of our study include single-center observation, in a specific population. Further multicenter studies of this kind with the involvement of different races and ethnicities need to be conducted to find the true prevalence of these hematological parameters.

CONCLUSION

The common hematological complications in patients suffering from malaria are Thrombocytopenia, anemia, Leukopenia, Neutrophilia, and Lymphopenia in decreasing order and these are some of the diagnostic markers of these conditions.

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CHEMICAL ANALYSIS OF DIFFERENT BRANDS OF BOTTLED WATER WITH WORLD HEALTH ORGANIZATION (WHO) STANDARDS

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ABSTRACT

Objective: To assess the quality and compare different brands of bottled drinking water with WHO standards.

Methods: This is a cross-sectional descriptive study conducted in Peshawar, Pakistan in 2022. 14 brands of bottled water were selected randomly by convenient sampling. Brands included were Aqua Divine, Aqua drink, Aqua Green, Aquafina, Nestle mineral water, Aqwah natural, Dasani, Hydrosip, Max 10 water, Muqattar, Truly, Tyrant Aqua, Dua, and Wah water. Two samples of each brand were taken and analyzed for physiochemical parameters, which included color, turbidity, taste, odor, and minerals such as calcium, total solids, nitrates, chloride, and sulphates. Comparison with WHO standards was done using one sample T-test using a one-sample t-test.

Results: According to our results, the pH values obtained were within the WHO range of 6.5-8.5. Chemical parameters such as calcium ranged between 10 mgs/L to 65 mgs/L (WHO level up to 300 mg/L, and Chloride concentration ranged from 20 to 156 mgs/L (WHO standard is 200 mg/L). Total solids were 500mg/L (WHO standard is up to 100mg/L), sulphates were 200 mg/L (WHO standard is up to 500mg/L and nitrates were not detected in any of the samples. Whereas physical properties such as color, odor, and turbidity were normal.

Conclusion: Our study concluded that the bottled drinking water of different brands available in Peshawar city is physiochemically fit for consumption as all the parameters tested were within the permissible limits of WHO.

Keywords: Bottled water, Drinking water, WHO water quality standards, Physiochemical parameters

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INTRODUCTION

In Nature, all living things depend on water for routine activities. In the microbial world, no microorganism can survive without water. ¹ Humans must have access to adequate, safe, and accessible supplies. Increasing access to clean water for drinking can have very positive effects on health. ² Social development is associated with water through its impacts on health. Lack of safe drinking water is the main cause of ill health in underdeveloped countries. Positive community health and well-being depends on safe water supply. ³

As per statistics from World Health Organization (WHO 2002), inadequate sanitation and unsafe water contribute to an estimated 1.7 million deaths globally and about 54.2 million disability-adjusted life years (DALYs) annually, with about 80% of children mortality being brought

on by diarrhea brought on by consuming tainted water. ⁴

With a fast-growing population and increasing urbanization in Pakistan, the need for fresh drinking water is increasing daily. There is no quality monitoring of Bottled water quality in developing nations (e.g., Ethiopia, Pakistan, etc.) for human consumption. In several parts of the country, bottled water plants have been established, indicating a rise in demand. ⁵ In Pakistan, increased public awareness of clean drinking water has encouraged the usage of bottled water, particularly in metropolitan areas. ⁶ Pakistan is ranked 80th among 122 countries in terms of drinking water quality. Only 20% of Pakistan's population is said to have availability of clean water to drink. However, the quality and safety of bottled water are in doubt, as many mineral water brands have been found to fall short of WHO and PSQCA criteria in microbiological and chemical tests. ⁷ The contents of bottled water are not strictly regulated, and the concentration listed on the labels may not be true. According to research conducted in Pakistan, around 52 percent of bottled water was unfit for human consumption. ⁸ Globally People drink about 13x1010 liters of bottled water during a year. In Pakistan, the use of bottled water increased from 5.9% to 9.5% in recent years. ⁹ Due to increased demand, there is also increasing concern regarding the quality of bottled mineral water. ^{10, 11}

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WHO had set up a specific concentration range for different chemical ingredients of bottled water, so every brand of bottled water should keep that range in mind to reach the standard and to be in the safe zone in light of health standards.^{12, 13} Essential chemicals i.e., Na, Ca, Nitrate, K, etc. are to be at a specific range for better health of human beings. Any concentration of the ingredients greater or less can cause adverse effects on health.^{14, 15} We focused on the comparison of the chemical ingredients concentration range of the most popular brands of bottled water according to WHO standards. Our study provided a new set of important information on different brands of bottled water in Peshawar city for health benefits. Our studies will provide people the important information about popular brands of bottled water consumed by them, and to choose those brands of water which are according to WHO standards.

MATERIALS AND METHODS

A cross-sectional descriptive design was set for the study. The study was approved by the Ethical review board of Khyber Medical College. The bottled water sample was collected from different shops across the city of Peshawar. Chemical analysis was done in the laboratory of the Community Medicine department, at Khyber Medical College. The sample size was calculated using the WHO formula, $N = Z^2 \times P [1-P] / d^2$. According to this formula, the sample size has to be 245. However, given the lack of many bottled water brands in Peshawar, such a huge sample size was not feasible. Our study included 14 brands, including multinational and local brands, 2 samples for each brand were collected making a total of 28 samples. Non-probability convenient sampling technique was used for the collection of samples. Common brands which are commonly used by people were included in the

study and unsealed water bottles were excluded. Each sample was 500ml in volume. Special care was taken to pick out samples that were of a fresh batch. Data was analyzed using SPSS software.

RESULTS

Physical Characteristics: The physical characteristics of the water including color, odor, taste, and turbidity were in the normal range according to the WHO standards. **Chemical Properties of different brands' bottled Water** The chemical properties which were analyzed included Chloride, Nitrate, Total solids, Calcium, and sulfate, and their concentration is shown in Table 1 below: According to PSQCA and WHO standards normal Ranges are:

1. PH.6.5
2. Chloride. 200mgs/L
3. T. Solid. 1000 mgs/L
4. Calcium. 300mg/l
5. Sulphate. 200mgs/L
6. Nitrates. 0.1mgs/L.

Table 1: Physical Properties of Mineral Water

Colour	Physical Parameter	Count	Percentage
	Normal	28	100%
Abnormal	0	0%	
Turbidity	Absent	28	100%
	Present	0	0%
Taste	Normal	28	100%
	Bad	0	0%
Odour	Absent	28	100%
	Present	0	0%

Table 2: Chemical properties of different brands of drinking water

Brands of bottled water	Chloride concentration mg/L	T. SOLIDS Mg/L	NitratesMg/L	Calcium Mg/L	Sulphate Mg/L
Aqua divine	140.00	250.00	Nil	50.00	54.00
Aqua drink	40.00	230.00	Nil	40.00	55.00
Aqua green	85.00	330.00	Nil	55.00	48.00
Aquafina	96.00	190.00	Nil	96.00	64.00
Aqwah natural	156.00	436.00	Nil	14.00	46.00
Dasani	20.00	190.00	Nil	140.00	10.00
Dua	126.00	275.00	Nil	15.00	40.00
Hydrosip	134.00	290.00	Nil	55.00	64.00
Max 10 water	136.00	440.00	Nil	18.00	58.00
Muqattar	140.00	426.00	Nil	50.00	65.00
Nestle pure life	90.00	205.00	Nil	25.00	45.00
Truly	148.00	316.00	Nil	46.00	42.00
Tynant aqua	132.00	320.00	Nil	50.00	63.00
Wah water	105.00	320.00	Nil	15.00	48.00

Table 3: Mean and standard deviation of minerals of all brands

Minerals	Normal range	Mean	Standard deviation
Chloride	200mg/l	104.36	37.74
Total solids	1000mg/l	293.04	83.12
Sulphates	200mg/l	45.07	33.40
Calcium	300mg/l	47.64	13.82

Table 4: One-sample T-test for comparison with WHO standards

Parameters	N	Test value	Std. deviation	Sig (2-tailed)	Mean Difference	95% Confidence interval	
						Lower	Upper
PH	28	6.5	.24527	.000	.96429	.8692	1.0594
Chloride	28	200	37.74399	.000	-95.64286	-110.2	-81.00
Calcium	28	300	13.81	.000	-252.3571	-257.7	-246.99
Total Solids	28	1000	83.119	.000	-706.964	-739.1	-674.7

The chemical properties of Our sample were according to PSQCA &WHO standards. Nitrate was not detected in any of the samples. Chloride concentration ranged from 20 to 156 (mgs/L) which is lower than 200 mgs/L (WHO standard). It is clear from the result that all the water samples have chloride concentrations within the permissible limit of WHO.

The value of calcium ranged between 10 mgs/L to 65 mg/L. The calcium concentration is less than WHO standard value for calcium (300mgs/L). Sulphate concentration ranged between 10 mgs/L and 140 mgs/L. Sulphate concentration is also within the normal limit according to WHO standard value for Sulphate (200mg/L).

DISCUSSION

The physiochemical characteristics of bottled water were found to be according to WHO standards in our study. A study was conducted in Saudi Arabia in which 21 different brands of locally produced bottled water were collected from a market in Riyadh. The concentrations of Ca, Total solids, and pH value were noted from the labels and then samples were analyzed for concentrations of these minerals in the laboratory. The mean level of Ca and pH was found to be higher than that mentioned on the label whereas the TDS was found to be lower than the mean mentioned on the label. While in our study concentrations mentioned on the label were the same as analyzed in the lab and were within the WHO range.¹⁶

A study was carried out in Wadi Al-Shati, Libya. Turbidity results ranged from 0.84 to 1.04 NTU, pH values ranged from 5.63 to 7.45, TDS values ranged from 28 to 303 mg/L, calcium values ranged from 0.4-6 mg/L, while chloride concentrations were 1.3 to 45 mg/L, nitrate was only 37 mg/L and sulfate concentrations were 0 to 73 mg/L. All these parameters' values were within the recommended WHO standards except pH. While in our study all the parameters complied with WHO standards.¹⁷

A study was carried out in Sudan, where the results when matched to drinking water standards set by WHO, the United States Environmental Protection Agency (EPA), the International Bottled Water Association (IBWA), and the Food and Drug Administration (FDA, all results were discovered to be within the appropriate ranges for acceptance as ours.¹⁸

A study looked into the physical and chemical properties of packed water available in Bangladesh's capital Dhaka. The investigated parameter values were discovered to be in the following ranges: pH (6.11-6.83), EC (38.3-492.1 S/cm), TDS (24.0-296.80 mg/L), DO (5.88-8.76 mg/L), TH (1.5-228.0 mg/L), Cl⁻ (0.23-2.70 mg/L), NO₃⁻ (0.11-2.98 mg/L), SO₄²⁻ (0.04-111 mg/L), Fe²⁺ (2.25- The results showed that all other parameter values were quite low and appeared to be within the WHO and Bangladesh Drinking Water Quality Standard (BDWQS) limit. This study's results were within alignment with our study's results.¹⁹

A study conducted in Lahore, Pakistan, compared various bottled water available in Lahore for commercial use. The results revealed a significant difference in quality. Data analysis revealed pH ranges of 7.35-7.95, turbidity 2.14-2.48 NTU, TDS 84-183 mg/L, calcium 16-40 mg/L, chloride 35-95 mg/L, sulphates 22-120 mg/L, nitrates 0.9-3.8 mg/L. Matching our study all the values were in the recommended WHO ranges⁽²⁰⁾

An important limitation of this study is the small sample size but a large sample size is needed so that all available brands are analyzed.

CONCLUSION

Our study concluded that the bottled drinking water of different brands available in Peshawar city is physiochemically fit for consumption as all the parameters tested were within the permissible limits of WHO.

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Ain HU: Data Collection

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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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A CASE REPORT - JACOB SYNDROME (45X/47XXY MOSAICISM)

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ABSTRACT

Objective: XYY syndrome is a rare chromosomal aneuploidy that affects males with an incidence of 1 in 1000. Males with this syndrome typically appear normal and have normal sexual responsiveness and fertility. However, they may be taller than average and have a variable risk of cognitive and behavioral deficits. Herein, we report a rare case of XYY aneuploidy presenting with ambiguous genitalia which was initially treated as congenital adrenal hyperplasia.

A 7-month-old infant was referred by a pediatrician to the Endocrine Out-patients' department with complaints of ambiguous genitalia by his parents and undescended testes after taking the consent detailed history was taken and a previous medical record was reviewed followed by a detailed examination done. As the suspicion of the chromosomal defect was raised, the patient was advised to do karyotyping. The karyotyping counted 30 cells: 21 cells showed 45 while 09 cells showed 47 chromosomes. thus, the diagnosis of Jacobs syndrome was made and confirmed. Most cases of 47XYY syndrome are not inherited but arise as a random event, mostly by paternal disjunction at meiosis II. However, most patients live a normal life, only requiring conservative management of their behavioral deficits.

Keywords: 47XYY, Chromosomes abnormality, Karyotyping, Aneuploidy, Non-disjunction

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INTRODUCTION

Chromosomes are cells' structures containing DNA and many genes. There are 23 pairs of chromosomes in each cell in the human body, with 22 pairs known as autosomes and one pair determining sex as sex chromosomes. In a male, this typically includes one X chromosome and one Y chromosome (XY). XYY syndrome or Jacobs syndrome is a rare genetic condition that occurs when a male has an extra copy of Y chromosomes in each of their cells (XYY).

Jacob syndrome, also known as 47 XYY syndrome, is a rare genetic condition that occurs in about 1 out of 1000 male babies. It comes under "sex chromosome trisomies". The discovery of the condition dates back to the 1960s.¹ Parental nondisjunction at meiosis II results in an extra Y chromosome, producing a 47 XYY karyotype in the affected offspring. 46XY/47XYY mosaics from parental nondisjunction during cell division after post-zygotic meiosis can result in the addition of the extra Y chromosome in early embryonic development.²

The median age of diagnosis of Jacob syndrome is approximately 17 years. Many patients present with infertility concerns in adulthood. Patients' presentation varies greatly, with a few patients having phenotypic concerns, including macroorchidism, tall stature, macrocephaly, and hypertelorism. Moreover, conditions like asthma, autism spectrum disorders, and seizures prevail more in such patients.¹ Although 1 in 1000 boys have the karyotype 47XYY, there is a paucity of information about the phenotype, and approximately 85% or more of males with XYY are never diagnosed.⁴

In hypospadias, karyotypes are normal in most cases. However, many types of chromosomal abnormalities in hypospadias have been reported in the literature: 47 chromosomes with XXY sex complement.⁷

Here, we report one rare case of Jacob syndrome with 45X/47XYY mosaicism with ambiguous genitalia with hypospadias in a 7-month-old infant.

Case history A 7-month-old infant was referred by a pediatrician to Endocrine OPD with a complaint of ambiguous genitalia and left undescended testis. Detailed history revealed that the child was born as a result of non-consanguineous marriage, at 35 weeks of gestation in a public sector health institute through spontaneous vaginal delivery with a birth weight of 3kg and an APGAR score of 9. The pregnancy was complicated due to delayed fertility for 3 years and the use of herbal medicines by the mother. Paternal age was 23 and maternal age was 21 years at the time of conception.

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The general physical appearance of the baby was normal with his height at the 50th centile and weight below the 5th centile in the CDC chart. Examination of genitalia shows penoscrotal hypospadias (grade 3) and cryptorchidism. There was no clinodactyly, hypotonia, hypertelorism, asthma, and seizure disorder.

At 1 month's age, Ultrasound showed hydrocoele and serology showed a serum 17-OH- progesterone level of 7.30 (0.07-0.7) with normal serum electrolytes. Inguinal scrotal ultrasound shows left undescended testes with inguinal hernia. He was started on cortisol 2mg and fludrocortisone for a presumptive diagnosis of congenital adrenal hyperplasia. Then Karyotyping was advised which showed "45X [21]/47XYY [09], 30 cells were counted; 21 cells showed 45 while 09 cells showed 47 chromosomes, showing a mosaic pattern. (Fig 01)

The diagnosis of Jacob syndrome was made and confirmed upon karyotyping, after that cortisol and fludrocortisone were stopped, and serum 17-OH- progesterone was repeated which was reported as <0.03 (0.03-0.90) with normal serum electrolytes.

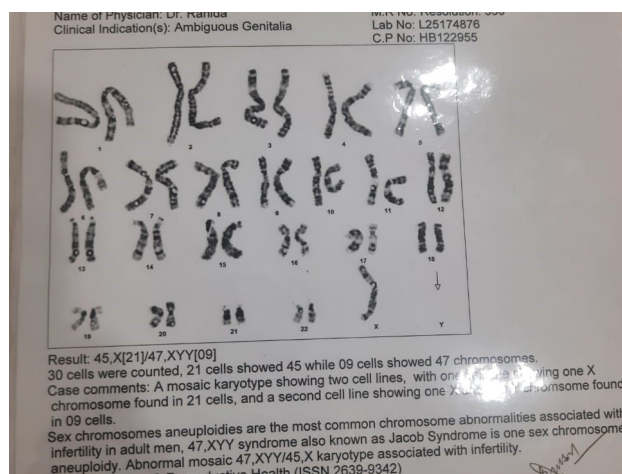


Fig 1: Karyotyping report

DISCUSSION

Jacob syndrome, also known as 47 XYY syndrome occurs in about 1 out of 1000 male children.¹ Diagnosis is often delayed, with the average age of diagnosis being approximately 17 years.³ Jacob syndrome commonly arises during meiosis II in the father during which an extra Y chromosome is attributed to the resultant sperm. Another form of this condition 46XY/47XYY arises during early embryonic development.² Disease symptoms might be quite vague during childhood, however, men with Jacobs syndrome exhibit hypotonia, macrocephaly, tall stature, clinodactyly, and hypertelorism.²

Probing into the history of a patient with Jacobs syndrome may reveal mild learning disabilities and behavioral disturbances as patients may have had delayed speech onset as children, attention deficit hyperactivity

disorder (ADHD), and autism spectrum disorder (ASD). Moreover, asthma, seizure disorder, and tremors are also common. Males in adulthood may present with a history of infertility and/or decreased libido. Atrophic testicles may be observed. In addition to this, about half of the patients may manifest flat feet and dental abnormalities such as underbites and macrodontia.⁴

Diagnosis of Jacobs syndrome may occur in the early prenatal period by a technique known as non-invasive prenatal testing using cell-free fetal DNA which has high accuracy for detecting sex chromosomes aneuploidy. Amniocentesis is a more invasive method of prenatal diagnosis but is not in use anymore.⁵ After the birth, diagnosis is made using karyotype analysis from the patient's blood sample. 47XYY males who are being seen for infertility should undergo semen analysis, testicular ultrasound, and blood work to measure levels of reproductive hormones.

Families who receive prenatal diagnosis should receive genetic counseling to help them understand the disease. The treatment of this syndrome is supportive and involves behavioral and speech modification and appropriate medical treatment for any co-morbid conditions such as asthma and seizures. Men with infertility should undergo comprehensive evaluation from a qualified reproductive endocrinologist.

According to studies, patients with Jacob syndrome live 10 years less than their age-matched peers who do not have the disease.² But many men with Jacob syndrome go on to live a normal life.

CONCLUSION

XYY syndrome patients very often live nearly normal lives with the condition. Patients should be reassured and counseled. The fact that up to 85% of these cases go undiagnosed is a testament to the mild symptoms but our patients presented at such a young age with ambiguous genitalia and hypospadias. Patients should also be educated regarding their fertility status and future reproductive. Management of this disease requires collaboration and effective communication with the patient's interprofessional team. Karyotyping is important in the workup of ambiguous genitalia and hypospadias as it guides toward proper diagnosis and management.

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INSTRUCTIONS FOR AUTHORS

Manuscript Submission

The Journal of Medical Sciences follows the uniform requirements for manuscripts submitted to Biomedical Journals as approved by the International Committee of Medical journal Editors as updated in Oct. 2004 and available at www.icmje.org. Manuscripts are accepted for consideration if neither the article nor any of its contents has been or will be published or submitted elsewhere before appearing in Journal of Medical Sciences.

Manuscript Formatting Guideline

While submitting the document on JMS website, the authors are advised to follow the following guidelines:

- 1) **Always use MS Word format. Don't send any tables in JPG format.**
- 2) **Always use Calibri fonts.**
- 3) **use 12 size fonts.**
- 4) **Double space the manuscript.**
- 5) **Justify the margins**
- 6) **Keep the main headings bold and in size 14.**
- 7) **No extra spaces between paragraphs.**
- 8) **Black text on white background only.**

Title and Authors Name

The first page of the manuscript must give the title of the article that should be concise and descriptive. Also include on this page the name(s) of the author(s), highest academic degrees, the name of the department and institution in which the work was done, the institutional affiliation of each author, and the name and address of the author to whom reprint requests should be addressed.

Any grant/support that requires acknowledgement should be mentioned on this page. Abstract's word count and article (excluding references) word count should appear at the bottom of this page.

Abstracts

Abstract must not exceed 250 words and the **article must not exceed 3000 words** (excluding references). Articles exceeding the word count or not

conforming to "Instructions for authors" will be returned without processing. It is further emphasized that results must not be duplicated in text/tables/figures/graphs.

Key words

Three to 10 key words or short phrases should be added to the bottom of the abstract page. Terms from the Medical subject headings (MeSH) list of Index Medicus should be used.

Introduction, Material and Methods, Results, Discussion, Conclusion, Acknowledgments and references should all start on a separate page from page 03 onwards.

References

The total number of references in an original article must not exceed 40 while in the review articles maximum limit is 100. References must be written double-spaced and numbered as they are cited in the text.

The references must be written in Vancouver style. The style for all the types of references is given in the "Uniform requirements for manuscripts submitted to biomedical journals" at the website of International Committee of medical journal editors. www.icmje.org

List all authors when there are six or fewer. If there are more than six, list the first six followed by "et al".

Tables and Illustrations

Each of the tables and illustrations should be on a separate page, must have a title and be on a double space.

Figures should be professionally designed. Symbols, lettering and numbering should be clear and large enough to remain legible after the figure has been reduced to fit the width of a single column. The back of each figure should include the sequence number, the name of the author and the proper orientation (e.g. "top"). If photographs of patients are used, either the subjects should be unidentifiable or their pictures must be accompanied by written permission to use the figure. Duplication of results given in tables and into figures must be avoided.

Ethics

When reporting experiments on human subjects, indicate whether the procedures followed were in accordance with the ethical standards of the responsible committee on human experimentation (Institutional or regional) and with the Helsinki Declaration of 1975, as revised in 1983. Do not use patients names, initials, or hospital numbers especially in illustrative material. When reporting experiments on

animals, indicate whether the institution's or a national research council is guide for, or any national law on the case and use of laboratory animals was followed. No article will be entertained without prior ethical approval from ethics committee/ board.

Units of Measurements

Authors should express all measurements in conventional units, with System International (SI) units given in parentheses throughout the text.

Abbreviations

Except for units of measurements abbreviations are discouraged. The first time an abbreviation appears it should be preceded by the words for which it stands. However title and abstract must not contain any abbreviation.

Statistics

Describe statistical methods with enough detail to enable a knowledgeable reader with access to the original data to verify the reported results. When possible quantify findings and present them with appropriate indicators of measurements error or uncertainty (such as confidence intervals). Avoid relying solely on statistical hypothesis testing, such as the use of p values, which fails to convey important quantitative information. Discuss the eligibility of experimental subjects. Describe the methods for and success of any binding of observations. Report complications of treatment. Give numbers of observations. Report losses to observation (such as dropouts from a clinical trial). Specify any computer programs used.

Put a general description of methods in the Methods Section. When data is summarised in the Results Section, specify the statistical methods used to analyse it. Restrict tables and figures to those needed to explain the argument of the paper and to assess its support avoid non technical uses of technical terms in statistics, such as "random" (which implies a randomizing device) "normal" significant, "correlation", and sample.

Define statistical terms, abbreviations, and most symbols.

Drug Names

Only generic names should be used.

Permissions

Materials taken from other sources must be accompanied by a written statement from both author an publisher giving permission to the journal for reproduction.

Case Report

Short report of cases, clinical experience, drug trials or adverse effects may be submitted. They must not exceed 500 words, 5 bibliographic references and one table or illustration. The report must contain genuinely new information. The format is title, abstract, introduction, case report, discussion, references.

Review and Action

All articles on receipt for publication are immediately acknowledged but that does not imply acceptance for publication.

Submitted manuscripts are reviewed for originality, relevance, statistical methods, significance, adequacy of documentation, reader interest and composition. Manuscripts not submitted according to the instructions will be returned to the author for correction prior to beginning the peer review process. All manuscripts considered suitable for review are evaluated by a minimum of two members of editorial board. The manuscripts is then sent to two or more than two reviewers who may take a couple of months time to review the manuscript. The ultimate authority to accept or reject the manuscript rests with the Editor.

Revised manuscripts are judged on the adequacy of responses to suggestions and criticisms made during the initial review. All accepted manuscripts are subject to editing for scientific accuracy and clarity by the office of the Editor. When the manuscripts is deemed fit for publication, letter of acceptance is issued to the author. No article is rejected unless similar comments are received from at least two reviewers.

FOR DETAILS, SEE OUR EDITORIAL POLICY IN THE NEXT SECTIONS

EDITORIAL POLICY

THE EDITORIAL POLICY OF THE JOURNAL OF MEDICAL SCIENCES (JMS), KHYBER MEDICAL COLLEGE, PESHAWAR

Overview

This document highlights the mission, objectives, and editorial policy of JMS regarding the publication process by adhering to the guidelines of COPE (Committee in Publication Ethics) and ICMJE (International Committee of Medical Journals Editors). Each component of the editorial policy is explained in the next sections.

A MISSION OF JMS

To publish relevant, scientific, and accessible material to help medical students and health professionals in their practice, teaching and learning, and career development

B OBJECTIVES OF JMS

- a. To publish clinical, epidemiological, public health, educational, translational, and allied sciences research to enable scientists, clinicians, and researchers to learn about developments and innovations in these disciplines
- b. To publish high-quality descriptive and experimental research, review articles, editorials, and case reports enhancing the understanding of the scientific community regarding clinical practice and education
- c. To provide a platform for the scientific community in promoting their career development through publishing quality research

C EDITORIAL POLICY

1 *Open access*

JMS is an Open access scholarly literature source that is free of charge and often carries less restrictive copyright and licensing barriers than traditionally published works, for both the users and the authors. However, it complies with well-established peer review processes

and tries to maintain high publishing standards.

2 *Peer review process*

The review process of JMS is following a “triage approach”. Upon submission of a manuscript, either online or physical, the document undergoes a preliminary open (un-blinded) review in the chief editor’s office. The document is either accepted for further review, sent for revision back to the authors, or rejected at that time. Further review of JMS follows a blinded approach, where the article is sent to 2 reviewers, local and international reviewers. During this process, all the relevant information about the authors and reviewers is kept confidential. However, we encourage sharing reviewers’ comments with co-reviewers of the same paper in a blinded manner, so reviewers can learn from each other in the review process. We also encourage the readers to send us the post-publication reviews about research work in the form of letters to the editors, which are then published and shared with the authors of relevant articles. The editorial board has the authority to retract an article if a serious violation of credibility or quality of research is found after the article is published.

The journal is under no obligation to send submitted manuscripts for review, and under no obligation to follow reviewer recommendations, favorable or negative at all times. The editor of a journal is ultimately responsible for the selection of all its content, and editorial decisions may be taken on issues unrelated to the quality of a manuscript, such as suitability for the journal. An editor can reject any article at any time before publication, including after acceptance if concerns arise about the integrity of the work.

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 tele-conference, 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.

